



Competitive and Sustainable Growth Programme

CIVITAS
Cleaner and better transport in cities

VIVALDI PROJECT GRD1–2001-40060
VISIONARY & VIBRANT ACTIONS THROUGH LOCAL
TRANSPORT DEMONSTRATION INITIATIVES

Aalborg • Bremen • Bristol • Kaunas • Nantes



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TABLE OF CONTENTS

1 EXECUTIVE PUBLISHABLE SUMMARY.....	4
2 OBJECTIVES OF THE PROJECT.....	6
2.1 Project Goal and Approach.....	6
2.2 Original Objectives versus Actual Measures.....	7
2.3 Environmental Improvement.....	9
2.4 Job Creation.....	9
2.5 Integration and Quality of Life.....	10
3 SCIENTIFIC AND TECHNICAL RESULTS.....	11
3.1 Results from the Horizontal Workpackages.....	11
3.1.1 Project Management.....	11
3.1.2 Political Issues.....	14
3.1.3 Evaluation.....	16
3.1.4 Exploitation and Dissemination.....	17
3.2 Results from the Demonstration Cities:.....	20
3.2.1 Aalborg.....	20
3.2.2 Bremen.....	25
3.2.3 Bristol.....	40
3.2.4 Kaunas.....	64
3.2.5 Nantes.....	71
4 USE OF RESOURCES.....	90
4.1 Use of Person Resources.....	90
4.2 Use of Financial Resources.....	91
4.2.1 Value for Money.....	92
5 LIST OF DELIVERABLES.....	93
6 RESULTS AND CONCLUSIONS.....	94
6.1 Exploitation of Results.....	94
6.2 Up-Scaling and Dissemination.....	95
6.3 Views on VIVALDI's Implementation and the Impact on CIVITAS.....	98
6.3.1 Project Co-ordinator: Barbara Davies, Bristol City Council.....	98
6.3.2 Aalborg: Kurt Markworth.....	98
6.3.3 Bremen: Michael Glotz-Richter.....	98
6.3.4 Bristol: Pete Davis.....	98
6.3.5 Kaunas: James McGeever.....	99
6.3.6 Nantes: Olivier Sorin.....	99
7 REFERENCES.....	100
7.1 Follow-up Projects and Events.....	100
7.2 Glossary: Short Names of Partners.....	101
7.3 Glossary: General.....	102
8 ANNEXES.....	104

1 EXECUTIVE PUBLISHABLE SUMMARY

The VIVALDI project was developed to address the objective of “increasing the urban transport system’s sustainability and efficiency through radical strategies for Clean Urban Transport” (CIVITAS). The project demonstrated an integrated package of innovative transport measures in five EU cities (Aalborg, Bremen, Bristol, Kaunas, and Nantes), and assessed their contribution to improving the four key urban policy goals of urban vitality and economic success, social inclusion, health and well being, and sustainability (please refer to Chapter 2 for further details).

The project was divided into 12 workpackages, four to co-ordinate the overall work (described in Section 3.1), and eight to manage the implementation of the clean urban transport measures, designed to match the policy strategies defined by CIVITAS:

- New forms of vehicle use
- Stimulation of collective modes
- Demand management
- Information services
- Goods distribution
- Clean vehicles
- Mobility management
- Access management

Section 3.2 of this report details some of the 69 key measures carried out at the 5 sites, and their integration within the overall CIVITAS policy strategies and a number of locally defined “integrated packages”. Examples include:



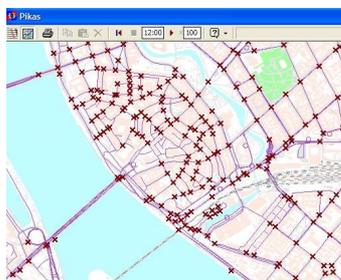
Travel info terminal, Aalborg



Car sharing vehicles, Bremen



Freight consolidation, Bristol



PT scheduling, Kaunas



CNG bus, Nantes

This report also looks at the VIVALDI project’s use of resources (Chapter 4), both in terms of financial budgets and personnel use. During the implementation and evaluation of the project measures, around 98% of the financial resources were expended and a little over the projected total of person months.

In Chapter 6, alongside how the work of VIVALDI will be up-scaled and disseminated by the sites in the future, each of the site managers gives a personal view of the success of the project in their city, and how this fits with the aims of CIVITAS at a European level. Chapter 7 contains a summary of how the networking opportunities offered by the project have led to the sites progressing further projects and bids. Appended as annexes are the 32 measure factsheets giving overview information on some of the key measures implemented through VIVALDI.

2 OBJECTIVES OF THE PROJECT

The VIVALDI project was developed in response to the Growth 2001 call for proposals, addressing the objectives of KA2.1.3/8 “increasing the urban transport system’s sustainability and efficiency through radical strategies for Clean Urban Transport” (CIVITAS). It also addresses the objectives of the ENERGIE5-T1 call for proposals, targeted action D “Rational use of Energy – Clean Urban Transport”.

2.1 Project Goal and Approach

The VIVALDI project sought to demonstrate an integrated package of innovative transport strategies and measures in five EU cities, and to assess their contribution to improving four key urban policy goals:

Urban Vitality and Economic Success

The vitality of urban areas is dependent upon economic development to drive investment in jobs and services, which subsequently multiplies through the urban economy and improves the quality of life for all. Across the demonstration sites, there are a number of policy objectives linked to the development of transport measures: access to employment, new investment and job creation, regeneration, and environmental improvement.

Social Inclusion

Areas of social exclusion can suffer from high crime levels, poor health and housing, and sub-standard education facilities. People in these areas are often on low incomes and cannot access ‘everyday’ services, they are also more likely to be reliant upon public transport. Improved access to transport can play a large part in improving social inclusion. Specific objectives for social inclusion include: improving access to transport for women, disabled people, children and older people, ethnic minorities and those with low incomes; improving neighbourhoods and returning streets to people; and assisting community transport initiatives.

Health and Well Being

For some groups of people with greater health needs, air quality and access to employment and services are poor. Affordable public transport, higher levels of physical activity, accident prevention, and improvements to air quality are particularly needed in tackling health inequalities. Key health objectives are: psychological health and well being; physical activity; reducing air pollution; and reducing road casualties.

Sustainability

Sustainability embraces a range of environmental objectives as well as linking the requirements for economic, social, and health policies for today and for future generations. The key aspects of sustainability are: air quality, energy use and climate change (reductions in fossil fuel use and subsequent CO₂ emissions and active promotion of a sustainable energy future), noise, and urban spaces.

Table 2.1 illustrates how the urban policy goals described above were designed to meet the challenges of the CIVITAS initiative’s eight policy strategies:

Table 2.1 CIVITAS and VIVALDI Aims

CIVITAS policy strategies	VIVALDI urban policy goals
New forms of vehicle use and ownership, and less car-intensive lifestyles	Social inclusion Sustainability
Stimulation of collective passenger transport and improved quality of service	Urban vitality Social inclusion Sustainability
Demand management and revenue-raising strategies based upon integrated pricing	Urban vitality Sustainability
Transport management systems and related information services	Social inclusion Sustainability
New concepts for the distribution of goods	Urban vitality Social inclusion Sustainability
Clean public and private vehicle fleets using 'alternative fuels'	Health and well being Sustainability
Measures for managing mobility demand, walking and cycling and integrated planning	Health and well being Sustainability
Access management to inner city and sensitive zones	Urban vitality Sustainability

2.2 Original Objectives versus Actual Measures

Alongside the four horizontal workpackages dealing with management aspects, the work of the VIVALDI project in each of the demonstration cities was divided into eight workpackages that matched the CIVITAS policy strategies. Table 2.2, below, illustrates how headline targets were set in each of these workpackages at the outset of the project, and how successful the project has been in attaining them.

The crosscutting nature of the work in VIVALDI, and the bundling of measures into local integrated packages at each site, has made the overall comparison of the VIVALDI policy goals against the CIVITAS strategies quite difficult. However, Table 2.2 shows that an example from at least one city can be provided to show how VIVALDI has met, and regularly surpassed, the targets set in 2002.

Table 2.2 How VIVALDI met the original headline targets

CIVITAS Strategy	Headline Targets	VIVALDI Achievements
Clean vehicles	<ol style="list-style-type: none"> 1. 250 clean vehicles in use in the sites 2. Reduce energy use and CO₂ by 8% in demonstration area 3. Meet national air quality objectives 	<p>304 CNG cars in Bremen, 214 various in Bristol, and 191 CNG buses in Nantes 1% reduction in total fuel use Aalborg, 2,000t CO₂ saving from CNG buses (Nantes) 50% reduction in NO_x in city centre of Kaunas</p>
Access management	<ol style="list-style-type: none"> 1. Reduce car traffic in managed area by 10% 2. Increase economic activity in area by 5% 3. Increase employment opportunities by 5% 4. Reduce parking space in area by 10% 	<p>10% reduction through TravelSmart (Bristol), 40% reduction on RN801 (Nantes) Up to 1,000 Euros daily savings from bus priority in Aalborg Too difficult to measure as direct result of project 300 places removed on Nantes campus</p>
Pricing strategies	<ol style="list-style-type: none"> 1. Reduce mode share for cars by 5% 	<p>10% reduction in car trips through TravelSmart (Bristol)</p>
Stimulation of collective modes	<ol style="list-style-type: none"> 1. Increase patronage on key corridors by 20% 2. Increase access to PT system 3. Reduce transit time from urban fringes to centre by 15% 4. To obtain a modal shift for students in the Nantes demonstration zones doubling the use of public transport and two wheelers. 	<p>11% increase on Showcase (Bristol), 7% increase on Chronobus (Nantes) 80% thought accessibility of new 500 service in Bristol improved 4% time savings in Aalborg, 7-11 minute savings on Nantes Chronobus Students using cars to campus from 22% to 17%, and 311 Vélocampus rentals</p>
New forms of vehicle use and ownership	<ol style="list-style-type: none"> 1. Increase number of car share sites by 5 2. All new car share sites with clean vehicles 3. Regain urban space by replacing about 1,000 private cars 	<p>7 more in Aalborg, 9 in Bremen, and 8 in Bristol 2 dual-fuel vehicles introduced in Bristol 313 cars removed in Bremen, 70 in Bristol</p>
Goods distribution	<ol style="list-style-type: none"> 1. Reduce lorry movements by 5% 2. Reduce lorry loading and access times by 10% 	<p>50% mileage reduction to participating retailers through consolidation (Bristol) 100% satisfaction ratings with deliveries</p>
Soft measures	<ol style="list-style-type: none"> 1. Increase cycle trips by 30% 2. Increase walking trips by 10% 3. Travel plans in all organisation in target areas 4. Decrease road accidents by 20% 	<p>30% increase through TravelSmart (Bristol) 15% increase through TravelSmart (Bristol) 16 companies with 16,000 employees active in Nantes 55% improvement of perception of safety in Bristol Home Zone</p>
Telematics	<ol style="list-style-type: none"> 1. Real-time information on all quality corridors 2. Increase number accessing PT information by 50% 3. Electronic payment 40% of all fares 4. 100% increase in DRTS trips 	<p>RTI on Showcase bus stops and Internet (Bristol) 24,000 monthly hits on Aalborg info kiosks, 32% more enquiries in Bremen ITIC BOB card (Bremen) resulted in 6% modal shift, 45% support for e-ticketing (Kaunas) 145% increase in use in new service area in Bristol</p>

2.3 Environmental Improvement

Through the reduction of motorised traffic and a measurable shift to environmentally friendly modes of transport, VIVALDI has led to a substantial reduction in the emission of air pollutants and noise.

As reduction in the demand for travel is seen as the “most effective and sustainable solution to reducing the growth in emissions”, VIVALDI fully covers that goal. The integration of car sharing into urban development, for example, is an innovative approach and not only has impacts in terms of shift in mobility patterns but also ensures that the urban infrastructure will be used more efficiently.

Sustainability embraces a range of environmental objectives as well as linking the requirements for economic, social, and health policies for today and for future generations. The strategies and measures developed and implemented by the cities are promoting the trend of more sustainable policy. Examples include the development of Home Zones (Bristol), and travel planning in Bristol and Nantes.

One of the biggest areas of implementation has been the introduction of clean-fuelled vehicles in many of the cities, including CNG cars in Bremen, electric cars and LPG vehicles in Bristol, and a fleet of CNG buses in Nantes.

2.4 Job Creation

VIVALDI placed employment, education, and training of primary importance to maximise the output of the project not only for the economic and social well being of the cities but also for all European urban areas. The whole employment life cycle has been considered including:

- Job search and transport accessibility to job markets for different social groups, specifically targeting the position of socially excluded groups.
- Commuting issues for job choice, job turnover, job satisfaction, and implications for transport policy.
- Job creation and stability – specifically the prospects for employment for people with different abilities and skills; identifying further education and training needs and special requirements.

One of the project objectives was social inclusion. Social inclusion is promoted through equal access to employment opportunities, training facilities, retail outlets, and leisure facilities. The development of collective modes and new forms of vehicle use has supported greater social inclusion. Examples include car sharing and car club expansion and promotion, integration with new development and interchange improvement (Aalborg, Bremen, and Bristol); a car-pooling website developed in Nantes; and new taxi and microbus services in Bristol and Kaunas. Telematics for access to information has been promoted through new kiosks (Aalborg and Bristol) and info centres. Real-time information for bus users was developed at several sites, both at bus stop locations but also audio transmissions on buses in Bristol and through mobile phones in Nantes.

2.5 Integration and Quality of Life

The integration and added value of VIVALDI measures in city centres, inner city areas, residential and commercial suburbs, and the urban fringe has measurable positive impacts on the quality of life of citizens. It promotes best practice models as a stimulus for other European cities, supported by project guidelines explaining how the benefits were achieved.

The transport system promotes the health and personal security of citizens. New fuelled vehicles, together with new fuelling stations and complementary measures, are improving the environment. The promotion and improvements for soft modes have been implemented through a range of measures, such as walking and cycling promotion for improved health and well being. This includes traffic management measures in Bremen, the Cycle Resource Centre in Bristol, and bike parking and rental on the university campus in Nantes.

3 SCIENTIFIC AND TECHNICAL RESULTS

This section constitutes the main part of the report, as it covers in detail the key “on the ground” delivery of the research approach and work performed in each city. In advance of this, an overview will be provided of the horizontal workpackages that were used to manage and co-ordinate the work of the consortium across Europe.

As part of the CIVITAS initiative, each of the VIVALDI cities attended one or more CIVITAS Forum events (for more information on this, see Section 3.1.2). Each year, awards are made by the CIVITAS Forum in a number of key areas – VIVALDI cities have won on three occasions:

Award on New Mobility Culture Leadership, Aalborg, 2004

Award for Implementing Sustainable Transport Policies, Kaunas, 2005

Award for CIVITAS City of the Year, Bremen, 2005

3.1 Results from the Horizontal Workpackages

3.1.1 Project Management

Management of the VIVALDI project was divided into Administrative and Financial Co-ordination and Scientific Co-ordination. The former task was carried out by Bristol City Council, the latter by UCN and TRITEL at the Nantes site. This was found to be a highly efficient way of managing a project with the huge scale of VIVALDI, allowing the necessary, but time-consuming, administrative management and reporting to the Commission not to detract from the scientific co-ordination at a project level. Each site was managed by a local site manager, through whom all communication was passed.

Bristol City Council, as Administrative and Financial Co-ordinators, were responsible for a number of key project roles, managed through a Project Office:

- Being the conduit for all communication between partners and the Commission.
- Collating information from partners to produce Progress Reports at the end of each year, and Management Reports each 6 months in-between.
- Managing the process of producing Cost Statements to be submitted with each PR, then circulating the necessary payment to partners once it had been received from the Commission.
- Quality control, editing, production, and submission of all deliverables.
- Dealing with any *ad hoc* management issues that may arise, such as the production of the documentation to request a contract amendment.
- Arranging, in association with the host city, all consortium meetings (held every 6 months).

The role of the Scientific Co-ordinator was significantly different, covering the following key roles:

- Monitoring and maintaining a record of the status of the implementation measures across the project.

- Keeping in close touch with the evaluation and dissemination managers to ensure that a consistent and up-to-date reflection of the project's progress was given in all promotional material.
- Liaising, in association with the evaluation manager, with METEOR, the Accompanying Measure for all CIVITAS I projects.
- Producing the key scientific deliverables for the project: the first Implementation Report, the implementation templates appended to the Evaluation Results Report (in place of a separate second Implementation Report), and the Technology Implementation Plan.

As well as regular communication between partners, site managers, and the Project Office, the management of the consortium as a whole was held together by a Project Management Board. This group, consisting of all site managers and any partner wishing to attend, met every 6 months in one of the cities. Not only did this ensure that any important project issues could be discussed at length, but the PMB meetings provided the opportunity to introduce guest speakers at workshop events, enabled a trusting and confident rapport to develop among all partners, and allowed for the development of a friendly, social group. All of these events actively encouraged the participation of partners in the project, producing better outputs as a result.



Figure 3.1a Consortium Meeting



Figure 3.1b The VIVALDI Football Match

Alongside the physical introduction of innovative new transport measures in each VIVALDI city, and the associated research that will allow others to be deployed in the future, the close personal and professional relationships that have grown through participation in the project cannot be underestimated. In a questionnaire distributed in advance of the final PMB meeting in Bremen in January 2006, the views of partners on the meetings were sought; here are some of the responses:

- “There was the opportunity to share experiences with experts and with other cities at a similar stage of development”
- “The project provided the chance to work with leaders in the field”
- “VIVALDI created useful partnership/co-operation that will extend beyond the lifetime of the project itself”
- “The informal elements of the project meetings were useful”

These responses clearly demonstrate the impact that partnership in the VIVALDI consortium has had for all members. Each site manager provides the following comment:

Kurt Markworth, Aalborg: “A great pleasure and challenge working together with leading cities in Europe concerning sustainability and environmental impact of transport”

Michael Glotz-Richter, Bremen “We have gained support for a new mobility culture through VIVALDI – it has been very important that citizens and decision-makers understand that we tackle a structural problem of cities in Europe in general – and that cooperation with other cities fertilises the development also in our own city.”

Pete Davis, Bristol: “The VIVALDI project has provided an excellent opportunity to share experiences and learn from other European cities in implementing a range of transport initiatives which have made Bristol a better place to live, work, and visit”

James McGeever, Kaunas: “A higher profile for Kaunas city on the European level as well as a much more in-depth and interactive relationship with many other major European cities”

Olivier Sorin, Nantes: “I have a great benefit from having participated to the project, by learning how to implement a European project, exchanging with colleagues from many countries, and discovering interesting initiatives on transport measures”

The performance of a relatively disparate group of 21 organisations in 5 cities could be very hard to quantify. However, the VIVALDI team can be seen to have been highly effective through reading Section 3.2, in which the implementation results of some 271 measures are summarised. On top of this, the list of deliverables provided in Chapter 5, with date of delivery and acceptance by the European Commission, shows that the key outputs of the project were largely prepared in time and to a high quality level. As well as this, each progress and management report was approved on its first delivery, and the associated payments made to the project co-ordinators for distribution.

For further information on the management, or indeed any other aspect, of VIVALDI, please contact:

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3.1.2 Political Issues

The active involvement of politicians has been one of the key achievements of the VIVALDI project, and one that will have a significantly lasting affect. The Political Advisory Board (PAB) was established in order to encourage the input and experience of politicians in the project, and met 3 times in:

1. April 2004, Brussels
2. November 2004, Rotterdam
3. September 2005, Bristol

Each of the politicians involved in the third PAB meeting in Bristol in 2005 provided a statement of what participation in the project has meant to them and their city.

Aalborg

Henrik Thomsen; Alderman

Aalborg has had great benefit from participating in the VIVALDI project from where we have exchanged experiences with other European cities. Our local approach to the public transport system has been put into perspective, which has led to better results.

Bremen

Kristine Kramer; Deputy Minister for Construction, Environment and Transport

All cities Europe face similar challenges. VIVALDI is an ideal platform to exchange experiences and to learn from each other. As a member of VIVALDI, we are able to better express our common interests at a European level than any city could do on its own.

Bristol

Helen Holland; Leader of the Labour Group

It has been great to know that other cities across Europe have been finding similar problems and working out their own solutions with their partners, too. Being able to go and see what people in Europe are doing, and how their politicians deal with shared problems, taking leadership about these issues in their cities, has all been a great benefit to Bristol.

Kaunas

Eligijus Dzežulskis-Duonys; Deputy Chair, Kaunas City Council Transport Commission

For Kaunas, perhaps the most important thing about working on European Union projects is the ability to develop clear, practical, and extremely useful relationships with major European cities. The VIVALDI partnership has clearly helped Kaunas to not only share experience of other cities but also to promote our own achievements as a new member state.

Nantes

Camille Durand; First Vice-President of Nantes Urban Métropole

Twenty years ago, the authorities in Nantes decided to invest in a modern tram system as they were convinced that mobility was going to become a major development issue. The key issues motivating our decision were clean energy and access restriction. Through the CIVITAS programme, the exchange of experiences with other European

cities and the financial support from the European Commission have been key factors in helping us propose a harmonious future for the citizens of Nantes.

At each site, political attendance at launches of VIVALDI measures was commonplace, and each city enjoyed political representation at the CIVITAS Policy Advisory Committee (PAC), which was chaired by Councillor Helen Holland of Bristol City Council for 2 years.

The PAC, usually convening at the same time as the CIVITAS Forum, is a high-profile group that allows VIVALDI politicians to share their experiences with a wider audience and to provide input to PAC Statements (political comment on key European transport issues of the day, of which there have been 3). In November 2005 in Nantes, European Transport Commission Jacques Barrot attended the PAC to hear from the politicians present. Further PAC meetings will be held as the CIVITAS Initiative continues; the six PAC meeting held during the lifetime of VIVALDI are as follows:

1. June 2003, Brussels
2. October 2003, Graz
3. March 2004, Brussels
4. November 2004, Rotterdam
5. April 2005, Paris
6. November 2005, Nantes

3.1.3 Evaluation

Evaluating the implementation of such a large project is an important element in ensuring that useful and transferable results are produced. For this reason, each site appointed a dedicated evaluation manager to run such activities and maintain consistency of approach across the project. Transport and Travel Research (TTR) were taken on by BCC to act as project-wide evaluation managers for VIVALDI. The evaluation management group met each other regularly, often in parallel with PMB meetings.

Regular meetings were also held with the evaluation team of the other CIVITAS I projects and with the Accompanying Measure METEOR. All cross-site evaluation at the CIVITAS level is being carried out by METEOR, so VIVALDI results have been fed to them through the evaluation manager. One of the early METEOR tasks was the preparation of a “do nothing” scenario for each city, using the ITEMS model; however, despite the receipt of data from each VIVALDI city, very little feedback has been received on this process. The cross-site evaluation is being carried out after the end of the CIVITAS I projects in 2006, so these results are not currently available.

Each site has carried out monitoring, measuring, surveying, and data analysis since the project started. Evaluation work is a constant process, requiring data capture at every stage of measure implementation. Examples include a survey of attitudes to public transport in Aalborg; an awareness survey of CNG in Bremen; Bristol’s 13 process interviews gathering views on the implementation process; public feedback on the PIKAS scheduling system in Kaunas; and Nantes’ before and after survey of bus quality perception.

The principal outputs of the evaluation work have been 2 project deliverables. In April 2004, the Evaluation Plan (D4) was finalised, setting out how the evaluation task would be approached across the project; this report was approved both by the EC and METEOR. However, what could be considered the principal published output of VIVALDI is D9, the Final Evaluation Results Report. Produced in November 2005, this 650-page report details the results of each measure implemented at each site during the project. Accompanying this report, and somewhat more user-friendly, are 67 measure-level implementation templates and a series of city-level templates. These are each focussed on one measure, providing a detailed history of the work from problem identification through to results evaluation. Once this report has been approved by the EC, it will be available on the VIVALDI and/or CIVITAS website.

3.1.4 Exploitation and Dissemination

Although the implementation activities at each site were the main focus of the project, it could be argued that these are of relatively limited use without the efforts carried out by all partners in spreading the wealth of information that they gained: citizens of each city benefited greatly from the introduction of the clean urban transport measures of which VIVALDI comprised, but these could not be taken up elsewhere without the best practice being exploited and disseminated throughout the project and beyond. However, exploitation is not limited to information going out from the project; there has been a regular flow of expertise within the consortium, including Bremen providing Nantes with advice on car sharing that led to a tender being launched.

TRITEL were appointed as dissemination manager at the start of the project to ensure a consistency in the approach to spreading the word of VIVALDI. One of their key early tasks, defined as deliverable 3 for the project, was the creation of a website. This site, www.vivaldiproject.org, is live until September 2006, and contains all of the published information and conference proceedings mentioned in the remainder of this chapter. Once the VIVALDI website itself closes down, all the key information and downloadable documents will be moved on the CIVITAS website.

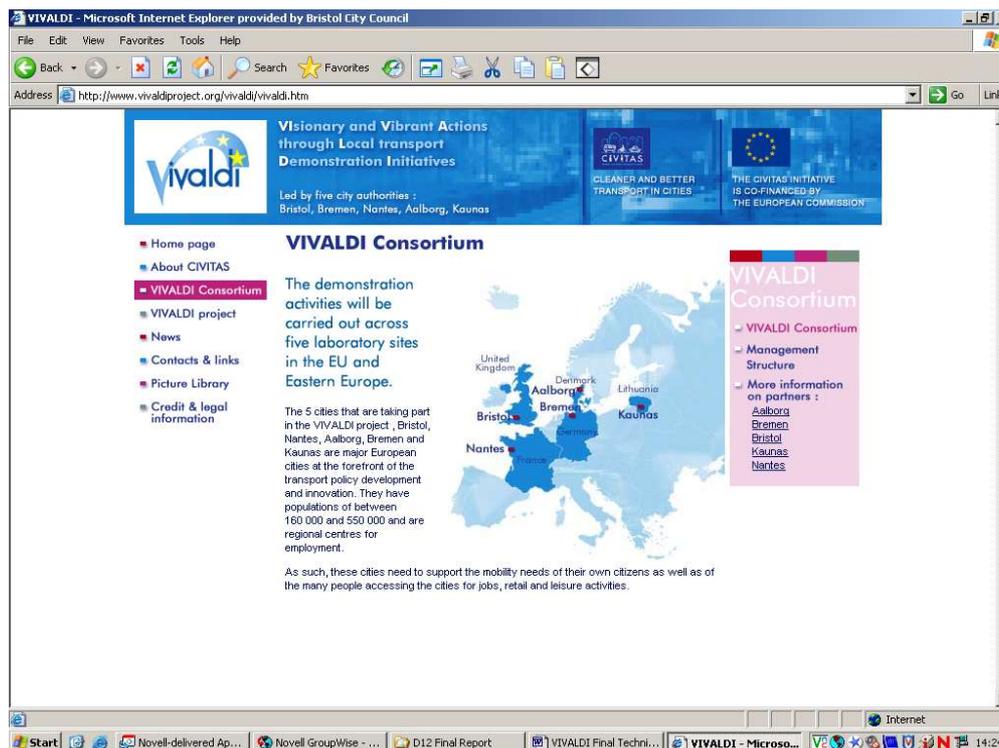


Figure 3.2 The VIVALDI Website

During the lifetime of the project, 6 newsletters were produced to disseminate short stories of VIVALDI successes to a circulation list of contacts both electronically and printed. At the beginning and end of the project, special brochures were created to promote, respectively, the aims and the results of the project. Input from the project was also made to the regular CIVITAS newsletters for more widespread dissemination, and VIVALDI information has been contributed to the CIVITAS website.



Results & Recommendations

November 2005



Figure 3.3 The Final Brochure

One of the key outputs of the project are the 32 factsheets. These describe, in one illustrated sheet, the targets, main actors, and implementation results for each of the measures in the five cities. As an “off the shelf” product to provide key implementation facts on specific measures, along with contact details for further information, the factsheets are an invaluable tool for other cities planning similar works to those carried out through VIVALDI. Going into a little more detail, the Policy Recommendations Report of the project, produced in November 2005, concentrates on 16 VIVALDI measures in a short, readable document; as an annex to this report, the project DVD illustrates implementation successes from all the cities in a 20-minute film.

A number of VIVALDI events were held with public participation. Attached to PMB meetings, open workshops were held on telematics (in Brussels in April 2004), on soft measures and cycling (in Aalborg in October 2004), and on co-operation and partnerships for clean mobility (in Bremen in March 2005). These were complemented by the two National Conferences held in Bristol in September 2005 and Bremen in January 2006 on, respectively, delivering innovative transport initiatives and clean air in European cities.

Being part of CIVITAS, each of the four projects used the others to provide expert guidance on particular topics, sharing the talents available within the initiative. Examples of this are shown in the list below. Other examples of VIVALDI input to CIVITAS include input to the CIVITAS Forum events and a project stand and a number of presentations at the CIVITAS I Final Conference in Nantes in November 2005.

- Bristol presenting on the development of Home Zones at the TELLUS conference in Gdynia in September 2003.
- Bremen providing input about innovative pricing strategies in public transport to the TRENDSETTER technical workshop on Efficient Public Transport in Lille in October 2004.
- Bristol and Bremen presenting at the TELLUS workshop on Goods Management in Gothenburg in June 2005.
- Hampshire (to the workshop in Aalborg in October 2004) and Rome (to the Bremen national conference in January 2006) providing expertise from MIRACLES.

In addition to this, speakers from VIVALDI shared their experiences with a large number of non-CIVITAS projects in Europe, such as the final conference of Target-II (Interreg IIIB) in June 2005 in Bremen and Worpswede (Germany). Visiting delegations from other cities interested in VIVALDI work were also welcomed by a number of cities, including a Swiss delegation to Nantes, a Japanese party that visited Bremen, and a party of American transport officers keen to learn of the VIVALDI experiences in Bristol.

Overall, the project has carried out a huge number of dissemination activities (707 in total) across a broad range of media, primarily focussing on the citizens in each city but including good coverage on printed and broadcast media across the 5 sites: the table below summarises this extent and variety.

Table 3.1 Dissemination Activities

Local press	National/int’al press	National conference	International conference	TV/radio	Other
306	193	59	45	15	89

3.2 Results from the Demonstration Cities:

This section is, by necessity, a whistle-stop tour of the key results from the extensive VIVALDI implementation measures in the five cities. In-depth results and further analysis can be found in the Evaluation Report (D9) produced in November 2005.

3.2.1 Aalborg

The implementation of tasks in Aalborg was carried out in two of the CIVITAS policy fields – new forms of vehicle use and telematics – and have therefore not been grouped into different integrated packages at the site level. Table 3.2 summarises the relationship of the measures to the overarching policy fields and packages.

Table 3.2 VIVALDI Measures in Aalborg

CIVITAS policy field	Measure	Integrated Package
New forms of vehicle use	Car sharing	New forms of vehicle use
Telematics	Transport information centre	Telematics
	Bus priority	
	RTPI	

New Forms of Vehicle Use – Car Sharing

Overview

The car sharing scheme Hertz Delebilen was launched on 6 January 2004 with a single site for car sharing. In April 2004, 4 more sites were opened; now there are a total of 7 car sharing sites and 11 cars. This has surpassed the targets of 2-3 sites and 4-6 vehicles. The number of members of Delebilen has been increasing since the launch and has now passed 200.

A system has been introduced which allows members to book a car via the Internet or telephone and it is easy to get information about and create membership of the scheme. Each member has their own smart card and PIN, making it easy to use the cars once they have booked. The system records the distance and charges that are sent out with the member's bill and members can at all times see how much time is left on their booking and what the mileage is.

As a marketing strategy, from October to December 2005, users of a monthly public transport travel card could join the car sharing scheme for a reduced cost. From this marketing initiative, 30% more potential car owners have joined the scheme and hence postponed the purchase of a car.

Results

As a result of the car sharing initiative, the total fuel use for transport in Aalborg has reduced by approximately 1%. A total of 48,700km were performed by the shared cars in the first year, with an average journey of 52km and fuel consumption of 13.7km/l. By selecting environmentally friendly cars, Hertz Delebilen has managed to keep the specific energy consumption level at 2.4 MJ/km: the average for the private vehicle fleet in Aalborg is 3.1 MJ/km. With a total of 149 members, of which 41% considered

buying a car, the potential energy savings add up to about 2,860GJ within the first year of car sharing.

In general, the car sharing scheme has seen increases both in terms of usage and number of members. Its potential is probably bigger than the existing scheme and if it grows further it may have a measurable influence on the level of congestion and emissions.

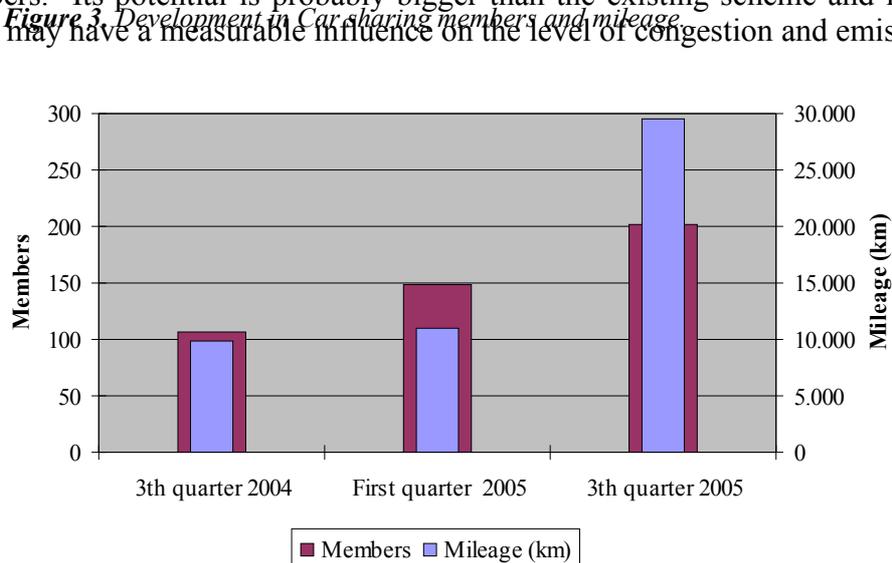


Figure 3.4 Rising Car Sharing Membership

The age distribution among users of car sharing is shown in Figure 3.5. It is remarkable that the proportion of young people has grown and now constitutes approximately one third of the users, indicating that the scheme enables users to postpone purchasing their first car, which was a major reason for establishing the scheme.

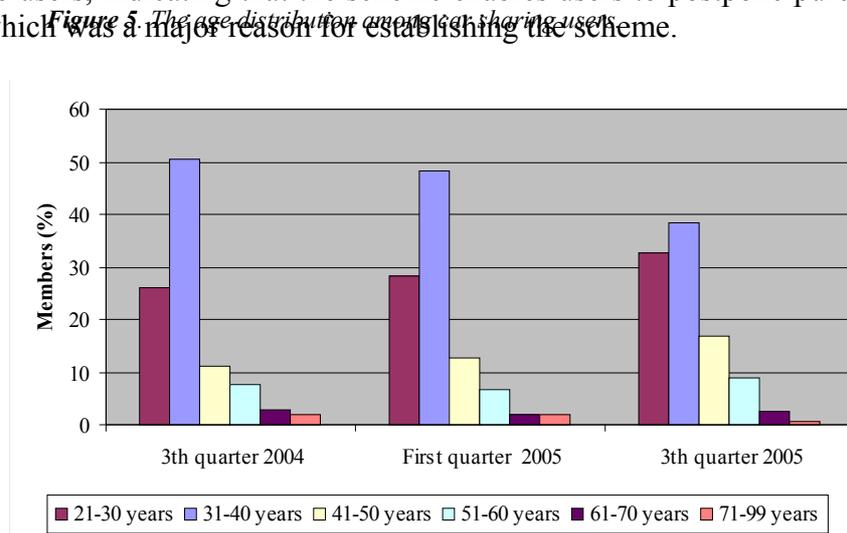


Figure 3.5 Age Distribution of Car Sharing Users

Most of the current members of car sharing in Aalborg make use of the shared car less than once a week. The average figures for households in Denmark are between 2.5-5.0 trips per day with the lowest figures for inner city apartments where the current user group of car sharing in Aalborg is found: car usage levels are about 1/20 of those of the average city resident. One of the main reasons is that a shared car is only rarely used in home-workplace journeys: only 12% of car sharing members have used the shared car on the way to work, shopping and leisure trips are the main areas of use.

This is also reflected in the average occupancy rates reported by the users. On average there are 1.93 persons in a shared car. This is notably higher than the average in home-workplace trips, which is about 1.21 persons per vehicle in the morning and 1.48 in the afternoon. It is even slightly higher than the national weekend average (1.87). In addition, 39% of car sharing users would have used other forms of individualised motorised transport (such as taxi, rental car) for their journey.

Throughout the project a close dialogue has been kept between the two partners in the private-public partnership, enabling the continuous positive development of the service. Ideas and proposals have been discussed and transformed into adjustments or expansions of the service. As car sharing in Aalborg will continue beyond VIVALDI, Hertz Delebilten has consequently increased the number of staff to enable an increased focus on individual marketing of the service.

Conclusions

At the end of the VIVALDI project, the car sharing scheme will be continued. The scheme has been increasing continually since its launch two years ago. The 7 existing sites may be up-scaled to include a few more, for example at the two largest shopping malls in the suburban area. The Municipality of Aalborg will not be a partner in the scheme after the end of the VIVALDI project, but will continue to be a member. Finally, the measure will be further integrated with future projects with the aim of improving the environment in the urban areas.

Telematics – Bus Priority and RTPI

Overview

Before the VIVALDI project, bus priority and AVL (Automatic Vehicle Location) were only operated on three bus lines in Aalborg, with 28 signalised intersections fitted to enable bus priority. The focus was also more on urban buses than regional services, which were still being caught in traffic. The regional bus terminal in the city was redeveloped in 2003 in a reduced space to allow for complementary land uses that increased demand for public transport – this required flexible platforms with Real Time Passenger Information (RTPI).

The RTPI came into operation in August 2004 and the bus priority in January 2005. In total, 209 buses are now fitted with computers connected to a mobility centre that operates the system. Around the city there are 32 signs with RTPI at the most important bus stops and at the four local railway stations. The number of intersections with bus priority has increased to 51.

Results

In terms of the new information points located in the public transport terminal, the public is well aware of the new opportunities. The self-service information kiosks at the terminal facility demonstrate this: on a monthly basis, 24,000 pages are activated at the terminal with itineraries and schedules as key searches. It is very positive that this service, which is the least visible of the ITS initiatives in Aalborg, has been identified and accepted by users.



Figure 3.6 Travel Information Terminal

Although construction of the new terminal was not a VIVALDI measure, the telematics systems that allow it to operate efficiently are. The following Figures 3.7 show user satisfaction with 16 indicators, many of which are directly managed by the new telematics infrastructure. The overall picture shows a positive development in user satisfaction. On average, satisfaction amongst the users of urban bus lines is 0.62 points higher after the introduction of the new terminal facility; amongst users of regional buses, the development is an even more positive 1.25 point higher level of satisfaction.

User responses on 16 indicators before (blue) and after (red) the changes at the bus terminal. Response from users of coaches to the left and for urban bus lines to the right.

1) Transfer distance bus-train	2) Transfer distance coach- bus	3) Transfer distance bus-car	4) Transfer distance bus-taxi
5) Transfer distance bus-bike	6) Parking / kiss & ride facilities	7) Bicycle parking facilities	8) Indoor facilities
9) Outdoor facilities	10) Bus regularity	11) Information on service	12) Information on schedules
13) Information on itineraries	14) Perceived safety and security	15) Ease of perception of terminal	16) Visual impression

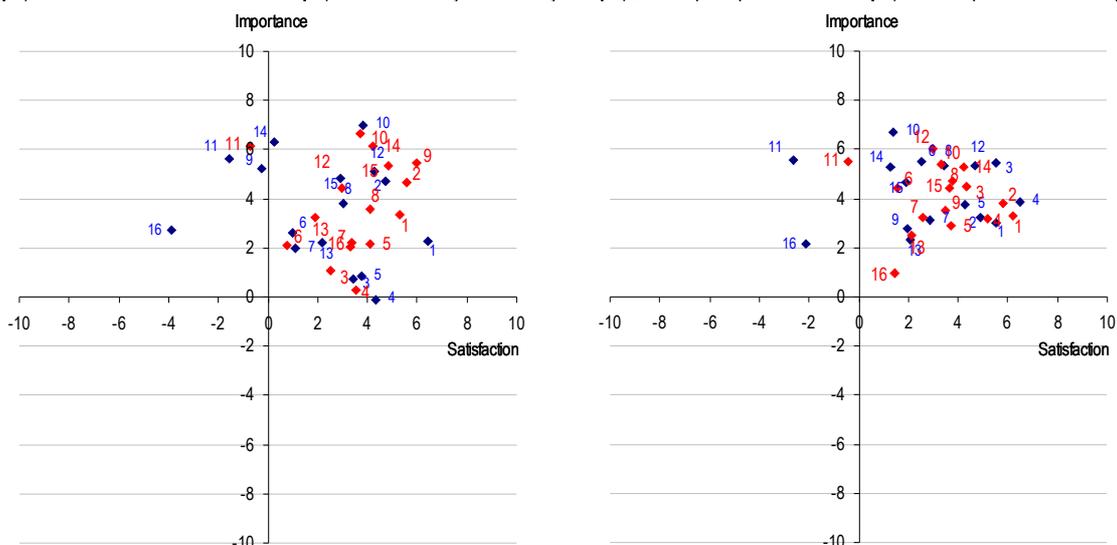


Figure 3.7 User Satisfaction of New Bus Terminal

A separate study on the impact of bus priority was made. In a corridor with eight signalised intersections all fitted with bus priority, the buses on average saved up to 4%

of their total travel time. This is quite remarkable considering that only buses delayed by more than 3 minutes actually gain priority.

Based on the study, a rough estimate of the impact of the entire bus priority system is a daily travel time saving of about 4 minutes per bus passing each of the 51 signals with bus priority, or a total of 17 hours saved per day. The Danish Ministry of Transport suggests that the value of delay time in this situation is about 15.75 Euros per hour. Assuming 30-40 passengers occupy the buses, the value of daily timesavings due to bus priority can be estimated at 8,000-10,700 Euros per day. To the extent that these timesavings can also be converted into savings in schedules, there is not only a benefit for the passengers but also for NT and Aalborg Kommune. Currently, the cost of one bus-hour is about 57 Euros, so the two project partners in VIVALDI will potentially save up to 740-970 Euros per day due to bus priority.

There was also a difference in the perceived regularity of buses among urban and regional bus users, both felt that there has been a reduction in the frequency of delays. The perceived reduction in delays for urban buses changed from 39% to 30% and for regional buses from 26% to 24%.

Process evaluation in VIVALDI has been ongoing throughout the project. There has been a continuous dialogue between key stakeholders – politicians, technicians, operators, and users – to keep the project on track. Processes and approaches have continuously been adapted whenever the situation required it. A project like VIVALDI, realised in a municipal or county organisation, demands solid political support. Key drivers in the process of getting this support are the clear need for the project in Aalborg, the funding opportunities, the chances of success, and the opportunity to be in the forefront of sustainable transport at a national and European level. However, targets, political backing, and funding do not necessarily create success; the successful completion of the ITS work in VIVALDI is closely related to:

- The decision to join forces with Greater Copenhagen Transport
- The capability to effectively take charge of the project
- A common commitment to succeed by project partners, consultants, and suppliers

Conclusions

When the VIVALDI project finishes, the telematics will continue. Moreover, it is decided that RTPI should be implemented in other parts of the city to improve the service level in the remaining part of the PT route network. The measure will also be further integrated with future projects to improve the environment in the urban area.

3.2.2 Bremen

A total of 10 tasks were carried out at the Bremen site, within 6 locally defined integrated packages. As one of the three largest sites in VIVALDI, Bremen's activities had an impact against each of the CIVITAS policy fields. Table 3.3 below shows how this relationship maps out.

Table 3.3 VIVALDI Measures in Bremen

CIVITAS policy field	Measure	Integrated Package
New forms of vehicle use	Car sharing/city car club development	Car sharing
	Integration with urban developments	
Collective modes	PT and car sharing	Car sharing
	New tram lines	New tram
Integrated pricing	Integrated transport pricing	Information and ticketing
Information services	Travel Information Centre	Information and ticketing
Goods delivery	City logistic scheme/ freight village	City logistics
Clean vehicles	Clean and efficient vehicles	CNG fleet
Mobility management	Walking and cycling measures	Cycling
Access management	Residential traffic management	Cycling

New Forms of Vehicle Use – Car Sharing Development (City Car Club)

Overview

Nine new car sharing locations with 33 vehicles have been set up, with expansion also to more peripheral sites that had not previously been a market area. The idea was to raise demand for car sharing by installing high quality stations with at least 2 cars, a concept realised in Vegesack (2002) and Borgfeld (2005), both districts at the very edge of Bremen. Another element of this measure is to open the scheme up, focussing on special target groups such as business people, cyclists, and commuters. A new tariff for business users was developed in order to increase use of the car sharing vehicles during weekdays.

Results

The numbers of car sharing users have significantly increased by over 40% to more than 3,500 in total, within the VIVALDI project.

Car sharing has always been attractive to clients who run a business. A customer survey in 2000 found out that 25% of all members in Bremen were self-employed (most representing one-person companies), whereas only 6% of the working population can be thus defined. Self-employed members of car sharing clubs use the cars more than others for work-related journeys. Since April 2002, cambio addressed larger companies and tried to gain new ones with a marketing campaign for a new tariff. By 2004, 124 companies had signed up, including 4 public authorities.

The *cambiobusiness* tariff is one of four different tariffs. The sum someone has to pay depends on such factors as membership fee, price per km and per hour, and size of car. These factors are calculated in a specific way to meet the needs of different target groups. The purpose of the *cambiobusiness* tariff is to be competitive with conventional car rentals for long distance journeys, and aims to balance the differences between the use of cars on weekdays and at weekend.

The *cambiobusiness* tariff has not been particularly successful. In terms of booked hours, the business tariff has gained only a share of 4%, despite the number of companies joining cambio rising greatly. This is because many of the new companies did not choose the business tariff: only 40% did so in 2004 compared to 78% in 2003. The new enterprises said that the costs were too high. Operational data revealed that the assumption business users would drive a large amount in a short time span was not true, so the tariff did not meet the demand of the business clients in this respect. This induced cambio to adjust the tariff to actual travel behaviour and launch a new tariff in 2005 that is more successful. In terms of utilisation (booked hours) the share of the *cambiobusiness* tariff increased from 4% in 2004 to 11% in 2005.

Conclusions

To extend the car sharing service to the suburban region is one of the potential growth paths for car sharing organisations. A focus group discussion in September 2005 decided that the suburban region is not the core area where car sharing organisations can win new clients with pure market-based offers, and that in suburban regions the demand for car sharing is too low from a business point of view.

New Forms of Vehicle Use – Integration with Urban Development

In the course of the VIVALDI project, the idea of car sharing was further integrated into the general city/regional transport policies and guidelines. For these achievements to come about, several institutional barriers were overcome. Within VIVALDI, there have been negotiations with various stakeholders for a new inner city development on a former water supply plant near the river Weser. In summer 2004, the Parliament committee approved the formal development plan for this area. This is the first formal development plan in Bremen that foresees a certain area as public car sharing station, which will reduce the demand for parking space.

Overall Car Sharing Results and Conclusions

The VIVALDI car sharing measures have had a significant impact on the growth of car sharing. The number of cars has been increased from 80 to 100, the number of clients went up by 700 (+39%), and the number of people entitled to drive by 1,000 (+41%).



Figure 3.8 Car Sharing Vehicles in Bremen

These growth figures for car sharing indicate a decline of private car dependence. Because of the service, about 500,000 vkm/year could be saved, and each cambio car replaces 9.5 private cars. The car sharing fleet consists of new vehicles that emit on average 133g CO₂ per km. Compared to the average fleet composition, about 100,000kg CO₂ could be saved each year only because of using these vehicles and a further 85,000kg CO₂ could be saved due to the decrease in mileage.

Collective Modes – Public Transport and Car Sharing

Overview

This measure is about integration of public transport into car sharing (and vice versa) by developing and promoting a combined offer for those who use both: PT users get an attractive tariff when using the cars of the CS company, while access to both is enabled by a smartcard. The integration is further underlined by establishing common mobility centres in which the combined offer can be bought and information about other services provided. The general objective of this measure is to reduce private car dependence by making the use of public transport and car sharing organisations easier and more attractive: both providers complement one another.

Results

Whether someone can make use of the combined offers requires some knowledge of them. This was researched through a survey in 1998 and 2003; in both samples, advertisements and information material produced by the service providers are the most frequently stated source of information. Also, reporting in the media was very important for raising awareness about the offer, although this applied more in 1998 when the integration between car sharing and PT started. The most striking result is perhaps the high proportion of people who heard of car sharing from personal recommendation, over 38% in 2003, seeming to be as successful a source of information as formal advertisements and information.

Car sharers drive comparatively little, less than they did before membership. Car mileage per year of the subscribers fell by 32% in 1998 and 54% in 2003. These savings are mainly caused by users giving up their cars and by the fact that clients do not

use friends' cars or rental cars any more. Secondly, there is an effect of driving less as the result of long-term membership – car sharers learn to plan their car usage and try to avoid unnecessary car trips. For some users car sharing has been a step on their way to abstain totally from car use.

Subscribers of the combined offer increased their use of public transport. On average, the distance clients made by public transport increased by 5% per year in 1998 and by 8% in 2003. The frequency of public transport usage also increased (except for trains), confirming that car sharing does not compete against PT but complements it.

Conclusions

Further co-operation between car sharing and public transport is one growth path for car sharing organisations, as found by a focus group discussion in September 2005. The working relationship between the two operators is good. In the course of the project it has changed from a formal to a more informal, but very efficient, co-operation in terms of common marketing and exchanging information.

Collective Modes – New Tram Lines

Overview

As the hybrid tram was not put into service during VIVALDI, it was decided to survey the planning and implementation process and to evaluate a similar tram project in the northeast of Bremen, the extension of tramline 4. This substitution could be made because the tramline extensions in both areas share common features in terms of the suburban locations, the increased attractiveness of public transport for commuters, a potential shift from bus to tram patronage, and the size of investment required.

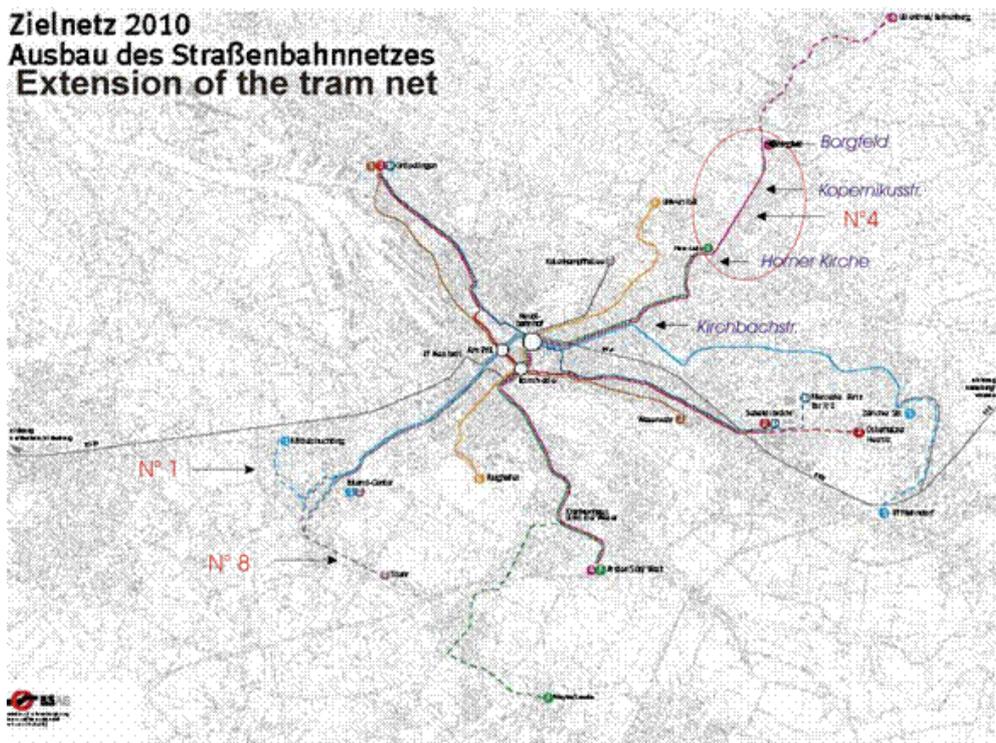


Figure 3.9 The Tram Network in Bremen

Results

The new tramline 4 attracts significantly more residents than the bus, meaning that residents who have never used buses in the before situation now get the tram. The number of surveyed panellists who used PT after the tram has been in operation rose by 7.5% and the journey frequency (trips per year) increased by about 12.4%. Since the change from bus to tram, PT is used more often for leisure activities, although the new tram did not attract new commuters. Overall, however, 27% of residents were found to have reduced their car usage because of the new tram.

One of the most important reasons which panellists stated for their increased PT usage is “no need for a change in journey” (as the new tramline is an extension of an existing one, to which bus users had to change). The share of those who had to interchange during their “most regular journey” decreased significantly from 54% to 19%. Other reasons are “the tram is more convenient” and “reduced journey times”, qualities of the tram that are perceived as the most important in relation to individual travel behaviour. Safety and driving comfort also give the tram a significant better impression compared to the bus.

BSAG carried out passenger counts in order to find out the change in ridership resulting from the tramline extension. In February 2001, nearly one year before the tram was introduced, they counted passenger occupation in the buses at selected stops. One year after the opening of the new line, they counted the occupation of the tram at these stops. The vast difference at Horner Kirche can be partly described by the fact that it is the first major interchange on the route.

Table 3.4 Increasing Tram Usage on Line 4

	Before	After	Change in %
stop	Feb 2001	Feb 2003	
Kopernikusstraße	2693	2901	7,7
Horner Kirche	4219	8792	108,3
Kirchbachstraße	5771	9136	58,3

Source : BSAG

The table below shows a decrease in the number of private vehicles counted on the road after the tram commenced operation. It is reasonable to suppose that this decrease of car traffic is caused by both a better service of the PT, the offer of the new Park and Ride service, and the slight narrowing of road space may have acted as a deterrent for car users.

Table 3.5 Decreasing Car Use Along Tramline 4

stop	time	A.M.		P.M.	
		into town	outbound	into town	outbound
Borgfeld	10/1999	4.127	1.881	2.766	3.420
	10/2003	3.505	1.503	2.390	3.419
Kopernikusstraße	10/1999	5.144	2.182	3.325	4.951
	10/2003	4.990	2.061	3.425	4.966

Source: Amt für Straßen und Verkehr

Conclusions

In general the shift from bus to light rail in suburban regions is likely to be an efficient means of improving the public transport system, so that it can compete better with private car usage and contribute to the development of the area. Despite the high investment costs, a positive effect can be expected in the long run, as patronage increases and the operation of PT gets cheaper. In general terms, a tramline extension can be recommended for other cities.

Integrated Pricing – Integrated Transport Pricing System

Overview

On the basis of the GeldKarte (MoneyCard) of the German credit services sector, a chip card was launched in June 2005 that is a kind of debit card for PT journeys. It was named BOB ticket, which stands for “Bequem Ohne Bargeld” (convenient without cash), and allows customers to easily use public transport without prepaid tickets or cash. The customer registers once, then, on entering the PT vehicle, electronically books in the destination and the number of passengers for the journey. The information is stored on the smartcard and transferred to a main database for the monthly bill direct from a nominated bank account. Customers doing several journeys a day are charged for the cheaper day ticket rather than several single trips.

The objective of this measure is to increase the patronage of local and regional transport. The measure addresses irregular PT user, and aims to win new customers and foster the loyalty of existing non-frequent users.

Results

The advertising campaign for the BOB ticket was launched with the product in June 2005, mainly by poster, printed media, and TV/radio. The advertising success was measured by a representative survey carried out in July 2005 with 306 people. The findings were that the campaign for the BOB ticket is one of the most successful PT advertisement campaigns: 42% of respondents remembering it.

The figure below shows the growth of the BOB ticket since it has been launched in May 2005, the demand exceeding BSAG’s expectations. The postcode of BOB ticket subscribers shows that the districts that surround the city centre attract above average subscribers. This is in line with findings that regular PT users holding a season ticket are more likely to live on the urban fringe; the target group of the BOB ticket, irregular PT users, are more likely to live within the more central districts.

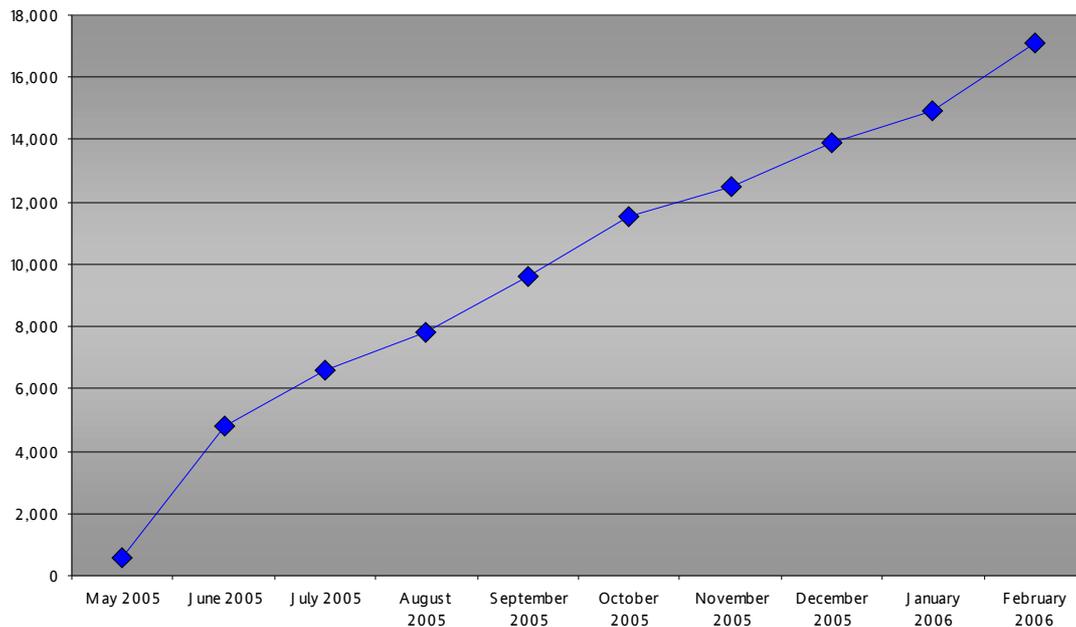


Figure 3.10 Increasing Number of BOB Card Holders

The BOB card is carried out in a partnership with the three public transport operators BSAG, VWG Oldenburg, and BremerhavenBus. It is valid on all 34 public transport operators of the region who form the co-operation VBN. An acceptance analysis in January 2006 showed that over 90% of all BOB card users see this post-paid ticket in a satisfactory manner. More than 6% of all trips would have been done by another mode than PT if the BOB card were not available.

Conclusions

The BOB ticket has been a highly successful development that will be continued. The number of new subscribers has continued to climb at an impressive rate, encouraging the use of public transport for irregular journeys by, mainly, residents close to the city centre.

Information Services – Intermodal Travel Information Centre

Overview

The Intermodal Travel Information Centre (ITIC), operated by local public transport operator BSAG, opened in November 2002 and replaced a smaller centre that was mainly used for tickets sales. The ITIC concentrates several BSAG services – sales and distribution, annual subscription, timetable and fare information – in a single place. It also includes information about cambio, the local car sharing organisation: visitors to the centre can join cambio on site and cars are available in the same building. Regarding telematics, the existing intermodal Internet information platform has been improved and is available at a self-service terminal. Another terminal can be used for electronic ticketing. In comparison to the old customer centre in the ITIC, the area has been enlarged (from 58m² to 214m²) and additional staff employed.

The visitors use the information centres mainly in order to gather information or to buy tickets, although the new ITIC has more visitors than the old centre for information requests.

Table 3.6 Reasons for Visiting the ITIC

Why did you go to the BSAG customer centre at the Domsheide?	before (old center)		after (ITIC)	
	frequ.	col%	frequ.	col%
registration issues	13	11,0	9	7,3
information on time tables, tariffs and PT network	46	39,0	59	51,7
complaints	3	2,5	1	0,9
„fare dodging“	3	2,5	4	3,4
ticket sales	92	78,0	68	59,1
information about <i>cambio</i> or combined PT/Car-Sharing offer (Bremer Karte Plus / AutoCard)	*	*	4	3,4
trip planner terminal (self service)	*	*	2	1,7
charging/decharging of electronic purse (Geldkarte)/Bremer Karte/Bremer Karte Plus (self service)	*	*	4	3,4
other issues	2	1,7	1	0,9

* not available

The new ITIC has been well received by the people who use it: a survey of before and after attitudes found that the new ITIC was significantly more modern, attractive, and functional than the old one, and many people consider it of importance to the city as a whole.

In the after survey, customers of the ITIC were asked if they have known or made use of the offers of information on *cambio* or of car sharing cars within the building. Approximately a quarter of the visitors stated that they were aware of these offers, and 7.3% asked for further information related to *cambio* and the combined cards.

The information terminal was used by nearly everyone who had noticed it, and the operation of the terminal and the quality of information were well received. In contrast, the terminal where users can charge up their electronic tickets was relatively seldom used and was considered more difficult.

Conclusions

BSAG collects continuous data about the transactions in the ITIC. Compared to the old information centre, the amount of tickets sold decreases clearly in the new ITIC, in line with the results of the user surveys. Visitors mainly come to the ITIC because they want to take advice; tickets are often sold in a kiosk nearby.

Goods Delivery – City Logistic Scheme/Freight Village

Overview

The overall aim of this measure is to reduce emissions and energy consumption by making the distribution of goods to certain areas, such as the city centre, more efficient. To achieve this objective, it is necessary to strengthen city logistics in comparison to conventional delivery systems, encouraging efficient urban freight distribution through consolidation systems and logistic software. There is already some experience with city

logistics in Bremen, as the first application took place in the mid-90s, based in the freight village “Güterverkehrszentrum” (GVZ).

Results

Many of the stated objectives have not been fully achieved. A large number of structural changes in the freight transport market have led to a limited success of this measure, particularly for deliveries to the city centre. In addition, the purchase of at least 4 CNG trucks could not be realised (see below), due to non-availability. The development of route optimising software was also not implemented. The results are based on process interviews and an analysis of operational data.

The following table shows how freight consolidation and the use of clean vehicles could reduce the emissions caused by the distribution of goods within the city. All scenarios simulate goods transport from the freight village to three different locations in the city. In scenario 1 (the reference case) this is done by 3 carriers each using a conventional truck, needing 100 vkm in total. In scenario 2, the carriage is consolidated in one truck, which reduces the vkm from 100 to 60 and reduces emissions. If the truck has a diesel soot filter, as in scenario 3, particulate emissions can be reduced to 12%. The best situation is scenario 4: a CNG truck emits hardly any particulates and the emissions of NO_x are also very low.

Table 3.7 Emissions Impact of Freight Consolidation

Scenarios	vehicle-km	particles [g]	NO _x [g]
Scenario 1 - Situation at present, several trucks	100	16,100 g	703,0 g
		(100 %)	(100 %)
Scenario 2 – bundling with conventional truck	60	9,660 g	421,8 g
		(60 %)	(60 %)
Scenario 3 – bundling with truck diesel soot filter	60	1,932 g	421,8 g
		(12 %)	(60 %)
Scenario 4 – bundling with truck running on CNG	60	0,145 g	126,5 g
		(1 %)	(18 %)

Vehicle manufacturers appear not to be taking the risk to push CNG in road freight transport. As stated in the Implementation Report: “promising advertising of CNG trucks from car manufacturers always ended up with disappointing offers. Announcements of the new DING technology (direct-injection natural gas engines) are only running as field tests and will not be on the market before 2005. Volvo produced a new diesel truck fulfilling EURO V standards in late 2004 and abandoned their CNG programme. Mercedes will not produce 7.5 to 12.0 ton CNG trucks, because the research department is focusing on fuel cell and hydrogen technology”. The plan to buy at least one vehicle by the end of VIVALDI failed in June 2005, because a promised and advertised truck (IVECO EURO CARGO 12,0 ton CNG) was not delivered due to a sudden management decision of the manufacturer.



Figure 3.11 Planned CNG Truck

While CNG trucks were still not available, Bremen looked into reducing the emissions of urban freight transport by introducing CNG vehicles for courier services. A pilot scheme started with 7 CNG vehicles for DHL parcel services in November 2005.

Conclusions

Bremen is still very keen on sourcing a number of CNG trucks for use in the City Logistic scheme, as the modelled results on emissions improvements are highly impressive. It would appear that there may be a role for the European Commission in encouraging the vehicle industry to develop more of these models and harmonise standardisation methodologies across the EU to encourage uptake. As a member of the “Conference of the Ministers of Environment”, Bremen has initiated a decision in November 2005 of all German states and the federal level, urging the motor industry to provide clean trucks for urban delivery, and became a member of the contact group with the motor industry. Together with other CIVITAS cities, Bremen plans also to take up the issue on the European level, including through the CIVITAS PAC.

Clean Vehicles – Clean and Efficient Vehicles

Overview

The core elements of this measure are a local awareness campaign, called “Bremer Offensive – Das Erdgasfahrzeug”. A local promotion scheme was launched for the use and purchase of CNG cars with a financial incentive to buy one (1,000 Euros for private households and up to 2,500 Euros for companies per car). An information desk was set up in the city centre by the local energy provider (SWB) to inform potential buyers about all aspects of CNG cars. The campaigning measures use different media and materials, including a co-operation network with key stakeholders.

Results

The Büro für Verkehrsökologie (BVÖ) and the University of Bremen carried out several surveys in order to measure the impact of the campaign, from December 2002 until June 2005. The sectors involved were prospective private car buyers, business car buyers (fleet managers), car dealers, and the general public. The general public were surveyed on their knowledge of CNG cars in general, and the campaign “Bremer Initiative – Das Erdgasfahrzeug”, in May 2003 and June 2005. The results are presented in Table 3.8.

Table 3.8 Public Knowledge of CNG Vehicles and Campaign

	Public 2003	Public 2005
Heard of the term “Erdgasfahrzeug” (CNG vehicle)	84.4%	89.9%
Know of a CNG fuelling station	28.8%	31.3%
Compared to conventional cars, CNG cars are:		
Cheaper concerning fuel consumption	53.5%	54.0%
More expensive concerning purchase	72.9%	74.5%
Equally safe	64.7%	71.4%
More environmentally friendly	86.5%	88.6%

Table 3.9 Overall Knowledge of the CNG Campaign

	General public 5/2003 (N =205)	General public 6/2005 (N =297)	Car traders 8/2004 (N =57)	Fleet managers 8/2004 (N =83)
Yes	21,5	17,8	56,1	56,8
No	78,5	82,2	43,9	43,4

The campaign succeeded in supporting the purchase of 250 CNG cars in Bremen. By October 2005 the local gas provider received more than 300 applications for the incentive for the purchase of a CNG car: 297 were approved, of these 231 came from commercial users and 66 from private users. It was not planned to have more companies than private users, but it is probably due to the fact that companies receive a much higher allowance. The campaigners justify the unbalanced support by arguing that business cars have a higher mileage, which makes them a better advertising medium (the buyers of a car are obliged to show CNG stickers).

Table 3.10 CNG Vehicle Applications

Year	Number
2003	61
2004	82
2005 (Oct)	161
Total	304

Not everyone whose allowance was approved used it. Up to October 2005, only 70% of the approved applicants bought a CNG car: in total, 160 vehicles have been purchased. The rest of the buyers either had to wait for the purchase, because several manufacturers had long waiting times for delivery, or eventually decided to buy another car type. Although the actual number of CNG cars sold is still relatively small, there is a growing demand for them – the share of surveyed car traders with CNG cars on sale grew from 44.3% to 57.9% from 2002 to 2005.

The main incentive to buy a CNG car is to have cost and fuel savings. Prospective buyers stated that the matter of fuel consumption is most important to them when buying a new car. The target groups were asked which conditions or activities are needed for stimulating the demand for CNG cars. A prerequisite for all groups is a denser network of fuelling stations providing CNG, and an allowance for the purchase of a car would be necessary: cost advantages are essential. Car traders underline the impact of a high quality and intensive advertisement campaign for further growth of the CNG market, but add that they do not have sufficient information about CNG cars.

People who had received allowances for their CNG car purchase were obliged to complete a survey just after they bought the car and another 6-12 months later. The first survey showed that there is a wide range of information sources by which the CNG car owners knew about the promotion: newspapers, the Internet, and car traders have been the main information sources for the private users, whereas the business users have been pointed to the promotion by car traders, information brochures, and personal recommendation. It is likely that at least the success of the brochure and of the car trade is a consequence of the intensive campaigning activities. The second survey requested a description of satisfaction with certain aspects of the car. Although 71% of respondents were not satisfied with the density of CNG filling stations, there were high levels of satisfaction with fuel consumption (96%) and performance (95%). In fact, a large proportion of drivers would recommend friends to buy a CNG car.

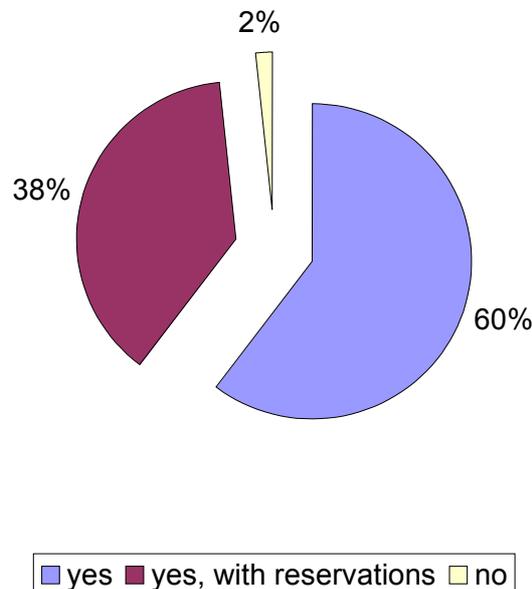


Figure 3.12 Would You Recommend CNG?

Conclusions

The CNG car fleet has decreased energy use and emissions. Compared to a fleet made up of 60% petrol and 40% diesel cars, the CO₂ reduction amounts to 99,817kg, which is -17%. The reduction for NO_x is 501kg (-61%) and for PM₁₀ 34kg (-98%).

A panel of experts was gathered to discuss the potential of up-scaling the CNG measures in Bremen, and how this may have an impact in the future. The results were as follows:

- Experts are quite confident that car makers will solve technical problems (mileage, loading capacity, engine efficiency), but are in doubt whether manufacturers' commitments to CNG cars will be sufficient to enable a market breakthrough
- The main problem is the low density of fuelling stations, particularly in Bremen and Europe, but the experts are confident that most of the problems can be solved
- The most important political decision is to tax vehicles according to their emissions as an effective way of stimulating the market
- The experts asked a large number of car traders, but they are sceptical about implementation. However, a small number of companies which champion CNG cars contrast with the majority of traders who do not get involved
- Experts say that car buyers' knowledge about the economic and environmental benefits of CNG cars is insufficient and are not confident that this will change by 2010
- The Bremen campaign, the larger national network "Trägerkreis Erdgasfahrzeuge", the car user organisations, and the support coming from VIVALDI are considered as the driving forces

Mobility Management – Walking and Cycling Measures

Overview

Cycling is a way of life in Bremen. A high share in the modal split for cycling – 22% of all journeys are done by bike – shows how common cycling is. The overall aim of the walking and cycling measures is to stabilise and increase the existing potential.

This measure consists of a contraflow lane for cyclists on Lahnstraße, a one-way street, to improve safety, along with better cycling infrastructure and reallocation of road space in Hohentorsheerstraße and Langemarckstraße.



Figure 3.13 Reallocation of Road Space for Cycling in Contraflow Direction (Lahnstraße)

Results

Surveys were carried out with cyclists in Lahnstraße and Hohentorsheerstraße, and with residents in Lahnstraße and Langemarckstraße. They were asked for their before and after impressions of the cycling measures undertaken. Table 3.11 shows the change in satisfaction with the cycling infrastructure. It can be seen that the measures are approved of highly.

Table 3.11 Change in Levels of Satisfaction

street	Langemarckstraße	Lahnstraße	Lahnstraße	Hohentorsheerstraße
sample	residents/shopkeepers (N=137)	residents (N=87)	cyclists (N=72)	cyclists (N=80)
survey item	new cycle paths	new cycling regulation	new cycling regulation	reallocation/ new cycle paths
Very good	37,1	33,5	26,4	60
Rather good	34,8	23,4	31,7	21,2
Rather bad	-33	-46,3	-28,5	-53,8
Very bad	-39,6	-10,6	-22,6	-16,3
unknown	0,6	0	-7,2	-11,3

Residents and cyclists using the new cycle lanes feel significantly safer. The share of those who feel “very safe” or “safe” has grown for Langemarckstraße from 17% to 79%, for Lahnstraße from 10% to 79% and for Hohentorsheerstraße from 39% to 71%.

Table 3.12 Change in Assessment of Safety

street	Langemarckstraße	Lahnstraße	Lahnstraße	Hohentorsheerstraße
sample	residents/shopkeepers (N=137)	residents (N=87)	cyclists (N=72)	cyclists (N=80)
survey item	new cycle paths	new cycling regulation	new cycling regulation	reallocation/ new cycle paths
Very safe	26,5	9,6	8,6	7,5
Rather safe	36	43,3	60,3	25
Rather unsafe	-32,3	-20,4	-37,1	-22,5
Very unsafe	-33,9	-24,1	-23,5	-6,3
Don't know	3,7	-8,5	-8,2	-3,8

Residents and cyclists clearly assess the new facilities as more attractive than the old ones. The share of those who appreciated the new lanes as “good” or “rather good” has increased for all sites from 14-18% to 76-95%. There is also a considerable share of those who said that they would cycle more often because of the new cycle lanes, as shown in Table 3.13.

Table 3.13 Frequency of Cycling

street	Langemarckstraße	Lahnstraße	Hohentorsheerstraße
sample	residents/shopkeepers (N=137)	cyclists (N=72)	cyclists (N=80)
survey item	new cycle paths	new cycling regulation	reallocation/ new cycle paths
more frequently	10,4	41.7	13.8
same	71,9	52.8	85.0
less frequently	3,0	5.6	1.3
don't know	14,8		

Conclusions

Maintaining and improving cycling infrastructure is essential to keep cycling attractive for residents. It is essential to keep modal split for cycling at a high level, and increase it if possible.

3.2.3 Bristol

As well as being responsible for administrative and financial co-ordination, the Bristol site saw activities under each CIVITAS policy field within 6 local integrated packages. The coloured measures on Table 3.14 indicate how the local integrated packages were spread widely across the eight CIVITAS policy fields to pull together the diverse work carried out through the VIVALDI project in Bristol. Because of the large number of measures carried out, 30 in total, not all of these can be summarised in the following section; full details on every measure can be found in the Evaluation Results Report.

Table 3.14 VIVALDI Measure in Bristol

CIVITAS policy field	Measure	Integrated Package
New forms of vehicle use	Car club development	Developing new mobility services
Collective modes	Clear zone orbital bus services	City centre clear zone
	New forms of PT contracts	Improving public transport
	Improving interchange	
	Promoting Park and Ride	
	Promoting walk/cycle and ride	
	Taxi sharing	
	Demand responsive transport routes and technology	Developing new mobility services
Integrated pricing	Integrated pricing	Improving public transport
Information services	Travel information centre	City centre clear zone
	Information kiosks/advice screens	Social inclusion in south Bristol
	Widening access	
	City navigators (Info Bus)	Improving public transport
	Trip planner	
	Bus priority and RTPI	
	Multi-modal scheduling system	Developing new mobility services
Goods distribution	City logistics scheme	City centre clear zone
	Freight loading and signing	
	Home shopping	Social inclusion in south Bristol
Clean vehicles	Clean and efficient buses	Promoting clean and efficient vehicles
	Clean fleet vehicles	
	Fuel supply infrastructure and local network	
	Renewable energy supply	
Mobility management	Travel plans	City centre clear zone
	Community travel workers	Safety and access in an inner city area
	Walking and cycling	

	Travel awareness/ marketing	Social inclusion in south Bristol
Access management	Development of a clear zone	City centre clear zone
	Access management	
	Home zones	Safety and access in an inner city area

New Forms of Vehicle Use

Overview

The City Car Club was re-launched on 5 February 2003 and now has over 220 members, a fleet of 24 vehicles and operates in eight city districts. A system has been introduced which allows members to book the car via the Internet or telephone and the control centre sends details of the booking to the car's onboard computer via GSM mobile phone. Each driver has their own smart card and PIN, making it much easier and more secure to use the cars.

As part of this project, the Council has developed a mechanism to designate parking bays on the highway for the sole use of car club vehicles, necessitating the creation of a new type of legal order. The provision of on-street bays has been very important in raising the profile of the car club and the guarantee of a parking space also increases the appeal of the club, particularly in heavily built up areas. The Council has implemented 19 on-street parking bays for car club vehicles around the city centre.



Figure 3.14 Car Club Car in a Designated Bay

Results

Utilisation rates refer to the number of bookings made per vehicle during a 24-hour period. Average utilisation rates have fallen since 2002, although this may be accounted for by an increase in the number of available vehicles and locations, resulting in a spread in use. An additional reason may be that it takes time for usage at new locations to grow, so expanding by 6 or 7 locations at a time will lower the overall utilisation rate for a few months. Trends in utilisation across months have remained static with peaks

occurring across school holiday periods, but utilisation rates are not consistent across all vehicle locations, ranging from 9-28%.

Approximately 60% of members had access to a car prior to joining the car club and over half of these have now given-up this car since joining. Only 7% of members now own two or more private vehicles and 61% of members do not own one. Some 19% considered buying a vehicle before joining the car club, so membership of the club has contributed towards lower purchasing rates of private vehicles.

Conclusions

Since the City Car Club's re-launch in 2002, membership has exceeded the originally set target and the advent of on-street parking has been advantageous to the club as vehicles are situated more conveniently for members and have greater visibility.

Collective Modes – Clear Zone Orbital Bus Service

Overview

This measure involved the upgrading of the Baltic Wharf Loop (service 500) operated by local bus company Buglers. Service 500 operates around the city centre linking locations otherwise poorly served by public transport, including the railway station, areas of business, and the city centre. Public transport provision was especially poor to the Create Centre, a council-owned building located in the Harbourside area.

Results

Prior to the service upgrade in 2005, the overall trend was a gradual decrease in passenger numbers (in 2004, 5,000 fewer journeys were made on the service compared to 2003). However, since April 2005, passenger numbers have been steadily increasing: data for June-August 2005 reveals that patronage levels are up by 1,257 passengers from the same period the previous year, a 10% increase or an additional 400 journeys per month.



Figure 3.15 The Service 500 Baltic Wharf Bus

A user survey was carried out to provide some insight into how and why the service is used. The main results indicate that the service has a long-standing passenger base with over 100 respondents using the 500 service for over 12 months prior to the survey, representing over two thirds of the sample. Passengers use the service regularly with

nearly half (70) using the service at least four times a week, and over 70% using it both during the week and at the weekend. The most common journey purposes were shopping and travel to work, representing two thirds of all responses.

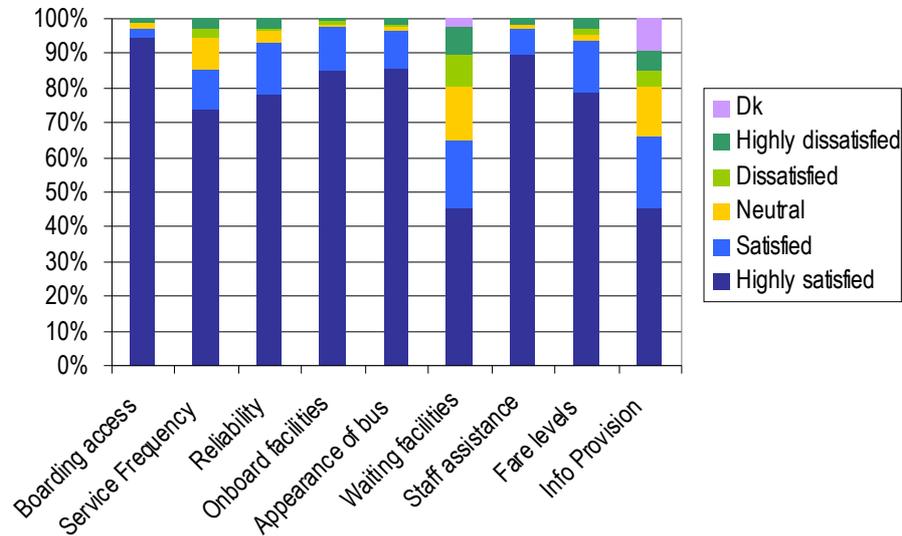


Figure 3.16 User Satisfaction

The service upgrades are viewed as having had a very positive impact on the quality of the service. The introduction of new low floor buses and the increased frequency were identified by over 80% of respondents as having significantly improved the service provided. One respondent commented about the new buses: “the low level floor buses are a great help as I have a baby and therefore prefer buggy-friendly buses”.

Conclusions

The survey has highlighted extremely high levels of user satisfaction for the 500 service, the recent service upgrades are seen as having improved an already excellent service. Further improvements are likely to be further explored, including earlier morning and later evening weekday and Saturday services, and a Sunday service.

Collective Modes – New Forms of Public Transport Contract

Overview

This measure involves improving public transport provision by implementing a step change in bus service quality through the introduction of a Showcase bus route.

Results

Patronage data from the 76/77 service experienced a decline during the construction phase of the Showcase route. However, since construction finished and the Showcase bus route was launched in December 2003, the service has experienced a rapid growth in patronage. For the year 2004/05, over 2 million passenger journeys were recorded, passenger growth peaking at 10.8% in January 2005. The provision of improved information, better priority for buses, and improved waiting facilities are key factors in making a bus service an attractive option to potential passengers.



Figure 3.17a The 76/77 Showcase Bus Route

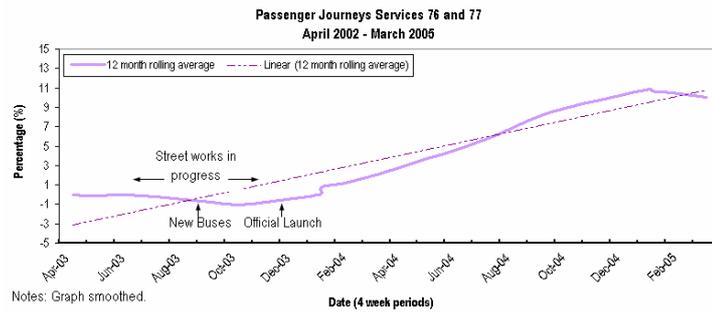


Figure 3.17b Change in Patronage

Journey times were also improved, leading to 24% of people using the bus more than they had previously.

Conclusions

On the basis that a third of the increased usage identified in the demand analysis survey is drawn from previous car use, a rough estimate of car trip reduction is around 30,000 vehicle kilometres per annum.

Collective Modes – Promoting Park and Ride

Overview

The Council operates three Park and Ride services, two of which have been the focus of improvements through VIVALDI. Improvements for these sites include enhanced cycling and walking links, improved capacity, introduction of an i+ kiosk, retrofitting vehicles with exhaust treatment equipment, and VMS information.

Results

Figure 3.18 shows that there has been a 13.2% rise in passenger growth on the 904 Bath Road service since the start of VIVALDI, an achievement that is particularly impressive as the service was already established and had high patronage figures. The 902 Portway service is relatively new, and has seen a rapid growth of passengers: in March 2005 the patronage figures were 82.8% greater than they were in April 2002.

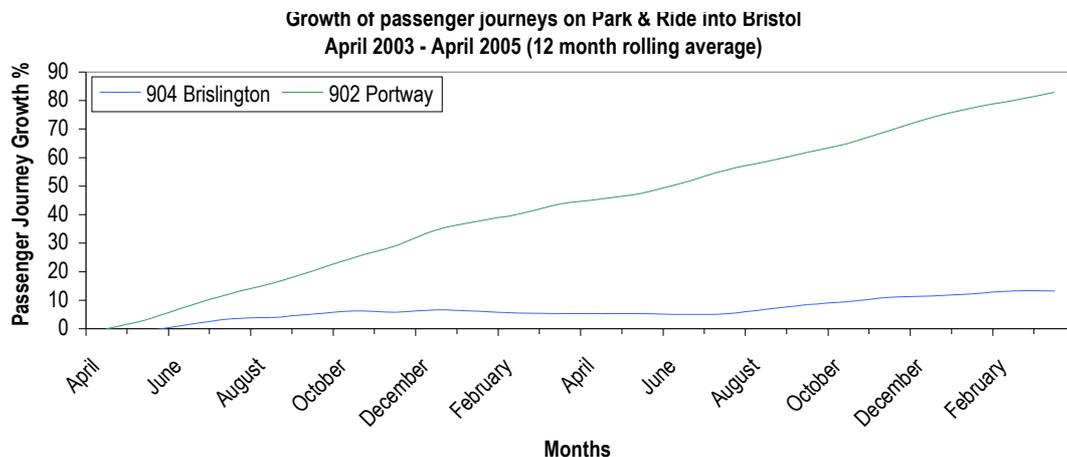


Figure 3.18 Patronage Data from the Park and Ride Services

In a survey undertaken on the bus, both sets of passengers were asked to state what mode of transport they used before choosing to use either the 902 or 904 P&R. It was found that 41% of 902 and 51% of 904 passengers would have used the car for their journey before deciding to use P&R. This represents a saving of 217 car journeys per day through the VIVALDI improvements.

In total, 94% of both samples thought that the bus priority measures had a positive affect on the service. There are also high levels of satisfaction for the various information services for both routes, and in particular high levels of satisfaction for the audio and visual information on board the 902.

Collective Modes – Promoting Walk/Cycle and Ride

Overview

The Council formed a partnership with the Mud Dock Café/Cycleworks with the intention of improving the facilities available to cyclists, particularly commuters, entering the city centre. As a result, the Cycle Resource Centre (CRC) was launched in December 2004. The CRC provides secure parking, clothing lockers, shower and changing facilities, and on-site service and repair facilities.

Results

The CRC has the capacity to store 30 bikes; after 9 months of operation the number of users has been less than expected. In a questionnaire of users, respondents were asked for their views on the cost of the services at the CRC, and were given the opportunity to state what they feel the cost of the services should be:

- Bike parking and lockers: 1.80-2.20 Euros (currently 3.70)
- Shower facilities: free-1.50 Euros (currently 3.70)

Conclusions

The objective of the implementation of the CRC at the Mud Dock was to provide a range of services to encourage cycle use and improved cycle security: the CRC has certainly achieved this aim. The utilisation of the centre is less than expected. However, the evaluated results for the first year of operation have identified possible areas for improvement and the Mud Dock will continue to market the CRC and will review their pricing structure in order to increase usage.

Collective Modes – Demand Responsive Transport Routes and Technology

Overview

Bristol Dial-a-Ride (BDAR) is a charitable not for profit organisation that provides a demand responsive transport service for mobility impaired travellers. It focuses on providing a door-to-door service across Bristol, and sets out to provide people with disabilities the opportunity to access public transport. The works completed under VIVALDI included the expansion of Dial-a-Ride into the previously unserved area of Westbury-on-Trym, Henleaze, and Stoke Bishop wards.



Figure 3.19 A BDAR Driver Assisting a Passenger

Results

Since the launch of the new area in August 2002, membership has increased steadily. By the end of the second quarter in 2005, it had increased to 1,008, an increase of 188%. In the same period, BDAR membership in all areas excluding the new one increased by 14.7% to 10,598. During the period January 2003-June 2005, the new area saw a total of 9,306 passenger journeys. Patronage ranged from 622 for the period January-March 2003 to 1,523 passenger journeys in April-June 2005, an increase of 145%.

BDAR conduct an annual passenger survey. The last survey with available data was in October 2004 and received a response from 410 members. It revealed high levels of user satisfaction:

- 80% of passengers rated the service as 'excellent' (and a further 16% as 'good')
- 87% of passengers rated staff as 'excellent' in terms of their friendliness, helpfulness, knowledge, and efficiency
- 100% of passengers reported that they felt safe when using the service

Conclusions

BDAR were able to use the new area as a test bed to try out suggestions and alternative ways of operating.

Information Services – Travel Information Centre and ITS Integration

Overview

The TravelBristol info centre was introduced in conjunction with the main bus operator and project partner First, and located in a high profile city centre position. The centre aims to provide a single point of interface with the public.

Results

The monitoring conducted by First and Tourist Information staff indicates that the centre is well used by people seeking travel information or services, with over 1,600 people per week using the centre. The new centre has proved extremely successful in increasing the number of tickets that First have been able to sell. The information provided at the centre is important for planning new journeys, obtaining travel information, and purchasing tickets. Some 35 respondents to a survey (29%) identified that the information provided had influenced the type of transport that they intended to use, highlighting that the info centre could significantly influence mode shift.

Users are extremely satisfied with the location, look, and access to the premises, with over 90% satisfied or very satisfied with each of these aspects. Some 103 respondents, 93% of those who used this facility, were satisfied with the assistance they received from First staff and over 80% of respondents using paper-based transport information provided rated it as highly or quite satisfactory.

Conclusions

The info centre is in a high profile location and is attracting a large number of users, leading to a significant increase in First ticket sales. Both the First staff and the Tourist Information staff based at the centre are also dealing with a large number of travel enquiries, mainly related to public transport information.

Information Services – Information Kiosks/Advice Screens

Overview

i+ kiosks are stand-alone electronic information kiosks. The kiosks allow users to access the Internet and use e-mail facilities as well as access numerous information channels. In total, 28 i+ points are now installed in and around Bristol city centre, some funded by the Legible City project and some at transport interchanges in community-focused locations, funded as part of VIVALDI. As part of the project, the Bristol Travel Channel was added to the available information through the i+ kiosks. The results are reported for the period January 2003-December 2004.



Figure 3.20 i+ Kiosk

Results

On average, the 10 VIVALDI kiosks are used over 600 times a month (20 times a day) compared to a utilisation rate of 1,000 per month (35 times a day) for the Legible City kiosks that are located in the city centre and other areas of higher footfall. The average amount of time per day that the kiosks have been in use has remained fairly constant and suggests that although there has been a drop in the number of uses over time, the kiosks are being used for longer.

The Bristol Travel Channel (BTC) was introduced on the i+ kiosks in June 2003. In 2003 and 2004, there were an average of 6 daily sessions on the BTC through the Legible City kiosks and 6.25 on the VIVALDI kiosks. The average time spent per day on the BTC for both kiosk types has reduced over time. As the levels of BTC usage have not declined, this could suggest that there are regular users of the BTC who are able to access the required information more efficiently.

Conclusions

There is evidence to suggest that the current levels of use are sustainable. For example, while quite low, the average amount of time that the kiosks are in operation has remained fairly constant and the average time spent per use has increased. This demonstration has shown that the public will use on-street kiosks for information and evidence suggests that there may be a sustained set of users of the kiosks and regular users of the BTC.

Information Services – Widening Access

Overview

This measure was aimed at widening participation and encouraging e-learning and use of other online services through the implementation of a wireless hotspot, providing equipment and Internet access to local residents, along with an on-line GIS database of community education opportunities. The project implemented a wireless hotspot in an area around The Park Opportunity Centre in Knowle. Participants in the Build-IT course learned how to recycle old PCs donated by Bristol City Council and Avon and Somerset Police.

Results

In a survey of residents involved in the ‘Knowle West Web’, it was found that:

- 13% of participants have started to work from home, reducing the need to travel
- 57% used the Internet for shopping and 35% used Internet banking facilities, which may lead to a reduced number of trips
- 74% stated that they used the Internet for educational purposes, with 26% actually completing training on-line
- 30% used the Internet to obtain travel information. This suggests that Internet access may make it easier for people to travel by public transport

Conclusions

Around a third of participants stated that the Internet reduced their need to travel to the bank and 39% claimed it reduced their need to travel to work and shops. Nearly half claimed that journeys to educational classes and to visit family and friends were reduced.

Information Services – City Navigators (Info Bus)

Overview

The creation of a mobile information vehicle termed the “Info Bus” was seen as a way to satisfy the need for the provision of mobile transport information and services. The scheme provides information to travellers at key sites such as public transport interchanges or where special events are held. A dedicated branded vehicle is used to provide information relevant to its location through a combination of staff, displays, paper-based material, and electronic systems. The key functions of the Info Bus are:

- Promoting public transport, walking, and cycling
- Providing transport information and services
- Marketing campaigns and event management

The Info Bus was created from an electric bus previously used as a Park and Ride service from a car park into the city centre. Being left-hand drive, and very small, the Bus is an eye-catching landmark at the events it attends.



Figure 3.21 The Info Bus

Results

During the period December 2003-August 2005 the Info Bus attended 17 events. Utilisation of the bus has been lower than anticipated, representing no more than 2-3 weeks use each year. A number of factors have been identified that are acting as a potential barrier to the vehicle’s use by council staff including the technology, the unconventional vehicle itself, and staffing events held on weekends.

Over the three days of the Harbourside Festival, it is estimated that 200,000 people attended the event and 735 people visited the Info Bus. The main reason for using the Info Bus was to gain information regarding public transport and almost 20% used it to get advice on walking and/or cycling.

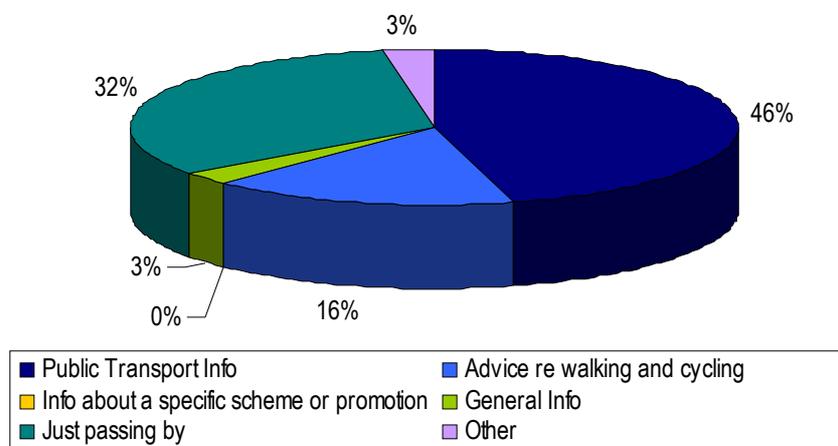


Figure 3.22 Reasons for Using The Info Bus

Some 80% of respondents to a survey during the Harbourside Festival found that the information provided was useful in planning a new journey, and 60% agreed that the information provided had influenced the type of transport they were going to use.

Information Services – Trip Planner

Overview

The Intermodal Trip Planner (ITP) is an Internet product designed to give access to high quality travel information for the bus, rail, and ferry services, as well as by bicycle or walking. The information provided is door-to-door using either address points or places of interest, with full itineraries provided in either textual or graphic form, recognising the need to provide information tailored to the individual traveller.

Results

Since July 2003, the ITP has received 10,919 hits with 6,505 completed journey requests made. This equates to an average of 600 journey requests per month of which about 60% lead to a successfully completed journey plan being produced.

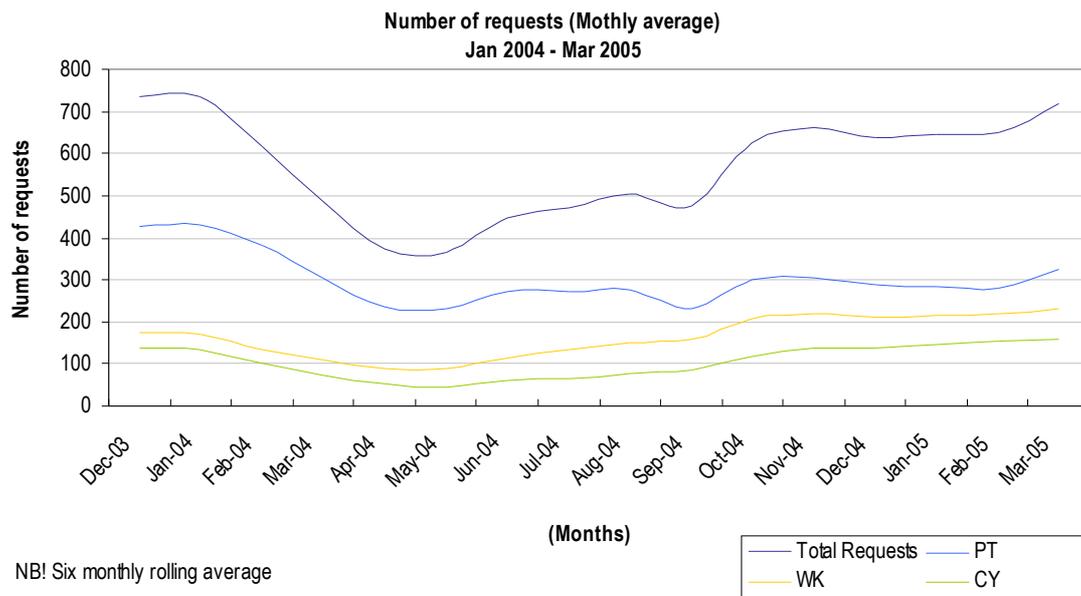


Figure 3.23 Journey Requests on the Trip Planner

Between July 2003 and March 2005, the bus trip planner received 5,902 hits while the walking and cycling planners received 3,005 and 2,012 hits respectively. Although still accounting for the most significant proportion of ITP hits, the bus planner’s use has declined from 60% to 40% of hits, matched by a growing use of the walking and cycling planners.

Conclusions

This measure successfully demonstrated the introduction of an intermodal trip planner. The growing number of users of the cycling or walking trip planners suggests that the ITP continues to be a useful resource.

Information Services – Bus Priority and RTPI

Overview

The use of Real Time Passenger Information (RTPI) and bus priority measures in Bristol aims to help encourage the use of buses through improved service reliability and information provision. The deployment of RTPI has enabled the information to also be available to serve dissemination media other than bus stop displays. The Council has utilised this information to produce an Internet-based real-time bus information service. The web site was launched in December 2003 and can be accessed via the TravelBristol website (www.travelbristol.org).

Results

In the monitoring period of March-December 2004, 1,281 hits were received on the site, almost 130 a month. The results show that over 31% of the requests were for 8 city centre bus stops, with the peak hours for hits being between 3pm and 5pm: this late afternoon peak suggests that people are checking the status of buses before leaving work. Stops on the 76/77 Showcase bus route contributed 25% of the total hits received by the RTPI website, with the Park and Ride services accounting for 18%.

Goods Distribution – City Logistics Scheme

Overview

The works under VIVALDI in this measure included the creation of a freight consolidation centre operated by Exel Logistics, providing consolidated deliveries to more than 50 retailers in the Broadmead shopping area. The centre is located 11km from the city centre, close to the strategic road network. The scheme has been developed with the active support and participation of key local and national stakeholders including the Broadmead Board (who represent the interests of retailers), Business West (Chamber of Commerce), and representatives of the freight sector. As the first such scheme in the UK, the centre has attracted a lot of interest and been nominated for 4 prestigious awards.

Results

The centre started operation in May 2004, and the benefits started to accrue as more and more retailers joined the scheme. One VIVALDI-branded 7.5t lorry was used when the service was launched, which was subsequently assisted by a 17t vehicle.



Figure 3.24a Freight Consolidation Vehicle



Figure 3.24b Consolidated Delivery

Vehicle utilisation started at 35% in May 2004, increasing gradually to 61% by December and averaging 65% through 2005. The average number of roll cages

delivered each month had surpassed 1,000 by the end of 2005, a tenfold increase from scheme launch.

There has been a reduction in delivery vehicle movements to participating retailers every month since the introduction of the scheme. Generally, the percentage reduction in vehicle movements has been over 50%, regularly surpassing 70%. A reduction in vehicle kilometres travelled is evident every month since the start of the scheme and this reduction has remained at over 1,000km per month since June 2004, occasionally up to 5,000km. Mirroring the reduction in distances travelled, harmful emissions have been greatly reduced:

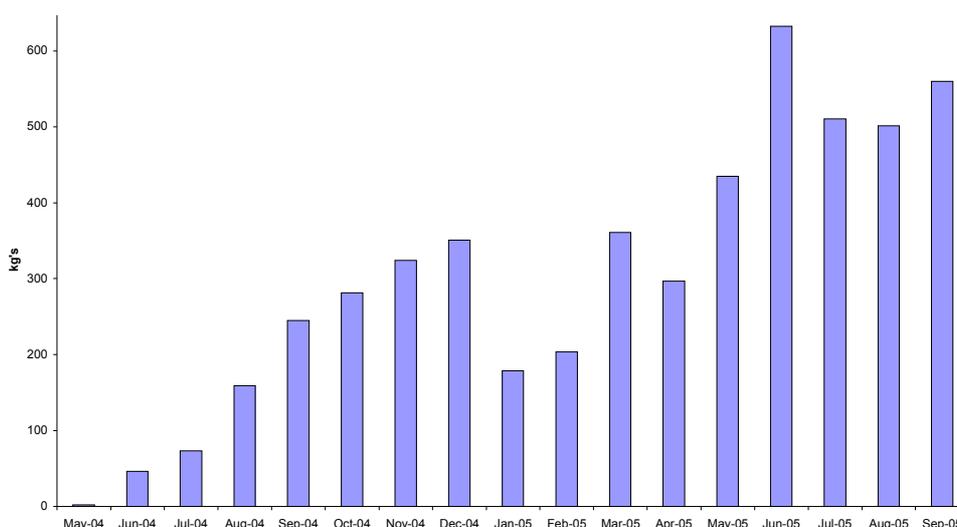


Figure 3.25 Kilograms of CO₂ Saved Through Use of the Freight Consolidation Centre

The graphs for savings of NO_x and PM₁₀ mirrors the pattern Figure 3.25, resulting in savings of up to 100g and 1,300g every month, respectively.

All of those retailers that responded to the monthly satisfaction survey thought that deliveries were made on time and no discrepancies or damages to deliveries had been experienced. All retailers felt that the delivery team had left the delivery area clean and tidy and, for those retailers that had items collected by the centre, all felt that they had been taken at the correct time.

Interview surveys were undertaken with a small number of store managers of members and non-members of the consolidation scheme. It was found that delivery times are generally shorter for those retailers that are involved in the consolidation scheme. The majority of those involved in the scheme also agreed that the way in which deliveries are made now saves staff time and that the time and method of deliveries was now more reliable and created fewer access problems in delivery areas.

Conclusions

The scheme has had a very high beneficial affect in reducing goods vehicles distances in Bristol city centre and a consequent reduction in air pollution. All members of the scheme have reported favourably on the service received, and the numbers have continued to grow. The consolidation centre is to be maintained after VIVALDI, in association with an expansion to the Broadmead shopping area. Value added services

are being added to the scheme, including the collection of recyclable materials, and the scheme is progressing towards self-sufficiency, with contributions being sought from participating retailers.

Goods Distribution – Home Shopping

Overview

The Local Collect service was developed by Royal Mail with the aim of improving their parcel delivery service by improving convenience to customers and reducing the number and length of journeys made by the delivery vans. Customers can ask for the Local Collect service at their local Post Office or to a secure Locker Bank. The locker bank system involved the installation of secure electronic locker-bank technology at locations that are more convenient for the customer than the nearest Royal Mail depot.

The Home Shopping trial was delivered as a partnership between Bristol City Council, Brunel University, Somerfield, and the Dolphin Society charity. It was designed to enable housebound people to shop independently from home, but with a more straightforward alternative to Internet shopping. Brunel University designed and manufactured a barcode reader and computer, known as the Companion, to enable people to scan barcodes to select and order their shopping from a catalogue of products stocked by the local Somerfield supermarket.

Results

The Local Collect trial in Bristol formed one-third of a national trial, and it has not been possible to separate the data. Some overall results include:

- 84% thought the service made collection of their items easier
- 28% have bought more through home shopping channels as a result of convenient delivery
- 33% of users stopped using a car to collect items

The limited number of participants in the home shopping trial (13) has made it difficult to draw any significant impacts. An average of 4.6 deliveries have been made per week, and on more than half of the weeks in the trial, 5 or more participants used the service. The majority of the trial participants were over 70 and required support to carry out their weekly shopping, mostly completed on foot or by car – half of them reduced their car use (or that of carers) through participation in the trial.

Conclusions

The results for these trials have shown that there has been a reduction in car trips as a result. In addition, it should be stated that both schemes, and in particular the Home Shopping trial, have provided social benefits to the end users.

Clean Vehicles – Clean and Efficient Buses

Overview

A Hybrid Bus was introduced and operated on a city centre orbital route with the aim of significantly reducing harmful emissions.

Following a review of bus operator First's fleet, 56 buses were fitted with retrofit equipment comprising 9 oxidisation catalysts and 47 particulate traps, installed in December 2002. Catalysts (reducing HC and CO by a minimum of 50%) were fitted on older pre-Euro vehicles, and particulate traps (reducing HC and CO, plus PM by up to 90%) were fitted on the slightly newer vehicles.

It was decided to introduce LPG vehicles to the Demand Responsive Transport Service operated by BDAR. The launch of the first LPG vehicle took place in August 2002 and four further LPG vehicles of a similar type have been introduced since, replacing older diesel vehicles as part of fleet renewal (these vehicles now comprise a third of the fleet).

Results

Since the new service launched in June 2005, the hybrid bus has only managed to complete three weeks in service covering 1,399km, but a series of problems (associated with the batteries and software) have kept it off the road. The hybrid bus has therefore not been in service for a sufficient length of time to meaningfully evaluate the emissions, and other, results.

Overall, there have been significant savings in the emission of most pollutants due to the retrofitting, with the exception of CO₂, as shown in the following table:

Table 3.15 Emission Changes (tonnes per year) for Retrofitted Buses

Pollutant	Before	After	Difference	% Change
CO	6.44	0.64	-5.81	-90
NO _x	25.70	25.70	0.00	0
VOC	1.74	0.17	-1.56	-90
PM	1.03	0.05	-0.98	-95
CO ₂	2,466.58	2,515.92	49.33	2

There is an apparent correlation between fuel consumption and the fuel mix: as the amount of LPG used increases, the fuel consumption decreases. On average, the fuel cost of operating the LPG/petrol vehicle is 0.13 Euros per vehicle km, compared to a figure of 0.16 Euros for the diesel replacement vehicle. Due to the cheaper price of LPG, it is estimated that over the monitoring period BDAR saved around 820 Euros in fuel costs through operating the LPG/petrol vehicle. The use of LPG/petrol engines also resulted in a 75% decrease in NO_x and a 30% reduction in volatile organic compounds, although CO and CO₂ (6%) increased.

Conclusions

In terms of vehicle emissions, the retrofitting of diesel buses with particulate traps led to a reduction in particulate matter (PM), which is important for local air quality. There was a slight penalty in terms of increased fuel consumption and CO₂ emission (a climate change gas). The buses fitted with oxidisation catalysts did not appear to suffer a fuel penalty, but did not remove as many pollutants (in particular PM).

The emission reduction benefits of the LPG vehicles were significant for NO_x, which is important for local air quality. The increase in fuel consumption meant that there was a slight penalty by way of increased CO₂ emissions. The lower cost of LPG meant that savings were made on fuel costs.

Clean Vehicles – Clean Fleet Vehicles

Overview

In total, 73 LPG vehicles have been introduced and successfully operated within the council's fleet, bringing the LPG proportion of the fleet to around a quarter.

In terms of electric vehicles, 5 battery-powered Reva G-Wiz cars were leased and delivered in March 2004, charged using renewable energy. These vehicles are used as pool cars for council staff and are based at three separate buildings.



Figure 3.26 G-Wiz Electric Pool Vehicle

A Toyota Prius (hybrid synergy drive system combining petrol engine and electric motor) was introduced into the council fleet in November 2004. This is petrol driven at high speed and under acceleration, and electrically driven at low speeds.

Results

Comparing the LPG vehicles with a control group highlights that they are less fuel-efficient than the diesel equivalent if a low proportion of LPG is used in the fuel mix. Compared to the existing situation, NO_x emission reductions are significant and PMs are eradicated; this local air quality benefit is at the expense of increases to CO₂.

Between May 2004 and July 2005, the two electric G-Wiz cars based at Wilder House covered a total of 3,593km with an average trip length of 11.3km: this reflects the use of these vehicles for travel between council sites and within the city, a duty to which these vehicles are well suited. It is estimated that the G-Wiz cars have consumed 502 kw/h of electricity and have an average operating cost of just 0.03 Euros/km.

At the point of use, the G-Wizs emit no pollutants at all, and are very efficient over a full life cycle. Table 3.17 shows the differences between the electric vehicle and a diesel and petrol car: although very efficient compared to diesel, a petrol car produces less NO_x than a coal-fired power station that may be providing the electricity, and PMs are increased (from a very small base).

Table 3.16 Electric Vehicle Emissions Change

Pollutant	% Reduction (compared diesel)	% Reduction (compared petrol)
CO	-94.9	-98.8
NO _x	-72.4	-1.1
VOC	-64.5	-79.2
PM	-83.8	93.9
CO ₂	-61.8	-62.6

Over the period November 2004-August 2005, the Hybrid Toyota Prius covered 13,110km with an average trip length of 104km. It was refuelled with 682.1 litres of petrol, equating to an average fuel consumption figure of 19.2km/l and an average cost of operation of 0.06 Euros/km. In terms of emissions, the Prius has reduced the output of all measured pollutants (CO, NO_x, VOC, and CO₂) by around 55%.

Conclusions

For the niche application for which they have been used, the G-Wiz electric cars show some admirable cost and emissions savings. Not only are emissions zero at point of use, but total life-cycle emissions are significantly lower.

Due to its increased fuel efficiency over a normal petrol car the Prius hybrid is estimated to have proportionately lower emissions of all pollutants.

Clean Vehicles – Fuel Supply Infrastructure and Local Network

Overview

A tendering process was undertaken for a “clean fuel support network” and the contract awarded to the Greenfuel Company, based in Bath.

Results

The project met its primary objective of converting 50 vehicles owned and used in the Bristol area. Slightly over half (27) of all project participants were residents within the Bristol. The remainder consisted of 11 taxi drivers, 9 BCC employees and 3 Small and Medium sized Enterprises (SMEs).

The LPG vehicles averaged a monitoring period of 147 days during which an average 21,300km were covered per vehicle, giving an estimated annual distance of 35,000km. The fuel consumption figures were calculated as an average of 7.9km/l, a poorer efficiency than that achieved for the BCC fleet LPG vehicles. A significant factor in the level of fuel consumption by the Greenfuel converted vehicles is likely to be the high proportion of large engines present compared to the council fleet LPG and control groups. The average cost of running the converted vehicles was 0.12 Euros/km.

Using petrol as the ‘before’ scenario when looking at emissions, NO_x and VOC are increased after the conversion to LPG with CO₂ going down by 23%; a reversal of the comparison with diesel vehicles.

Conclusions

The increase in NO_x emissions of 79% may be a little worrying for local air quality, but the reduction in CO₂, a greenhouse gas, could be seen to balance this.

Mobility Management – Travel Plans

Overview

For a number of years, the council has been working with major employers to encourage the development of travel plans. However, limited work has been undertaken for sites that generate significant trips by visitors. Through VIVALDI, this measure aimed to bring together the major leisure and tourism destinations on Bristol’s Harbourside and improve access and travel choices for visitors.

Results

The group developed a Sustainable Travel Action Plan to record all achievements and future plans to improve sustainable travel in the area. The action plan was developed throughout the project and is intended to be a ‘living’ document.

The VIVALDI Cross Harbour Ferry Service was launched in July 2004. Patronage data was collected for the period July 2004-July 2005, and the results showed that 27,554 passengers used the service since its introduction. The results show an expected seasonal trend where patronage is far greater during the spring and summer. However, usage figure do not drop below 1,000 in any month, indicating a large number of regular users.

In a user survey, it was found that the main journey purpose was for work or business, accounting for 39% of trips. Tourist trips were the second most common purpose, representing a further 28%. This is shown in Figure 3.27.

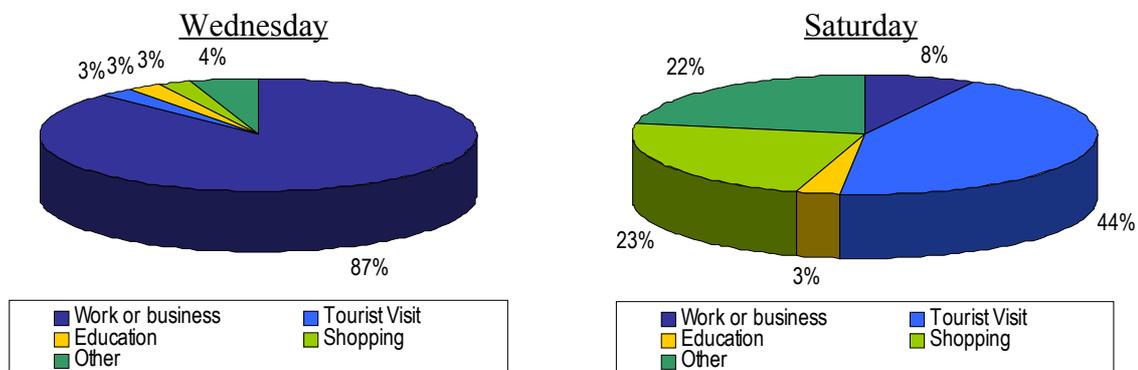


Figure 3.27 Journey Purpose for Cross Harbour Ferry Trips

Over a third of passengers surveyed were using the ferry service for the first time. A further 37% use the service frequently, particularly passengers making work trips. Walking was the most frequent other mode of transport used as part of the journey being made by ferry, representing 61% of responses, while a further 21% identified using the car for part of their journey. Some 12% of passengers previously used their car for part of the journey now being made by ferry, showing that there has been a mode shift.

The survey revealed three common reasons for using the ferry service: journey time savings, convenience, and enjoying travelling by this mode. Overall, user satisfaction was very high with all elements of the service provided. Ease of access, fare levels, and staff assistance were all rated as highly satisfactory by 84% of respondents.

Conclusions

The ferry survey has revealed that the service is popular for work and tourist purposes. During the week there is a core group of frequent users who are using the service to get to work or make business trips. The service is also important in linking origins and destinations either side of the Harbourside area.

Mobility Management – Community Travel Workers

Overview

Other transport projects have found that local support is higher when an inclusive and comprehensive consultation process is carried out involving those that are likely to be affected. Although true across a number of measures, the project plan for the Dings Home Zone required significant effort to encourage residents to actively participate. Two part-time Community Travel Workers (CTWs) were recruited, leading a programme of community involvement including face-to-face surveying, street trial events, liaison between project partners and residents, and a programme of sustainable travel promotion. In addition to involvement in the Home Zone, CTWs have also been involved in the TravelSmart programme.

Results

Community involvement within the Dings has remained high throughout the design and implementation of the measure. CTWs were successful in engaging 84 (74%) of the 115 households. This successful engagement contributed towards 82% of residents supporting the concept of a Home Zone in 2002. The high support for the Home Zone is largely attributable to the level of involvement CTWs have had with the local community and in their aim to inform, involve and empower them at all stages of development.

CTWs have also been involved in ensuring that alternative mode information and rewards were personally delivered to households as part of the TravelSmart campaign. The success of the campaign is largely attributable to the personalised service that the campaign offered.

Conclusions

Community Travel Workers have been an integral and vital component of the Dings Home Zone and the subsequent success of its implementation. The involvement of a trusted independent third party enabled strong lines of communication to form between residents and all partners involved in the project. This measure provides a good model for how difficult decisions relating to local transport issues can be resolved through a meaningful consultation process. The use of CTWs has provided a valuable model that could be employed in future major schemes.

Mobility Management – Walking and Cycling Measures

Overview

Works have been progressed through seven target schemes. Cycling and walking improvements have assisted in improving access to education, employment, and services through the provision of cycle and walking infrastructure in targeted areas and corridors, and the linking of new or extended provision to other project measures.

In one development, the Bristol-Bath railway path was extended along the alignment of an old railway line into Temple Meads Station, providing access opportunities to the station for residents of the Dings Home Zone.

Results

Although a path existed through Crox Bottom, the condition of it, like that of others improved as part of this measure, was very poor. The path is an important strategic route linking Hartcliffe to the Malago Greenway route. Work on the path included widening and resurfacing along the valley bottom, as shown in the following images.



Figure 3.28a Crox Bottom Path Before



Figure 3.28b Crox Bottom Path After

The walking and cycling count collected at Crox Bottom before and after infrastructure change show that pedestrian numbers have increased by almost 70% (particularly among the elderly) and cyclists have gone up by around 80%.

Conclusions

Extended and new build routes have been successful in increasing the number of pedestrians and cyclists using all the routes targeted through this measure.

Mobility Management – TravelSmart

Overview

The traditional approaches to achieving modal shift have been through the provision of transport services and infrastructure, pricing, and longer-term land use policies. Although these measures are essential to increase walking, cycling, and use of public transport, their value is limited if people are unaware of the options available. Individualised Travel Marketing (ITM) campaigns have successfully been utilised as a technique for changing travel behaviour, in particular through the promotion of public transport.

TravelSmart 1 was implemented among a target population of 2,143 households (5,000 people) in the Bishopsworth and Hartcliffe areas of Bristol in autumn 2002 and autumn 2003. A second project was carried out in the Bishopston area among a target population of 1,937 households (5,000 people) in spring 2003. The third project was completed in the Bedminster, Southville, and Windmill Hill areas of Bristol among a population of 2,275 households in spring 2005.

Results

The first TravelSmart campaign resulted in substantial increases in walking (15-16%), cycling (up to 27%), and use of public transport (12-13%), leading to relative reductions in car trips of 9% in Bishopsworth and 12% in Hartcliffe.

The Bishopston campaign resulted in substantial increases in walking (5%), cycling (42%), and use of public transport (13%), leading to relative reductions in car trips of 11%, and in car distances travelled of 13% (a net saving of 1.7 million car kilometres per year among the target population).

In Bedminster, Southville, and Windmill Hill, the campaign resulted in relative increases in walking trips of 7%, cycling trips (22%), and public transport trips (18%).

Conclusions

The TravelSmart programme successfully achieved shifts towards more sustainable modes of transport without significantly altering journey times or distances.

Access Management – Access Management

Overview

The bus lane enforcement project sought to carry out a trial examining the technological requirements and legal implications of using Automatic Number Plate Recognition (ANPR) cameras to record vehicle violations in designated bus lanes. It is hoped that if motorists are fined for illegally using a bus lane using technology which was easily transferable and needed few resources to operate, then bus journey times would be greatly reduced and thus encourage a mode shift from private car to public transport.



Figure 3.29 ANPR Camera at Lewins Mead in Bristol city centre

Installation of the cameras was carried out at two sites in early 2005 and data collection started from April 2005. Data capture was carried out by the ANPR system matching a captured vehicle registration number against a list of vehicles that could legitimately use the bus lane (buses, certain taxis, etc). When a vehicle is captured that does not match this 'non-violator' list, images are recorded and encoded in a file along with a text document containing information such as time and date of violation, location of violation, registration number of vehicle, and confidence rating.

Results

The ANPR system gave a rating for each recorded violation to measure how confident the system was to accurately record the correct vehicle registration number/mark (VRM). It was decided that results above a level of 95 confidence will be used in the comparison of results. A total of 40.5% of cases fell below the 95 confidence level, which, if the system were in full operation would not be acceptable. In addition, the system failed and recorded no data on a large number of days (up to 11 in each of June and August). The cause of the equipment failing to record cases is not fully known.

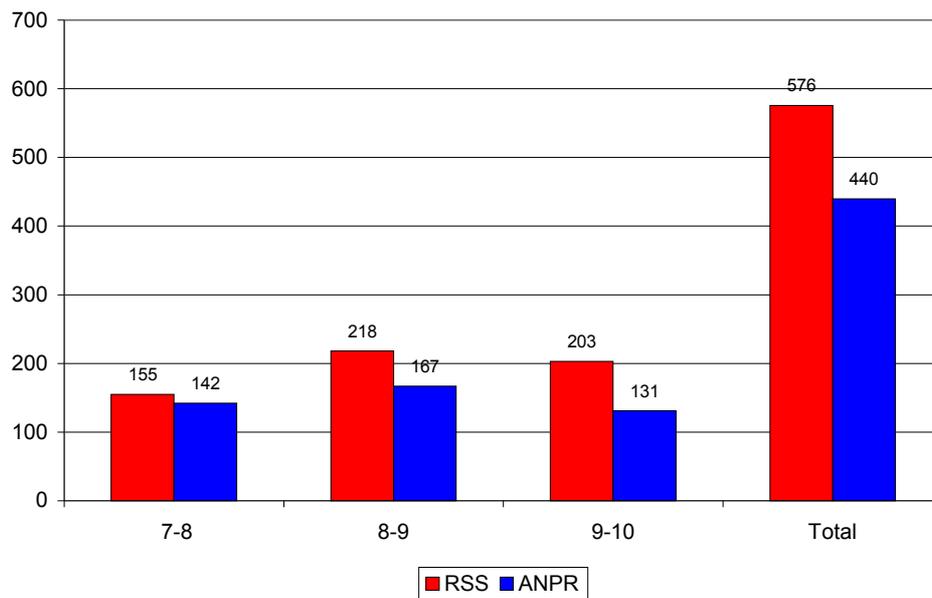


Figure 3.30 Roadside Survey and ANPR Camera Comparison

Figure 3.30 shows roadside survey results compared against data collected by the Bath Road ANPR camera on Tuesday 10 May. The surveys produced a higher count of vehicles than the ANPR camera that suggests that the equipment is not accurately recording all vehicles, which would need to be addressed before full implementation.

Conclusions

The Bus Lane Enforcement trial set out to test the available technology to identify issues and potential problems that could occur in a more extensive trial or full implementation. The trial did not set out to be a fully functioning system where no problems occurred. To this degree the trial can be regarded as a success. Many issues and problems were identified and have been discussed above; however, it is with this information that further development work can be carried out and potential issues can be predicted.

Access Management – Home Zone

Overview

The Dings, comprising a residential area surrounded by light industrial businesses, is located to the east of the city centre. It is on the edge of the redeveloped Temple Quay area, characterised by new office developments, but has been recognised for many years as Bristol’s most deprived ward, suffering from high levels of social stress.

Home Zones are now part of UK policy, and various initiatives including Government funded pilot schemes and private developers implementing Home Zones, have resulted in an increase of such schemes. The Home Zone in the Dings involved the implementation of a new retrofit Home Zone in seven residential streets remodelled to ensure equal priority was given to pedestrians, cyclists, and motor vehicles, and the level of commuter parking in residential streets was reduced.



Figure 3.31a Street Simulation Event



Figure 3.31b Shared Surface with New Paving

Design features within the Home Zone include: new surface materials helping to create a more vibrant streetscape whilst also providing a shared surface; reduced sight lines for motorists encouraging lower vehicle speeds; traffic route alignments; street furniture and new street lighting; a link to the Bristol-Bath cycle/walkway; and improved amenities. A number of innovative approaches were taken, including the inclusion of a ‘Sustainable Urban Drainage System’ (SUDS). This is a permeable paving system allowing rainwater to follow its natural course and drain into the sub grade and not into the sewage system. This is one of the first and largest areas of it in adopted highway in the UK. Furthermore, innovative social aspects have been implemented in the Home Zone including public artwork of some considerable stature, designed to enhance the streetscape, identity and community ownership of the area.

Results

During the consultation phase, street simulations were presented to residents enabling them to view the different features of the proposed Home Zone, raising awareness and acceptance of the measures from the early stages. The simulation included alternative vehicle parking arrangements, shared surface-space areas, and traffic calming measures and was presented to residents as part of seven street events organised by Community Travel Workers.

A survey conducted in December 2002 measured the level of support for the Home Zone and provided an opportunity for residents to raise concerns about it during the early stages of the project. Of the 80% of residents who had heard about the Home Zone concept, 82% supported the idea, 13% were unsure and only 1% presented a view against redevelopment of the area.

A residents’ survey was completed on Dings Walk in December 2004 following implementation of the first remodelled street. Residents rated safety as the most improved aspect of the area since it had been developed, and thought that the Home Zone had positively contributed towards many existing problems in their streets.

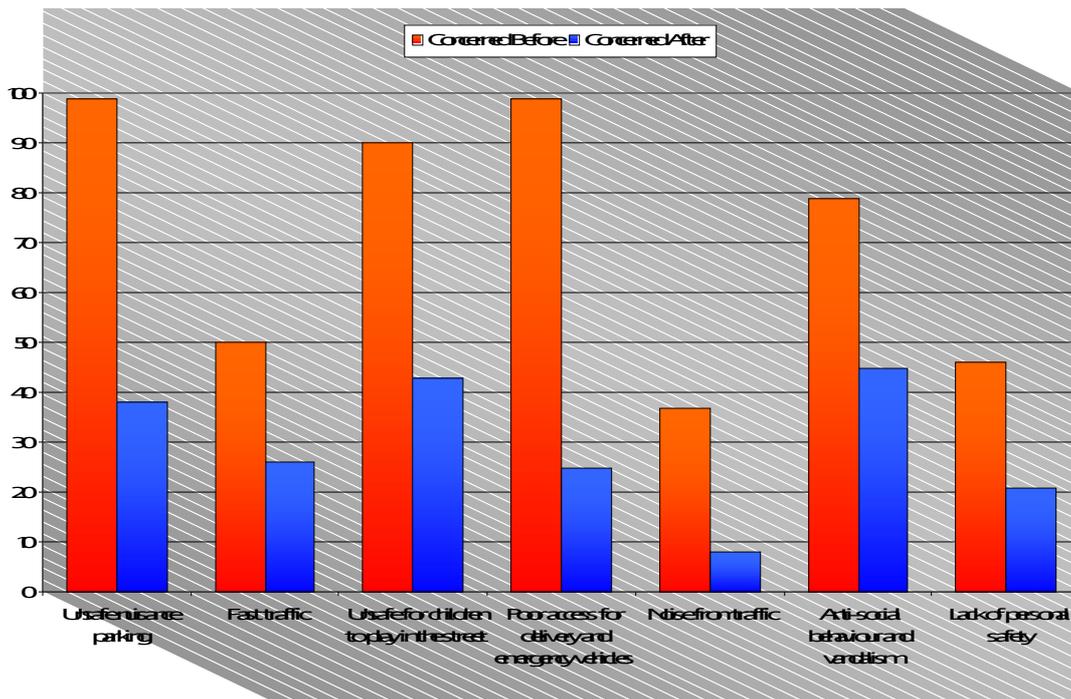


Figure 3.32 Are You Concerned About the Following Issues?

Of the 12 businesses that were interviewed, 4 believed that the development of a Home Zone would benefit their business. They believed that improving the access along Barton Road would be beneficial, along with general improvements making the area more attractive for potential customers. The remaining 8 businesses believed that the Home Zone would have no effect.

Conclusions

The community involvement process has helped to demonstrate the positive impact that residents can have on local transport projects and the enthusiasm they have for helping to improve their local environment and strengthen local identity. The project has also shown that streets can be designed with non-conventional features without comprising safety. The new layouts create a unique environment that not only keeps cars moving slowly but gives equal priority to motor vehicles, cyclists, and pedestrians.

The pilot use of Sustainable Urban Drainage (SUDS) in the Home Zone is now going to be actively encouraged for future developments within Bristol.

3.2.4 Kaunas

As a smaller site, similar to Aalborg, the implementation of tasks in Kaunas was also carried out in two of the CIVITAS policy fields – integrated pricing and stimulation of collective modes. Table 3.19 summarises the relationship of the measures to the overarching policy fields.

Table 3.17 VIVALDI Measures in Kaunas

CIVITAS policy field	Measure	Integrated Package
Collective modes	New public transport services	New PT services
	Integration of taxis and microbuses into PT	
	Access and security improvements	
Integrated pricing	Integrated ticket system of public transport	New PT services

Collective Modes – New Public Transport Services

Overview

This measure concentrated on the impact of modifying the public transport route system: in particular on the reduction of some routes, better management of others, methods of attracting new passengers, and what effect this has had on the number of cars in the city. The main objective of this measure was to modify the public transport system to satisfy the public needs related to transport, safety, comfort and economy, and to attract new passengers.

Results

During implementation of the VIVALDI project, the PIKAS transport management system was introduced in Kaunas. Its main aim was to improve the effectiveness of public transport management, and thus attract more passengers.

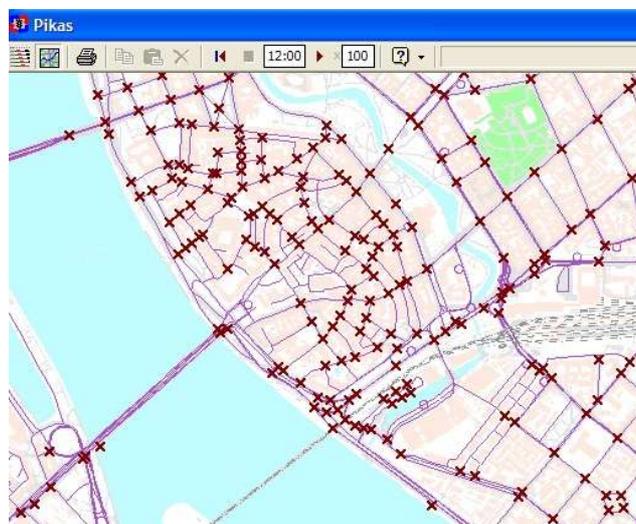


Figure 3.33 PIKAS Scheduling System

The change in the number of public transport routes in Kaunas in 2002-2005 was analysed. During this period, the number of bus routes increased by 9% (4 new routes), better regulation and control meant that the number of minibus routes reduced by almost 30% (14 routes cancelled), and due to limited overhead electrical power-lines trolleybuses increased by a single route to 16.

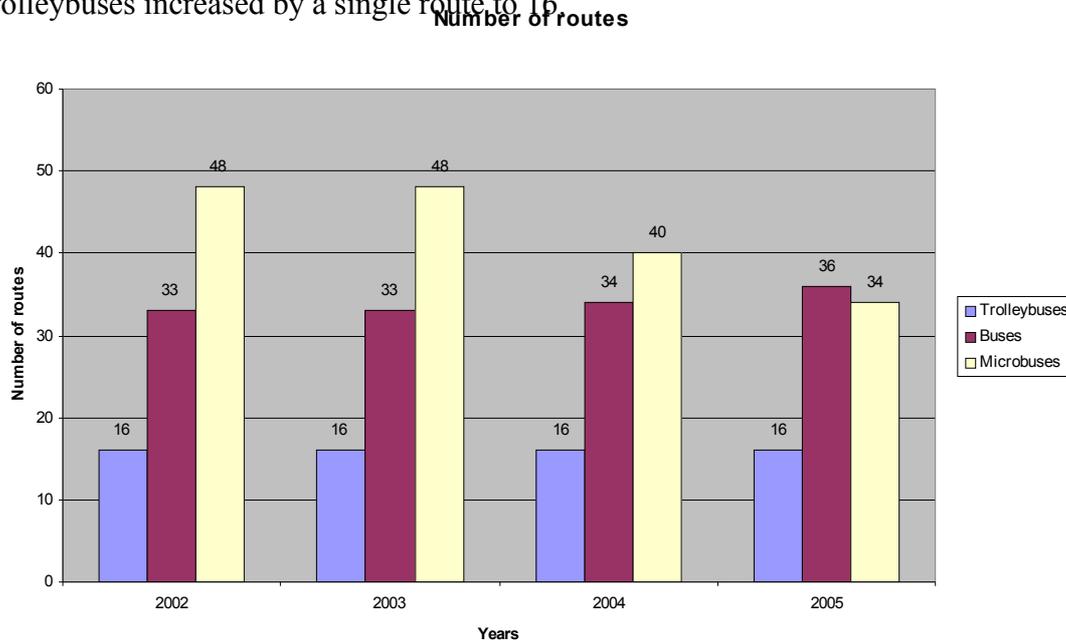


Figure 3.34 Changes in Number of Public Transport Routes

The Kaunas public transport system is such that trolleybuses serve the central part of the city, buses reach industrial and residential districts, and minibus taxis reach the suburbs; thus, minibus routes are the longest. From 2002 to 2004, the length of bus routes increased by 1%, for trolleybuses it increased by almost 18% and the length of minibus routes increased by just less than 2%. Similarly, the transport units show that minibuses make the biggest number, although this reduced by more than 18% from 2002 to 2005. In the same period, the number of trolleybuses did not change and the number of buses increased by more than 72%.

During the years 2002-2004, the costs of trolleybuses increased by almost 39%. In the same period, the costs of buses decreased by almost 8% and the costs of minibuses by about 22%. Reporting true levels of profit, costs against revenues, is very difficult beyond Kaunas Municipality due to the confidential nature of the data. In addition, as many of the minibus companies are very small concerns, such records have not always been kept.

The amount of fuel (buses) and electricity (trolleybuses) used depends on the length of routes and number of units in use. From 2002 to 2004, the amount of electricity used by trolleybuses decreased by about 4%, as shown in Figure 3.35; the amount of fuel used by buses increased by almost 57%. In 2002, the annual distance travelled was 5.6 million km, and in 2005 it was 11 million km. The analysis of air quality monitoring data in recent years showed the increase of air pollution caused by transport in some parts of Kaunas. However, due to the technical, economical, and planning measures introduced, concentrations of some air pollutants have been considerably reduced (e.g. concentrations of NO_x in the city centre were reduced by almost 50% in 2001-2002).

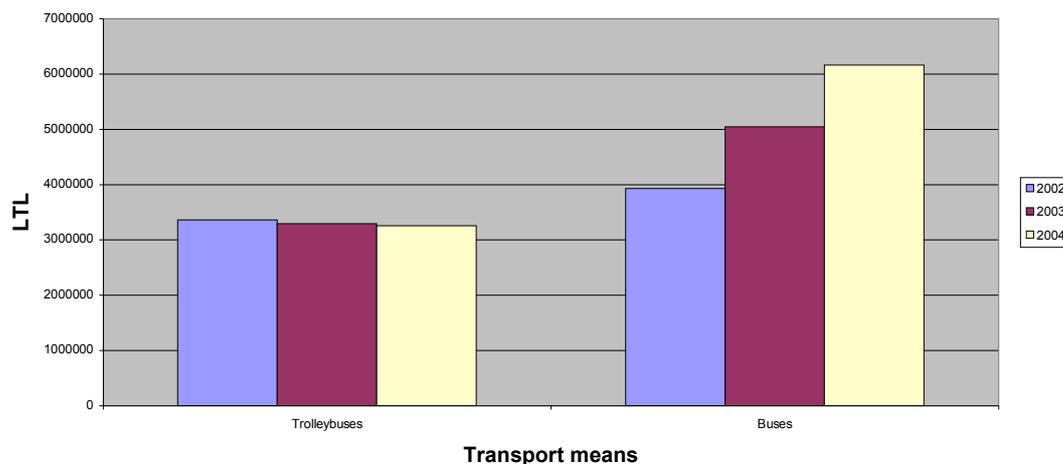


Figure 3.35 Fuel Use

Changing human behaviour needs a lot of effort and time. In Kaunas, activities related to modernisation of the transport system and popularisation of public transport started comparatively recently, so the number of private cars was increasing: from 2000 to 2004, the number of private cars per 1,000 inhabitants increased by almost 26%. However, it needs to be borne in mind that there were other economic and social changes going on during this period, including becoming a member state of the EU which, for some, brought new opportunities to leave and earn ‘new wealth’ in other EU countries. Economic growth was substantial during these years and the number of private cars increased. The vicious circle between economic growth and transport growth has been identified as one of the key obstacles for sustainable urban development in Europe.

Conclusions

Public transport routes have been managed in such a way that they more closely reflect passenger usage. There is also now a clear line of feedback from the passenger to the transport division at the city municipality and this aids the constant monitoring and evaluation of the PIKAS management system. Passengers would like to see more of the newer buses on popular routes – something that is planned with the purchase of further SOLARIS buses in 2006.

No real impact can be made as regards car usage: for a number of external economical reasons, people now have more disposable income and are attracted by the idea of owning their own mode of transport. It is nevertheless important to persevere and continue to improve efforts to make public transport the most attractive form of city transport.

Collective Modes – Integration of Taxis and Minibuses into the Public Transport System

Overview

The aim of the taxi/minibus integration in Kaunas was to increase public transport reliability, accessibility, and attractiveness. It also seeks to address the wider issue related to the disorganised development of city transport. Much of the work related to this measure was political, and concentrated on activities based around negotiation and

changing administrative processes. The integration of taxi/minibus services into the general regulation and control system of the city public transport system aimed to increase the sustainable mobility of public transport. It would also increase the integration of transport management systems, including related information systems and passenger services.

Results

The PIKAS software was used to calculate new optimised and co-ordinated traffic timetables that included private carriers into the public transport system. Routes of minibuses, their length as well as number of vehicles used were optimised. The number of passengers transported by minibuses from 2001 to 2004 decreased by almost 35%.

Clearly the reduction of the routes for minibuses (as well as the reduction in actual numbers of minibuses) may well coincide with the delivery of the new SOLARIS buses and the additional services that have been added for these: there has been a relatively high jump in the number of buses (72% increase) against the drop in the number of minibuses. Also, the number of passengers carried by trolleybuses overtook that carried by minibuses in 2004.

Conclusions

Public survey results on the integration of minibuses found that over 50% of respondents thought that numbers of minibuses in Kaunas are optimal with only 12% believing that numbers should be increased. However it must also be noted that 18% of respondents had no opinion or did not answer the question, and that the term “optimal” is very subjective and indicates more the general satisfaction with numbers of minibuses in the city.

Collective Modes – Access and Security Improvements

Overview

The aim of the activities implemented in this part of the project was to ensure convenient accessibility to information about public transport services. During the project, the infrastructure of stops was renewed, vehicles adapted to the needs of disabled people, and special information on public transport was prepared.

Results

During implementation of the project, 367 new bus stops were implemented. By 2004, 1,300 cylinder-type timetables were made and fitted. All new stops have information stands with Kaunas public transport maps and principal tourism sites, of which nearly five thousand were designed and printed in 2005. Figure 3.36 shows that 83% of public transport users interviewed thought that the stops were comfortable; the older the respondent, the more satisfied he/she is with the convenience.

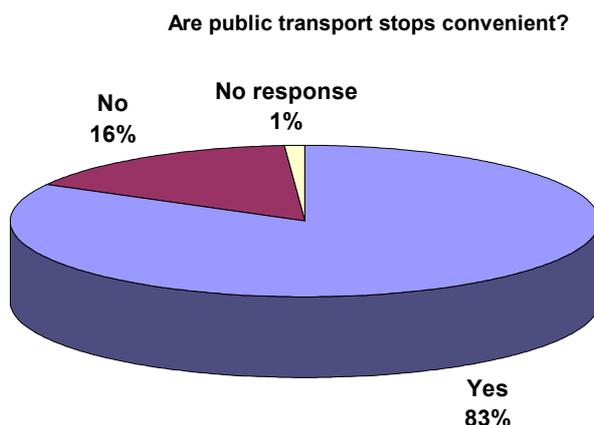


Figure 3.36 Satisfaction Levels with Bus Stops

Internet pages (www.kaunas.lt/transportas) on public transport were also created during the implementation of the project. All information related to public transport was presented – from routes, timetables and ticket prices, to regulations. Kaunas is the first city in Lithuania to present timetables of minibuses together with timetables of buses and trolleybuses. In the first 5 months of the website launch, there were 125,000 visitors to the site. On the same site, it is also possible to find instructions on how to get information on public transport departure from any stop by SMS, although this service has not been in place for long enough to allow meaningful evaluation. As Table 3.18 illustrates, the various forms of public transport information reach different audiences.

Table 3.18 Usage of Information By Age

Age groups	Knows and uses indicated means of information about public transport routes and schedules			
	Information stands	Leaflets	Internet	SMS message
15-18	60*	0	20	0
19-29	91	9	47	3
30-45	81	25	19	13
46-60	86	5	14	0
Over 60	82	9	5	0

* % of respondents in the age group, who marked that know and use indicated means of information

Conclusions

Although Kaunas residents generally like the layout of public transport routes, and consider the provision of stops and information to be convenient, Kaunas City Administration is continuously improving the access to information. For 2006, a major promotional campaign to target specific groups of users is planned – based on much of the VIVALDI research – which will lead towards increased campaigning and identification of most relevant means of information to different target groups.

Integrated Pricing – Integrated Ticket System of Public Transport

Overview

The aim of this measure was to produce a viable unification of the single and monthly bus and trolley journey tickets, and ticket validation and vending machines. Ideally, the price of each ticket should be in relation to the distance travelled or the duration of the journey. The idea of “zoning” the city into three distinct zones was explored; each ticket sold being for a single journey of a minimum of one zone and a maximum of three zones with the price dependent upon the number of zones travelled. The measure also aimed to include development of an e-ticketing system that would allow transport companies to deliver a more economical system as well as plan and organise their activities more effectively.

Results

During implementation of the project, 309 new ticket punchers were installed in buses and 460 in trolleybuses. The number of public transport tickets sold in Kaunas in 2001-2004 is presented in Figure 3.37. During this time the biggest number of tickets were used in trolleybuses, with an increase of 45%. A small increase was also noticed in buses, almost 8%.

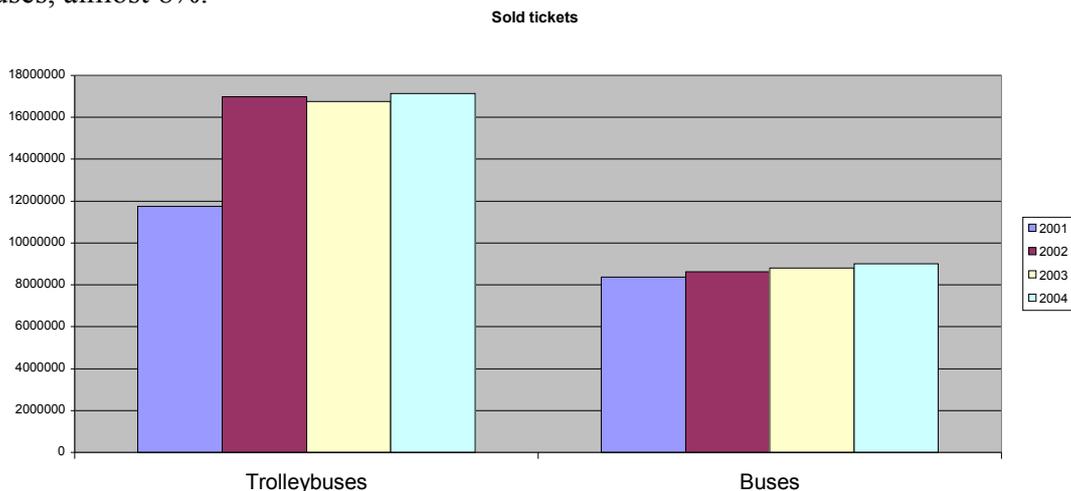


Figure 3.37. Changes in PT Ticket Sales

The new ticket validators are a success as people like the convenience. Where people felt they were not convenient, the main reasons given were that the punchers were fixed too high or they would not mark crumpled or wet tickets.

As part of the efforts to create a system geared towards e-ticketing, a number of people were asked about their perception of changing the style of ticketing. The most favourable evaluation to the convenience of electronic cards came from respondents of the age group 19 to 29 years. This is very useful because a marketing campaign targeting students and young professionals will commence to ascertain their opinions on more specific aspects of the e-ticketing system. If those of an already positive opinion can welcome the planned changes and be encouraged to promote the benefits to others, the launch of e ticketing in Kaunas will be a success.

**Would it be more convenient for you, if instead of paper tickets
electronic cards are used?**

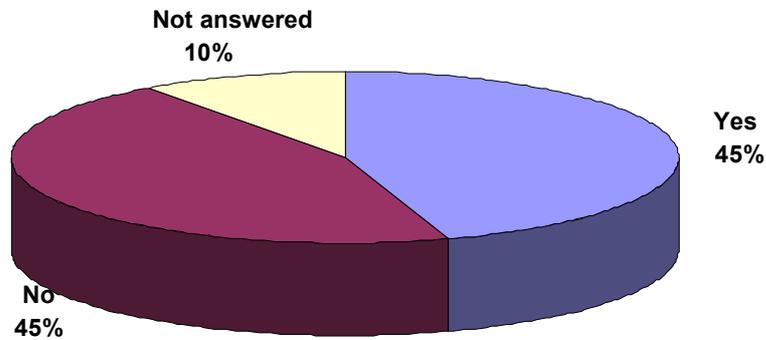


Figure 3.38 Levels of Support for e-ticketing

The potential for up-scaling this measure is fairly substantial and highly realistic, and will be done through the development and implementation of an e-ticketing system. Based on international experience and feedback through VIVALDI, it is believed that the development of electronic tickets is imperative in order to allow the Kaunas transport companies to organise their activities more effectively and save money while diminishing the expenditure related to ticket production and analysis. E-ticketing should offer a convenient and comfortable method of payment, which in turn should increase the prestige of the usage of public transport and attract more passengers.

3.2.5 Nantes

Activities at the Nantes site were within 7 of the CIVITAS policy fields and 6 locally defined integrated packages, on top of the city's role as scientific co-ordinator. The coloured measures on Table 3.19 indicate how the local integrated packages were spread widely across the eight CIVITAS policy fields to pull together the diverse work carried out through the VIVALDI project in Nantes.

Table 3.19 VIVALDI Measures in Nantes

CIVITAS policy field	Measure	Integrated Package
New forms of vehicle use	Incentives for car pooling	New mobility concept for the campus site
Collective modes	Public transport promotion campaigns	Improving the use of PT and soft modes
	New SEMITAN quality contracts and improvement of perceived PT quality	
	Creation of new railway link between Vertou and Nantes	Implementation of a large scale sustainable transport strategy
	Remodelling of RN801 motorway and PT projects	
	Better and new PT services	
Information services	Multi-modal station at the junction of the new line 3 and Vannes road	Integration and rehabilitation programme of Vannes road
	Multi-modal information and telematics	Improving the use of PT and soft modes
	Bus priority and RTPI	
	New student services centre with mobility services	New mobility concept for the campus site
Goods distribution	City logistics scheme/ freight village	Distribution of goods
Clean vehicles	Clean and efficient buses	Implementing a new clean public transport fleet
	Clean fuels support services, fuel supply infrastructure	
Mobility management	Park, walk, cycle, and ride measures – rent-a-bike	Improving the use of PT and soft modes
	Implementation of Nantes Metropole mobility plan	
	Promotion of company mobility plans	
	Vélocampus actions	New mobility concept for the campus site

	Integration and rehabilitation program of Vannes road	Integration and rehabilitation programme of Vannes road
Access management	New parking policy and strategy	Improving the use of PT and soft modes
	Remodelling of the university campus site	New mobility concept for the campus site

New Forms of Vehicle Use – Incentives for Car-Pooling

In January 2003, the website www.illicovoiturage.com opened with the support of a promotion campaign during the spring. The campaign included press articles, 160 posters, 48,000 napkins in student restaurants, and 2,000 flyers on cars parked near the university campus. The website provided two services: to find a car with driver for a trip as passenger, or to propose a trip as driver. The main trips targeted are daily commuting from home to university and at the weekend back to families.

The students’ car-pooling association Illicovoiturage now has about 1,000 regular users. Within the company mobility plans promotion, a new service is now offered on car-pooling: www.covoiturage-nantesmetropole.fr/.

Collective Modes – Public Transport Promotion Campaign

Overview

Through an annual marketing and communication plan, SEMITAN regularly communicates with existing and potential public transport customers, paying attention to “brand management”, and regularly controls the effects of the communication actions on the image of the service among the public. Within VIVALDI, three marketing and travel awareness campaigns are directly linked with the development of “Chronobus” routes or new CNG vehicles, the implementation of the railway link in the southeast area, and with the fare strategy.

Before 2002, frequent users could only purchase a monthly ticket, and the number sold to students had decreased since 1996. For this reason, a new annual fare regime was implemented in 2002, with the “PassCampus” aimed at students.

The creation of this new concept of “Chronobus” route was to give the passengers of some main bus routes on the urban network a guarantee of frequency, regularity, comfort, and short journey time. This required a new kind of bus: CNG buses with low floor, kneeling system, and on-board information systems, as well as some changes in the layout of streets: bus lanes, bus priority, staff training for new operating conditions, quality certification, and promotion campaigns. These changes were made on routes 25 and 32, as shown on the following figure.

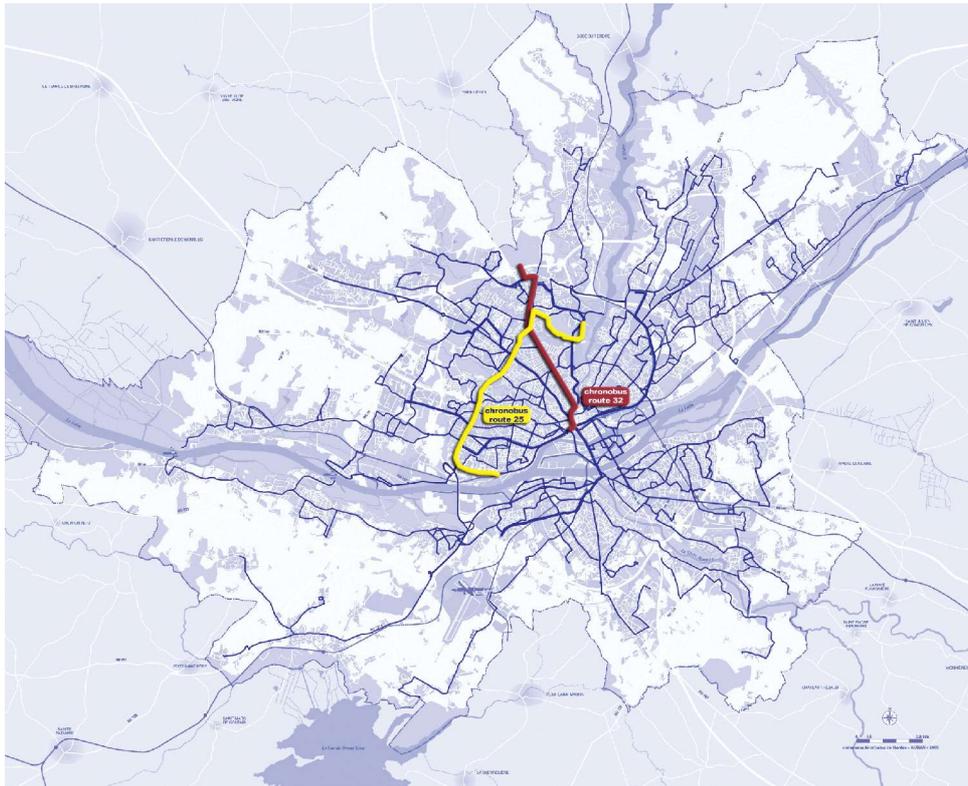


Figure 3.39 Chronobus Routes 25 and 32

A direct marketing campaign concerning around 8,000 people living 300m either side of the “Chronobus” route was undertaken. They each received a mail-shot that included information and a free trial ticket.

Results

Campus monthly ticket sales had been decreasing for several years, and the launch of PassCampus in September 2002 saw sales of yearly and monthly tickets for students start to grow again. Beyond the increase of student customers, PassCampus has won customer loyalty and decreased fare evasion. PassCampus is thought to have increased the targeted customers by about a third.

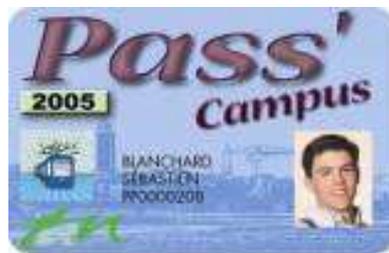


Figure 3.40 The PassCampus Card

Car trips amongst annual pass holders have decreased by 6%. In addition, easy access to the PT network, combined with payment facilities offered with the PassCampus, form a part of the fare strategy to limit fare evasion. Between 2000 and 2003, the fraud rate fell from 15% to 6%.

“Chronobus” route 32 has 13 new CNG standard buses. Annual run kilometres have increased about 35,000 km (+6.9%) and patronage has increased by 25% (450,000 trips)

between 2001 and 2004. “Chronobus” route 25 needed only 9 new CNG articulated buses for the same frequency and operating range, due to the reserved bus lanes that have permitted better frequency. Patronage has increased by 6.9% (110,000 trips) between 2001 and 2004.

A Real Time Performance Measurement (RTPM) system, with Automatic Vehicle Location (AVL) and automatic data recording, has been implemented on all tramlines and bus routes. Using this system, the figures below show how running has changed for “Chronobus” route 32 and route 25. In all, the “Chronobus” routes have saved between 7 and 11 minutes in peak hour running times.

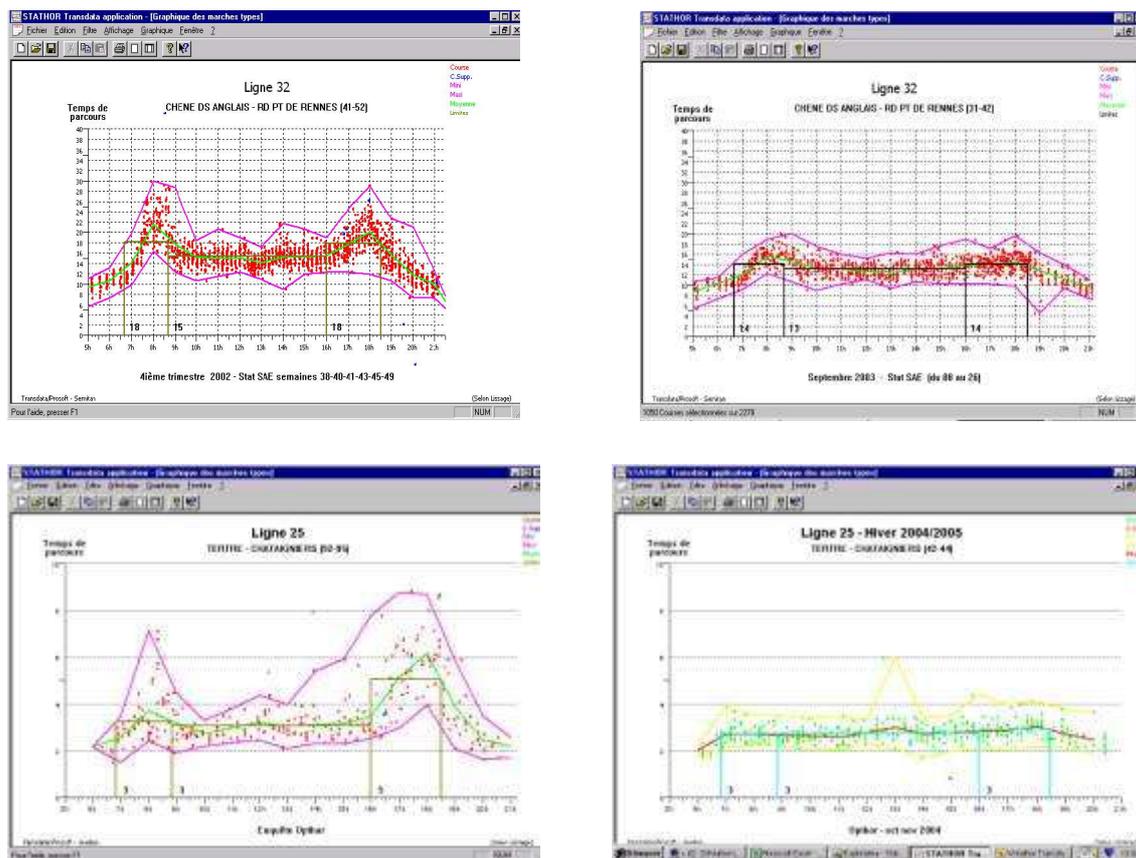


Figure 3.41 The Improvement in Regularity for Chronobus Journeys

Conclusions

The local objective of a better modal split in favour of public transport, with a share of 18% in 2010 (compared to 14.8% in 1998) is not achievable with only the measures of this measure or integrated package: it will require all the VIVALDI measures at the city level taken in combination.

Collective Modes – New SEMITAN Quality Contracts and Improvements of PT Perceived Quality

Overview

It was anticipated that a high level of satisfaction among customers would increase customer numbers. Subcontractors were appointed to conduct “mystery shopper” observation and customer interviews to measure perceived quality. Towards new

quality contracts and improvement of perceived quality, SEMITAN is implementing a contractual and customer-orientated process involving a large number of staff.

Results

The objective was to have a NF EN 13.816 approval for one route in 2002, and five others by the end of VIVALDI. In January 2003, bus route 32 received NF EN 13.816, along with tramline 2 and bus routes 12, 25, and 56.

Collective Modes – Creation of a New Railway Link Between Vertou and Nantes

Overview

Despite the large flows by all modes from the southeast of Nantes (car traffic of 55,000 vehicles per day), this area does not benefit from a structured public transport system linking it to the city centre. This sector is where the public transport market share is currently the lowest one in Nantes, yet is predicted to have a strong population growth in the next 10 years. To combat this, a major rail infrastructure project was initiated, linking Vertou to Nantes via two newly constructed stations at St Sébastien Frêne Rond and St Sébastien Pas Enchantés.

The new link uses existing rail tracks on the national Nantes to Bordeaux line. Parking facilities were designed with car drivers and cyclists in mind (with 290 car parking spaces at the three stations and 32 cycle spaces) as well as ensuring connection with existing bus stops close to the stations. The works commenced in April 2002, and by December 2003, a full service of 19 round trips each day ran from each railway station.



Figure 3.42a St Sébastien Pas Enchantés Station



Figure 3.42b Cycle Parking at Vertou Station

Results

In one year, passenger numbers have nearly tripled and are still increasing, especially with car traffic restrictions due to the BusWay works. About 70% of the customers are daily users, and 82% use the route several times a week, mostly for journeys to work (49%) or study (35%). Of the 52% of people who did the same journey the year before, 29% would have used a private car.

The use of St Sébastien Pas Enchantés and St Sébastien Frêne Rond Park and Ride services was low until April 2005. This date corresponds with the start of restrictions for car traffic because of the BusWay works, and use of these two sites has greatly increased. Since the route opened, Vertou Park and Ride has been overcrowded, and the extension of the site from 80 parking spaces to 140 was implemented immediately.

Collective Modes – Remodelling of RN801 Motorway and PT Projects

Overview

When the extension of tramline 3 south was cancelled in 2002 due to large costs and the size of the works, it was decided to create a new guided bus route on the RN801 motorway. This project is now underway with articulated buses, developed as a new concept: the BusWay. The bus runs on a reserved lane, which ensures speed and comfort, with an attractive urban layout. The works included the modification of the motorway to form a boulevard with only one car lane and cycling lanes in each direction (as illustrated by Figure 3.43), and the creation of a roundabout at Bonne Garde station.

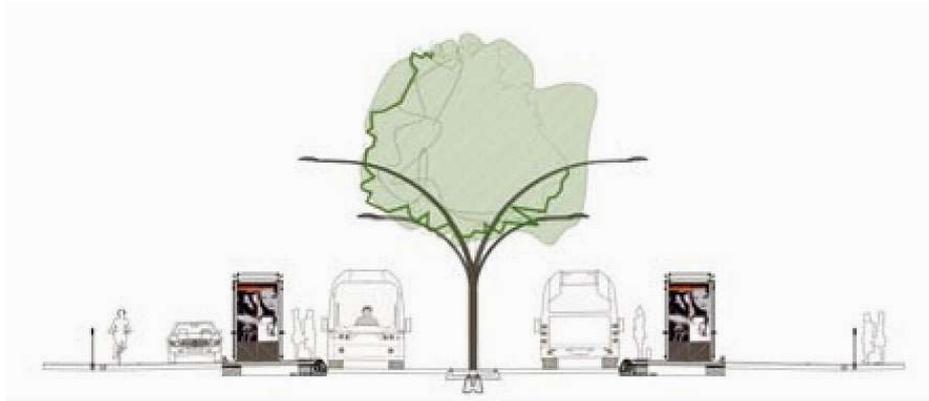


Figure 3.43 New Cross-Section of the RN801

Results

In 5 years, average daily traffic has increased by 23% outside the ring road, and by 15% inside. However, since March 2005, the traffic during peak hours has decreased by around 40% to 25,000 vehicles a day. Monitoring of O₃, NO_x and PM₁₀ shows that all pollutants are below critical values.

Conclusions

The actions of VIVALDI in the southeast of Nantes are currently incomplete. The remodelling of RN801 and the implementation of the BusWay, with its Park and Ride site, is still being carried out. However, some effects of the implementation of the project can already be seen: traffic restrictions on RN801, combined with a new PT offer, have led to a decrease in car traffic during rush hours and increased PT use.

Collective Modes – Better and New PT Services

Overview

The River Erdre is a protected green area. Tramway route 2 ensures a very efficient link between the Tertre campus and the centre of the city, but the link between the two banks of the river in the campus area is not as good.

In June 2003, Nantes Métropole decided to create two new public transport services on waterways: one along the Erdre River, and another on the river Loire in connection with tramline 1. The target groups in the case of the Erdre waterbus are campus students and workers, as well as all people travelling between the main railway station and the city centre or the suburbs around the River Erdre.

In 2004, Nantes Métropole and SEMITAN chose the company to operate the waterbuses on the river Erdre. The specifications required having a boat powered by a non-polluting engine, with a hull that makes very few waves, and especially designed to have quick and easy loading and unloading for about 90 passengers and 10 bikes. The result was delivered in June 2005 as the waterbus service “Navibus”.



Figure 3.44 The Navibus

Tramline 2 is very crowded during rush hours, a lot of students coming from the east of the city use tramline 1 then tramline 2 to reach the Tertre campus. The new bus route 83 offers to these students the opportunity to come to the campus directly from the east bank of the river Erdre without interchanging in the city centre.

Results

Each year, around 80,000 passengers and 1,200 bicycles are ferried by the River Erdre ferry from one bank to the other.

The new Erdre Navibus is a very new experimental service, launched in July 2005. With only one boat, the frequency is every 80 minutes. Since July 2005, the Navibus has carried close to 25,000 passengers and 450 bicycles, with 250 to 300 passengers as a daily average (to October 2005).

The waterbus service on the river Loire from Gare Maritime and Trentemoult, with a 20-minute frequency in peak hours, was launched in June 2005. From this date until the end of October, more than 80,000 passengers and 3,800 bicycles were ferried, with a 600 passenger daily average. These waterbuses clearly answer the demands of people moving along or across the rivers in Nantes.

Conclusions

The implementation of the new waterbus service, Navibus, has enabled the layout between the campus and the waterbus station to be improved and reinforced the link over the Erdre River towards the east bank neighbourhoods.

Information Services – Multimodal Information and Booking

Overview

Nantes Métropole has always taken into consideration the need to integrate transport systems, most suburban interchanges being designed to host tramlines, urban buses, and interurban buses. This policy was developed and reinforced with the regional railway operators and authorities to allow fare integration between regional trains serving the urban perimeter and the development of train links between Vertou and Nantes in the southeast area.

To provide better public transport information, SEMITAN created a new system for real-time passenger information available on mobile phones: MOBITRANS. User needs were identified through surveys conducted on their perception of the quality of public transport. The scheme launched in 2003 and includes the two next departures of any bus or tram route from any stop on the urban network; warning messages about potential route disruptions; and the location of the nearest bus or tram stops from a given address.

Results

New fare integration between regional and urban transportation has been monitored with surveys conducted on board trains serving 10 stations inside the urban public transport network. The overall traffic in the 10 stations has grown by more than half in one year. Of those people newly using the train, 65% did the same journey the year before, 19% of them by car.

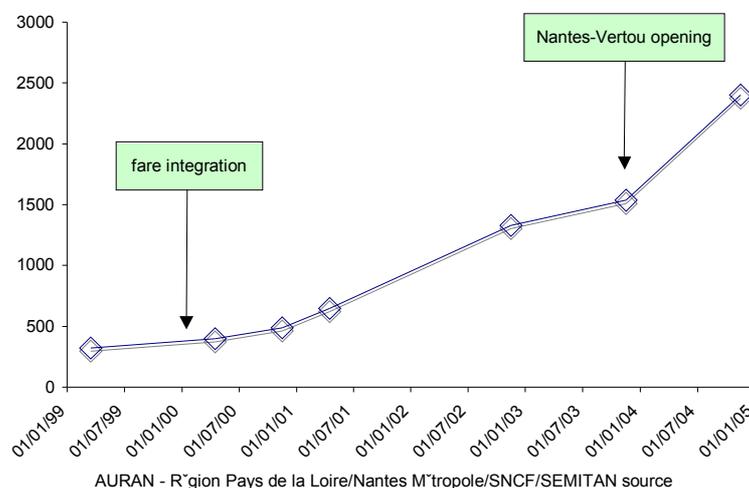


Figure 3.45 Urban Rail Use Increases, 1999-2005

Users interviewees and a round table conference were organised to discover how the MOBITRANS service had been perceived. It was found that the information was considered reliable and accurate, delivered in a user-friendly manner that allowed journeys to be planned better. The service was popular with young users as a modern service. On the downside, users thought there was a great deal of competition in terms of information provision, and fears over the potential costs of using the mobile phone to access the data. An average of 1,650 connections per week are made to MOBITRANS (250 to 300 daily).

Goods Distribution – City Logistics Scheme/Freight Village

Nantes Métropole approached this problem by consulting partners in logistic activities, including freight companies, retailers, and the Chamber of Commerce. Nantes Métropole did not receive any complaints from the freight companies about traffic or parking difficulties, problems are localised in specific areas particularly the city centre.

Nantes Métropole collected all the rules about heavy vehicles and goods distribution, the main problem being the lack of unified regulation due to the history of relations between communes in the urban area. Each commune had its own regulation on goods transit and distribution, so there are 24 different regulations. Nantes Métropole now has the capacity to harmonise these regulations and to improve the structure of goods distribution, especially the link with parking policy. This work is still being progressed.

Clean Vehicles – Clean and Efficient Buses

Overview

Two major factors influenced the willingness of Nantes Métropole to implement a policy regarding the promotion of a non-polluting fleet: implementation of the first tramline in 1985 and the experimentation of CNG buses within the JUPITER-2 project. Opinion polls regarding the perception of public transport also indicated that it was necessary to enhance the overall image of bus travel in comparison to the tram.

All the new buses consist of: low floors, easy access due to the ramp and the kneeling system, provision of two wheelchair spaces, and electronic information displays both outside and inside. Two different models were chosen.



Heuliez GX 317 CNG
Standard bus – 100 passengers
Renault engine – 185 kW
9 gas tanks – 350km range
Cost per unit – 237,000 Euros
Figure 3.46a Heuliez Bus



Volvo 7000 CNG
Articulated bus – 150 passengers
Volvo engine – 215 kW
12 gas tanks – 350km range
Cost per unit – 369,000 Euros
Figure 3.46b Volvo Bus

The reliability rate of the Heuliez buses was unsatisfactory: around 30% of the buses were regularly out of order because of engine failures. Official approval problems also occurred. Initially, Heuliez wished to obtain bus probation, following the R110 (new European norm for CNG buses). Facing administrative and technical difficulties due to the interpretation of R110 by the French Department of Industry, Heuliez decided to use

the previous standard and was obliged to validate some components to the Euro 3 standard. The commissioning of the Heuliez GX 317 was completed by summer 2004.

The first Volvo 7000 vehicles were put in operation in July 2003, following a delay due to the official registration by the French Department of Industry. Some electronic problems appeared in 2004, unexpected and uncontrolled accelerations, which the health and safety committee took very seriously. A decision was made in May 2005 to authorize the fleet to carry on running with two modifications.

In the first year of full operation of the CNG buses, some 27 bus routes were operated solely with these buses, an increase from 3 routes in 2001.

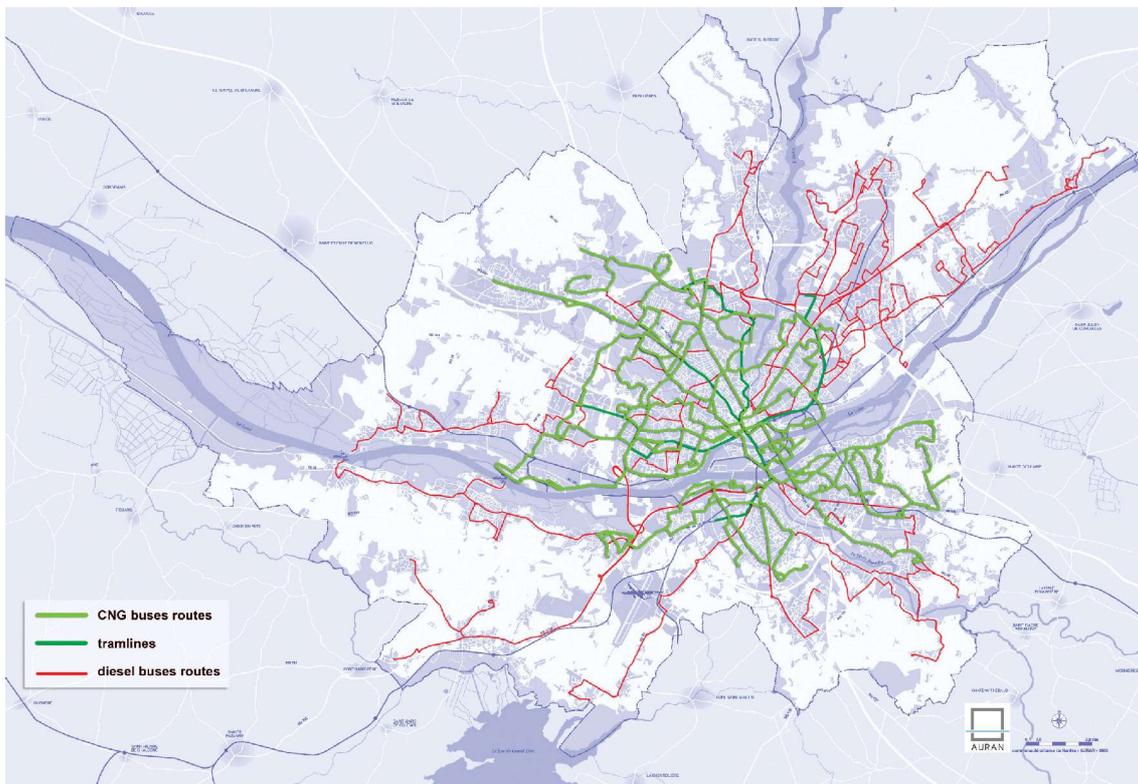


Figure 3.47 Bus Routes Served by CNG Buses, 2004

Results

As shown in the figure below, the SEMITAN bus fleet has been greatly renewed during VIVALDI. The objective of an average bus fleet age of 5 years was reached in 2004 and will decrease further over the next three years. Bus fleet renewal is also done with an increasing number of clean buses.

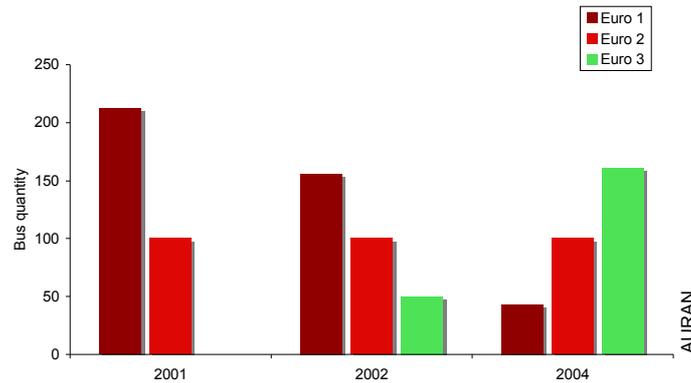


Figure 3.48 Euro Standards of Nantes Bus Fleet

The following results in terms of emissions and social costs have been gathered for the 27 bus routes that have changed from diesel to CNG, with up-scaled information for the whole urban area shown in *italics* (2001 to 2004):

- Total run kilometres (about 8 million) only increased about 0.5% (*+145%*)
- Energy costs have decreased by 7%, a money saving of 19% (*+9.8%*, *but this would have been 20.7% if all the routes had been operated by diesel buses*)
- Greenhouse gas emissions have increased by 21%, but this should be balanced against a decrease in car use (*+15%*)
- Carbon monoxide emissions have increased by 11%, but this would have been an increase of 13% with diesel buses (*+11%*)
- Non-methane hydrocarbon emissions have decreased by half (*-15%*)
- Nitrogen oxide emissions have decreased by 43% (*-13%*)
- Particulate emissions have decreased by 90% (*-32%*)
- Global social costs, including energy and pollutant emissions, have decreased by more than 20% (*+1%*, *but with diesel buses it would have been 16%*)

Conclusions

Problems encountered with new CNG buses are under manufacturer's guarantee, and the first thirty GX217 bought between 1998 and 2000 give an appreciation of CNG vehicle maintenance. It seems a little bit more expensive than for diesel, but this may change over time because: CNG engines continue to be more reliable; engine parts will become cheaper; SEMITAN's CNG knowledge is improving; and the continued growth of the fleet (over the existing fleet of 191 units, a further 60 units will be bought by 2008).

The measures implemented have allowed local objectives to be approached:

- 70% of mileage and 90% of trips made with non-polluting vehicles by the end of 2005 → 54.8% and 80.6% respectively at the end of 2004. The tramline 2 extension and CNG bus purchasing currently scheduled will allow this objective to be reached
- 155 new CNG buses to be bought → 161 new CNG buses purchased
- Average bus fleet age less than 5 years at the end of VIVALDI → Average bus fleet age was 5.5 years at the end of 2004, and the CNG bus purchasing currently scheduled will allow this objective to be reached

New CNG buses have also permitted increases in patronage in combination with other measures, and permitted the reduction of pollutant emissions of the fleet, especially for non-methane hydrocarbons, nitrogen oxides, and particulates, which are very bad for health. Greenhouse gas emission growth has been compensated by the observed modal shift away from car traffic.

Clean Vehicles – Clean Fuels Support Services, Fuel Supply Infrastructure

Overview

The need for a new fuelling station arose with the decision to expand the CNG bus fleet. The first fuelling station had been implemented in St Herblain in the northwest of the urban area. This depot could not accommodate such a large fleet, and the bus routes served by the CNG buses were running to the southeast. The decision was taken to build a new gas fuelling station in the Trentemoult depot in the south of the urban area, which opened in 2003.

Results

The only difference between the first gas station at the St Herblain depot and the new one was the implementation mode: for the first station there was a contract with the GN-Vert company, the second was built and owned by Nantes Métropole. The evaluation of the new station is based on a comparison of energy costs between the current situation and a “do nothing scenario” in which the second gas station would be under contract with GN-Vert.

Regarding energy costs, the difference between the current situation and the “do nothing scenario” is only 1.3% in favour of the current situation. Patronage on trams has increased by 33% between 2001 and 2004, but patronage of the bus network has decreased by 1.4%. However, only three bus routes operated with CNG buses have seen their patronage decreasing. Globally, the 27 bus routes currently operated with CNG buses have increased their patronage by 7% representing close to 1.5 million trips.

Answers to a customer survey on bus route 21 show that the majority of customers have noticed the implementation of CNG buses and they think that it was a good idea, notably for environmental reasons, as shown on the Figure 3.49. But it is not the vehicle type that makes them use more public transport, it is the high frequency of buses and good accessibility from the bus stops.

Could you say, in your opinion, what are the worst vehicles for environmental reasons ?

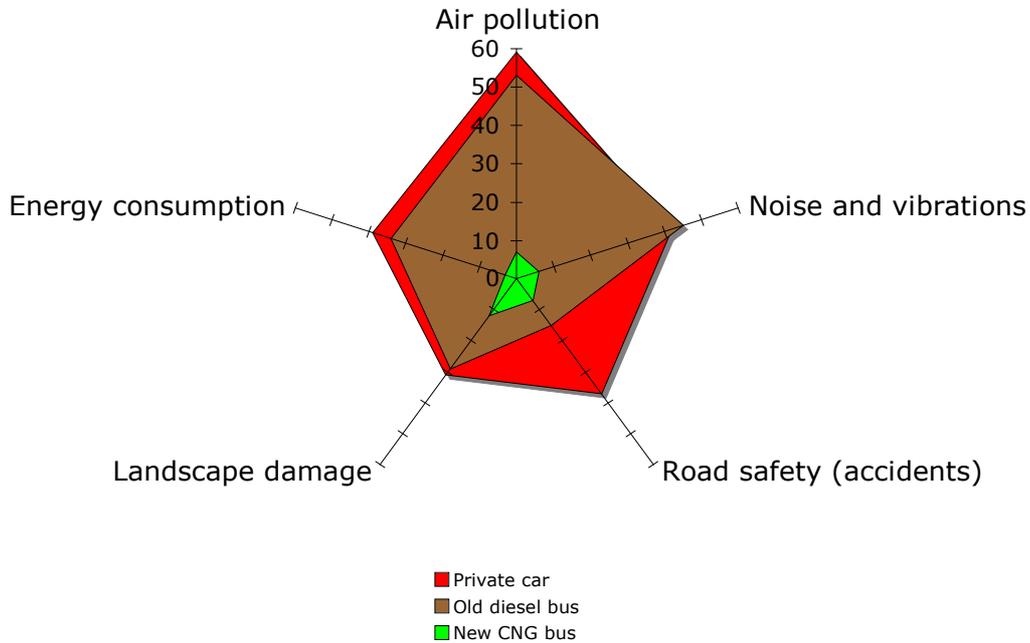


Figure 3.49 Customers’ Survey Results on Environmental Impact AURAN

Conclusions

These surveys and other analysis show that of the new customers of CNG bus, 5% previously travelled by car. If it is assumed that an average car journey were about 5km, with a CO₂ emission of around 140g/km, there is a saving of 1,918 tons of greenhouse gases between 2001 and 2004.

Mobility Management – Park, Walk, Cycle and Ride Measures – Rent-a-Bike Service

Overview

On each of the three stations located on the Nantes-Vertou railway link, 20 enclosed bike park spaces have been created, with free access by card for users with a monthly or annual public transport ticket. Twelve free bike parking spaces are also available.

A bicycle rent network using existing Park and Ride and multi-storey car parks was set up in an experimental phase with 200 bicycles available in the 8 public multi-storey car parks in the centre of Nantes, called “Ville à vélo”. Sixty of the bikes are rented monthly to companies that want to test them within company travel plans.



Figure 3.50 Rent-a-Bike Locations in the Centre of Nantes

Results

Since the “Ville à vélo” action started, an average of around 300 bikes have been rented per month, more during months with better weather. Commerce, the main interchange on the PT network, has been one of the most frequently used rental sites.

Mobility Management – Implementation of Nantes Métropole Mobility Plan

Overview

As the main authority for mobility policy in the urban area, Nantes Métropole has to set an example to other big companies and institutions concerning mobility plans. Therefore, Nantes Métropole prepared its own company mobility plan and promotes the issue to other companies and institutions to encourage their employees to choose public transport and soft modes, and to use their car more sustainably.

Nantes Métropole company travel plan was implemented in May 2002 with a study of site accessibility that identified that some sites on the outskirts of the city still have accessibility problems. In June 2002, a survey regarding employees’ travel habits was carried out in order to establish the modal split of journeys according to the different sites. The survey showed that PT use was high in the centre of the city and low in the outskirts.

The production of the mobility plan started in 2003 with a consultation of employees towards the end of the year, and the mobility plan was implemented in March 2004. The measures included: a 50% rebate on annual PT fares; the suppression of 98 employees parking spaces; PT tickets easily available for work-related journeys;

encouragement of car pooling; new bicycle parking spaces; and information on the intranet websites of Nantes Métropole and City of Nantes about the plan.

Results

PassPartout ticket holders increased by half between May 2004 and May 2005 to represent 14% of all Nantes Métropole employees, and continue to grow with an average monthly rate of about 3.4%.

Conclusion

Increasing PT use from 20% to 30% and decreasing the car share from 65% to 50% for Nantes Métropole employees must be continued with ongoing activities. However, the results obtained by Nantes City show that the aim is obtainable.

Mobility Management – Promotion of Company Mobility Plans

Overview

At the end of 2003, Nantes Métropole decided to give a 15% rebate on the annual PT PassPartout ticket for the employees of companies that decide to sign a mobility plan. The company mobility plan must integrate measures to improve PT use, cycling use or walking, and to reduce car dependency for commuters, with quantified objectives and with a commitment to an increase in PT use among employees. The plan must also integrate financial help from the company to employees, at least equal to the Nantes Métropole help of 15% on the annual PT fare.

Results

At the end of June 2005, 16 company mobility plans were active, representing close to 16,000 employees. Nineteen were being studied, representing about 5,400 employees, and 35 companies (18,500 employees) are making preliminary approaches.

One of the main measures featuring in a company mobility plan is the increase of PassPartout fare holders as an indicator of the employees’ loyalty to PT usage. At the end of May 2005 there were 2,843 PassPartout holders, a yearly increase of about 132%, an average monthly rate of about 7.3%.

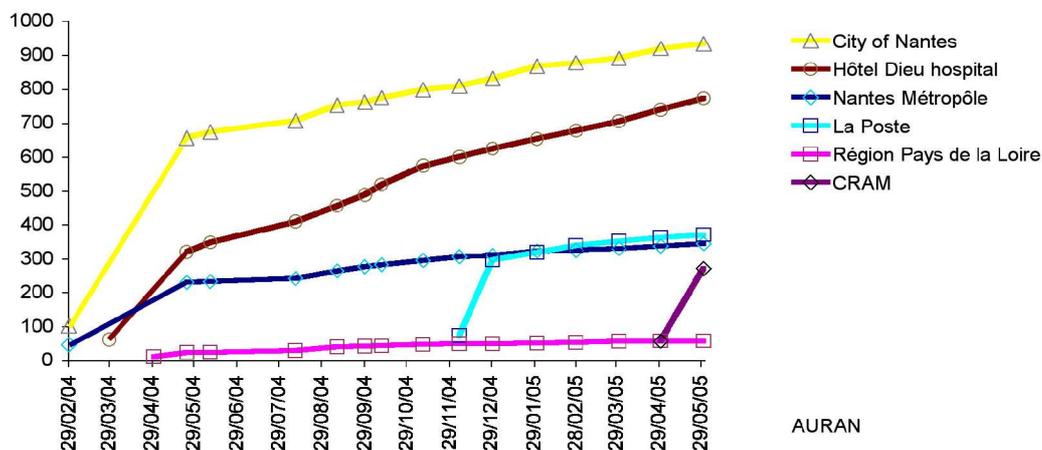


Figure 3.51 Increase in Ownership of PassPartout Passes

In total, 22% of PassPartout fare holders were daily car users before the mobility plan, therefore around 200 people have stopped using their car in a year. Some 49% of PassPartout holders state that their choice was linked to the difficulty of finding parking; 20% say that their motivation is to save money; and 11% say that this type of fare gives added value and convenience. Amongst the advantages of using public transport, PassPartout holders cite reasons of less stress with no traffic jams or parking difficulties.

Mobility Management – Vélocampus Actions

Overview

In accordance with the objectives of the Urban Mobility Plan, Nantes Métropole has supported a student association that offers cycling services on the Tertre campus, targeting students of this site but also all students in Nantes. The Vélocampus association ensures tasks like:

- Promoting cycling to students
- Renting bikes on a yearly basis
- Purchasing new bicycles to renew the 300 available
- Organising bicycle tours to discover the Nantes bicycle network
- Repairing bicycles and advising students about maintenance
- Selling old bicycles, bicycle parts, or anti-theft devices

Results

The bike rental service implemented by the students association Vélocampus, has been a great success. The total number of bikes rented during the year 2004-5 was 311.

Mobility Management – Integration and Rehabilitation Program of Vannes Road

Overview

The project for remodelling the Vannes road, the historical axis from the city centre towards Brittany, concerns a section 3.7km long (about 134,000m²).



Figure 3.52 Vannes Road

The main actions of the remodelling project are: to assign freight traffic and buses to a central road with local traffic on side lanes, implement and improve pedestrian and cycling facilities, provide efficient connections between buses and tramline 3, and to improve the urban, particularly shopping, landscape. Every year, the French “Ligue

urbaine et rurale”, holds a national competition for urban design projects, giving the Vannes road project an award in 2003. The implementation works started in 2004 with the building of new drainage and sewage networks, road works and public space layouts started in summer 2005 and are still progressing.

The implementation of Orvault-Morlière interchange point was started in September 2004. The site includes a Park and Ride site of 302 parking spaces accessible directly from the Vannes road, 10 bicycle parking spaces, and private parking with 98 spaces reserved for the shopping centre CONFORAMA. It is the first such public-private partnership in Nantes.



Figure 3.53 The Orvault-Morlière Interchange Point

Results

SEMITSAN surveys show a constant increase of tramline 3 patronage since it opened, and evidence that commuters have changed their behaviour: 13% of passengers surveyed were car users before the tramway. This figure is now higher if we consider the increasing of the patronage of the Park and Ride. Activity at the Orvault-Morlière Park and Ride site doubled in one year, as shown on the graph below.

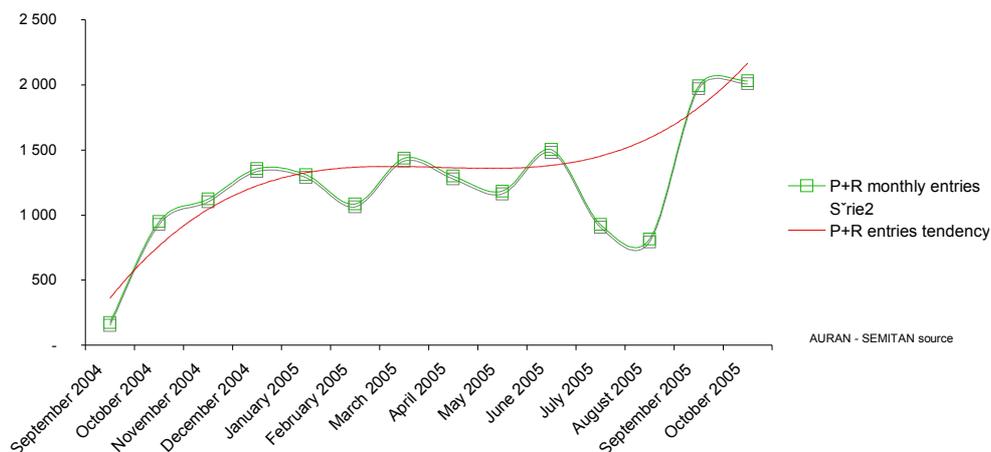


Figure 3.54 Orvault-Morlière Park and Ride Usage

The remodelling works started in 2004, increasing since summer 2005. It is not possible to evaluate this operation at present because of the disrupted situation.

Conclusions

If the implementation of the Orvault-Molière interchange point with its Park and Ride site is successful, this will be because enlargement of the site to include shopping functions has worked: there is a link with the shop CONFORAMA, an example of Private-Public Partnership.

Access Management – New Parking Policy and Strategy

Overview

The car parking policy is currently one of the most important tools for local transport authorities for mobility regulation. Studies that began in January 2002 focused on the fact that car park spaces were not used as they should be: a lot of commuters used them all day without payment and it was not easy for visitors and residents to park.

In January 2003, a proposal for a new parking policy was carried out and the first measures implemented included police control reinforcement against unlawful parking in the city centre, with a new squad of 36 policemen. The first steps were made in the modification of parking standards in urban project areas to decrease the number of car parking spaces in office buildings: the new standard is 1 parking space for 150 m² of gross floor area, with a new obligation of bicycle parking spaces, and the standard for housing will be 1 car parking space for 90m² of gross floor area. New street parking fees were put in place to favour of residents and visitors to dissuade commuters. The first measures to suppress car parking spaces (about 100 initially) were made in 2003 during the remodelling of specific streets.

To consolidate the Park and Ride improvements, a new site opened in January 2005 at Bourdonnières in the southeast, with 460 parking spaces. Three others opened in September 2005: one on the tramline 2 extension at Neustrie in the southwest, with 170 parking spaces and two on the Navibus route at Trentemoult on the south bank of the river Loire with 155 parking spaces. There are now over 4,000 spaces at Park and Ride sites.

Results

The development of public parking spaces in Nantes city centre shows that there has been a strong increase of pay parking spaces (+27%) and a decrease of free parking ones. At the same time, Park and Ride capacity has almost doubled (+87.6%), as shown in the following figures.

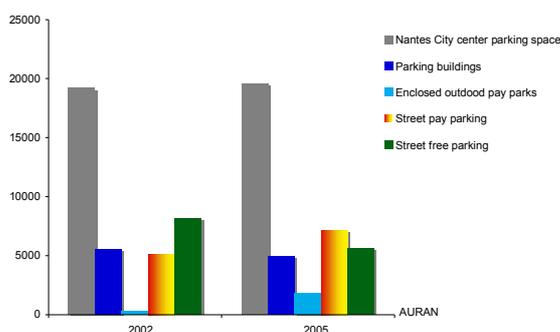


Figure 3.55a City Centre Parking Provision

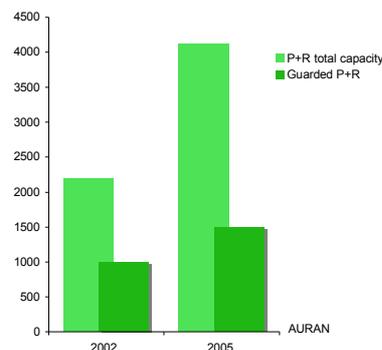


Figure 3.55b Park and Ride Parking Provision

Park and Ride occupancy shows a constant progression, but since the opening of new sites in 2004 and the start of car flow restrictions, in particular in the southeast, the patronage of these sites grew more rapidly. The last site opened at Neustrie on the tramline 2 extension and was overcrowded in its first operating week.

Conclusions

Local objectives regarding parking policy and car drivers' opinions seem to be reached, but more time is needed to evaluate the effects of the most recent policy changes.

Access Management – Remodelling of the University Campus Site

Overview

At the centre of the Tertre campus there was a large space in front of the university buildings that was mainly used as a car park for more than 2,000 cars. A new layout of this space, like a large esplanade for pedestrians, was carried out in 2002, in which about 300 parking spaces were removed. The Censive du Tertre Street, that crosses the site, is now a low speed zone and new accommodation has been built at the centre of the esplanade with a shopping area linking it to the tram station. New street furniture and 200 bike racks were also installed.



Figure 3.56a Tertre Campus Before



Figure 3.56b Tertre Campus After

Results

In line with the measure objectives, the number of parking spaces available on the Tertre campus decreased from 2,000 in 1999 to 1,700, and will further decrease to 1,600 in 2006 then 1,300 in 2012. A survey has shown that the number of students travelling by car to Tertre campus has decreased from 22% to 17% after the new layouts and parking restrictions.

Conclusions

The new layouts on the Tertre campus site have renewed the quality of public spaces. It has permitted an improvement of accessibility to all buildings, and ensures a comfortable link with two stations of the tramline 2, and with the bus stops on site.

4 USE OF RESOURCES

4.1 Use of Person Resources

As such a large project, the total use of person resources in VIVALDI was almost 2,000 person months. Figures 4.1a-4.1f illustrate the differences between the planned and the actual use of person month resources for each site, and the project as a whole.

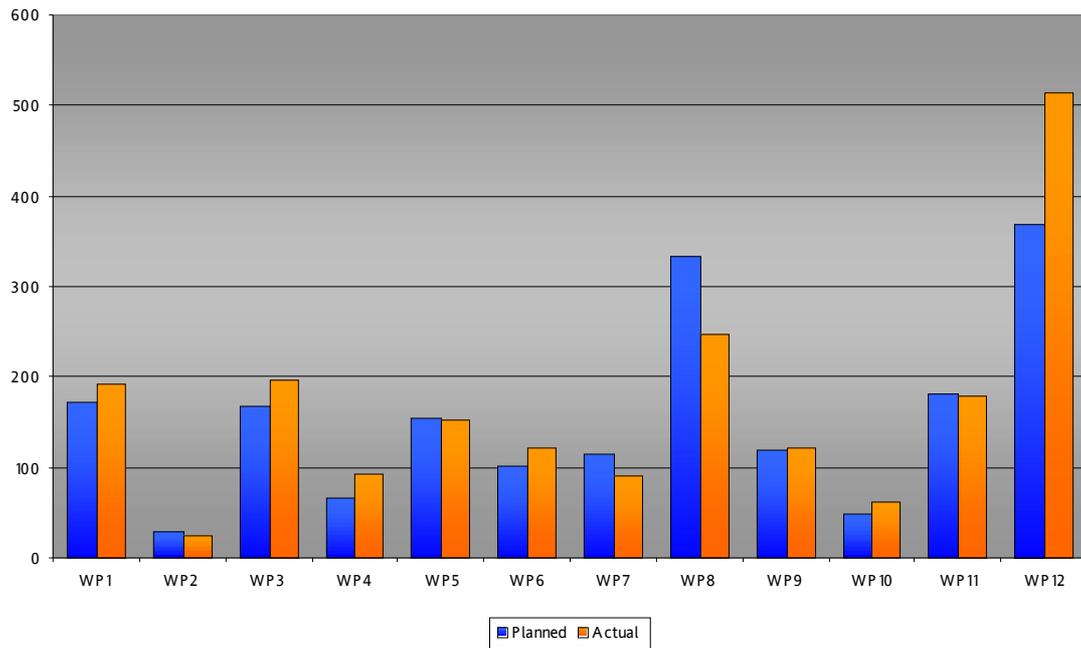


Figure 4.1a Resource Use, all Sites

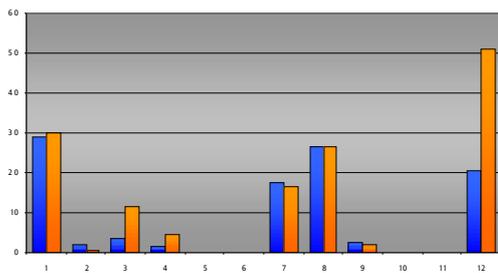


Figure 4.1b Resource Use, Aalborg

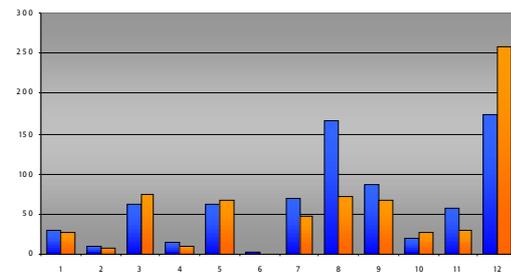


Figure 4.1c Resource Use, Bremen

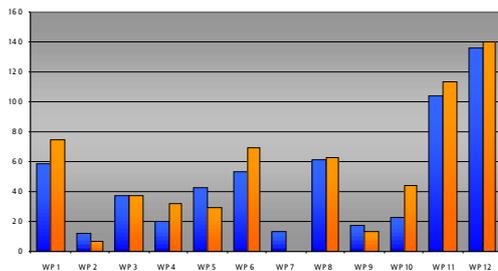


Figure 4.1d Resource Use, Bristol

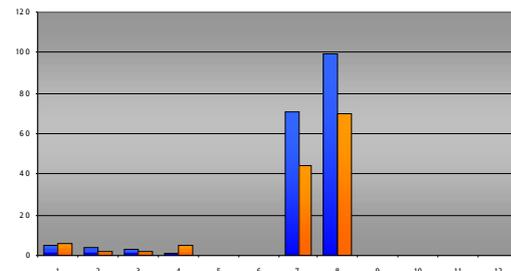


Figure 4.1e Resource Use, Kaunas

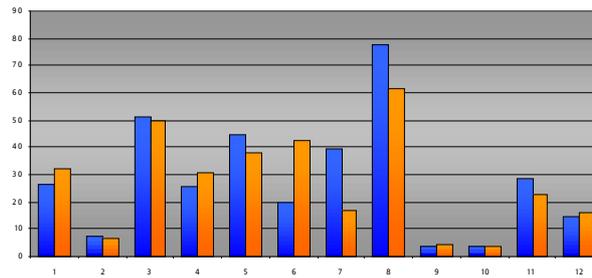


Figure 4.1f Resource Use, Nantes
Please note that the scales are different on each graph.

As can be seen, the overall picture is in line with expectations – 1,995 of 1,855 person months were used on the project, only 7.5% beyond the planned resources over the four-year period. There are a few WPs with proportionately large deviations from the planned resource use, in particular WPs 7, 8, and 12.

Workpackage 7, demand management through integrated pricing: the implementation of demand management policies is very challenging politically. For this reason, the integration of transport payment on a smartcard in Bristol, bringing together Park and Ride ticketing, car parking, and road user charging, could not be completed once the political decision not to introduce road user charging was made. On the other hand, the integration of public transport and car club payment in both Aalborg and Bremen, and BOB card introduction at the German site, saw resources more successfully used.

WP8, stimulation of collective modes: this WP also saw fewer person months expended in it than planned. Due to time constraints, some of the work on public transport improvements, particularly planning and consultations aspects, was tendered out to consultancies rather than being carried out by in-house staff. The fact that much ‘public’ transport in European countries is carried out by private companies (as recently introduced in Kaunas), not all of which were members of the VIVALDI consortium, has also had an effect in this area.

WP12, telematics: although the largest allocation of person months was given to this WP, an even higher amount was used – at 465 person months, the equivalent of almost 40 years work! The differences between planned and actual resource use in WP12 are clearly seen at the Aalborg and Bremen sites, and can largely be accounted for as the highly innovative nature of many such Intelligent Transport Systems projects requires large amounts of development and refinement as there are not always existing examples from which lessons can be learnt.

4.2 Use of Financial Resources

As with the large personnel resources available, the size of VIVALDI meant that there were also considerable financial resources. The total budget of allowable costs for the project was just under 40m Euros, of which 39m Euros were claimed across the five sites (98% of the total allowable budget). The financial budget is divided into a number of different categories. For example, 92% of the 8m Euros budget for ‘personnel’ costs was claimed over the four years, with staff working on VIVALDI in 21 different organisations. The combined budgets for ‘equipment’ and ‘subcontracting’, forming the

major infrastructure investment for the project, came to more than 24m Euros that have all been expended.

4.2.1 Value for Money

The consideration of a cost-benefit analysis for this expenditure is extremely difficult. Due to the way in which VIVALDI was structured, each measure was part of an integrated package that makes the extraction of specific costs against specific outcomes almost impossible to calculate. The use of cost categories, as described above, also confuses the issue as one measure may be made up of expenditure under personnel, overheads, equipment, and subcontracting.

In a couple of cases, approximations of costs against outcomes can be made, even if though do not constitute a full cost-benefit analysis. The introduction of a Clean Fuel Support Network in Bristol saw 50 cars converted to LPG. This resulted in the following changes to emissions, based upon 50 petrol engines in the before scenario:

Table 4.1 Greenfuel LPG Vehicles, Total Emissions in Tonnes per Year

Pollutant	Before	After	Difference	% Change
CO	3.54	1.98	-1.55	-43.9
CO ₂	214.76	165.32	-49.45	-23.0

The quite considerable saving of 1.5t CO and almost 50t of CO₂, a major climate change gas, came at a cost of 52,500 Euros for the conversion of the 50 vehicles (1,000 Euros per vehicle). The total cost of the contract was 110,000 Euros (2,200 Euros per vehicle) when taking into account the staff and other costs as well as the conversions themselves.

Looking at this from the side of the consumer, the difference in the cost of filling a car with petrol or LPG will allow them to make savings as well as having a positive impact on air quality and climate change. The average cost of petrol in the UK is 1.4 Euros/litre and LPG around 0.85 Euros/litre, so the 1,000 Euro conversion cost (the Greenfuel conversion project shared the cost with the driver) can be recovered after around 1,800 litres have been used, which would be roughly 22,000km, only a little over the average annual mileage (around 19,000km).

A different type of calculation has been used in Bristol to look at the effectiveness of TravelSmart individualised travel marketing. Analysis of the cost of the work against the benefits in modal shift have shown that it costs about 164 Euros for each 1,000km of car journey taken off the road. These figures compare very favourably with other, more traditional, measures such as Park and Ride services and showcase bus corridors. The calculation was also made on only the first phase of TravelSmart, so is a small-scale project that did not benefit from any economies of scale, included more monitoring costs than in later phases, and only shows benefits from one year – this cost could be significantly lowered in future projects, greatly improving the value for money.

5 LIST OF DELIVERABLES

Deliverable	Month	Current Status	Delivered (version and date)
D1 (Internal)	Month 3 April 2002	Approved	Project Handbook, Consortium Agreement and MOU with METEOR Version 1.0 delivered in May 2002
D2.1 (Internal)	Month 4 May 2002	Approved	Inception Report – draft Version 1.0 delivered in May 2002
D3 (Public)	Month 6 July 2002	Live	Project Website Live in October 2002
D2.2 (Internal)	Month 9 October 2002	Approved	Inception Report – final Version 1.0 delivered January 2003
D4 (Internal)	Month 27 April 2004	Approved	Site Evaluation Plans Version 1.0 delivered April 2004
D5 (Public)	Month 28 May 2004	Approved	Implementation Report 1 – information on measure design and progress Version 1.0 delivered May 2004
D6 (Internal)	Month 28 May 2004	Approved	Mid Term Review Report Version 1.0 delivered May 2004
D7 (Public)	Month 46 November 2005	Delivered	Implementation Report 2 – details of final implemented measures (Delivered as an Annex to D9)
D9 (Public)	Month 46 Nov'ber 2005	Delivered	Evaluation Report
D10 (Public)	Month 46 Nov'ber 2005	Delivered	Policy Recommendations Report
D8 (Internal)	Month 50 March 2006	Completed	Technology Implementation Plan
D12 (Public)	Month 50 March 2006	Completed	Final Report

Copies of all the publicly available deliverables can be requested from the contact point given in Section 3.1.1; some are available on the project website.

6 RESULTS AND CONCLUSIONS

6.1 Exploitation of Results

The VIVALDI project incorporates a range of integrated transport strategies and measures implemented and evaluated according to their Integrated Package. Each of these packages consists of a number of measures that belong together:

- Implementation of a public-private car sharing scheme in Aalborg
- Implementation of bus priority and Real Time Passenger Information (RTPI) in Aalborg
- Promoting a new clean public transport fleet in Nantes
- Improving the use of public transport and soft modes in Nantes
- Distribution of goods in Nantes
- Implementation of a large-scale sustainable transport strategy for the southeast in Nantes
- New mobility concept for the Tertre Campus site in Nantes
- Integration and rehabilitation program of Vannes Road (commercial zone) and Public Transport development on the northwest of urban area in Nantes
- Promoting clean and efficient vehicles in Bristol
- The city centre clear zone in Bristol
- Access and safety in an inner city area in Bristol
- Social inclusion in an edge of city community in Bristol
- Improving public transport in Bristol
- Developing new travel services in Bristol
- Implementing a new ticketing system in Kaunas
- New public transport services in Kaunas
- Access and security in Kaunas
- Microbus integration in Kaunas
- Integrated transport pricing system in Bremen
- (Hybrid) tram in Bremen
- PT and car sharing in Bremen
- Clean fleet vehicles in Bremen
- City logistic scheme/freight village in Bremen
- Travel information centre in Bremen
- Walking and cycling measures in Bremen
- Car sharing/city car club development in Bremen

Recommendations and case studies on all CIVITAS policy fields are formulated in the D10 Policy Recommendations Report. In brief, the principal policy recommendations are summarised as follows:

- The involvement of key stakeholders (including the general public as well as public and private bodies) is very important.
- However, it is also important to maintain strong project management on the part of the local authority.

- A good communication plan is necessary, supporting awareness raising and promotional activity.
- None of the VIVALDI measures can be seen in isolation, they are all part of integrated transport planning strategies in the 5 cities.
- The usefulness of participating in European Commission-supported projects cannot be stated too highly.
- Transferability is another key element of the role played by European projects – using good practice and learning from the challenges that others have faced.
- The importance of strong local government with a clear vision on sustainable transport cannot be underestimated.
- Finally, the role of people: both a political champion and the citizens in each city for whom all the schemes are implemented.

Broad dissemination and exchange of experience between cities happened throughout the duration of the project. The website was established and frequently updated, www.vivaldiproject.org, on which all of the publications and workshop proceedings mentioned in this section can be found.

A newsletter was produced 6-monthly and distributed electronically as well as printed. At the beginning and end of the project, a brochure was published showing, respectively, the aims and the results of the project. Fact sheets have been produced for most of the implemented measures, providing in one page a concise description of a measure, the partners involved, and what the results are.

The wider exchange of experiences and knowledge was organised in open technical workshops (telematics, co-ordination and co-operation, travel planning and cycling measures), national conferences (delivering urban transport innovations, clean air for European cities), and participation in international events such as the CIVITAS Forum.

There has also been cross-CIVITAS co-operation such as involvement and presentation of experiences at workshops of sister projects. The many site visits undertaken during these meetings supported the exchange of experiences and knowledge for technicians, practitioners, and managers as well as for politicians. In addition to the numerous informal exchanges of experience and knowledge achieved through these events, Bremen and Nantes exchanged more specific and formal information on cycling policy and the setting up of a car sharing scheme involving both technicians and politicians.

6.2 Up-Scaling and Dissemination

Aalborg: Up-Scaling

After closure of the VIVALDI project, the car sharing scheme will continue: the scheme has increased continuously since opening in January 2004, and expansion depends on demand.

The telematics project will also continue with RTPI implemented in other parts of the city to improve the service level in the remaining part of the public transport network (14 new signs and all buses equipped with computers in 2006), and the measure will be further integrated in future projects to improve the environment in urban areas.

Aalborg: Dissemination

To disseminate the experiences from VIVALDI, there is a local website, as well as dissemination through key European networks (POLIS, Car Free Cities, UITP, etc), at national conferences, and other local dissemination activities.

Bremen: Up-Scaling

Local and regional dissemination of post-paid BOB ticket and pre-paid electronic ticketing to the public continues as the number of holders increases, and there will be participation in national and international knowledge exchange.

Technical plans are drawn up and the participation process with residents continues for further details of implementation and process for the tramline 4 extensions. Construction of lines 1 and 8 is scheduled for 2009. The freight consolidation system will be extended and a second Bio-diesel truck has been purchased.

Car sharing is a regular business offer in Bremen and will continue. VIVALDI demonstrated that services in lower density areas in the suburbs are very hard to establish and maintain. Joint co-operation between the car sharing and PT operators will continue; growth rates are estimated at 10% per year. The business approach will be enlarged. The concept of bicycle infrastructure improvements is politically approved and will be fully implemented by 2007. Cycling measures will be integrated with all other road projects.

The great success of the CNG campaign convinced the management of both companies to continue with an adapted version. A new infrastructure programme was decided which will bring three more fuelling stations onto the market.

Bremen: Dissemination

Knowledge transfer and consultancy on car sharing is available. All future marketing material will be based on the VIVALDI campaign to allow high brand recognition

Bristol: Up-Scaling

BDAR continues to look to the future and to improve the service on offer to its members. The upgrade to the existing booking and scheduling system allows a move away from the area-based system and the allocation of vehicles more efficiently across the city as a whole. BDAR also remain committed to using alternative fuels and have embraced LPG, but have concerns regarding vehicle depreciation. The City Council's fleet has a rolling vehicle replacement programme and clean fuels will continue to be pursued as part of this process.

A business plan has been developed for the freight consolidation scheme that seeks to secure an increasing proportion of the operating cost from the participating retailers. The Cycle Resource Centre (CRC) will seek to further develop usage through publicity, and will also revise its pricing structure based on results of the survey and discussions with local businesses.

The use of Community Travel Workers has provided a valuable model which could be employed in the future in developing major schemes, particularly those which are likely to be innovative or contentious, where information exchange and involvement of residents or other effected groups will be vital to successful implementation. Following

the success of the Community Delivery Points, this has been rolled out as an optional service for commercial customers nationwide. The four local authorities in the Greater Bristol area are preparing a 'Smarter Choices' strategy within which an ongoing programme of Individualised Travel Marketing is likely to be a significant element.

The Park and Ride scheme will be the first experience of smartcards in Bristol, and successful operation will encourage further use of smart technology in the region. A number of teams within the council have an interest in smartcards, and may be accommodated as added services on the Park and Ride cards in due course. It is also hoped that successful operation will encourage the main bus operator in Bristol that smartcards would be a workable technology for a citywide ticketing scheme.

Bristol: Dissemination

The results of all measures are disseminated through partners' websites, local factsheets, the "VIVALDI Project in Bristol" brochure and a local evaluation report. In addition, dissemination occurs through presentations at national conferences and through European networks.

Kaunas: Up-Scaling

The new ticketing measure will be extended through the development of an e-ticketing system that should be implemented in the first few months of 2006. This process of replacing the public transport fleet will continue into 2006 until there is a complete new fleet, and some new trolley buses.

Kaunas: Dissemination

Continued dissemination will potentially be through the use of UBC money to share experiences with other interested cities – following the UBC award and the CIVITAS Award, there have been quite a few interested cities wishing to know more about the public transport services and their management.

Nantes: Up-Scaling

Purchase of new CNG buses instead of diesel buses will be carried out for all fleet renewal. All other public transport and mobility management measures will be continued, including: new company travel plans, extension of the bicycle network, and continuation of the parking policy.

The works on RN801 and the launch of the busway service will continue for opening at the end of 2006. The works on Vannes road will be completed, including the extension of tramline 3 north to connect to the ring road. Construction of new University premises at the Tertre campus will continue on previous car park areas.

Nantes: Dissemination

Results for every package are on the UCN website in French and English.

6.3 Views on VIVALDI's Implementation and the Impact on CIVITAS

6.3.1 Project Co-ordinator: Barbara Davies, Bristol City Council

Co-ordinating a project the size of VIVALDI has been challenging but highly rewarding. As one of the first four CIVITAS projects, the VIVALDI consortium felt like trailblazers in a new and exciting phase of the Commission's support of clean urban transport. The success of VIVALDI measures described in this report clearly shows that the project has had a large beneficial impact on the lives of citizens in all of our five partner cities.

In comparison to other framework projects, the fact that VIVALDI is part of the larger CIVITAS initiative provides an invaluable source of support and networking. This support, through the PAC, has been particularly important and helpful for politicians pursuing innovative transport measures. As EC-supported projects can be of limited use if their innovation is not shared widely, the CIVITAS Forum is a key audience for disseminating new technologies and ways of working. Recognition of the work of the VIVALDI consortium, with 3 CIVITAS awards given to the project, is the source of a great deal of satisfaction and a stimulus to continue the good work.

6.3.2 Aalborg: Kurt Markworth

The drive and creativity that was shown locally and in the consortium lead to synergy and good results in VIVALDI. Personally a single event in 2004 – winning the CIVITAS award for New Mobility Culture Leadership – was the most exciting for Aalborg.

6.3.3 Bremen: Michael Glotz-Richter

VIVALDI has intensively moved forward the implementation of clean vehicles and alternative fuels on the local and European level. Unfortunately, the CIVITAS initiative has not succeeded in the area of clean trucks so far – but has opened ears and eyes to that crucial problem for any clean air policy. I expect CIVITAS to be a platform to further raise that issue.

As Bremen is an example, VIVALDI has raised the issue of mobility culture and related this to promote an urban lifestyle as more energy efficient and less space consuming way of life. Car sharing became part of the mobility chain – and we are happy to share our experience in that innovative field as other cities do in their specific areas.

For the future, we have to further promote sustainable urban mobility to reduce the vulnerability against increasing mineral oil prices and to prepare the European cities for the upcoming demographic change. Attractive cities are a key for a wealthy Europe.

6.3.4 Bristol: Pete Davis

The project has enabled BCC and partners to implement a number of innovative schemes that support the transport and environmental aspirations of the Local Transport Plan. Key positive aspects of VIVALDI include:

- Promoting innovation by developing a number of cutting edge schemes such as the walking and cycling internet trip planner, and an Info Bus which travels around the city providing travel and transport information tailored to events and locations.
- Providing the catalyst to progress cross-cutting initiatives such as Southmead Hospital interchange project, the Dings Home Zone, and widening access to on-line services, which support broader policy goals such as access to health, regeneration, and e-government.
- Raising the profile of the city and the project partners, providing the opportunity to interact and communicate project experiences with a range of new European, national, and local organisations.
- Creating effective partnerships, both between those involved directly in the project, such as the joint development and occupation of the TravelBristol Info Centre by the Council and First, and also with other organisations such as working with the NHS Trust on the Southmead Hospital interchange project and with a private developer on the Cycle Resource Centre.

One of the most important lessons learnt through VIVALDI is that the active involvement and support of local politicians, together with strong local government with a clear vision on sustainable transport, are vital for successful implementation of innovative urban transport measures.

6.3.5 Kaunas: James McGeever

An important factor in the success of the whole CIVITAS initiative is that there is a CIVITAS II and that there will be an extension of the CIVITAS I programme. This prolonged approach to tackling some of the problems inherent in urban mobility will clearly help maintain pressure on the EC to push through some supportive policy changes in due course. However, what has been raised as a slight criticism of the CIVITAS initiative is the lack of more powerful EC support for policy changes in order to help implement many of the recommendations that have come from CIVITAS I.

6.3.6 Nantes: Olivier Sorin

The exchanges with partners have been quite interesting and useful (for example for Nantes Métropole representatives and people in charge of the Nantes car sharing project). The more the partner technicians in charge of measures are involved, the more useful it is. It has been a very useful experience for me personally.

The administrative and technical monitoring is sometimes time-consuming and needs a lot of work for a small benefit for partners and the Commission (but it provides work for subcontractors!). It is difficult to forecast at the beginning of the project period the exact contents of the measures, their budget, and the human resources needed for the 4 years.

There is a difficulty in disseminating the project at the national level if there is no budget on translation to target French representatives and technicians.

7 REFERENCES

7.1 Follow-up Projects and Events

Aalborg

Participation in VIVALDI has raised the profile of Aalborg and the project partners thanks to a good and solid cooperation with the CIVITAS office in DG TREN. The follow on actions are participating in EU projects with a focus on soft measures, individual marketing for public transport, and schemes for city logistics.

Bremen

At a local level, the Bremen Strategy for improving air quality will give particular attention to urban and suburban commuters and freight transport. Experiences and results of VIVALDI are also used for the Local Action Plan to fulfil clean air requirements. As a result of VIVALDI, Bremen intends to implement a “clean freight delivery point” adjacent to the pedestrian area, which shall be open only for Euro V/EEV delivery trucks. The PT operator will purchase only EEV busses and consider testing more hybrid buses.

The successful car sharing experience will be extended as more intermodal mobility stations are planned. Electronic ticketing and post-paid BOB tickets for non-frequent public transport customer are successful and will be implemented in all public transport operators in the region.

At the European level, Bremen will still be very active to promote the results of VIVALDI in conferences and workshops, as member of the CIVITAS PAC, and in direct exchange with other cities. The experience of Bremen is often requested by TAIEX – the Office for Technical Assistance and Information Exchange of DG Enlargement – to be beneficial for the new member states and candidate countries.

The non-availability of clean trucks of size 7.5-18 tons has been the issue of an initiative at the federal level and has been made an issue for the PAC. Joint initiatives with other CIVITAS cities are planned.

Bristol

The CIVITAS initiative has built upon existing relationships between the cities involved and forged new ones that we hope will carry forward. We are pleased that following technical exchanges at a TELLUS project workshop on freight, Bristol together with Göteborg, Ljubljana, Revenna, and Riga are participating in the START project looking at improving the efficiency of urban freight movements.

Another example of activities which have developed from experiences gained from involvement in VIVALDI is the work of Sustrans in supporting sustainable travel initiatives in Preston through the CIVITAS II Success project, and the development of a Home Zone in Swindon through an Interreg project titled Streets for Living.

Kaunas

We have two projects through the INTERREG III programme – both will involve our Bremen partners – called BUSTRIP and MoCuBa; Lithuanian E-ticketing system in partnership with Vilnius and Klaipeda; CIVITAS continuation project (if successful!);

plus various invitations to make presentations at seminars and conferences (probably due to the CIVITAS Award).

Nantes

Most of the local actions will continue or be reinforced: communication on travel awareness (implementation of a travel information centre with SEMITAN); choice of car sharing operator and launch of the service at the end of 2006; certification of bus routes; and cycling policy.

In European projects, Nantes is one of the partners of the Catalist bid as CIVITAS follow-on action and a partner of the Steer bid on clean PT vehicles. To progress the implementation of the integrated electronic payment measure that was delayed during VIVALDI, Nantes will work with the European project ITISS to implement this at the regional scale.

7.2 Glossary: Short Names of Partners

Aalborg	
Aalborg	Aalborg City Municipality
NT	Nordjylland Trafikselskab
Bremen	
FHB	Freie Hansestadt Bremen Senator für Bau Umwelt und Verkehr
BSAG	Bremer Strassenbahn AG
VBN	Verkehrsverbund Bremen / Niedersachsen GmbH
ZVBN	Zweckverband Verkehrsverbund Bremen / Niedersachsen
Cambio	Cambio GmbH & Co KG
StadtAuto	StadtAuto Bremen CarSharing GmbH
GVZ	GVZ-City-Logistik Bremen GmbH
SWB	SWB Vertrieb Bremen GmbH
Uni Bremen	University of Bremen
BREK	Bremer Energie-Konsens GmbH
Bristol	
BCC	Bristol City Council
First	First City Line
BDAR	Bristol Dial-A-Ride
UWE	University of the West of England
Sustrans	Sustrans
Kaunas	
Kaunas City	Kaunas City Municipality
Nantes	
UCN	Communauté Urbaine de Nantes
Semitan	Société d'économie mixte des transports de l'agglomération Nantaise
AURAN	Agence d'Études Urbaines de la Région Nantaise
TRITEL	Transport, Infrastructure & Telematics

7.3 Glossary: General

ANPR	Automatic Number Plate Recognition
AVL	Automatic Vehicle Location
BTC	Bristol Transport Channel
CIVITAS	CIty–VITAlity–Sustainability
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CRC	Cycle Resource Centre
CS	Cost Statement
CTW	Community Travel Worker
D1	Project Handbook
D2	Inception Report
D3	Project Website
D4	Site Evaluation Plans
D5	Implementation Report 1
D6	Mid Term Review
D7	Implementation Report 2 (appended to D9)
D8	Technology Implementation Report
D9	Evaluation Report
D10	Policy Recommendations
D11	National Conferences
D12	Final Report
DfT	Department for Transport (UK)
DG	Directorate General
DRTS	Demand Responsive Transport Services
EC	European Commission
EEV	Enhanced Environmental friendly Vehicle
EU	European Union
GIS	Geographical Information System
GJ	Giga Joules
GSM	Groupe Speciale Mobile
HC	Hydrocarbons
HGV	Heavy Goods' Vehicle
HZ	Home Zone
ITIC	Intermodal Transport Information Centre
ITM	Individualised Travel Marketing
ITP	Internet Trip Planner
ITS	Intelligent Transport Systems
km	Kilometre
KWh	Kilowatt hours
kw/h	Kilowatts per hour
LPG	Liquid Petroleum Gas
METEOR	The accompanying measure of the CIVITAS I projects
MIRACLES	Multi Initiative for Rationalised Accessibility and Clean Liveable Environments
MJ	Mega Joules
MOU	Memorandum of Understanding
NO _x	Oxides of Nitrogen

P&R	Park and Ride
PAB	Political Advisory Board
PAC	Policy Advisory Committee
PC	Personal Computer
PIN	Personal Identification Number
PM	Person Month
PM ₁₀	Particulate Matter smaller than 10µm
PMB	Project Management Board
PR	Progress Report
PT	Public Transport
RTPI	Real-Time Passenger Information
RTPM	Real Time Performance Management
SME	Small and Medium sized Enterprises
SUDS	Sustainable Urban Drainage
TELLUS	Transport and Environment aLLiance for Urban Sustainability
TIC	Travel Information Centre
TPM	Total Particulate Matter
TREND- SETTER	Setting Trends for Sustainable Urban Mobility
UBC	Union of Baltic Cities
VIVALDI	VIisionary and Vibrant Actions through Local transport Demonstration Initiatives
vkm	Vehicle kilometres
VMS	Variable Message Sign
VOC	Volatile Organic Compounds
VRM	Vehicle Registration Mark
WP	Workpackage

8 ANNEXES

Over the following 32 pages, the VIVALDI factsheets for a number of key measures can be found. These are listed below, by site.

Aalborg

Establishing car sharing
ITS in public transport
Travel information centre

Bremen

BOB card
Car sharing
City logistics
Clean vehicles
Cycle friendly neighbourhoods
Hybrid tram
Intermodal Travel Information Centre
Mobilpunkt

Bristol

Bristol Dial-a-Ride
City navigators (InfoBus)
Clean vehicles
Community travel workers
Cycle resource centre
Freight consolidation scheme
Harbourside travel plans
Home Zones
InfoCentre
Intermodal trip planner
Southmead interchange
Taxi-Sharing
TravelSmart
Widening access

Kaunas

Pikas

Nantes

Clean low-floor bus fleet
Compressed gas station
UCN's company travel plan
Vélocampus rent-a-bike
Nantes-Vertou railway line