

CiViTAS
Cleaner and better transport in cities

ARCHIMEDES

AALBORG • BRIGHTON & HOVE • DONOSTIA-SAN SEBASTIÁN • IASI • MONZA • ÚSTÍ NAD LABEM

D6.1 – Development and Experience of Innovative Mobility Support Measures and Demonstrations in ARCHIMEDES

November 2012



THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
EUROPEAN UNION

Project no.	TREN/FP7TR/218940 ARCHIMEDES
Project Name	ARCHIMEDES (Achieving Real Change with Innovative Transport Measure Demonstrating Energy Savings)
Start date of the Project	15/09/2008
Duration:	51 months
Workpackage	6
Deliverable:	D6.1: Development and Experience of Innovative Mobility Support Measures and Demonstrations in ARCHIMEDES
Due date of Deliverable:	September 2012
Actual submission date:	9 th November 2012
Dissemination Level	Public
Organisation Responsible	Aalborg
Author	Kristian Løbner
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Version	1.0
Date last updated	9 th November 2012

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1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for City-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme);
CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and
CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by:

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS

- CIVITAS is co-ordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories’ for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

Innovative mobility is one of the eight categories within CIVITAS ARCHIMEDES. New forms of vehicle use (car-sharing and car-pooling) can fill the gap in mobility needs and remove the need for car purchase (which tends to lead to over-use). Vehicle sharing can be optimised to maximise its exploitation and adaptation to customers' requirements. For even greater energy-efficiency and public health, cycling is an ideal mode of transport for many medium-sized urban areas.

The aims of the work package will be:

- To increase awareness towards alternative transport modes to conventional car use and the negative aspects associated with different vehicles and methods of travel;
- To enhance the modal split from single occupancy vehicle use towards public transport, walking and cycling;
- To extend the amount of vehicle sharing inside and outside the city and to increase the number of vehicles in the shared fleets;
- To raise the visibility of cycling, its infrastructure, convenience and use within each of the ARCHIMEDES cities.

In all of the cities there was some form of mobility service/energy saving mode already present, such as car sharing services, cycle networks/infrastructure, and vertical transport. Therefore research was undertaken to examine what has already been achieved, and how to expand and improve upon it from one or more of the following perspectives:

- Technical quality;
- Scope;
- Promotion and marketing of the offering.

The measures focus on expansion, further development or improvement of the existing initiatives supporting innovative mobility services and energy saving modes.

2 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

2.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark)
- Brighton & Hove (UK)
- Donostia-San Sebastián (Spain)
- Iasi (Romania)

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport company features as a partner in the proposed project.

2.2 Aalborg

The City of Aalborg, with extensive experience of European cooperation and having previously participated in CIVITAS I (VIVALDI) as a 'follower' city, is coordinating the consortium and ensures high quality management of the project. The City has the regional public transport authority (NT) as a local partner, and framework agreements with various stakeholder organisations.

Aalborg operates in a corridor implementing eight different categories of measures ranging from changing fuels in vehicles to promoting and marketing the use of soft measures. The city of Aalborg has successfully developed similar tools and measures through various initiatives, like the CIVITAS-VIVALDI and MIDAS projects. In ARCHIMEDES, Aalborg aims to build on this work, tackling innovative subjects and combining with what has been learned from other cities in Europe. The result is an increased understanding and experience, in order to then share with other Leading cities and Learning cities.

Aalborg has recently expanded its size by the inclusion of neighbouring municipalities outside the peri-urban fringe. The Municipality of Aalborg has a population of some 194,149, and the urban area a population of some 121,540. The ARCHIMEDES corridor runs from the city centre to the eastern urban areas of the municipality and forms an ideal trial area for demonstrating how to deal with traffic and mobility issues in inner urban areas and outskirts of the municipality. University faculties are situated at 3 sites in the corridor (including the main university site). The area covers about 53 square kilometres, which is approximately 5 % of the total area of the municipality of Aalborg. The innovation corridor includes different aspects of transport in the urban environment, including schools, public transport, commuting, goods distribution and traffic safety. The implementation of measures and tools fit into the framework of the urban transport Plan adopted by the Municipality.



Figure 1: The Archimedes Corridor in Aalborg

2.3 Brighton & Hove

Brighton & Hove is an historic city, in the south-east of England, known internationally for its abundant Regency and Victorian architecture. It is also a seaside tourist destination, with over 11km of seafront attracting eight million visitors a year.

In addition, it is a leading European Conference destination; home to two leading universities, a major regional shopping centre, and home to some of the area’s major employers. All of this, especially when set against the background of continuing economic growth, major developments across the city and a growing population, has led the city council to adopt a vision for the city as a place with a co-ordinated transport system that balances the needs of all users and minimises damage to the environment.

The sustainable transport strategy that will help deliver this vision has been developed within the framework of a Local Transport Plan, following national UK guidelines. The ARCHIMEDES measures also support the vision, which enables the city to propose innovative tools and approaches to increase the energy-efficiency and reduce the environmental impact of urban transport.

2.4 Donostia - San Sebastián

The city of Donostia -San Sebastian overlooks the sea and, with a bit more than 180,000 inhabitants, keeps a human scale. Some people consider the balanced combination of small mountains, manor buildings, and sea as the setting for one of the most beautiful cities in the world. We have a tradition in favouring pedestrians, cyclists and public transport.

For about twenty years, the city has been enforcing a strong integrated policy in favour of pedestrians, bicycles and public transport. Considering walking and cycling as modes of transport, has led to the building of a non-motorised transport network for promoting this type of mobility around the city.

Likewise, the city has extended its network of bus lanes. The city holds one of the higher bus-riding rates, with around 150 trips per person per year.

The CIVITAS project is being used as the perfect opportunity to expand Donostia -San Sebastian’s Sustainable Urban Transport Strategy. With the package of CIVITAS measures Donostia-San Sebastian will:

- Increase the number of public transport users
- Decrease the number of cars entering in the city centre
- Increase the use of the bicycle as a normal mode of transport
- Maintain the high modal share of walking
- Reduce the number of fatal accidents and accidents with heavy injuries
- Reduce the use of fossil fuels in public transport

2.5 Iasi

The City of Iasi is located in north-eastern Romania and is the second largest Romanian city, after Bucharest, with a population of 366,000 inhabitants. It is also the centre of a metropolitan area, which occupies a surface of 787.87 square kilometres, encompassing a total population of 398,000 inhabitants.

The city has five universities with approximately 50,000 students, the second largest in Romania. The universities and their campuses are located in the central and semi-central area of the city. In the same area, there are also a large number of kindergartens, schools and high schools with approximately 10,000 pupils. This creates a large number of routes along the main corridor, served by the public transport service number "8" (Complex Tudor Vladimirescu - Copou) with an approximate length of 10 km. The City of Iasi will implement its integrated measures in this area to be known as the "CIVITAS+Corridor".

The city's objectives in CIVITAS - ARCHIMEDES are based on the existing plans related to transport, Local Agenda 21, approved in 2002, and the Sustainable Social-Economic Development Strategy for City of Iasi. The CIVITAS Plus objectives will be integrated in the Strategy for metropolitan development which was finalized in October 2009.

2.6 Monza

Monza is a city on the river Lambro, a tributary of the Po, in the Lombardy region of Italy, some 15km north-northeast of Milan. It is the third-largest city of Lombardy and the most important economic, industrial and administrative centre of the Brianza area, supporting a textile industry and a publishing trade. It is best known for its Grand Prix.

The City of Monza, with approximately 121,000 inhabitants, is located 15 km north of Milan, which is the centre of the Lombardia area. This area is one of the engines of the Italian economy; the number of companies is 58,500, i.e. a company for every 13 inhabitants.

Monza is affected by a huge amount of traffic that crosses the city to reach Milan and the highways nodes located between Monza and Milan. It is also an important node in the Railways network, crossed by routes connecting Milan with Como and Switzerland, Lecco and Sondrio, Bergamo and Brianza. "Regione Lombardia", which in the new devolution framework started in 1998, has full responsibility for establishing the Local Public Transportation System (trains, coaches and buses) and has created a new approach for urban rail routes using an approach similar to the German S-Line or Paris RER.

Monza has recently become the head of the new "Monza and Brianza" province, with approximately 750,000 inhabitants, so will gain the full range of administration functions by 2009. Plan-making responsibilities and an influence over peri-urban areas will require the city to develop new competencies.

In this context, the objective of the City of Monza in participating in CIVITAS as a Learning City is to set up an Urban Mobility System where the impact of private traffic can be reduced, creating a new mobility offer, where alternative modes become increasingly significant, leading to improvements to the urban environment and a reduction in energy consumption (and concurrent pollution).

2.7 Ústí nad Labem

Ústí nad Labem is situated in the north of the Czech Republic, about 20 km from the German border. Thanks to its location in the beautiful valley of the largest Czech river Labe (Elbe) and the surrounding Central Bohemian Massive, it is sometimes called 'the Gateway to Bohemia'. Ústí is an industrial, business and cultural centre of the Ústí region.

Ústí nad Labem is an important industrial centre of north-west Bohemia. The city's population is 93,859, living in an area of 93.95km². The city is also home to the Jan Evangelista Purkyně University with eight faculties and large student population. The city used to be a base for a large range of heavy industry, causing damage to the natural environment. This is now a major focus for improvement and care.

The Transport Master Plan, to be adopted in its first form in 2007, will be the basic transport document for the development of a new urban plan (2011), which must be developed by the City subject to the provisions of the newly adopted Building Act. This will characterise the development of transport in the city for the next 15 years, and so the opportunity to integrate Sustainable Urban Transport Planning best practices into plan development during the project means an ideal match of timing between city policy frameworks and the ARCHIMEDES project.

The projects main objective is to propose transport organisation in the city, depending on the urban form, transport intensity, development of public transport, and the need for access. The process, running until 2011, will include improving the digital model of city transport that Ústí currently has at its disposal. The plan will have to deal with the fact (and mitigate unwanted effects that could otherwise arise), that from 2010, the city will be fully connected to the D8 motorway, running from Prague to Dresden.

3. Background to the Deliverable

This deliverable summarises the research and demonstration activities conducted in relation to workpackage 6 of the CIVITAS ARCHIMEDES project – Innovative mobility services.

3.1 Introduction to the Measures

Research and demonstration activities in respect of innovative mobility services were conducted in all six of the ARCHIMEDES cities, namely Aalborg, Brighton, Donostia - San Sebastián, Iasi, Ústí nad Labem and Monza, in the form of measures 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61 and 62. These measures are introduced in the following sections.

The results from the individual measures are reported in detail as follows:

Measure No:	Research Deliverables	Implementation Deliverables
51		T51.1
52		T52.1
53		T53.1
54	R54.1	T54.1
55		T55.1
56		T56.1
57	R57.1	T57.1
58		T58.1
59		T59.1
60	R60.1	T60.1
61	R61.1	T61.1
62	R62.1	T62.1

This deliverable draws together the experiences gained from the individual measures, and presents the common issues and conclusions that can be drawn at the workpackage level. Further information and outcomes of the measures can be found in D10.3 Final Evaluation Report and D12.4 Final version of measure level result templates.

Measure 51: Cycle Motorway in Aalborg

This measure focuses on implementing a Cycle Motorway on the central cycling link, connecting the city centre and the University. These are located at opposite ends of the ARCHIMEDES Corridor, approximately 5 km apart. Before the reconstruction the only facilities for cyclists were painted cycle lanes. The purpose of the measure was to provide improved and safer cycling facilities for students and other users of the stretch.

The whole 5 km stretch from the city centre to the campus area was rebuilt and upgraded from an ordinary cycle lane to a high class Cycle Motorway, which was finished in June 2011. A dedicated cycle track was established for a large part (approx. 2 km) of the route combined with new solutions for cyclists at bus stops, a bicycle counter, automatic air pumps, signposting, a segregated bicycle filter lane and a lane light system. However, the construction of the bicycle lanes was not financed by the ARCHIMEDES project.

Measure 52: City Bike Scheme in Aalborg

Aalborg implemented a city bike scheme within the ARCHIMEDES corridor. This task included purchase of city bikes and city bike stations, as well as entering a long term contract for operation of the scheme. Also implemented was an information campaign, an opening event combined with an ARCHIMEDES dissemination event and a city bike Internet site.

The city bike scheme was implemented in 2009, and contained 137 bikes and 19 stations initially. During the project period the system was subsequently expanded to over 200 bikes and 21 stations. The expansion was financed outside the ARCHIMEDES project.

Measure 53: Workplace Car Sharing in Aalborg

In the CIVITAS VIVALDI project the City of Aalborg established a car sharing scheme in cooperation with a car sharing company, HERTZ. The car sharing scheme was promoted to young people especially. It was decided to take the promotion effort a step further and to promote car sharing to companies as a part of the ARCHIMEDES project. The companies were encouraged through campaigns and promotion to use the car sharing scheme as a company car for employees during

working hours, whereas outside working hours the car would be part of the private car sharing scheme in the city.

Three campaigns were run during the project period. The first campaign was aimed at companies but as the results were insignificant, the target group was changed to young people, mostly students. Two different campaigns were conducted with this target group.

Measure 54: Car-Sharing Scheme Improvements in Brighton & Hove

This measure set out to identify the optimum locations for a car sharing demonstration in the Brighton & Hove ARCHIMEDES corridor. The ARCHIMEDES corridor includes areas of low income, with reduced density away from the city (in contrast to current car sharing sites in Brighton & Hove which are in central, and generally more affluent, areas of the city). Therefore the measure considered the implications of setting up a car sharing in disadvantaged or low income areas. To guide the project best practice in implementation and operation of car sharing was reviewed. The review is based on information from established car sharing in Europe, including Aalborg.

However, the measure did not proceed to implementation and evaluation as the car sharing scheme was not seen as viable by the potential commercial operators, mainly due to economic reasons.

Measure 55: Cyclist Priority in Brighton & Hove

The original intention of the measure was to focus on the implementation of a 'Green Wave' (see section 4.2 for definition). However, due to economic reasons the 'Green Wave' was no longer feasible. Therefore three alternative cyclist priority measures were identified to achieve the objective of removing cyclist delay:

- *Cycle ramps:* These aimed to remove barriers for cyclists in various locations throughout the city where steps exist.
- *Left turn for Cyclists from Old Steine into St James's Street:* Amended signal phasing was introduced as part of a Mixed Priority Route scheme on a nearby street. This resulted in cyclists being able to legally turn left from the Old Steine into St James's Street (2 major roads in the centre of Brighton) where previously this had not been possible.
- *Station Street:* Vehicles access at the southern end of Station Street from Trafalgar Street was prevented at a small "pocket park" featuring benches and cycle parking. The pocket park was not well used and offered room for improvement. The proposal was to enhance cycle access through an improved pocket park resulting in better access for cyclists.

The cycle ramps element did not progress to full implementation due to technical reasons.

Measure 56: Car-Sharing Scheme in Donostia - San Sebastián

The City of Donostia - San Sebastián planned to introduce a car sharing programme in co-operation with the Gobierno Vasco (regional government) and two of the other major cities in the region, Bilbao and Vitoria. Experiences including lessons learnt were provided by ARCHIMEDES partners Aalborg and Brighton & Hove.

Prior to this task no car sharing schemes were established in San Sebastián.

Measure 57: Vertical Transport in Donostia - San Sebastián

The city of Donostia - San Sebastián expanded the policy of vertical transport with 7 new lifts, 5 mechanical ramps and 1 mechanical escalator to support cycling and walking inside and towards the city centre pedestrian zone. Dissemination material was prepared to promote the use of the vertical transport aids as elements of walking and cycling trips.

Measure 58: City Bike Scheme in Donostia - San Sebastián

The city bike scheme in Donostia - San Sebastián was managed automatically using a membership card system. To encourage use of the scheme the first hour of using the public bike was offered for free during the start-up phase.

Initially, it was intended to establish 40-50 dispatch points throughout the ARCHIMEDES corridor and to introduce 500 public bicycles. However, it was realised that this was unrealistic due to the costs, so the project was adjusted. For now, 9 stations and 150 bicycles have been installed as part of the scheme.

Measure 59: City Cycle Routes in Iasi

The City of Iasi implemented bicycle routes and facilities for cyclists through a 5.5 km cycle lane. The cycle lane incorporated bicycle parking places and special coloured street markings to indicate the route. These new facilities were promoted through a campaign to encourage the inhabitants of Iasi to cycle. A specialised marketing company was contracted to organise promotional activities.

Measure 60: Cycle Transport Improvements in Ústí nad Labem

Ústí nad Labem has a target to improve conditions for cyclists in the city and the surrounding areas and to create suitable facilities for them. This came in two parts:

- Improving information about cycle transport for the local population. The main output was a web portal for cyclists in Ústí nad Labem.
- Linking the existing cycling infrastructure into the existing regional cycle network. This was an important step towards increasing the number of cyclists across the region.

The feasibility of connecting two existing major cycle routes of cross-regional importance in the vicinity of Ústí nad Labem was assessed and an implementation plan proposed within the task. The feasibility study proposed two different scenarios for the Ústí cycle link – a route using the existing cycling infrastructure and an alternative route using newly constructed cycling infrastructure. The proposals were compared and assessed in terms of costs and benefits. Further, a web portal was created to provide information on the cycle network.

Measure 61: Car Sharing Scheme Improvements in Monza

Monza introduced a car sharing scheme in April 2007, agreeing with the Province of Milan on commitment to introduce this new approach to urban mobility. Monza conducted a study of barriers to car sharing to promote its extension in the five districts of Monza. To establish the current situation in Monza and assess user needs for future planning, the research methodology was broken down into two stages:

Stage 1: A precise analysis of available data about the city of Monza concerning:

- Socio-economical characteristics of residents/employees (private, commerce and offices)
- Accessibility and urban mobility
- Organisation of people's time, services and quality of life in the city.

Stage 2: A survey of user needs.

According to the results of the study, a marketing strategy was developed to increase the number of subscriptions to the car sharing service in Monza. In addition, a more rational positioning of car sharing vehicles in the city was defined. The cars are now located where accessibility is guaranteed to reach a higher amount of potential users.

Measure 62: Cycle Transport Improvements in Monza

The aim of the measure was to raise visibility of cycling, and its infrastructure, convenience and use within the city. It was intended to reduce the impact of private traffic, creating a new mobility offer where alternative modes are increasingly significant, leading to improvements to the urban environment and a reduction in energy consumption.

The creation of a complete cycle network, even though it will take some years to be achieved, will require:

- Infrastructural interventions on the cycle network;
- Interventions for the improvement of complementary services, like parking facilities, rentals, repairs and maintenance;
- Communication interventions and marketing of bicycle use.

The measure is delayed because, due to the economic situation in Italy, the municipality was not allowed to invest money originally allocated as its share of project funding.

4. Analysis

4.1 Comparison of Measures

4 of the measures cover car sharing schemes, 2 are aimed at city bike schemes, 5 measures cover improvements for cyclists while one measure is concerned with vertical transport.

Car sharing schemes

The measures in BHCC and Aalborg aimed to expand the car sharing schemes to other user groups - in BHCC it was aimed at disadvantaged people and in Aalborg at companies. Monza wanted to expand the existing user base and ADS wanted to implement electric cars in the car sharing schemes car fleet.

In general, it was very hard to pursue the target groups to take up car sharing and the idea of car sharing might be too idealistic.

Aalborg:

The main objective of this measure was to encourage companies in the ARCHIMEDES corridor to use an existing car sharing scheme in the city instead of own company cars. Employees could use the scheme at a special rate. The measure aimed at improving the system and at making it more attractive to more people.

Another objective was to promote car pooling for commuting to employees in the companies - although this is not a part of this workpackage. As the approach to companies was not successful, the main objective was redefined to campaigns aiming at students and young people as a more likely target group for car sharing.

However, the use of car sharing slightly decreased during the project period and the campaigns were not able to change this trend.

Brighton & Hove:

This measure aimed at expanding the car sharing schemes currently operating within Brighton & Hove to more socially disadvantaged and less densely populated locations than are currently served. It was intended to increase accessibility for individuals in such communities as well as reduce the level of car usage in the city.

Donostia - San Sebastián:

The objective of the measure was to reduce traffic, as it was acknowledged that one car in a car sharing scheme can replace up to four private cars. The objective was for Ayuntamiento de Donostia-San Sebastián (ADS) to define and accommodate dedicated parking spaces for car sharing vehicles at strategic locations in the city. ADS also planned to organise a promotion campaign to attract clients for the scheme.

Monza:

The measure aimed at changing people's attitude towards car ownership, while building a significant client base for the car sharing scheme in Monza. The purpose was to achieve a better understanding of barriers for using car sharing and reduce the number of circulating private cars.

City bike schemes

Aalborg:

The main aim of the measure was to stimulate the use of bicycles on short trips within the city and attract users that had not previously cycled as their preferred means of transport. The objectives were to:

- increase the number of trips on bicycles and thus improve energy efficiency and public health;
- stimulate the use of bicycles on short trips within the city;
- raise visibility of cycling and thereby attract new bicycles users;
- enhance multimodality including cycling;
- minimize the level of bicycle theft.

Donostia - San Sebastián:

The objective of this measure was to introduce a public bike sharing service to citizens and visitors to further widen the cycling culture and increase the number of cycling trips.

The impact of the measure was expected to be wider than the use of the city bikes alone. Hence, the scheme was also aimed at stimulating people to also make more use of their own bicycles. The measure aimed at contributing to the city level objective of reaching an increase in bicycle use of 30%.

Improved conditions for cyclists

Aalborg:

The overall objective of the Cycle Super Highway measure was to increase the number of trips made by bicycle and thus to improve energy efficiency and public health. The measure focused on increasing the modal split of cycling amongst students and other people travelling along the corridor. The objectives were to:

- have a positive impact on modal choice in favour of cycling for residents within the corridor;
- increase the number of cyclists by 5 % on the route and thereby improve energy efficiency and public health;
- achieve quantifiable improvement in travel time on the route;
- improve safety for the cyclists on the route;
- increase the visibility and awareness of cycling.

Iasi:

This measure established a 5.5 km long cycle track within the ARCHIMEDES corridor and promoted the route through a campaign. The objectives were to reduce car traffic, and encourage pupils and students to use the trail for their journey to and from their educational institutions.

It was intended to increase awareness of the need to reduce pollution and excessive traffic by increasing the use of bicycles. This was achieved through a communication campaign involving all type of audiences.

Ústí nad Labem:

This measure aimed to inform about the cycle transport improvements. The main improvement was the implementation of the web portal for cyclists in Ústí nad Labem as a major source of cycling information.

Another objective was to conduct a feasibility study for an appropriate route linking the Elbe and the Ore mountains cycle routes. Such a route was not pre-determined and there were several possible solutions. Linking the two routes was expected to increase cycling tourism in the city, thus supporting development of cycling services and infrastructure and having a great impact on local cyclists as well.

Brighton & Hove:

Brighton & Hove's cycle priority demonstration planned to introduce innovative engineering measures along the city's cycle network in the ARCHIMEDES corridor to avoid cycling delay. This was designed to reduce stop-start cycling conditions, improve cycling journey times and reduce cycle conflict with other traffic.

The objective was to implement three innovative design solutions:

- *Cycle ramps*: The objective was to produce a cycle ramp that could be installed on a narrow set of steps without taking away too much of the width of the steps from pedestrians. The aim was to provide priority for cyclists at 12 intersections in the CIVITAS area of Brighton & Hove.
- *Left turn for cyclists at St James's Street*: The major objective of this element was to improve accessibility for cyclists at a point where they previously needed to dismount to continue their journey.
- *Improved access at Station Street*: The objective was to enhance cycle access to the southern end of Station Street from Trafalgar Street, through an improved pocket park.

Monza:

The aim was to provide guidelines for planning and realisation of:

- A cycle network
- The re-styling of existing cycling routes, both main and secondary paths, either as cycle lanes with no kerb segregation to the adjacent road or cycling routes in separate to alignments.

These guidelines were a useful and effective instrument for Municipality technicians in charge of cycling mobility, but also for contractors which could possibly undertake the development of cycling routes within the territory of Monza.

The report contains guidelines and analyses of organized and explained examples of cycling routes also aimed at suggesting possible solutions to specific problems (e.g. crossing intersections, installing bus stops along bikeways, providing suitable bike parking, implementing bike lanes against the traffic). So the aim was to give consistency to the infrastructure (including construction details, information panels, and road signs and markings).

Vertical transport

In Donostia - San Sebastián, the objectives were to:

- identify the existing Vertical Transport Systems (VTS) in Donostia - San Sebastián;
- assess VTS in relation to new pedestrian and cyclist infrastructures in the main neighbourhoods in order to update the Vertical Transport Plan;
- improve access to and from elevated areas;

- improve access to existing infrastructures;
- interconnect the VTS through creation of new routes for pedestrian and cyclists.

The increased accessibility aimed at creating new possibilities for social development and allowing people to live in areas that were not easily accessible beforehand.

4.2 Differences in Approach

Research and preparatory activities in respect of development and experiences of innovative mobility support measures have been conducted in four of the ARCHIMEDES cities, namely Brighton & Hove, Donostia - San Sebastián and Ústí nad Labem and Monza.

Car sharing schemes

To establish the foundation for car sharing promotion campaigns for companies, the City of Aalborg conducted in-depth studies of all drivers and barriers to car sharing. All relevant topics were considered but especially the (lack of) financial drivers.

After this work a promotional campaign directed to selected companies was carried out, but with poor results. Analyses showed that there in fact were no drivers in companies who would car share. Thus the target group was changed to young students, for whom there were positive drivers. The whole campaigning process with companies and students involved four phases.

Phase 1: Identifying drivers and barriers for companies to adopt the car sharing scheme

The drivers for uptake of car sharing were identified as:

- The environmental benefit;
- The public relations benefit for the company;
- The effect of reducing congestion;
- The economic benefit.

The primary barriers for uptake of car sharing were identified as:

- Distance to the nearest car sharing station
- The need to book the car in advance.

Phase 2: First campaign - directed at private companies

A folder describing the possibilities and the benefits was composed and sent to selected private companies. The messages in the campaign were 'It is good for the environment', 'It is a benefit for your economy', 'It is easy' and a recommendation from 4 companies already using car sharing in Copenhagen. The folder was followed up by calls requesting an interview. However, the response was negative.

Phase 3: Changing the target groups

Among the City of Aalborg and the Hertz car sharing company a new strategy was decided, including the following elements:

- Redistribution of existing cars to match the residential distribution of the new target group of young students;
- Extension of the fleet with a new car at the university campus;
- A new modernised internet information and booking system;
- An iPhone app for easy booking;
- A citywide campaign concentrated on most relevant media to the target group;
- A dedicated follow-up campaign with a sub-segment of the target group, young people most interested in new technology.

Phase 4: Second campaign - directed at young people

The aim of the second campaign was to draw attention to the advantages of the existing car sharing scheme in the city, and to market car sharing as easy, smart and modern. The media used were posters in the bus shelters all over the city and promotion on the live monitors in all city buses - see measure 69. However, the initial results of the campaign were not encouraging.

In order to test a new and innovative form of campaign the sub-segment of computer “geeks” was selected. The content was a competition requiring skills and effort to participate. The intention was that:

- The competition was so hard that only a small number of the participants were supposed to find the solution – giving them a significant possibility to win a prize;
- A great number of participants should spend a lot of time trying to solve the puzzle, and thus be very much aware of car sharing;
- The puzzle should be so difficult that the target group would start sending it to each other – creating a viral marketing effect.



Figure 2: The campaign for the car sharing scheme was installed at every bus stop in Aalborg (Measure 69).

In Brighton & Hove car sharing are largely confined to more densely populated and affluent areas. It was planned that BHCC would expand the existing scheme to more socially disadvantaged and less densely populated locations.

BHCC undertook research to identify the optimum locations for the car sharing demonstration. The research included a review of best practice from other established car sharing in Europe including Aalborg.

Investments in car sharing scheme Improvements

Initially the approach was based on analyses of investments, covering:

- Installation of car sharing bays;
- Costs of signing and road marking;
- Legal costs of the Traffic Regulation Order process;
- Planning and monitoring;
- Promotion and marketing materials;
- Further development of car sharing & lift share website.

A number of discussions were held with the two existing commercial car sharing companies operating locally, City Car sharing and Streetcar. The objective was to refine a shared project. It was hoped that these negotiations would be the first step towards full implementation of the project; however, the

proposals that could be drawn up were not seen as viable by the operators, mainly due to economic reasons.

Initially the approach in Donostia - San Sebastián was to work together with the Basque Government to implement the car sharing service in the three main cities of the Basque Country. However, the speed of the process was too slow and the Mobility Department decided to find another way to implement this measure. Due to issues with the tender material, the new Local Government in the City of Donostia - San Sebastián and long negotiations it was decided to prepare a new tender with different conditions. The new tender was published in late March 2012 and finally the company IBILEK car sharing was awarded the contract.

In Monza the approach was to implement a marketing strategy to increase the awareness car sharing and the number of car sharing service subscriptions in the five districts of the city. The measure covered 2 tasks:

- R&D - Study of a marketing strategy to show advantages of car sharing
- DEMONSTRATION - Car sharing scheme improvements

The research aimed to obtain useful indications to orientate the service towards real needs of actual and potential users, through the analysis of drivers and barriers, possible improvements and future developments. This approach was aimed not only at reaching new potential users, but also at preserving faithful customers, in order to create a 'hard core' of users which helps to finance the service. The methodological approach included the following stages:

- Identification of a sample of users: (socio-economical characteristics, accessibility and urban mobility, perception of time, quality of life etc.);
- Distributing a questionnaire and analysis of results;
- Conduct of a focus group.

Further, a SWOT analysis was conducted to define drivers and barriers for a car sharing service, and opportunities and risks in the territory where the service was proposed (for instance, market characteristic). All factors are represented in the matrix below:

<p>DRIVERS:</p> <ul style="list-style-type: none"> • Economic advantages • Facilities • No direct competition • Highly technological system • Automatic system and self service 24H/365days • High flexibility • Integrability of technology with other systems • National interoperability 	<p>BARRIERS</p> <ul style="list-style-type: none"> • Uncertainty about car availability • Unreliability of technological systems • Bad conditions of cars (dirtiness, damages...) • Lack of an Italian benchmark • Difficulty of understanding operation and convenience of the system • High costs of used system • Development of medium term strategies not defined yet
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Increasing concern about expenses from families and business customers • Essential "plug" of intermodal transport • Facilities from public administrations • Participation in a strong group offering "mobility" • Favourable social and cultural context • Care for environment 	<p>THREATS</p> <ul style="list-style-type: none"> • Less availability of / access to transportation • Cultural distrust towards idea of "sharing" • Niche market

Monza issued a subcontract for specialist expertise to develop a marketing strategy. The strategy utilised experience from the existing, well-established car sharing in Aalborg and Brighton & Hove.

City bike schemes

Two cities, Aalborg and Donostia - San Sebastián, implemented city bike schemes. In Aalborg, the scheme was based on strong and tamper-proof bicycles with a deposit system which is easy to use. The target groups were tourists and students. In Donostia - San Sebastián the approach was based in a subscription service aimed at daily commuters and tourists.

In Aalborg it was decided to implement a high class city bike scheme, so the system would be intensively used and vandalism minimised. The approach was based upon three main elements:

- **Bicycles:** It was decided to go for a relatively strong and tamper-proof bicycle as the city centre can be a tough environment. At the same time it was intended to offer a lighter city bike than usually seen, and a bicycle with more equipment (lights, gears, etc.) than usually.
- **Bicycle Stands:** For the bike stations a new stand was designed. This according to traditional Nordic design traditions in stainless steel, incorporating experiences from Copenhagen and Aarhus, especially concerning size and material.
- **Deposit system:** To motivate users to return the cycle to the stations the cycle was locked to the stand with a coin lock, and could be released by the deposit of a 20 DKK coin (app. € 3). The coin was returned when the cycle was returned to any of the city bike stations.



Figure 3: The city bike scheme in Aalborg now consists of 21 bicycle stands and 200 city bikes.

Motivating citizens to report 'lost bikes' was an important task. To make reporting easy, this was possible via a form on the city bike home page, SMS and an automatic telephone answering service.

A potential problem was people not being able to use the system due to users not returning the bikes. The deposit system was intended for minimising this problem. Still it was anticipated that some bikes could be left in parks or bike sheds. It was a part of the operation contract that the company collects these bikes every day. The contract also included:

- redistribution of cycles between stations once a day;
- daily inspection and cleaning of the city bike stations;
- inspection and repair of minor defects on the bikes in the stations;
- repair of major defects on repair shop within 72 hours;
- in the winter all bicycles go through a major maintenance check.

In Donostia - San Sebastián the approach to a city bike scheme was based on bike rental. The phases that were addressed were:

1: Definition of the main uses and users to whom the promotion is addressed

Initially, the city bike scheme was aimed at residents that:

- did not own a bicycle and would like to use one in specific circumstances;
- owned a bike but wanted to access bikes at specific times and locations within the city rather than using their bike.

It was found that it was technically and economically reasonable to place 9 dispatch points and 150 bicycles. These dispatch points were placed at main train and bus stations, at the university and at locations in the city centre.

2: Search for possible sources of funding

The construction of the first five dispatch points and management of the public bike sharing service system was completely funded by CEMUSA (a private company that runs the urban equipment of the city).

3: Definition of scheme model, implementation, equipment and dissemination

To use the bicycle-lending system in Donostia - San Sebastián, registration was required. In turn this required possession of the Donostia - San Sebastián citizen card costing 20 €/year. The registered person received a magnetic card allowing him/her to use the bicycles at a dispatching point. This way, the system could track the usage of bicycles and the person under whose name the bike was registered would be held responsible if it was stolen, vandalised or damaged. In such cases CEMUSA charged the user 150 €.

Conditions of use

Purchase the card:

Where: Boulevard 8, SAN SEBASTIÁN TURISMO-DONOSTIA TURISMOA, SA,

Timetable:

Monday to Saturday:

10:00-13:00 / 15:30-18:00

Sundays and bank holidays:

10:30-13:00

SUMMER

Monday to Saturday:

10:00-19:00

Sundays and bank holidays:

10:30-18.00

Return the card:

In the same place on the day after the card runs out

If it is not returned in time the deposit will be forfeited (without prejudice to any legal actions relating to non-compliance with the conditions)

Cost (cash payment):

- 1 day: 8 €

- 3 days: 15 €

- 1 week: 25 €

- Deposit: 20 €

Hours of use:

Monday to Sunday:

10:00-21:00

Maximum continuous use:

4 hours

Once the bike has been returned to one of the bicycle stations, it can be used again after 30 minutes.

The bicycle-lending scheme incorporated electronic and telecommunication technologies to prevent robbery and to make the service user friendly. To pick up a bike from a bicycle stand the user needed to swipe their card on a reader, which recorded their order and details.

The approach to bicycle design was:

- Strong models designed specifically for a long lifespan despite being used by many different people;
- Fitting an anti-theft system in which each part - e.g. wheels, saddle, handle - was incompatible with any other bike and therefore parts were easily recognisable if re-used or re-sold
- Using low frames so adequate for men, women, and people of different heights and flexibility.

The approach to dispatch points was:

- Clearly identifying them by signs that could be seen from different distances within the city centre;
- Equipping them with a map where users could locate other lending spots;
- Displaying the rules service usage.

The bicycle stands were small pillars specifically designed to:

- Identify the user when a card was swiped at a machine;

- To hold and lock each of the bikes when not in use;
- To articulate the locking and unlocking mechanism when a user was identified.



Figure 4: The city bike scheme in Donostia - San Sebastián is based on a bike rental system for local citizens.

Improved conditions for cyclists

The measures concerned with improved conditions for cyclists aimed at increasing the free flow for cyclists. In Aalborg a high class cycle path was constructed and several extra service features were established. In Ústí nad Labem the preparatory work was done prior to improving the cycle network in the region and in Monza the initiative was aimed at improving the entire cycle network. BHCC focused on improving conditions for cyclists at a specific intersection and a specific pocket park in the city centre.

In Aalborg, a concept for **the Cycle Motorway** was developed to increase the number of trips made by bicycle. The concept paid specific attention to:

- *Free flow conditions for cyclists:* The focus was on establishing a cycle stretch without unnecessary stops and detours. Recent Danish research revealed that these factors were important in relation to choice of the bicycle as a means of transport
- *Traffic safety:* The route should be a safe route for cyclists.
- *Visibility and service:* Providing cyclists with extra services was seen as a way to increase the visibility and attractiveness of cycling.

The following initiatives were implemented.

- *Reorganisation of cycle flow at bus stops*
The stretch was renovated with dedicated cycle paths, separated cycle paths from bus bays and improving overall cycle facilities along the stretch. Special attention was given to improving the safety and free flow conditions for cyclists at bus stops.
- *Bicycle counter with electronic information for cyclists*
Along the southbound section of the cycle lane (towards the University), a bicycle counter was installed. The purpose of the counter is to provide the cyclists with information during their journey. In addition, the counter increases the visibility of cycling for other road users.
- *Automatic air pumps for cyclists*

Two air pumps were installed on the route. Their purpose is to make cycling even more attractive by providing the cyclists with extra services.

- Lane lights for cyclists at one intersection**
To improve free flow conditions for cyclists, a lane light initiative was implemented at one intersection. The purpose was to test whether the lights could improve free flow conditions for cyclists, and to evaluate how the cyclists experienced this. 10 LED lights were installed at a distance of 50-140 m before one of the traffic light controlled intersections.
- Signposting of the entire stretch**
To keep cyclists informed on their journey, the cycle motorway was equipped with signs all the way from the city centre to the university area. The signs showed that this was a route to the university (in Danish: Universitetsruten, rute nr. 100) and the distance to the university or city centre.
- A segregated bicycle filter lane**
To improve free flow conditions for cyclists, a segregated bicycle filter lane was established. This allowed cyclists to turn right without coming onto one of the important intersections on the cycle motorway.



Figure 5: The bicycle counter (pictured left) and the segregated bicycle filter lane (pictured right) are both part of the cycle motorway in Aalborg.

In Brighton & Hove the initial approach was to establish a 'green wave' for cyclists to improve cycling flow and transport time. However, it was not possible to establish the green wave due to economic reasons. Three alternative initiatives were implemented to improve facilities for cycling.

Cycle ramps:

Stage 1: Preparation: In January 2010 a University of Brighton lecturer for technology and design was contacted. This was to determine interest in asking students to enter a design competition for the cycle ramps as part of their second year design course. A designed was developed by students and with assistance from the BHCC highways engineering team

'A Green Wave'

An intentionally induced phenomenon in which a series of traffic lights are coordinated to allow continuous traffic flow over several intersections in one main direction.

A series of lights installed in the ground alongside the cycle lane light up in sequence so that a cyclist who follows the lights will be guaranteed to arrive at the next traffic signals during a green light phase.

the design was refined and amended.

Stage 2: Decision making: Potential sites were chosen where there was an obvious requirement for cycle access or travel within the CIVITAS area. These were Falmer Rail Station, London Road Rail Station and Preston Park Rail Stations.

Stage 3: Implementation: The prototype was trialled at the University of Brighton site in April. Although the design looked promising when trialled on a life sized basis, there were technical problems with the moving mechanisms of the ramp.

Unfortunately, despite several design iterations, the decision was taken in September 2011 not to progress any further with the design as it was felt that the students had developed it as far as possible. Although the design had many positive features it was not of sufficient quality to be installed on public highways.

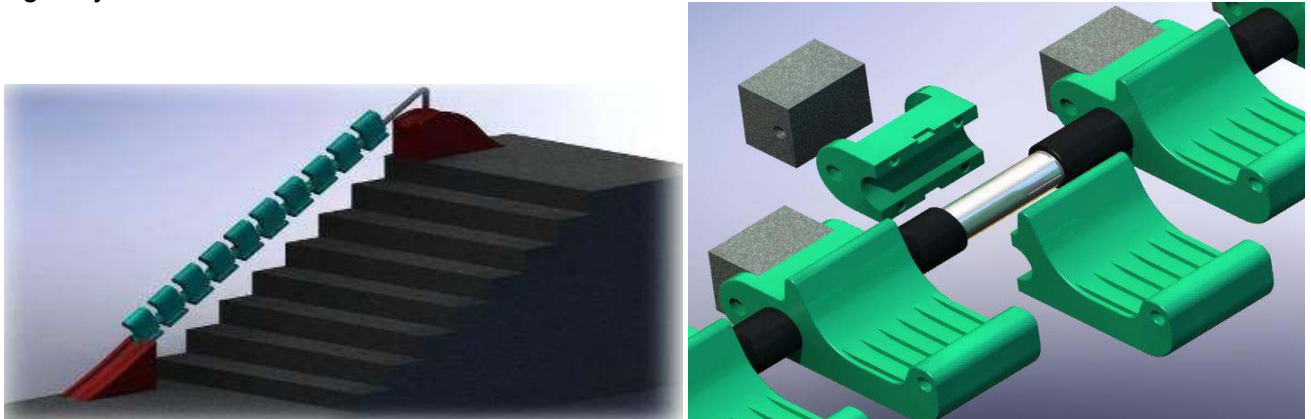


Figure 6: The design of the cycle ramps in Brighton & Hove.

Left turn for cyclists at St James's Street

Amended signals phasing was introduced as part of a Mixed Priority Route scheme on a nearby street. This resulted in cyclists being unable to legally turn left from Old Steine into St James's Street (2 major roads in the centre of Brighton). The proposal was to install a new cycle stop line and cycle signals to allow the left turn manoeuvre to be carried out legally and without affecting pedestrian flow or vehicle capacity.

A design for the scheme was produced in April 2011 and contractors appointed. The measure was implemented in the Summer 2012.

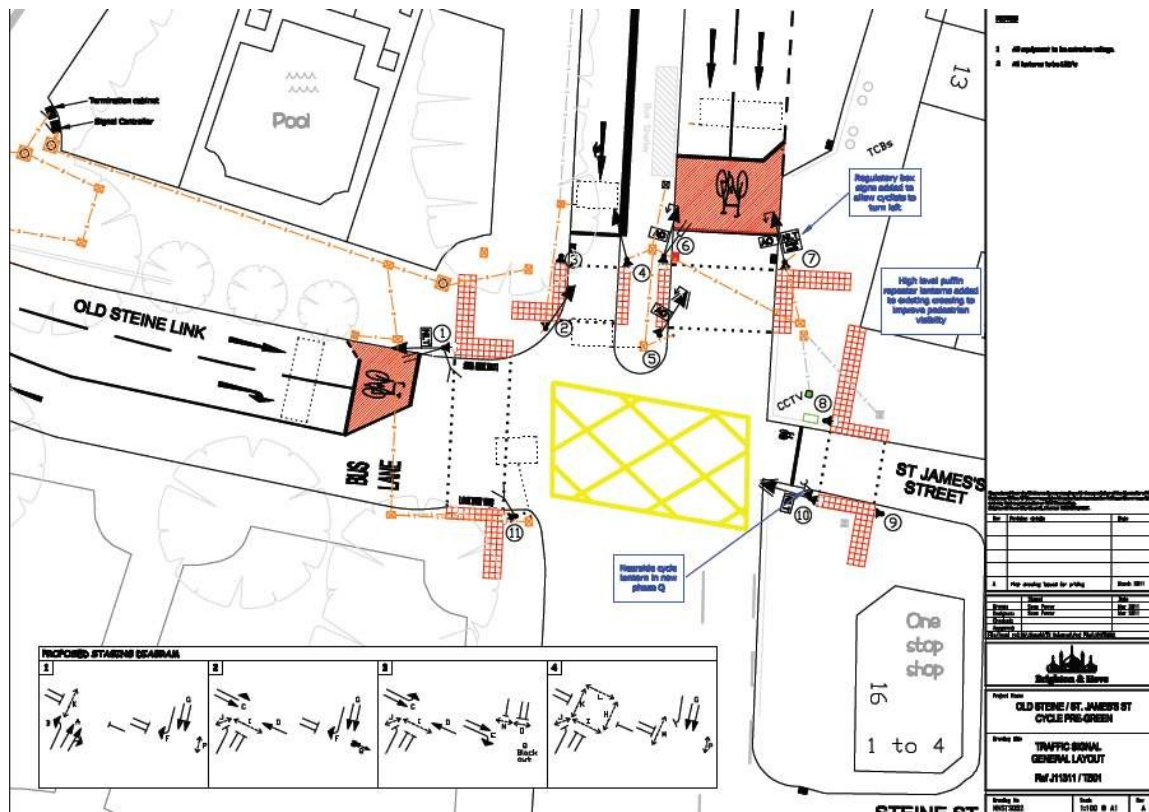


Figure 6: Scheme for left turn for cyclists at St James's Street in Brighton & Hove.

Improved access at Station Street

Video analysis of the area was carried out in winter 2010. Observations of pedestrian and cycle desire lines were used to inform the re-design of the pocket park. In early 2011 redundant street furniture was removed. An artist was appointed in September 2011 and a design of the utility box was installed in October 2011. In November 2011 on-street consultation was carried out to inform the detailed design of seating provision. Local businesses and passers-by were engaged and asked for their views on what should be provided. Chairs were placed on the street so that consultees could experiment with different seating arrangements. As a result a seating brief was prepared and a street furniture designer was commissioned to design and install the seating element. The initiative was implemented in the summer, 2012.

In Iasi the new 5.5 km bike lane now accesses a significant part of the city, including an area with an intense volume of traffic which links the Tudor Vladimirescu Student Campus (University) with other areas of traffic congestion (Podu Ros, Podul de Piatra), an area where numerous educational centres, as well as a recreation area, are situated.

The works consisted of the following activities:

- Installing kerbstones;
- Ballast layer to provide the foundation;
- Sand layer including the flattening of bumps with 2 to 5 cm thickness;
- Installing self-locking paving;
- Providing longitudinal marking to define the direction of circulation;
- Installing 60 specific road signs.

To increase bicycle use in Iasi, a series of complementary activities took place during a bicycle use promotion campaign. Bicycle use was promoted in a very positive way to high schools and other academic and social environments. This campaign consisted of two major components:

- Organising events;
- A school education and media promotion campaign.

The new cycle lane was inaugurated on September 22 2010. The event began with a press conference that took place at the City Hall. The press conference was attended by representatives of local authorities, personalities and celebrities from Iasi and mass media representatives. The event included a bicycle parade, which was attended by those at the launch press conference and inhabitants of Iasi.

During the organised events 50,000 flyers, 5,000 brochures, 25,000 notebooks, 10,000 school time tables, 5,000 pens, 5,000 t-shirts, 1,000 cyclists' water bottles and 1,000 backpacks were distributed.

Ústí nad Labem developed an autonomous, interactive **Web portal for cyclists** in the Ústí region, which is currently available at: <http://cyklomapa.usti.cds.w.cz/imapa.aspx>. Implementation of the web application was carried out in several steps:

- A field survey was conducted on all cycle routes in the region utilising GPS recordings and photographs on a bike, small motorbike or by walking;
- Data were processed into the information database for the web portal. This was undertaken by an application that required coding of web sources and implementing the graphical interface, editing of maps and uploading information on individual cycle routes, such as pictures and videos, and related points of interest.
- Debugging of the website and its features;
- Public testing in the form of a trial version, collecting feedback and improving the functions of the web portal;
- Updating information about local cycle transport, its possibilities, goals for improvements and corresponding progress.

The cycle website included interactive maps of cycle routes in the area, which provided the following information:

- Detailed characteristics of individual cycle routes
- Safety issues in terms of traffic on the route, description of its surface, warning about narrow sections, steep hills and other safety risks. These were shown by warning marks on the map; critical points were presented with comments and pictures
- Quality of the cycling network according to suitability for in-line skating, road bikes, track bikes, mountain bikes or leading the bike on foot (e.g. over obstructions). These were shown in various colours on the map
- Videos from each section of the cycle route, which were recorded by a camera attached to a bike and allowed users to view the route. These were shown in a separate window, while the mark moved on the map according to the current position on the cycle route
- Technical equipment, such as cycle stands, rest areas and services with a corresponding photo gallery
- Interesting locations in the area, presented with descriptive text and pictures from the locality
- Links to other websites.

Before physical improvement of the cycle routes, citizens were asked to send their comments and feedback to determine where improvements could be made. The cycle website provides information about cycling opportunities, cycle services and areas of interest for tourists in the Ústí region. However, construction of the cycle routes was not financed within ARCHIMEDES project.



Figure 7: The new cycle routes in Ústí nad Labem. The Elbe route (pictured left) and The Ore Mountains route (pictured right).

The city of Monza produced a cycling plan and a **document on constructing criteria for cycling routes** in the Monza.

The study prior to the document on construction criteria for cycle routes developed the following themes:

- Examination of current cycling in the city (consideration of strengths and weaknesses of the infrastructure, its safety and its accessibility);
- Consideration of a proposed cycling network, integrating the present network with a series of possible routes. This was based on what had already been proposed in the General Urban Traffic Plan, currently being updated by the municipality.
- Development of cycling routes, considering the value of different types (e.g. restricted bikeway, bike lane, multi-use path) and proposing solutions to possible conflicts with the road network (e.g. crossroads, road signs and markings, traffic dividers), to adopt a consistent approach of action across the whole cycle network;
- Identification of suitable actions to promote sustainable mobility in the city, to reduce the use of private motorized vehicles and make cycling more appealing;
- Investigating the opportunity of launching a 'Bike Sharing' service in the city.

The document, later approved by the City Government (February 2012), provided 'cycling guidelines for physical interventions in Monza'. The study also focused on the opportunity to implement a bike sharing scheme in the city. This should have been accomplished through a grant by Regione Lombardia. However, there was a reduction of funds coming from central government to local authorities due to the economic situation. Therefore it was decided to postpone the introduction of the bike sharing scheme and to undertake the following actions (with the remaining 2011 budget):

- Extension of a cycling route by 800 metres and creation of two new cycling paths
- Installation of a camcorder for video surveillance of cycle parking in the rail station
- Revamp of a cycling walkway in the city centre
- Organization of events with local stakeholders and cyclists' associations to encourage cycling.



Figure 8: Extension of cycle routes in Monza.

Vertical transport

The study into vertical transport in Donostia - San Sebastián had 7 elements.

Study point 1: Background and purpose of the study

It was decided to locate and describe problems to inform and refine the Vertical Transport Plan.

Study point 2: Location and field features

The main public transport systems and pedestrian and cyclist facilities were located in low and flat areas. Therefore the study focused on the high areas and the 10 most populated neighbourhoods in the city. Some of these neighbourhoods had the biggest vertical mobility problems and therefore offered bigger possibilities for improvement.

Study point 3: Vertical Transport Systems

The different types of urban VTS studied were arranged according to the specific needs and characteristics of the relevant areas. The table below shows the characteristics that were considered when evaluating the installation of new VTS.

COMPARATIVE TABLE FOR LIFTS, ESCALATORS or RAMPS		
CONCEPT	LIFTS	ESCALATORS AND MECHANICAL RAMPS
Installation costs	Relatively cheap, depending on the external finish	Relatively expensive
Maintenance costs	Relatively cheap	Relatively expensive
Energy consumption	Low	Medium
Slopes where installed	Very steep slopes, close to vertical. Steep slopes if combined with footbridges and medium slopes for inclined lifts	Medium (27-35 degrees) for escalators and small (6-12 degrees) for ramps

Height difference overcome	Lifts cover drops ranging from 8-30 metres, a landing and emergency exit must be provided every 11 metres	Each flight or escalator can overcome height differences from 6 to 10 metres
Carrying capacity	480 persons/hour/direction	4,500-11,000 persons/hour/direction
Accessibility	Complete	Limitations for wheelchairs, prams, elderly people, and persons using a walking stick
Attractiveness for user	Acceptable as long as there is at least one glass window providing external visibility	Very high (apart from the above user groups)

Study point 4: Present state of the different elements of vertical transport systems

An inventory was created containing comprehensive information about VTS. Photographs, characteristics of the terrain and existing data were included.

Study point 5: Assessing the introduction of public vertical transport systems in a district of a city

To assess introduction of new public VTS, each neighbourhood was examined under the following criteria:

- Population served and demographic characteristics;
- Modal split for travel to and from the district;
- Pedestrian and cycle connectivity;
- Public transport alternatives;
- Topographic features and their relation to buildings and activities.

Study point 6: Study of the different areas and evaluation of the priority of installation

This study looked into ten neighbourhoods, which were selected due to their centrality, high population, unfavourable topography and existence of discontinuities in pedestrian and cycling paths.

This phase's two main aims were to:

- plan new cycling and pedestrian paths located on high and low terrains of the city;
- improve the mobility of citizens between inaccessible areas of the city to facilitate further social development of these areas.

Study point 7: Intervention proposals

6 places were proposed for the installation of VTS.

Proven the effectiveness of the systems, within the CIVITAS project, the city of Donostia - San Sebastián expanded the existing vertical transport network by implementing 7 additional elevators and 6 new escalators/ramps to support cycling and walking inside and towards the city centre. Vertical transport systems facilitate walking and cycling thus encouraging its use. The construction finished in the autumn 2012.



Figure 9: Vertical transport in the hilly city of Donostia – San Sebastián aims at increasing the mobility between various residential areas and urban core.

4.3 Problems Encountered & Solutions Attempted

The technical issues concerned physical/engineering barriers, particularly integrating new and existing infrastructure, for example integrating new cycle routes into current infrastructure. A general technical issue was the physical delimitations for cycle paths as there were vested interests for both integrating cycling and for maintain a good service level for cars and buses. It is also important to be aware of owner relations which can obstruct the construction of the desired shortcuts for cyclists.

The main problems identified from measures into mobility services and energy saving modes are to a larger extent related to difficulty in changing people's behaviour and ensuring relevance to a large enough proportion of the population to ensure viability. For example, regarding the car sharing schemes the problems were:

- Lack of acceptance/awareness Lack of critical mass/demand for service
- General problems with satisfying a variety of different needs
- Financial and legislative viability of the scheme (primarily car sharing in Brighton & Hove).

4.3.1 Technical Issues

Improved conditions for cyclists

The construction work of the cycle motorway in Aalborg started in August 2010 and was expected to be finished by the start of December 2010. However, in the middle of November 2010 the first snow fell and a lasting period of frost started. Very unusually for Denmark, the frost lasted more or less without pause until March 2011. Even though continuation of the construction work was attempted on additional occasions, the work had to be paused from the middle of November 2010 to March 2011. The construction work was finished in June 2011.

Another technical issue related to the development of the cycle ramps in Brighton & Hove. Several design issues were identified with the cycle ramps during the development process. The major issue was insufficient tension in the mechanism that sprung the ramp sections from a horizontal to a vertical position. This meant that the ramps would not consistently spring back into a vertical position after use, thus causing an obstruction to pedestrians using the steps. A number of improvements were

made, but ultimately the problem was not completely resolved. This meant that the cycle ramps were not installed.

There were several major issues facing Ústí nad Labem in relation to develop cycle transport improvements in the city and increasing the number of cyclists. These are outlined below:

- *Motor vehicle drivers not respecting cyclists on roads*
Dense traffic in the city was not conducive to cycling. Moreover, drivers did not regard cyclists as road users of equivalent status and current legislation prioritised drivers, even where officially marked cycle routes crossed a road.
- *Inadequate infrastructure for cyclists*
There was a lack of routes dedicated exclusively to cycle transport, which resulted in cyclists being forced to ride within the main traffic stream.
- *Difficult landscape*
Ústí nad Labem is located in a hilly terrain on the base of the Bohemian highlands. The city elevation profile is demanding for occasional cyclists. Despite this fact, gradually improved cycling conditions would clearly help overcome these limitations.

Vertical transport

Regarding the vertical transport improvements in Donostia - San Sebastián, technical problems were related to localisation issues, as it proved difficult to choose the best location for a lift. A specific district accessibility study was drawn up in these cases. The main risks were delays due to construction licences and ownership of land, and geotechnical problems in the civil works. Careful planning and designing was thus required.

4.3.2 Process Issues

Car sharing schemes

Regarding the car sharing scheme in Aalborg two main problems were identified:

1. Lack of drivers to use the car sharing system, especially for the first target groups of companies. The short conclusion was that the drivers that made car sharing attractive in other European cities – mostly bigger cities size than Aalborg - did not exist for the companies. As a consequence the measure changed its focus group from companies to young people.
2. Problems and delays due to organisational changes at the car sharing company with resulting uncertainties related to project development.

Due to the financial crises in 2008, three different CEOs were responsible for the car sharing company, and three different people had daily responsibility for the car sharing scheme in Aalborg during the ARCHIMEDES period. After each change of CEO, the new CEO had to develop his own strategy for the company and as car sharing was a marginal part of the company's activities, this scheme – including campaign activities – was significantly delayed until the new strategy was ready.

In Brighton & Hove the challenges and development of sighting a car sharing in less affluent and less densely populated areas were evident, as no operator found the scheme economically feasible. No solutions to the problems were found and the measure did not proceed.

In Donostia - San Sebastián the design of the car sharing scheme in Donostia - San Sebastián turned into a long and difficult process. After long processes of agreements and tenders the company, IBILIEK car sharing, was awarded the contract towards the end of the ARCHIMEDES project period. The challenges with the car sharing scheme concerned the contract and tender material. First, it was

decided to hold discussions with different private operators. After having analysed various options, HERTZ appeared to be interested in the service as a possible operator. Negotiations were held with the company and the service was ready to be launched in autumn 2010.

A new car sharing company, IBILEK, with electric and hybrid cars wanted to introduce services in the three main cities of the Basque Country. The Mayor's Office instructed the Mobility department to talk with EVE instead of HERTZ and to negotiate another agreement to install in the city the car sharing system promoted by IBILEK. After further and delayed negotiations, the Municipality and the car sharing company reached an agreement acceptable to both parties.

On May 22th 2011 there were local elections in Spain and there was a change in the Local Government in the city of Donostia - San Sebastián. There was a delay of some weeks until this new Government was ready to start to take decisions. Unfortunately, it decided not to sign this agreement and instead proposed to develop a public tender to develop the car sharing system in the city. Up to 5 companies showed interest in the conditions of the tender, but in the end only one submitted a bid and did not fulfil the conditions of the tender. So this tender process was declared void.

It was necessary to prepare a new tender with different conditions. The main aspect that was changed was the period of the concession. In the first tender the period had been for 10 years, but in the second one the duration of the concession was defined for 25 years, which seemed more attractive.

City bike schemes

Regarding the city bike scheme in Aalborg the design and quality of the bike and the stations was satisfactory. However, the bikes were used very heavily, and the tendency for individuals to 'privatise' the bikes was so big that it could be a problem to find bikes at the stations. This was mitigated by information efforts and by cooperation with porters and waste collectors in reporting 'lost bikes'.

In Donostia - San Sebastián a technical and economic analysis of the city bike scheme was carried out to define the number of dispatch points. It was concluded that the objective of placing 40 – 50 dispatch points was difficult technically and economically for Donostia – San Sebastian Municipality. It was considered that placing 9 dispatch points and 150 bicycles would be reasonable technically and economically.

Improved conditions for cyclists

In Brighton & Hove, budget pressures within Brighton & Hove City Council (BHCC) after the measure began meant that the amount of match funding available was significantly reduced. Thus it was necessary to reduce the scope of the task to match the funds available. This meant that the 'Green Wave' (which was estimated to cost up to € 600,000) was no longer feasible. Instead it was decided to implement three other initiatives for improving mobility for cyclists:

- Cycle ramps at staircases;
- Left turn for cyclists in an intersection;
- Improvement of a pocket park.

In Monza, when the ARCHIMEDES project was submitted, one objective was to subcontract a study about cycling in Monza focusing on the opportunity to implement a bike sharing scheme in the city. According to the study results, it was defined that the Municipality of Monza could promote a bike sharing system as a contribution to the strategy that aims to widen intermodal opportunities, developing the realisation of a multi-modal model, free from an excessive use of private motor vehicles.

For this reason, the Municipality presented a bike sharing project to Regione Lombardia and obtained a grant to implement the system within the lifetime of ARCHIMEDES. Unfortunately, a reduction of funds coming from the central government to local authorities due to the economical situation, has not allowed the investment of money originally allocated by the City as its share of project funding.

Because of these problems it was decided to postpone the introduction of the bike sharing scheme. However, by the end of 2011, extra revenue was identified through the sale of real estate owned by the municipality. These revenues were included in Streets and Infrastructures Department section of the city budget. It was for this reason that the measure was implemented in a different way from what initially scheduled, accomplishing the following actions:

- extension of a cycling route by 800 metres and creation of two new cycling connections;
- installation of a camcorder for video surveillance of the cycle parking in the main rail station;
- revamp of a cycling walkway in the city centre;
- organisation of events with local stakeholders and cyclists' associations to encourage the use of bicycle.

4.4 Main Outcomes & Results

4.4.1 Impacts

Car sharing schemes

Compared to other successful car sharing schemes, the results indicate that reaching a critical mass is hard and resource demanding.

In Aalborg, the car sharing scheme was initially aimed at companies. The comparison between two time periods (2009 and 2011) shows a significant decrease in the number of car rentals, kilometres performed, and kilometres performed by cars.

	No. of cars	No. of rentals	Active users*	Kilometres	Kilometres pr. car
Total before	8	1388	119	113.536	14.192
Difference in %	-13 %	- 31 %	- 32 %	- 32 %	- 22 %
Total after	7	954	81	77.346	11.049

Three main likely explanations can be given for this decrease:

- Pricing. Since the price for renting a car sharing car was increased in December 2010, this could have affected the number of car rentals.
- Weather conditions. The winter period of 2010-2011 was very long, which could have led to decreased use of cars in general.
- Changing the location of the cars seem to have a large negative impact on the indicators, given that the share of the car rentals for the displaced cars is lower than expected.

As a result of the negative results the target groups for the car sharing scheme was changed to young people. The main outcomes are several and innovative campaigns. However, it is too soon to conclude on the success of the car sharing scheme aimed at young people.

Work in Brighton & Hove showed that financial viability, negatively affected by lower density locations, was the fundamental barrier to delivering car sharing in less densely populated areas. Operators

emphasised that compared with this issue, social deprivation and barriers such as concerns over vandalism were of secondary importance.

Additionally, the research task suggested that liaising with community workers and representatives (who would act as local 'champions' of the scheme) might help overcome some of these non-financial barriers. The experience in Brighton & Hove has not disputed this, but showed that it can only contribute to successful project delivery if the key stakeholders - car sharing operators - are convinced of the financial viability of any scheme. This measure did not proceed to implementation and evaluation.

In Monza some of the key outcomes and results were that:

- The number of subscribers to the car sharing service increased significantly. The marketing campaign was launched in September 2010 and in 2011 an increase of 73% of subscribers was registered. From 2009 to 2010 the increase was 29.2%.
- Car rentals registered a significant increase - from 373 in 2010 to 582 in 2011 (+ 56%).
- Focus groups showed that car sharing users were aware of the facilities offered by the service. However, older people who were a potential target group in general were not aware either of the service or of the opportunity to subscribe for free, in spite of strong marketing activity. This means that communication has still to be improved. Nevertheless, the Municipality website was a good platform to inform people about the service.
- The quality of service was generally considered good by users, who preferred cars located in peripheral areas, to use them as "last mile connection" to the city centre and to interchange modes. This need conflicted with the requirement of the managing society to have cars located in visible places.
- From the economic viewpoint, car sharing in Monza could not be considered remunerative as many free subscriptions were handed out. Revenues did not pay back investments afforded by the managing society, which maintained cars in Monza in order not to lose existing customers. Economic losses suffered in Monza were offset by revenues from Milan, thanks to the joint management of the service in the two cities. If this situation does not change, it is unlikely that the managing society will increase the number of cars in Monza.

City bike schemes

Besides improving conditions for cyclists, city bike schemes were implemented to further increase the use of cycling. The impacts in Aalborg and San Sebastián were very positive. In Aalborg, the flexible and heavily used city bike scheme was aimed at tourists, students and other users. It now contains 200 bikes and 21 dispatch stations, and a survey of impacts indicated that:

- The user is typically a student between 18 and 29 years
- More than 70 % of the users of the city bike scheme were either users of bicycle or public transport as the main daily mode of transport
- More than half of the respondents would have walked if there was no city bike scheme, and 5 % would have taken the car
- The most frequently utilised stations were located near leisure and cultural activities. 30-40 bikes were constantly parked in the stations. The stations with the highest activity are located outside the city centre. Stations within the city centre were also very active, especially at the main rail station
- Although only 0-20 % of the city bikes were parked at the stations the disappearance rate is very low – only 11.4 % over 3 seasons.
- The city bikes primarily were being borrowed for longer periods, i.e. days or weeks.

In Donostia - San Sebastián the city bike scheme was based on rentals by registered subscribers. The number of users registered in the service reached 5,006 subscribers in 2011. In 2010 a 50 % increase in the number of trips was observed compared to the previous year, while in 2011 this yearly increase

reached 64% compared to 2010. Also the average number of uses per bicycle per day increased since the system started operating - from 1.84 uses per bike per day in 2009 to 4.59 uses per bike per day in 2011. Other key outcomes and results were that:

- The scheme now consists of 9 dispatch points and 150 bicycles. There were a total number of 68,219 uses of city bikes in 2009. This makes an average of 5,685 uses / month. There were a total of 102,241 uses of city bikes in 2010. This makes an average of 8,520 uses / month.
- The main risk related to economic feasibility. That is why ADS reduced the number of dispatch points to 9 and the number of bicycles to 150. The dispatch points cover the flat neighbourhoods in the ARCHIMEDES corridors and are distributed to ensure a maximum distance to the nearest dispatch point of 500 metres (7 minutes walking).
- The majority of uses have durations below 15 minutes and occur during the weekdays. This suggests that the service is being used mostly for daily mobility in the city and not for leisure.
- The system is equally used by men and women. In terms of age, 41% of the people that use the service are between 20–40 years and 47 % are between 40–60 years with a significant number of users older than 60 years, i.e. 10%
- The measure is stimulating people to make more use of their own bicycles. In 2011 there was an increase of 25 % of movements by private bicycle from 2010.

Improvements for cyclists

The main objective of the increasing the facilities for cyclists was to encourage cycling as a means of transport. The main results are:

- In cities where the level of cycling is relatively high improvements in cycling infrastructure can increase in number of cyclists by 20-30 % in two years. In cities where the uptake of cycling traditionally is at a lower level, the number of cyclists can almost be doubled in two years.
- The improved cycling routes have had a positive effect on how much people cycle and imply a modal shift from car to bike by approximately 5 %.
- Awareness about and satisfaction with the measures is very high. The shortcuts behind bus stops and the segregated bicycle lane are the most appreciated improvements.

In relation to promotional activities designed to increase cycle use, the results were generally encouraging. By creating attention and awareness through campaigns using various the effect of the measure increased. The campaigns helped acceptance of the improvement of the cycling route and uptake of cycling.

Further outcomes are webpages aimed at safety information, including an interactive cycle map of the city and a feasibility study of linking the major existing cycle routes.

Vertical transport

In Donostia - San Sebastián, a huge majority of the population (98% in 2011) approved the system (ranked the system with a score of 5 or higher), providing it with an average rate of 8,9 out of 10. The reason for this very positive public perception is that the vast majority of the surveyed population (99%) believes that vertical transport increases the accessibility of hilly neighbourhoods. Moreover, 92% of the population believes that vertical transport systems contribute to increase non-motorized mobility. While 94% of the population believes that the vertical transport network increases the attractiveness of the neighbourhood.

The positive public perception of the new vertical transport systems implemented within CIVITAS project are also reflected by significant usage levels, reaching 4.879 daily users in 2011 (2.801 in 2011 when only part of the network was in operation).

An overall analysis of the data reveals that vertical transport systems are more used when they are located in high density population neighbourhoods connecting hilly areas with important commercial areas and/or public transport nodes.

Although usage levels are conditioned by demographic and orography condition of each particular case, the evaluation conducted has revealed that in almost all cases vertical transport systems are slightly more used by women (55%). This observation is in line with the fact that there is an overall higher share of female pedestrians in the city.

But lifts, ramps and escalators are very expensive infrastructures. The evaluation process undertaken within CIVITAS has helped understand the economic dimension of vertical transport systems (real costs of construction, maintenance and operating), making it easier to take decisions for future infrastructures in the city (and in other cities). The assessment conducted reveals that implementation and maintenance costs are much bigger for ramps and escalators than for lifts. For example, in Larratxo, the construction of the escalators was twice the cost of the construction of two lifts. While the maintenance cost of the three escalators is about 5 times the maintenance cost of the two lifts.

4.4.2 Changes to Processes

In general, it is very important to clarify the economic costs of the initiative - otherwise there is a major risk of reaching a situation where it is impossible to implement the initiatives.

Car sharing schemes

Originally the car sharing scheme in Aalborg was aimed at promoting an existing car sharing service towards companies in the ARCHIMEDES corridor, making it possible for the company to subscribe to the scheme and use the scheme for business purposes.

However, after testing this approach, partly based on modelling of the benefits for the company to join the existing car sharing scheme and partly on practical experiences from contacting 25 companies in the ARCHIMEDES corridor and encourage them to use the scheme, this approach showed out to be unfruitful. Both methods led to the conclusion that with the current structure of the scheme, there were no obvious benefits for companies to join.

A new target group and a new target area were hence selected. The new primarily target group is young people in Aalborg, for example university students, who only at some occasions need a car. A GIS analysis to determine the best locations for the car sharing was carried out in spring 2011, using existing data from the municipality. These analyses resulted in various maps to find the most feasible locations for car sharing cars.

Work in Brighton & Hove has shown that financial viability, negatively affected by lower density locations, is the fundamental barrier to delivering car sharing in less densely populated areas. Operators emphasised that compared with this issue, social deprivation was all but irrelevant, whilst the barriers cited by earlier research, such as concerns over vandalism, were seen as of secondary importance.

As the car sharing scheme improvements were not financial viable the measure did not proceed to implementation, demonstration and evaluation.

City bike schemes

In Donostia - San Sebastián the objective of placing 40-50 dispatch points and 500 public bicycles has been considered disproportionate technically and especially economically for Donostia - San Sebastián Municipality or public funding. Hence, it has been impossible to comply with the objective of

50,000 monthly uses. It is reasonable technically and economically placing 9 dispatch points and 150 bicycles and a new target of 15,000 monthly uses during the last year of the project.

Improvements for cyclists

The original intention of the measure in Brighton & Hove was that the majority of the measure would be focussed on the implementation of a 'Green Wave'. Unfortunately after the measure began budget pressures within BHCC meant that the amount of match funding available to the measure was significantly reduced, making it necessary to reduce the scope of the task to match the funds available. This meant that Green Wave (which it was estimated would cost up to € 600,000) was no longer feasible.

Therefore 3 alternative cyclist priority measures were identified that would achieve the objective of removing cyclist delay. One measure, the cycle ramps, did not proceed to implementation, demonstration and evaluation due to technological and engineering difficulties.

In Monza the measure was delayed because, due to economic crisis, the Municipality was not allowed to invest money originally allocated as its share of project funding. Works are in progress to connect the cycling route of Via Carnia with Via Monte Santo in San Rocco district and to connect two sections of Via Adda in Sant'Albino district. A surveillance camcorder controlling the cycle parking outside the railway station was installed, but there were problems in gaining the due authorizations to install ramps for bicycles along staircases in the station, due to the protected nature of the building.

4.5 Future Plans

Future plans for all the measures are focussed on conducting further studies and analyses prior to implementing further measures. There will inevitably be further development and broadening of scope for many of the projects.

Car sharing schemes

Car sharing will continue to be encouraged as a sustainable mode of travel in Brighton & Hove. It is highly likely that car sharing schemes will be supported by BHCC outside the CIVITAS programme. However, it is a necessary prerequisite that car sharing operators, saturate their core market is and that the fledgling industry becomes more established.

The car sharing scheme in Monza was extended until December 2012. At the end of the campaign, according to the number of new subscriptions, it will be evaluated whether to:

- increase the number of available cars in the territory;
- launch other marketing initiatives, such as communicating through social networking channels or highlighting car sharing locations with visible signs like totem. Currently these are too expensive compared to actual returns of the service.

According to evaluation surveys, these decisions will depend on how many people will confirm their subscription to the service, since some of the surveyed people said they were not going to do it. While this report is being written, there are still free subscriptions available, but no particular interest has been shown by citizens. This indicates some of the difficulties faced by car sharing.

For the rest of the ARCHIMEDES project and afterwards, the car sharing company and the City of Aalborg will continue to run the car sharing scheme. This includes the launch of a smartphone booking app. in the next months.

City bike schemes

In the rest of the project period the city bike scheme in Aalborg will be kept operational. Bikes and stations will be maintained and the number of bikes will be supplemented to compensate for lost bikes. The success with the city bikes inside the ARCHIMEDES corridor implies that the system should be extended to the rest of the city. This will require a doubling or tripling of the numbers of bikes outside the ARCHIMEDES budget. However, this is a political decision.

In Donostia - San Sebastián new funding sources will be sought to keep the service operational.

Improvements for cyclists

The City of Aalborg plans to develop Cycle Motorways on five other stretches in the city. The first stretch was established in 2011 connecting the city centre with a commercial area 5 km south of the city, the second stretch (along Hobrovej) was implemented in 2012 and a third stretch (Lindholm) is planned to be established in 2013. The planning, design and implementation of these projects is based on the concept developed in relation to this measure and the experiences of the planning process. The evaluation results from this measure will provide valuable input for the planning of these projects.

Brighton & Hove are planning further development of the three initiatives for improved conditions for cycling.

- Cycle Ramps: The student team intend to pursue work on the design in the future, although the council's involvement with the project has ended;
- Left turn for Cyclists at St James's Street: Video monitoring was carried out prior to and after installation to assess the difference.

For the future, there are two projects that the city of Iasi wants to engage with. These are the design and construction of two new bike lanes, connected with the one built in the ARCHIMEDES project. One of these projects would involve the construction of a 7.5 km trail which would cross the town from East to West and the other one would involve the construction of a 6.7 km trail which would connect the North and South part of the town.

In Ústí nad Labem implementation of new sections of cycling infrastructure is planned, as well as their interconnection with the existing network. Emphasis will also be placed on traffic education for cycle transport. This is currently realised at all primary schools in Ústí nad Labem and will be further targeted at motor vehicle drivers to lower the safety hazard for cyclists as much as possible. It is necessary to gain stable political support to reach defined objectives and financial resources from the city budget, the state and from other funds.

After the delivery of the study regarding cycle transport improvements in Monza, a project was delivered in order to activate a bike sharing service in Monza with both traditional and electric bicycles. In the same project, the actual cycle park located outside the railway station will be revamped. Tender documents were prepared, but, due to the economic crisis, the Municipality was not allowed to invest money originally allocated as its share of the project funding. The bike sharing scheme is still an ambition for the future even though it was not implemented within the framework of ARCHIMEDES.

Even though the implementation of a bike sharing scheme could have added value to the realization of the measure, other initiatives in favour of cycling mobility have been undertaken. About 800 metres of cycling route have been completed and contacts are in progress with management of Monza railway station to install ramps for easy transportation of bicycles along the stairs leading to platforms, which could also allow people to use the railway station subway to cross with their bicycle from one entrance of the station to the other entrance, which opens on Corso Milano, one of the most important access roads to the city centre.

Vertical transport

More lifts and escalators will be constructed according to the Vertical Transport Plan in Donostia - San Sebastián, which is now being reviewed. This means the priority of the projects may be modified due to changes in urban development planning.

5. Conclusions and Recommendations

This workpackage focuses on innovative mobility services and energy saving modes. ARCHIMEDES measures tended to be relatively small in scale (in terms of capacity or geographic area covered) compared to each city's overall mobility system. As such they need to be treated as innovative trials. Isolating and confirming their impacts within the overall mobility system can be very difficult (even if the level of impact for an individual journey is significant).

This section summarises results, conclusions and recommendations regarding the various initiatives within this workpackage. More detailed information regarding the different measures can be found in D10.3 Final Evaluation Report and D12.4 Final version of measure level result templates.

Although the specific topics covered by the research into Innovative Mobility Services and Energy Saving Modes in the ARCHIMEDES cities were quite diverse, there were some clear research outcomes spanning across all measures. In particular, it is clear that when planning the introduction or improvement of mobility services and energy saving modes, it is important to consider/have:

- Good partnerships with shopkeepers, interests groups (cyclists organisations), companies etc.;
- Reliability of service/provision as the alternative to private car should be an actual opportunity for replacement, thus, car sharing should be as convenient, flexible and feasible as the private car;
- Publicity/information on opportunities for other means of transport and creation of a positive 'fuzz' around them;
- Implementation within an integrated transport system while recognising that citizens must be able to travel in networks and not only along specific stretches;
- Population served/demographic characteristics should be taken into account as different areas and different citizen groups will react differently on the initiatives;
- Attractiveness as the alternative means should be competitive to the private car. Hence, the solutions made should appeal by design, quality and time saved;
- Demand for service/provision as too costly initiatives can signal that the alternatives are too costly. On the other hand the initiative should not be too cheap as the service level will be too low.

In all cases, the energy saving modes were already established in the cities and were viewed as positive initiatives to move forward with. The emphasis was therefore on increasing awareness and accessibility of the schemes, as well as improving the extent or quality of provision. This helped to promote the modes, and encourage modal shift. In Aalborg, for example, the modal shift from car to bike is around 4-5 % as a result of the Cycle Motorway. However, it was recognised that the high ambitions for expanding a desired scheme were sometimes not met. The car sharing schemes are examples on this.

However, this type of approach is undoubtedly a long-term strategy. As an example, it has taken 20 years of continuous political support, determination and incremental investment to develop a comprehensive cycle network in Donostia - San Sebastián offering a realistic alternative for the majority of journeys in the urban area. It also needs to be recognised that this type of measure will not be used effectively unless properly researched and designed to meet actual needs of travellers and then actively promoted as such.

5.1 Conclusions

The experiences regarding **car sharing** schemes are that:

- The important drivers for uptake of car sharing are:
 - The environmental effect;
 - Reducing congestion (fewer parking spaces as 1 car sharing car replaces 6 private cars);
 - Other benefits like access to free public parking, access to car sharing facilities across cities;
 - The public relations effect for companies (green image);
- The important barriers to uptake of car sharing are:
 - Economic viability of running formal schemes;
 - Distance to the nearest car sharing station;
 - The need to book;
- The ordinary user group for car sharing is young people, mostly students or other groups with limited financial resources;
- The reasons why locations with lower population densities are not financially attractive are that:
 - More readily available parking reduces the incentive to join a car sharing;
 - The prospect of multi-modal journeys becomes less attractive as the frequency of public transport declines with distance from central areas;
 - Car sharing vehicles require approximately 40 members to be financially sustainable. In less densely populated locations, the distribution of this membership base becomes wider. This is problematic as individuals are less likely to join a scheme if a vehicle is not conveniently located close to their place of residence.

There remains considerable scope for expansion within the core market areas of car sharing and for them to contribute to a sustainable transport system in this manner.

The experiences regarding **city bike schemes** are that:

- Learning from other cities with functioning city bike schemes is fruitful
- Support from decision makers, key stakeholders (companies, cyclists organisations etc.) and the general public is necessary
- It is important to specify clear standards for the daily maintenance of the bikes and stations
- If the scheme is constructed as a deposit system with no need for subscription nor time restricted charging, users will most likely be students and tourists who borrow bikes for longer periods
- If the scheme is constructed as a rental system with subscriptions, most trips are likely to have durations below 15 minutes during weekdays for daily mobility in the city and not for leisure

In general, the experience is that the city bike schemes increase cycling.

The experiences regarding **improvements for cyclists** are that:

- The combination of awareness raising and physical measures can create real improvements and positive buzz. Constructions or improvements of infrastructure in favour of cyclists are very visible and the awareness of the initiatives is high
- Construction of new cycle paths, for example, takes space from other modes of transport like cars and buses. This might be unpopular but places pressure on roads users to take up cycling
- Improvements for cyclists have very positive effects on cycling levels, which can increase by up to 20-30 %

The experiences regarding **vertical transport** are that:

- Vertical transport systems are more used when they are located in high density population neighbourhoods connecting hilly areas with important commercial areas and/or public transport nodes;

- Lifts, ramps and escalators are very expensive infrastructures in both construction- and maintenance faces;
- Implementation and maintenance costs are much bigger for ramps and escalators than for lifts. For example, in Larratxo in Donostia - San Sebastián, the construction of the escalators was twice the cost of the construction of two lifts. While the maintenance cost of the three escalators is about 5 times the maintenance cost of the two lifts;
- Ramps are best indicated for high density connections and main transport nodes (for example train stations). In some areas the orography makes it impossible to build lifts, therefore ramps or escalators are needed.
- The construction of lifts or ramps makes easier and improves the mobility of people, but especially elderly, impaired people and people in charge of caring duties.

5.2 Recommendations

For future projects regarding the implementation of **car sharing schemes**, the following points should be considered:

- Forge partnerships with local businesses and employers in order to increase the potential membership base;
- Form a fruitful partnership with a car rental/car sharing company;
- Develop car sharing schemes in densely populated areas that have limited parking spaces. Ensuring parking spaces for car sharing cars is a large driver;
- Aim the campaigns and initiatives at young people or less affluent citizens.

For future projects regarding the **city bike schemes**, the following points should be considered:

- Consider the entire city bike scheme. The bike, the loan method, the maintenance of the system, primary user group – and the geographical context;
- Place the dispatch points near bus and train stations. This is useful for people using public transport to enable cycling for the last part of the trip, improving intermodality;
- If the system is constructed as a subscription/rental system then limit the number of users depending on service capacity. Exceeding the number of users can make the management of the service difficult;
- Make the city bike system a part of the community through strategic communication and events, and thereby avoid vandalism and theft;
- If the winter is severe, take the bikes off the streets during the winter period to avoid high maintenance costs;
- The economic viability of the service must be assessed and funding defined in advance
- The process of locating stations requires careful attention, as sufficient space is needed at central and attractive places;

For future projects regarding the **implementation of improvements for cyclists**, the following points should be considered:

- Working with cycling infrastructure on several service levels (hierarchies in terms of Cycle Motorway, ordinary cycle paths etc.) is a way to develop an already well established cycle network and take it to a higher level;
- Physical and promotional measures should be complementary- the high awareness of campaigns, lane lights and bike pumps etc. in combination with branding the improvements of the cycling infrastructure;
- Developing a conceptual framework focussing on free flow conditions, traffic safety and visibility/service helps to guide the work and develop meaningful initiatives;
- Think in terms of cycle lane networks and plan for interconnectivity between the different routes. This gives cyclists the opportunity to travel consistently along the whole network.

- If new and innovative initiatives are to be implemented - and in which the municipality has no previous experience – they might require more time and funds than originally planned;
- Workshops with stakeholders can constitute a base for engagement in and common understanding of the project;
- Political approval and engagement is all important for establishing improvements for cyclists;
- The media can play a vital role in promoting the new initiatives for cyclists;
- The realization of cycling routes is often not enough to hit the target of shifting the urban modal split towards forms of sustainable mobility, as alternatives to the use of a private motorized vehicle; the realization of these infrastructures must come together with a series of stimuli and incentives. On the other hand, the use of promotional and marketing campaigns to promote cycle use might prove self-defeating when users do not find the right conditions; .i.e. when the infrastructure is not there to support their choice.
- An approach to cycling in urban areas – particularly as a support to commuters – should consider the necessity of its integration as a mode within the general transportation system of the town, exploiting intermodality. Making the change between different means of transport – from public forms of transport or car to bicycle – comfortable and easy (e.g. placing car parks at the main junctions outside the town centre) can reduce traffic congestion in the urban road network.

For future projects regarding the **vertical transport**, the following points should be considered:

- The construction of these infrastructures facilitates walking and cycling and can open new options for new routes for cycling and walking. Synergies with pedestrian and cycling network developments should be pursued.
- A careful analysis of possible locations for vertical transport system is highly recommended, taking in account population density, orographic characteristics of the area, public transport connections, leisure and commercial areas, cycle lanes and walking routes. It is very important to define correctly the location of the infrastructure to serve as much people as possible to make the service efficient.
- A careful design of the different parts of the lifts or escalator and ramps should be undertaken, taking into account vandalism and weather inclemency. The cost of maintenance because of vandalism is high so it has to be considered in the project.
- Funding for maintenance of the service and operating costs should be taken into account in the planning process. The maintenance and operating costs are very high, and might be a key issue in the decision making process.
- In order to increase the effectiveness of the measure, infrastructural developments should be accompanied to incentives and promotion activities, as well as actions to restrict car use in the city;
- It is very important that the citizens are involved in the strategies to change mobility behaviour. It is necessary to make citizens aware of the existence of the vertical transport systems and the future plans of the municipality.
- Before getting into the planning phase, an extensive review of existing public vertical transport systems is recommended.