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Cluster Report 3: Cycling and Walking

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Cluster 3: Cycling and Walking



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1 Introduction

Improvements to pedestrian and cycling environments have long been found to support integrated transport and a transition from car to mixed-mode travel. The CIVITAS initiatives described here have demonstrated a range of measures and shown the impacts that can be achieved in different settings. Many of the measures in Cluster 8, relating to access control strategies, also introduce extensive improvements to the pedestrian environment and can usefully be considered alongside this cluster report.

The 19 measures within this cluster largely form into 4 main sub-clusters:

- (a) Cycle lanes and cycle parking (8 measures)
- (b) Cycles on buses (2 measures)
- (c) Cycle rental or loan schemes (4 measures)
- (d) Safety for cyclists and pedestrians (5 measures)

The measures, listed in Table 1.1, mainly concern cycling, with improvements of infrastructure and facilities, encouraging cycling and making it a more attractive and safer form of transport. There are only a few walking measures and these concern the provision of pedestrian areas and footpaths. In CIVITAS I there were 10 cycling measures which similarly aimed at making cycling a more attractive form of transport.

Table 1.1: Cycling and walking enhancement measures

City	No.	Measure Title	Outline Description	Success of implementation ¹	Success of outcome ¹
(a) Cycle infrastructure - lanes and parking					
Burgos	11.13	Increasing bicycle use	Cycle network and parking improvements, cycling promotion	2	2
Debrecen	11.06	Integrated and extended cycling network	Cycle network and parking improvements	2	2
La Rochelle	11.01	Implementation of new structure for alternative modes	Cycle path created as an ecological corridor providing a pleasant environment linking four communities to the north of the city	1	2
Ljubljana	11.07	Participatory planning and promotion of sustainable mobility with emphasis on safe and increased bicycle use	Public participation in mobility planning; cycle parking shelters and racks	3	3
Malmö	12.04	Internet tool for travel planning	Cycle trip planning with other modes	0	1
Ploiesti	11.09 & 11.10	Planning for alternative transport modes and implementing new infrastructures for walking and cycling	Strategic plan for walking and cycling; cycle track from a satellite village to the city; walking paths in the centre and in residential areas	1	3
Preston	11.04 & 11.05	Planning and new infrastructure for alternative modes	Planning and improvements to cycle network and cycle parking, plus cycling promotion	3	2
Toulouse	6.02	Public space redesign	Improved pedestrian areas, cycle parking and vehicle access restrictions	3	3
(b) Cycles on buses					
Krakow	8.08	New leisure related mobility service	Cycle racks on buses to leisure destinations	1	-
La Rochelle	8.05	Extension of bike-bus scheme	Buses carrying bicycles to leisure destination	1	3

City	No.	Measure Title	Outline Description	Success of implementation ¹	Success of outcome ¹
(c) Cycle rental and loan schemes					
Burgos	9.06	City bike scheme	Cycle loan scheme and cycling promotion	3	3
Krakow	9.07	Bicycle renting	Cycle renting scheme	2	-
La Rochelle	9.02	Bike sharing	Cycle sharing scheme; cycling promotion	2	3
Toulouse	11.02	Promotion of bicycle use and integration with PT services	Cycling policy development and Cycle rental system; cycling promotion	3	3
(d) Safety for cyclists and pedestrians					
Burgos	11.12	Safe access for pedestrians to peripheral neighbourhoods	Safer pedestrian access and environment	2	3
Burgos	11.15	Safety & accident prevention plan	Safety for pedestrians and cyclists; safety campaigns	2	2
Malmö	8.03	Integration of cycling with public transport	Safety of cyclists at junctions and on lanes	1	1
Odense	11.10	Interactive traffic training for children	Safety behavioural training for child cyclists	3	3
Venice	11.09	Promoting safe and increased bicycle use	Safety of school cyclists and cycle parking and promotion for all	3	3

Note 1: Rating of success: 0=not successful, 1=moderately successful, 2=successful, 3=very successful

Table 1.1 also shows the ratings of success of the measures in relation to the implementation process and the outcome. The estimated ratings were made by the CIVITAS projects themselves and collected at the end of the project. In relation to other clusters, cluster 3, Cycling and walking related measures is characterised by a successful implementation process and an above average success of the outcome.

2 Implementation

2.1 Cycle infrastructure - lanes and parking

Cycling is often not seen as a mode of transport that has a significant role in a city's transport system, resulting in a lack of investment in cycle facilities. People are less likely to start cycling when cycling is not treated as an equivalent transport mode. Lack of investment in infrastructure and increased motorised traffic make cycling a less attractive means of transport resulting in a lower mode share of cycling. Investment can expand the role of cycling: this eco-path in La Rochelle links four communities to the north of the city, targeted particularly at commuting and school travel.

Different infrastructure related measures can help to increase cycle use, such as:

- closing gaps in the cycle network
- extension of cycle lanes
- installation of secure cycle racks
- traffic calming
- internet tool for cycle travel planning



The following conception and implementation steps and issues can be identified:

- Preliminary studies of conditions for cycling and target groups' needs

A data-gathering exercise is the starting point. A state-of-the-art analysis including security aspects and parking requirements for cyclists offers a good overview of possible measures. To consider all relevant aspects, key stakeholders must be identified and communication channels defined. Contact with all the stakeholders should aim at interactive engagement and seek feedback on techniques used. The collection of existing data and the analysis of factors influencing behaviour will give important information concerning the possibilities for increasing cycle use.

- Elaboration of a strategic cycle development plan

The definition of a strategic cycle development plan should include the available resources of the city and deal with alternative development options as well. The plan is not only important to outline the project but also vital for presenting the project to the public and the local authorities. A key part of the plan will be the costs involved and the identification of the sources of the finances required.

- Political and legal approval

As projects generally need political and legal approval, it is advisable that working groups and/or stakeholder meetings have this issue on the agenda. It is essential to consult the local decision-makers for political approval from the very start of the project.

- Public involvement

The involvement of the public can take place in different ways and at different stages of the project. They can participate actively in planning and decision making or can attend public meetings and hearings. It is important to determine the appropriate level of involvement, which will depend on the nature of the scheme and the local culture. Failures of consultation at the decision making stage can cause delays in implementation.

- Improving infrastructure for cycling:

- Closing gaps in the cycle network

The area and routes to be closed can usefully be identified through a hierarchy which considers incomplete cycle routes. The priorities will be determined locally, but might include strategic routes, heavily used routes, scenic routes or often routes in which an incomplete cycle network causes conflict between cycles and other traffic. Data concerning topography may influence decisions. A ranking of gap closing measures will assist budgeting.

- Extension of bicycle lanes

Good cycle lanes make cycling an attractive means of transport. It is essential to extend cycle lanes to surrounding areas in order to increase accessibility. Consultation with residents close to the cycle paths, land owners, local authorities and the representatives of the municipalities can contribute important information.

- Installation of secure bike racks

Outdoor secure bike racks help to reduce thefts and improve the perception of cycle security. Racks vary from large storage to compact systems capable of providing a safe storage option for a smaller number of bikes. The racks need to accommodate modern cycles, which have a broader frame.

- Traffic calming

Urban streets with high traffic volumes can be redesigned as cyclist and pedestrian-friendly streets. Former two-lane roads can be converted into one-way roads for motorised vehicles, but still open in both directions for cyclists, as in this example from Toulouse.



- Internet tools for travel planning

An internet travel planning tool can help cyclists make best use of the cycle network. The relevant parameters to design software and base data have to be described first. Important steps for an internet tool are: make a 'bridge' layer connecting the national road database and walking- and cycling-networks; patch the road net with z-coordinates from terrain height database; adapt existing travel planner to handle the digital map; create a new entry page for existing travel planners; adapt user interfaces to establish location based services. It is important to give a formal name for cycle lanes on maps (to avoid things like "travel along cycle lane for 300m, turn left into cycle lane for 500m, then cross main road and continue straight ahead on cycle lane for 1km") for the internet.

- Call for tender procedure

Specifications have to be written and the call for tender procedure launched. Basic criteria considered are the financial offer, the respect of deadlines and increasingly the ecological aspects (combining protection of biodiversity and convenience for cyclists).

- **Consultation and approval**

At all events it is necessary to get the acceptance and/or support of the neighbourhoods, as they are directly affected. For an efficient and successful implementation it is necessary to inform and consult the affected stakeholders, as well as cyclists and pedestrians.

- **Promotion**

The measures can be promoted via websites, press, radio, regional TV, maps, flyers and brochures, letters and/or awareness campaigns. Basic criteria are: preparation and publication of maps (in local magazines and newspapers and/or stand-alone maps for separate distribution); preparation and distribution of special implementation schedules; information on urban website(s) about new routes and facilities; articles on new services to be published in local magazines and an official opening ceremony with press, radio and regional TV coverage.

2.2 Cycles on buses

Two measures concerned transporting cyclists and their cycles to leisure destinations; in CIVITAS, these were both bus-based measures, but rail and tram measures would have similar implementation steps and issues. These include:

- **Investigation of similar ideas in other European cities**

Transporting cycles on buses has been investigated in several European cities and the measure in Krakow showed the benefits of researching this experience. Existing international experience and contacts concerning cycles on buses are supportive, and in some cases the data provided from previous projects can be taken as an input to help define specifications. International cooperation leads to best practice solutions and can make use of synergies. The potential technical options include carrying bikes within buses or, as selected in Krakow, on cycle racks attached to the bus.

- **Feasibility study on economic aspects**

Some projects are restricted by budget limits. A strict control system by a local committee can supervise the budget situation and prevent problems at an early stage.

- **Call for tender procedure**

For bus bike racks, the specifications should consider strength of the construction, noise emission, usability, functionality, comfort of travelling by buses with bike carrying facilities, time to load the bike on the bus and take it off again. It is advisable to integrate a prototype construction and testing in the call for tender.

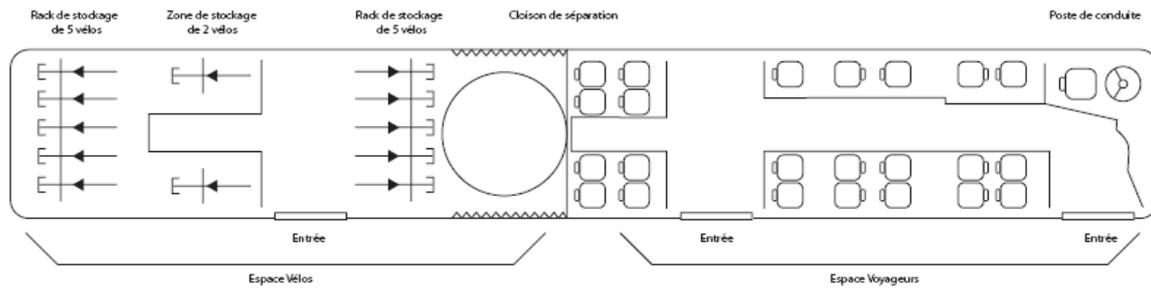
- **Prototype construction and testing**

Due to lack of experience in local conditions, the construction of a prototype is recommended. Time and costs should be included in the tender procedure.

- **Realisation of the service**

It is essential to define the service area and select the bus line(s) and corridors. The routes on which buses with carrying facilities will be sent every day, or every working day or only during weekends and holidays, need to be determined. It may be necessary to redesign bus stops to accommodate the cyclists with their bikes, the other passengers and the bicycle handling (La Rochelle).

La Rochelle's 'bike bus' is a specially adapted articulated bus equipped to carry bicycles with two separate compartments, one for passengers (in the front of the bus) and one for bikes (in the rear).



- Preparation of instructions

Preparation of instructions on how to use the cycle carrying facilities, with training and manuals for bus drivers, avoids problems in implementation.

- Promotion

Promotion of the measures included maps with routes on which cycle carrying buses are operating published in local magazines and newspapers, as well as via the city and/or bus operators' website. Schedules were also distributed at bus stops and information points. Special stickers/logos can be put on the cycle-carrying buses. Additionally, Krakow held an official opening ceremony with articles in the press, radio, regional TV.

- Monitoring

Monitoring is necessary to count the numbers of cycles transported in order to identify the most popular routes and to be able to adjust/expand the service over time.

2.3 Cycle rental and loan schemes

A range of cycle rental and loan schemes have been implemented, some operated by the city authority; some under licence to the authority, and others directly by a commercial company. Implementation steps and issues include:

- Accompanying measures and pre-conditions

Cycle rental and loan schemes require accompanying measures. Technical groups comprising representatives of authorities, potential users, hardware providers and consultants with related competences need to exchange and discuss their points of views. Stakeholders have to become aware of the barriers to and limits of a cycle rental and loan scheme and the problems perceived by potential users e.g. security, theft, reliability etc.

- Feasibility study on economic aspects

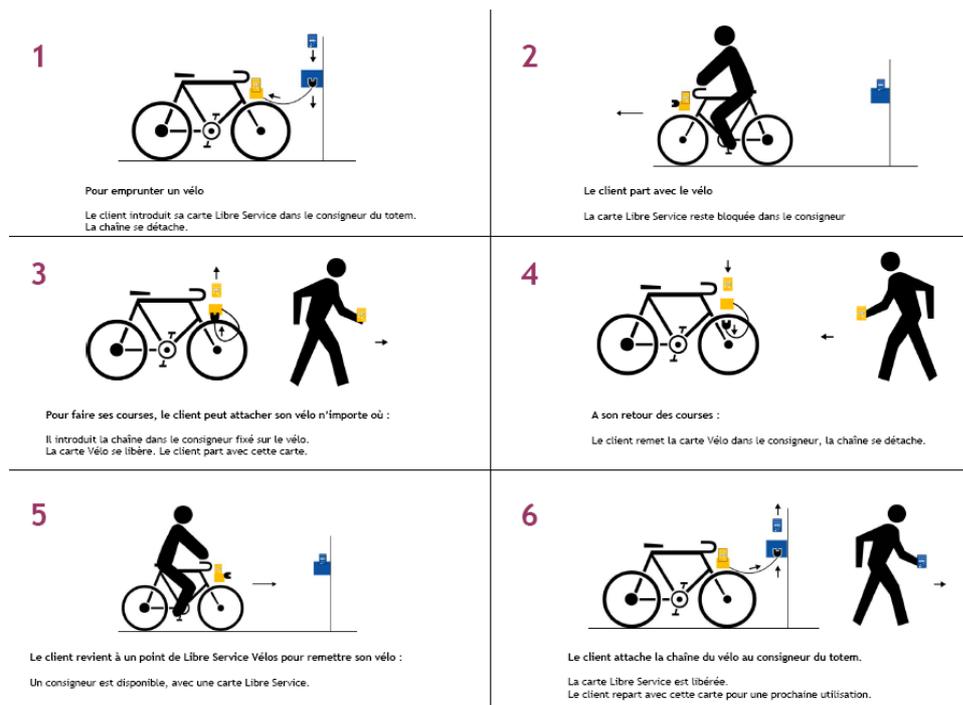
The realistic potential of users can be assisted by market research surveys. Fares, maintenance system, recharging system, communication and marketing campaign have to be defined including stakeholder meetings and consultations of technical experts.

- Design of service area/ cycle renting system

The feasibility study should lead decisions on the service area of the cycle renting scheme, the locations of the cycle stands (e.g. at transport nodes such as bus and railway stations and park and ride sites, and activity nodes such as universities and other attractors), the design of the specific cycles, the renting system and options to integrate the service in the intermodal transport chain.

- Development of the renting system

There are different concepts in setting up the renting and loan system. One of them is to design a smartcard system. Figure 2.1 illustrates one approach to managing the renting system (La Rochelle):



Bicycle renting system with a Smartcard system

- Each station is solar-powered and is equipped with a wireless smartcard reader and a digital-code keypad to enable users to choose the bike they want.
- Card locks are placed on the bikes and at the stations.
- System users introduce a punch card into the station's card lock to free a bike. The card remains in the support's lock. It is reported that punch cards are more reliable than cards with other technologies (computer chip, magnetic strip).
- There is another card on the cycle to lock the cycle during usage (e.g. while shopping).
- When the user returns the cycle, she/he introduces the safety chain into the lock at the station and receives a punch card again - not necessarily the same card, if she/he does not return the cycle to the same rack or location (the risk is that bicycle theft is quite high in this system).

- Development of a management system for operation

The principal task of the management is to estimate costs, determine the staff required, organise maintenance and frequency for balancing the bike stations (bikes as well as available spaces at each station). The management decides in cooperation with the local decision-makers the scheme's hours of operation, safety and security provision, pricing frameworks, etc. For example, the service might be free for public transport season ticket holders. An option is to integrate the bike-sharing system into the ticketing system of the public transportation of the city.

- Call for tender procedure

Define the specifications for the manufacture of the structure, the engineering and implementation and for the furniture of the specific bikes and card locks. The next step is to ensure delivery of specific cycles, self service cycle stands with places for cycles and software to monitor the system in operation. It was reported that 100 cycles and 12 stations are a minimum for companies to participate in tenders (most of the companies prefer to participate in projects with more than 1000 cycles). Companies are interested in offering a package (equipment and operation of the bike renting system) and not only in providing the equipment. The selected company should pay a penalty for each day of delivery delay. It has to be defined which partner should be responsible for controlling the renting system: one solution is that the company would be responsible for the renting system for three years and the revenues are collected by the company operating the system.

- Realisation of the service

Introducing the renting system includes matching cycles with the lock and unlock system at the stands, and designing the user information system. It was reported that the implementation of the service should start on a small scale, followed by a step by step extension to other service areas.

- Training activities and information

Training is necessary for the local operators of the bike system. Inform the operator about the elements of the city bike scheme, the web applications, the system of controlling etc during internal working meetings. Further information about usage can be collected during operation (number of bikes rented, at which time and station the cycles have been taken from and returned to) and about stations (occupancy rate). Each station can be equipped with a GPRS modem to transfer data online to a server at the operator.

- Promotion and official presentation

The launch and use of the cycle rental system is supported by promotion campaigns, such as posters, flyers, press, radio, regional TV, internet. Burgos also sent gifts to people who registered for the scheme, including reflective clothing strips and cycle lights.

- Possible further technical improvements

A GPS system can be installed with the introduction of a chip on each bike for a real-time localisation. However, it was reported that the existing legal framework can prohibit such a system.

2.4 Safety improvements for cyclists and pedestrians

Implementation steps and issues include:

- Analysis of basic conditions and mobility needs of cyclists and pedestrians

Data regarding frequency and location of accidents, dangerous places and areas with safety deficiencies need to be collected and analysed to identify the source of risk. The needs and priorities of the stakeholders and citizens have to be taken into consideration and can be found out by surveys and/or round table discussions.

- Software involvement

It is recommended that a database and software tool is designed for use by the city for safety improvements in order to collect data concerning the safety of pedestrians and cyclists for actual and further measures. Therefore all relevant parameters have to be described and maps showing walking areas, bicycle lanes and paths, distribution of roads and spaces according to different modes of traffic, parking places, areas with traffic calming and similar have to be developed. The new software might also be made available to the police department (e.g. Burgos) as it will include traffic accident data; this may require a special agreement and training workshops to inform the police department about the new database and software and to introduce the accident information and other relevant issues for the department.

- Elaboration of a strategic safety improvement plan

The strategic safety improvement plan has to consider the available resources of the city. The definition of a strategic safety improvement plan is not only important to outline and to develop a financial plan for the project but also for presenting the project to the public and the local authorities. This plan may have to be approved by local decision-makers. A list ranking the single measures and the scheduling of the projects should be in accord with the analysis of basic conditions and target groups' needs. Projects include for instance: enlarging the pavements and raising attractiveness of areas where pedestrians can walk and rest, improving road layout, traffic calming, and traffic light priority. One of the considerations in design is sightlines and planting, to balance attractiveness with clear vision so that pedestrians and cyclists feel safe (Malmö).

- Political and legal approval

As projects generally need political and legal approval it is advisable that working groups and/or stakeholder meetings have this issue on the agenda. It is essential to consult the local decision-makers for political approval from the very start of the project.

- Public involvement

The involvement of the public can take place in different ways and at different stages of the project. They can participate actively in planning and decision making or can attend public meetings and hearings. It is important to determine the appropriate level of involvement, which will depend on the nature of the scheme and the local culture. The involvement can prevent delays in the future being caused by a lack of support.

- Improving the subjective safety perception of cyclists

People are unlikely to start cycling or allowing their children to cycle if they regard cycling as being unsafe or do not see cycling as an equivalent transport mode. Different measures to improve the cyclists' situation and to privilege cyclists help to increase cycle use. Such measures include: increased control of illegally parked cars on cycle lanes, cycle traffic education and promotion of safe cycling, (possibly free) cycle repairs stand, cycle racks and shelters, reducing motorised traffic in order to decrease the stress levels of cyclists, improving horizontal (on to the street) and vertical (at eye level) signing to and along the cycle lanes, visual aids for safer road crossing, paving, removing obstacles, planting of trees in some specific cases, extension of flower-beds and securing safe sight-lines.

- Several on street measures to improve safety of pedestrians and cyclists were reported

- Improvement of road signs

Road signs often disregard pedestrians and cyclists and are focused on car drivers. Adapted and/or new road signs at pedestrian areas and dangerous sites improve the subjective safety perception of cyclists and pedestrians and the safety situation.

- Speed reducing elements

High speed levels increase the severity of accidents. Speed reducing elements improve safety for all road users.

- Traffic lights adaptation for non motorised modes

Traffic lights are mainly focused on vehicle drivers. To improve pedestrian safety at traffic lights, signals for pedestrians should be installed at eye level and the time allowed for pedestrians to cross should consider pedestrians' and cyclists' speed levels.

- Visual aids highlighting zebra crossings

- Improving conditions for cyclists

New outdoor secure bike racks help to reduce thefts and improve security. Improvement of cycle lane surfaces reduces accidents due to bad road conditions. Systems to give priority for cyclists on highly frequented lanes makes cycling safer and a more attractive means of transport. Detectors which influence traffic lights in favour of cyclists were used in Malmö; such detectors should be installed in cooperation with bus operators to avoid conflicts with public transport priorities. Cycling 'barometers' displayed daily/monthly/annual cycling traffic.



- Improving conditions for children

Measures to improve safety for children include education and training activities. Campaigns at schools and at workplaces are very successful. It is essential to create age-related projects. For older children interactive games are interesting. The game can be designed for the internet in cooperation with schools or children's associations. Another successful measure for older children is to let them check the cycle lanes in cooperation with teachers and police.

Downloadable maps for children can be designed and printed showing existing cycle routes, paths, recreation areas, cycle renting points and children's points of interest. To increase cycle use campaigns should not only point out cycling as a mode of transport but also show additional benefits of cycling, such as sports, exercise and health effects.

- Evaluation of the activities

Critical evaluation shows which measures are good and effective, and helps to create a ranking for further measures. In CIVITAS, the monitoring also helps to show the return on investment, so that other cities can see the benefits of these measures.

3 Drivers and strategies to overcome barriers

The tables below show, by sub-cluster, the drivers (Table 3.1) and barriers (Table 3.2) encountered, as reported by the individual project teams.

3.1 Drivers

Drivers were asked about in an open question format. They were asked to be reported only if they were recognized as being more than what would normally be expected. To give a better overview and to compare the different measures with each other, categories have been created. A tick mark indicates that the specific driver was indicated at least once in the evaluation for the measure. In detail, the drivers were described as follows:

- **Social acceptance**

Within the cycling and walking cluster, measures have been implemented which have a strong social acceptance. Public acceptance to reduce individual motor car traffic, to improve safety for pedestrians and cyclists and to reduce accidents to pedestrians in the city is usually given (see Table 3.1). Beyond that a lack of car parking area in the cities and increasing environmental problems made cycling a more attractive means of transport.

- **Improved infrastructure**

To intensify social acceptance, cycle riding infrastructure has been improved in the cities in recent years. That is why the degree of ownership of cycles increased a lot and measures for cyclists are popular.

- **Interest groups**

Sometimes pressure by interest groups (for instance cyclist network) encouraged projects. Project partners (bus operators, companies, project partners for marketing) are generally interested in successful implementation and therefore ownership of and responsibility to the measure is above average.

Table 3.1: Drivers

City	Measure	Driver related to above expected...				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
(a) Cycle infrastructure (lanes and parking)						
Burgos	Increasing bicycle use (11.13)	✓				
Debrecen	Integrated and extended cycling network (11.05)	✓				
La Rochelle	Implementation of new structure for alternative modes (11.01)	✓				
Ljubljana	Participatory planning and promotion of sustainable mobility (11.07)	✓		✓		
Malmö	Internet tool for traffic planning (12.04)	✓				✓
Ploiesti	Planning for alternative transport modes (11.09)	✓			✓	
Ploiesti	Implementing new infrastructures for walking and cycling (11.10)				✓	
Preston	Planning for alternative transport modes (11.04)			✓		✓
Preston	Implement new infrastructure for alternative modes (11.05)			✓	✓	✓
Toulouse	Public space redesign (06.02)	✓		✓	✓	
(b) Cycles on buses						
Krakow	New leisure related mobility services (08.08)	✓		✓	✓	
La Rochelle	Extension of bike-bus scheme (08.05)				✓	
(c) Cycle rental and loan schemes						
Burgos	City bike scheme (09.06)	✓				
Krakow	Bike renting (09.07)			✓		
La Rochelle	Bike sharing (09.02)				✓	
Toulouse	Promotion of bicycle use and integration with PT services (11.02)	✓			✓	
(d) Safety improvements for pedestrians and cyclists						
Burgos	Safe access for pedestrians to peripheral neighbourhoods (11.12)	✓				
Burgos	Safety & accident prevention plan (11.15)			✓		
Malmö	Integration of cycling with public transport (08.03)			✓		✓
Odense	Interactive traffic training for children (11.10)			✓	✓	
Venice	Promoting safe and increased bicycle use (11.09)	✓		✓		

3.2 Strategies to overcome barriers

Measures concerning cycling and walking dealt with different problems throughout the project and several faced organisational problems (see Table 3.2). In detail, strategies to overcome barriers were described as follows:

- **Round table discussions and stakeholder meetings**

Some measures to increase cycling and walking can seem controversial. Sometimes there is strong lobbying against measures and/or related topics from specific groups. Existing stakeholder resistance to measures can be overcome in meetings, site visits and negotiations along the way, as different views and opinions can be discussed and can lead to an agreement.

- **Knowledge of the specific legal framework**

Road and traffic management systems and legal frameworks have developed over a long period of time often without consideration of cycling traffic. Therefore the legal requirements and authority may be unclear or inadequate for the intended measures, but it is important to address these issues and ensure the measure accords with the legal framework.

- **Acting according to technological possibilities**

It is possible to implement improvements for pedestrians and cyclists. However the city infrastructure is often not really suitable for what may seem to be obvious measures. For instance, the need to rebuild some sections of the path with specific material for the surface in order to ensure a sufficient level of security can be expensive.

- **Financial restrictions**

Careful planning assures keeping within the given financial resources. If costs increase substantially the budget will have to be modified in cooperation with local authorities, otherwise the missing budget will result in political controversy. Timescales have to be agreed by all participants in order to get political and stakeholders' support. A possible strategy is that new guidelines are developed for new infrastructure or replacement works.

- **Public involvement and media**

Cooperation and open dialogue with the public using different media, personal meetings or round table discussions help to meet the goals of the project and avoids negative or unjustified media reporting.

Table 3.2: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
(a) Cycle infrastructure (lanes and parking)													
Burgos	Increasing bicycle use (11.13)			✓							✓		
Debrecen	Integrated and extended cycling network (11.05)		✓							✓		✓	
La Rochelle	Implementation of new structure for alternative modes (11.01)							✓		✓			✓
Ljubljana	Participatory planning and promotion of sustainable mobility (11.07)			✓			✓			✓			
Malmö	Internet tool for traffic planning (12.04)		✓					✓	✓				✓
Ploiesti	Planning for alternative transport modes (11.09)	✓		✓			✓		✓				✓
Ploiesti	Implementing new infrastructures for walking and cycling (11.10)	✓		✓			✓		✓				✓
Preston	Planning for alternative transport modes (11.04)	✓		✓					✓				
Preston	Implement new infrastructure for alternative modes (11.05)	✓		✓					✓				
Toulouse	Public space redesign (06.02)									✓	✓	✓	
(b) Cycles on buses													
Krakow	New leisure related mobility services (08.08)			✓	✓		✓			✓	✓	✓	✓
La Rochelle	Extension of bike-bus scheme (08.05)		✓	✓	✓				✓				
(c) Cycle rental and loan schemes													
Burgos	City bike scheme (09.06)			✓						✓	✓		✓
Krakow	Bike renting (09.07)			✓			✓						
La Rochelle	Bike sharing (09.02)	✓									✓	✓	✓
Toulouse	Promotion of bicycle use and integration with PT services (11.02)					✓				✓			✓
(d) Safety improvements for pedestrians and cyclists													
Burgos	Safe access for pedestrians to peripheral neighbourhoods (11.12)							✓					
Burgos	Safety & accident prevention plan (11.15)							✓					
Malmö	Integration of cycling with public transport (08.03)												✓
Odense	Interactive traffic training for children (11.10)	✓	✓	✓						✓			✓
Venice	Promoting safe and increased bicycle use (11.09)		✓							✓			

4 Impacts

4.1 Cycle Infrastructure (lanes and parking)

Seven of the eight measures in this sub-cluster of cycle infrastructure measures concern the extension of the cycle network of lanes and path and/or provision of additional cycle parking at key locations; one measure concerns cycle trip planning using the cycle network. A summary of the outputs and impacts is given in Table 4.1.

Table 4.1: Achieved Outputs and Impacts for Infrastructure (lanes and parking)

City	No.	Outputs	Economy Energy Environment	Transport	Society
Burgos	11.13	<ul style="list-style-type: none"> • Connections between existing cycle lanes and areas • Extension of cycle lanes by 15km • Provision of 156 new cycle stands • Campaigns and publicity 	No information	<ul style="list-style-type: none"> • Modal split (with other measures) 04-08: Cycling 1.8% to 9.2%; PT 10% to 18%; car 37% to 32%; walk 52% to 41% • Main use of cycle 07-08: work /study 27% to 34%; leisure 43% to 53%; shopping/other 28% to 12% • Perception of safety as good/ok increased from 38% to 58%, 07-08 	<ul style="list-style-type: none"> • Acceptance and use by cyclists of lanes increased from 90% to 99%, 07-08 • Perception of access of cyclists to lanes near home increased from 29% to 43%, 07-08
Debrecen	11.06	<ul style="list-style-type: none"> • Connections of existing cycle lanes with 4km of new lanes • Provide 51 new cycle racks for over 300 cycles 	No information	<ul style="list-style-type: none"> • No before/after data • Modal split cycling 9% 	<ul style="list-style-type: none"> • Users of new racks satisfied, • Knowledge of new racks among cyclists 60%
La Rochelle	11.01	<ul style="list-style-type: none"> • Cycle path 14km long linking 4 neighbourhoods to city 	<ul style="list-style-type: none"> • Set-up costs €2.1M; operational cost about €19k/year • Fuel saved 148kg (177lit) /week or 0.17kg (0.20lit) /trip/ person • Emissions saved also calculated 	<ul style="list-style-type: none"> • Use of path 76% for work/school trips, 21% leisure • Modal change: 26% of the cycle path users (sample 50) had switched from car to cycle 	<ul style="list-style-type: none"> • Awareness of cycle path of local inhabitants increased from 70% to 98%, 07-08 • About 90% satisfied with comfort, upkeep and safety of path • Public support for such paths very high 96%
Ljubljana	11.07	<ul style="list-style-type: none"> • Public involvement in mobility planning • Installed 420 cycle racks and 60 covered cycle racks 	No information	<ul style="list-style-type: none"> • Small 1.2% (ns) increase in cycle counts, 06-07 	<ul style="list-style-type: none"> • Involvement of stakeholders in planning very helpful and led to further steps on public engagement
Ploiesti	11.09 & 11.10	<ul style="list-style-type: none"> • 8km of cycle track from village to city • 4.3km of walking tracks in areas of city 	<ul style="list-style-type: none"> • Cost €275k for cycle tracks, €368k for pedestrian works 	No local data	<ul style="list-style-type: none"> • 42% of PT users were aware of cycle tracks
Preston	11.04 & 11.05	<ul style="list-style-type: none"> • Cycle network plan for Preston • 13.6km of new cycle paths • New cycle parking stands 		<ul style="list-style-type: none"> • Cycle flows increased by 13% 03-07 (but includes effects of other measures) • mode split 1%/year increase 06-08 	<ul style="list-style-type: none"> • New/improved paths have encouraged new users

		<ul style="list-style-type: none"> Improved conditions for cyclists in clear zones promotion of cycling 		<ul style="list-style-type: none"> Cycle accidents in 2 central areas increased from 5 to 7, 05-07 	
Toulouse	6.02	<ul style="list-style-type: none"> Re-organisation of trafficked streets in central area with opening of new metro line Cycle and pedestrian friendly streets and extra 6km of cycle lanes Cycle rental with 135 stations, 1500 cycles, 2200 terminals Goods delivery area agreement on good practice (not assessed) 	<ul style="list-style-type: none"> Total investment cost of about €1m 	<ul style="list-style-type: none"> Car traffic reduced 12.5% peak, 17% off-peak Through traffic reduced 5% peak 2.5% off-peak Pedestrian no's lower weekdays, 5% higher on Saturday Cycles 10% lower weekdays, 70-100% higher on Saturday (weather & timing of counts may partly explain) 	
Malmö	12.04	<ul style="list-style-type: none"> Addition of cycle lane network to travel websites to provide mode comparisons for trips 			<ul style="list-style-type: none"> 3-18% may use a cycle planning facility on website if available (survey before site operational) Use of cycle option 400/week from May 08

Across these measures, a total of 60 km of extra cycle lanes, 4 km of pedestrian paths and around 950 additional cycle parking stands were installed. The provision of this infrastructure was, in each case, a direct charge to the local authority¹. In La Rochelle, installation of the cycle lanes cost about €150k per km while in Ploiesti the cycle lanes cost about €35k per km and the pedestrian paths about €85k per km. The difference is explained partly by the accounting procedures, with La Rochelle including amortised staff and maintenance costs over 10 years, whilst the Ploiesti costs count staff and infrastructure costs in setting up the scheme but not future costs.

In La Rochelle, the project demonstrated designs of cycle lanes which integrate into the specific local environment (pictured, below).



Urban cycle path



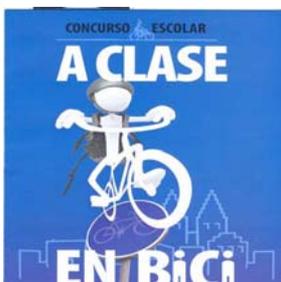
Rural

The provision of additional cycle lanes and facilities, in conjunction with other measures, is generally associated with some increase in cycle flows, such as 1.2%/year in Ljubljana (continuous automatic

¹ This need not always be the case: cycle stands and facilities are often provided by site operators where car parking is constrained, e.g. railway operators, supermarkets and shopping centres, apartment blocks, employers.

counters), and 3%/year in Preston (annual traffic census). In Toulouse cycle flows reduced during the week by about 10%, but were 70-100% higher on Saturdays (counts in 2006 and 2008); this effect is thought to be linked to the fairly unique situation of the start of a new metro service in the city.

A change in modal split towards cycling has also been seen, with a 2% shift in Preston (2006-08). In La Rochelle 26% of the sample (of 50) new cycle path users interviewed were previously car users. In Burgos over the period 2004-08, the modal share for cycling increased five-fold from 1.8% to 9.2%, and was accompanied by an increase in public transport use from 10% to 18% and a decrease in car use from 37% to 32%, but also decrease in walking from 52% to 41% (annual surveys). The strong and very visible promotion of cycle use particularly for the trip to work in conjunction with the significant improvement in the cycling infrastructure and facilities is considered to have helped change the minds of the planners and politicians and the travel habits of the citizens.



Cycling promotion in Burgos

Awareness of the new or improved cycling facilities by the general public can be quite modest (42% in Ploiesti), but good information provision and campaigns increase awareness and public support, such as 96% in La Rochelle, 99% in Burgos.

In Malmö the cycle lane network was integrated into the local internet trip planning tools to provide additional mode choice options. Unfortunately, delays in implementation precluded proper evaluation of the measure, though in the first month of operation about 400 users per week had accessed the cycle option.

4.2 Cycles on buses

Two further measures deal with carrying cycles on buses to leisure destinations. These are summarised in Table 4.2.

Table 4.2 Achieved Outputs and Impacts for Cycles on buses

City	No.	Outputs	Economy Energy Environment	Transport	Society
Krakow	8.08	<ul style="list-style-type: none"> • Bike racks for leisure trips fitted on 15 buses and used on 21 routes 	<ul style="list-style-type: none"> • Operating costs for all 15 racks exceeded additional revenues, but are small at €0.5/km/rack 	<ul style="list-style-type: none"> • Used well on only one route to a hilly green area with 292 users/month in May-Aug 2007 and 359 users/month in May 2008 	<ul style="list-style-type: none"> • 81% general approval of service. • for leisure trips, 13% said they would use the service and 6.6% said they already had
La Rochelle	8.05	<ul style="list-style-type: none"> • 'Bike-bus' service with cycles on board in rear section of articulated bus • 2 converted buses and increased frequency on popular tourist route 	<ul style="list-style-type: none"> • Average annual net present cost of service is 78500€ • At current ticket price (1.50€), operation costs will always exceed revenue • Estimated saving of 4170 litres of fuel in 2008 through car users switching to bike-bus 	<ul style="list-style-type: none"> • Bus return trips up by 38% and passenger trips up by 32% 07-08 • Passengers with bikes 52% female • Age groups 18-29 and 40-49 largest • Overall 25% of passengers took a bike on the bus 	<ul style="list-style-type: none"> • New livery of buses attracted 25% of new users • General public awareness up by 10% over the year • 97% of public thought the service worthwhile • 99% of users were satisfied with the service, despite problems with loading/unloading • 27% of users gave 'not using car' as main reason to use the service

In both Krakow and La Rochelle, buses were used to carry cycles in order to encourage cyclists to visit leisure sites without taking their cars. In Krakow, bike racks were fitted on the rear of 15 buses for use on 21 routes, though predominantly used for one route, while in La Rochelle the rear section of two articulated buses were converted to hold cycles for trips to one very popular leisure destination.



Bus-bike service in La Rochelle

In both cases the cycles were taken without additional charge, with the cyclist paying the usual passenger fare (€1.50 in La Rochelle, 2.50PLN (€0.65) in Krakow). In La Rochelle the net present annual cost of the service (including set-up costs, operational costs and revenue) was estimated to be €78,500; in both cases operational costs would always exceed revenue at standard ticket prices.

In the summer months the service was used well on one route in Krakow (to the zoo, where there are popular down-hill cycle tracks) with over 350 users/month. In La Rochelle trips on the bus increased by 32% in one year (2007-08) from 13,600 to 18,000; overall 25% of the bus passengers took a cycle with them. Comparing trips that otherwise would have been made by car, a saving in fuel of 4170 litres was roughly estimated for 2008 for the La Rochelle service.

The general public approval of the services was high at 81% in Krakow and 97% in La Rochelle. Nearly all (99%) of the La Rochelle users were satisfied or very satisfied with the service.

The main problem with both services concerned the ease of loading and unloading the cycles; the time taken for this tended to limit the services stopping for cyclists at intermediate stops along the route. In addition, attention needs to be paid to the area at the bus stops so that cyclists waiting for the bus do not obstruct the path for pedestrians.

4.3 Cycle rental and loan schemes

Four cities (Burgos, Krakow, La Rochelle and Toulouse) initiated a new cycle rental scheme. A summary of the outputs and impacts is given in Table 4.3.

Table 4.3: Achieved Outputs and Impacts for Cycle Rental and Loan Scheme Measures

City	No.	Outputs	Economy Energy Environment	Transport	Society
Burgos	9.06	<ul style="list-style-type: none"> • Bike loan scheme 'Bicibur' in 8 locations, with about 250 cycles • Real time control system allowing 2 hours' use • Education and marketing to promote the scheme during 2007 	<ul style="list-style-type: none"> • 3€ for card, then free use • Average operating cost (07) €10.69/user or about €26k in 2007 • Revenue €3/user or about €3125 in 2007 • Investment cost not available 	<ul style="list-style-type: none"> • Subscribers Sep 08 = 3464. • Loans increased from 558/month 2006 to 1440/month (50/day) in 2008 • With other measures, modal split 04-08: Cycling 1.8% to 9.2%; PT 10% to 18%; car 37% to 32%; walk 52% to 41% 	<ul style="list-style-type: none"> • Awareness increased from 57% (2007) to 80% (2008) • Good acceptance among citizens (55% positively support, 22% against)

Krakow	9.07	<ul style="list-style-type: none"> • Cycle renting scheme with 100 cycles and 12 stations with 140 racks • Start delayed until Nov 08 	<ul style="list-style-type: none"> • Investment cost €165k, running cost €120k/year • Charges: 20 mins free, 1hr €0.25, 2 hrs €0.65, 3hrs €1.65 	<ul style="list-style-type: none"> • Cycles 1-2% modal split; insufficient period to measure any shift • In first 5 weeks 643 persons registered, 80 trips/day (winter) 	
La Rochelle	9.02	<ul style="list-style-type: none"> • Cycle sharing scheme with 120 cycles at 12 stations at main transport/activity hubs • Access with PT smartcard from 2008 • Real time info for better system management • Promotion campaigns in Sep 05, 06 and 07 	<ul style="list-style-type: none"> • Access included in PT card, €50/year for non-PT users • Free first 30 min then increasing cost • Deposit of €100 • Set-up costs €675k; average running cost €66k/year • fuel, est. 200-650 litres less • CO2, est. 720-2290 kg less 	<ul style="list-style-type: none"> • Average numbers of subscribers: 17 in 05, 45 in 06, 102 in 07, 78 in 08 (drop in 08 due to lack of cycle replacement from theft, damage, wear-&-tear) • About 16,700 trips made in 2007 • Car use, about 3000-9500 km less 	<ul style="list-style-type: none"> • Awareness of general public decreased from 32% to 28%, 07-08 (low profile of measure compared with others) • Student awareness rose from 35% to 42% 05-07
Toulouse	11.02	<ul style="list-style-type: none"> (1) Cycling policy development • Cyclists survey on use, safety, security • Produced Guide for cities wishing to implement cycling policy • Cycle parking racks at stations • Extension of cycle network (2) Cycle rental system • 2400 cycles at 253 automatic rental stations 	<ul style="list-style-type: none"> • Rental charges: 30mins free, day 1€, week €5, month €10, year €25. • Modal split: cycling 3% in 04 (no 08 data) • Cost €4.19M/yr • 83% of cycles needed repair by Jan 09 	<ul style="list-style-type: none"> • Extra 150km (+60%) of cycle lanes, paths etc added since 2004 • Cycle flow fell by 10% 06-08, but still about 25% higher than 01 (poss. reasons: new metro and other PT, time of counts?) • Cycle flows up on Saturdays (2) At Dec 08: 234 stations, 2082 cycles available, 4660 racks, 11465 subscribers, 2.71M rentals; average 4370 hires/day 	<ul style="list-style-type: none"> • Safety: cycle accidents increased by 2%-3%, but cycle acc rate /km decreased • men 66% of users • vandalism: 2000 cycles and 190 racks damaged in one year

The schemes in Burgos, Krakow and La Rochelle were of a similar size with respectively 8, 12 and 12 rental locations at the main transport or activity locations and having a total of 200, 100 and 120 cycles available for use. The scheme in Toulouse however was on a much larger scale with 253 rental points located throughout the city at intervals of 200 to 300m from each other and with 2400 cycles available. This in part reflects the different size of the cities.

The set-up costs in Krakow were about €165k with running costs of about €120k/year, whereas in La Rochelle set-up costs were about €150k (for the initial 12 stations) with running costs about €66k/year. In Burgos running costs averaged about €23k/year (2006-7). In Toulouse the set-up costs were borne by the private company that set it up; the company charges Toulouse €4.19M/year to run the scheme but also provides Toulouse with publicity space.

For all four schemes, an initial user registration was required, generally providing a smart card giving access to the scheme. In Burgos this cost €3 after which use of the cycles was free, though for a 2 hour maximum period. In Krakow, La Rochelle and Toulouse the first 20 or 30 minutes was free (to encourage use for short trips) with an increasing charge thereafter (see Table 4.2). In La Rochelle the scheme could be accessed with a Public Transport smart card, with non-PT users paying €50/year. In Toulouse, a cycle could be rented for a day, week, month or even a year. Each of the schemes operated using a real-time access and management system.

Use of the schemes averaged out at about 30 trips/day in Burgos, 50 trips/day in La Rochelle and 80 trips/day in Krakow (but data only for the first 5 weeks of winter operation). In Toulouse however 4370 trips per day were being made. Clearly this reflects the number of rental stations and cycles available and the table below summarises these data.

City	No. rental stations	Approx No. cycles	Average trips per day	Trips per day per station	Trips per day per cycle	Av. Annual running costs (k€)	Running cost per trip (€)
Burgos	8	200	30	3.7	0.15	23	3.93
Krakow	12	100	80	6.6	0.80	120	4.11
La Rochelle	12	120	50	4.2	0.42	66	3.62
Toulouse	234	2082	4370	17.3	1.82	4190	2.63

In Toulouse there was an average of 17.3 trips/day/station compared with 4-6 trips/day/station in the other cities; similarly there were 1.8 trips per cycle/day in Toulouse compared with 0.2-0.8 trips/cycle for Burgos / La Rochelle / Krakow. Note, however, that the Krakow data are for winter operation only over the first 5 weeks. The scale of operation is clearly much greater in Toulouse, and in terms of running costs per trip, Toulouse is the lowest by €1.0.

In each city the cycle rental scheme was accompanied by other cycle related measures as well as marketing and promotion. In Toulouse a cycling policy for the city was developed and the rental scheme supported the move towards easier and safer cycling within the city. In Burgos the combination of measures, such as the cycle lanes, helped to increase cycle mode share from 2% to 9%. General awareness of the cycle rental schemes varied from good (80%) in Burgos to only modest at 28% in La Rochelle (which may be due to the relatively late implementation and short period for monitoring and evaluation).

Misuse and vandalism was a serious issue reported in Toulouse where during the course of one year 2000 cycles (83%) and 190 cycle racks were damaged and had to be repaired or replaced. Also in La Rochelle, the drop in the number of subscribers in 2008 was considered to be due to lack of renewal of the cycles caused by theft, damage and wear-and tear, so that there were not enough cycles available for use.

Overall, the cycle rental schemes were generally appreciated and used at a satisfactory level. They were never intended to provide a net income but to be run at a net cost to the city authority. But in return the schemes have reduced the need for some car trips within the cities, particularly short distance trips, thereby reducing fuel use and emissions; this is also likely to help a number of people keep a bit fitter than they otherwise would be.

Cycle rental can be seen as a good way of encouraging cycling in a city, which is likely to have longer term benefits, but is quite expensive and once started may be politically difficult to stop

4.4 Safety improvement measures for pedestrians and cyclists

Five measures mainly concern safety improvements for pedestrians and cyclists. These measures are given in Table 4.4 and include safer pedestrian areas and paths, signing, traffic speed reduction, traffic signal improvements (countdowns, radar detection), cycle lane upgrade, new accident database, cycle parking racks, road safety training for school children, safe cycling campaigns and home-school routes.

Table 4.4: Achieved Outputs and Impacts for Safety Improvement Measures for pedestrians and cyclists

City	No.	Outputs	Economy Energy Environment	Transport	Society
Burgos	11.12	<ul style="list-style-type: none"> • Safer areas for pedestrians and cyclists in peripheral neighbourhoods • Footpaths, pedestrian spaces, cycle lanes 		<ul style="list-style-type: none"> • No. of users of pedestrian areas increased 125% 05-07 • Accidents in city reduced by 40 in year (13%), despite general increases in traffic flow, but other measures were implemented (e.g. radar) 	<ul style="list-style-type: none"> • Perceptions of safety in city largely unchanged
Burgos	11.15	<ul style="list-style-type: none"> • Safety improvements: signs, speed reductions, traffic signal improvements, countdowns • New police accident database and software • Police training • Road safety campaigns in schools and workplaces 		<ul style="list-style-type: none"> • Accidents in city down slightly. 04 to 07: 278, 300, 260, 261. 	<ul style="list-style-type: none"> • Perception of road safety improved for all road users, drivers, cyclists and pedestrians
Malmö	8.03	<ul style="list-style-type: none"> • Radar cycle detectors at 20 junctions to improve safety & comfort • 2 cycle lanes upgraded • Information and campaign on safe cycling 	<ul style="list-style-type: none"> • Measure cost €1m (10.9M SEK) • Perhaps marginal changes from car to cycle, giving reduced energy and emissions, but this is not shown 	<ul style="list-style-type: none"> • With radar detectors about 3 seconds less waiting time (off peak only) and 2km/hr increase speed on link (off peak only) • Cycle mode share increased from 20% to 22% 03 to 08, but many measures and factors contributed 	<ul style="list-style-type: none"> • About 39% of cyclists noticed the cycle lane improvements • Perceived change in safety, speed, convenience and signing is mildly positive • Awareness of 07 campaign 40%, acceptance 10% • Awareness of 08 campaign 18%, 8% affected, 1.5% greatly affected by it
Odense	11.10	<ul style="list-style-type: none"> • "B-Game" traffic training tool for road safety education for children 	<ul style="list-style-type: none"> • Encouraging children to cycle safely is intended to reduce need for parental car transport saving energy and emissions (but not justified by this measure) 		<ul style="list-style-type: none"> • 'B-Game' used 1694 times in project. • 85% achieved highest level 11 • Only 12 of 53 schools participated
Venice	11.09	<ul style="list-style-type: none"> • Provision of 100 secure cycle parking racks at strategic points making over 1000 in total • Safe home-school routes and stimulating children's cycling • Enhancing 2 key 	<ul style="list-style-type: none"> • Encouraging cycling instead of car use can reduce energy use and emissions, but this is not shown 	<ul style="list-style-type: none"> • Modal split 06 to 08: Cycle 16.7% to 19.7%, walk 21.9% to 23.2%, PT 14.9% to 12.6%, car 43.9% to 41.9% <p>[Cycle path network increased from 34km to 58km 02 to 07 (2nd</p>	<ul style="list-style-type: none"> • Over 2500 school children involved in ABiCi, Biking-school bus, Bike safety to school projects • School teachers 99% satisfied with ABiCi project

		cycle routes by signing, road crossings, attractiveness ● School cycling campaign ABiCi project on benefits of cycling + maps of cycle paths etc		highest in region) – not part of CIVITAS]	
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Notable results show that:

- (a) in Burgos the creation of safer pedestrian areas increased use by 125%.
- (b) the combination of measures helped to increase cycle mode share from 20% to 22% in Malmö (2003-2008)
- (c) the “B-Game” traffic training tool in Odense was used 1694 times encouraging safer cycling by children
- (d) over 2500 children participated in the ABiCi biking-school bus in Venice.

Encouraging children to cycle or walk to school, either by themselves or in groups as in ABiCi, is believed to reduce the need for parents to use their cars for the school trip, thereby saving fuel, energy and emissions, as well as helping to establish good travel habits for the future.

Each of the five measures and the specific elements within them as well as the measures discussed earlier (such as extension of cycle lane networks) is likely to have contributed to an improvement in safety, but it is only their net effect on safety within each city that may be observed. For Burgos a reduction of 13% in the number of accidents was recorded from 2005 to 2007 (after an 8% increase from 2004 to 2005), but across the five cities the perception of change in safety seems to be only mildly positive.

5 Upscaling and Transferability

A summary of the potential for upscaling and transferability is given in Table 5.1.

5.1 Cycle lanes and cycle parking

Upscaling

In Burgos, Debrecen, La Rochelle and Ljubljana further development of the cycle network was seen as part of the future plans for the city in order to provide better safety for cyclists through the cycle lanes (e.g. linking communities) and improved security through further cycle parking racks.

Transferability

The provision of cycle lanes and tracks to extend an existing network or link in outlying suburbs is seen as being generally suitable for transfer to other cities where it is not too hilly. Consultation and co-operation with cycle groups in the planning stages and good political support are seen as particularly important. Strong marketing and publicity showing the positive effects of cycling in terms of reduced cars trips, resulting in lower energy use and emissions, together with improved health and fitness of the cyclists are also essential to achieve any noticeable change of mode (e.g. Burgos).

5.2 Cycles on buses

Upscaling

Both cities saw little scope for upscaling. In Krakow, it would only be considered if accompanied by the development of the city cycling policy. In La Rochelle, extended operation of the service between May and September and one or two other routes may be possible, but would need an increase in ticket prices.

Transferability

Transferability depends strongly on the nature of the cycling infrastructure (lanes and secure parking facilities) at the origin and destination and on the route to the leisure area being difficult in some respect (lack of cycle lanes, hilly, lengthy). Issues to overcome include conflicts between waiting passengers and cycles to be boarded, and ease of loading and unloading the cycles, particularly at intermediate bus stops.

5.3 Cycle rental and loans schemes

Upscaling

The Toulouse cycle rental scheme, with 253 locations, already covers the whole of the conurbation. For Burgos, Krakow and La Rochelle an increase in the number of rental locations (mostly doubling in number) is being considered/planned which is expected to give greater network effect and improved viability.

Transferability

The Burgos scheme has already been transferred to over 20 other Spanish cities. From all the cities the key issues are good cycle infrastructure for safety, solidity of equipment and reliability of cycles, selection of sufficient location points, smart access and management, clear scheme rules and good awareness raising.

5.4 Safety improvements for pedestrians and cyclists

Upscaling

Upscaling was seen as possible for some of the safety elements implemented. These include creating further pedestrian schemes in the peripheral areas around Burgos, enhancement of cycle lanes in Malmo, and use of the “B-game” traffic safety training in all the other secondary schools in Odense.

Transferability

The “B-game” traffic safety training game could quite easily be transferred to other cities in Denmark and to other cities across Europe with translation and local filming. From the Venice experience it is recommended that a package of complementary safety measures is more effective than one big measure. Also, projects with school children need the strong involvement of the teachers and parents to encourage and support the children. High quality facilities are also required to increase cycling levels.

Table 5.1: Upscaling and Transferability possibilities

City	No.	Upscaling	Transferability
(a) Cycle infrastructure and facilities			
Burgos	11.13	<ul style="list-style-type: none"> Increasing network of cycle lanes as city grows High security/safety for cyclists Cycle is a favoured mode in General Plans 	<ul style="list-style-type: none"> Need good cooperation with cycle groups Strong political and technical support required Strong marketing & publicity showing positive effects of cycling Cycle promoted as a good transport mode assists positive perception
Debrecen	11.06	<ul style="list-style-type: none"> Extension of cycle network and provision of more cycle racks planned 	<ul style="list-style-type: none"> Cycle representatives included in development of Bicycle Development Plan Lack of publicity resulted in low knowledge and use of new racks
La Rochelle	11.01	<ul style="list-style-type: none"> Other cycle paths are actively being considered to link other communities 	<ul style="list-style-type: none"> Consultation and involvement of all municipalities, users groups etc Sharing space with pedestrians Part of global strategy of encouraging cycle use
Ljubljana	11.07	<ul style="list-style-type: none"> Participation of public to be widened to other areas of planning Development of cycling strategy planned 	<ul style="list-style-type: none"> Participatory model could be used by other cities Guidance on training for officials on group facilitation, preparing programmes and plans, assessment of stakeholder needs
Ploiesti	11.09 & 11.10	<ul style="list-style-type: none"> Cycle routes and pedestrian paths across the city planned No consideration of wider implementation given 	<ul style="list-style-type: none"> No consideration of transferability
Preston	11.04 & 11.05	No upscaling as already city network	<ul style="list-style-type: none"> For cities with low levels of cycling, planning and implementing new cycle infrastructure can be used with appropriate promotion to help cycling become a viable mode of transport.
Toulouse	6.02	No upscaling, as concerned central area of city	<ul style="list-style-type: none"> Similar actions in other cities requires strong local political support and good communication with shopkeepers and residents
Malmö	12.04	<ul style="list-style-type: none"> Possible cycle planning feature for other areas, but not assessed 	<ul style="list-style-type: none"> Potential for transfer to other cities in region
(b) Cycles on buses			
Krakow	8.08	<ul style="list-style-type: none"> Any upscaling needs to be accompanied by development of city cycling policy 	<ul style="list-style-type: none"> Transferability depends strongly on the nature of cycling infrastructure, and is useful where cycling to leisure areas are difficult
La Rochelle	8.05	<ul style="list-style-type: none"> Extended operating period (May –Sep) and extra routes were requested and could be possible System of loading and attaching bike needs improvement Ticket prices would need increasing 	<ul style="list-style-type: none"> Service needs good quality of cycling routes etc. at origin & destination Waiting area conflicts of bikes and passengers need addressing Loading and attaching bikes needs to be made easy

(c) Cycle rental and loan schemes			
Burgos	9.06	<ul style="list-style-type: none"> ● Measure to be extended with 8 new lending points in other areas of city with 80 new spaces 	<ul style="list-style-type: none"> ● Measure already transferred to over 20 other Spanish cities ● Selection of location points, scheme rules and awareness raising are important
Krakow	9.07	<ul style="list-style-type: none"> ● Increase in number of locations and cycles across city, particularly at PT nodes and main attractions 	<ul style="list-style-type: none"> ● Recommended to other cities as complement to Public Transport
La Rochelle	9.02	<ul style="list-style-type: none"> ● Number of stations to increase from 12 to 30, and no. cycles from 120 to 350, with the aim of reaching a network effect, not currently present; many improvements made at end of study 	<ul style="list-style-type: none"> ● Key issues are safety, solidity of equipment and reliability of cycles and system ● Electronic / smart card access provides management info ● Conditions must be suitable including local regulations, good cycle infrastructure, awareness raising ● Need sufficient stations and cycles to provide an adequate network
Toulouse	11.02	<ul style="list-style-type: none"> ● Already covers all the conurbation ● Cycle lane network to be completed ● Secure cycle racks to be installed 	<ul style="list-style-type: none"> ● "Guide for cities wishing to implement cycle policy" available ● Working group of all interested parties essential ● Automatic rental stations important ● Promotion important
(d) Safety improvements for pedestrians and cyclists			
Burgos	11.12	<ul style="list-style-type: none"> ● Other peripheral neighbourhoods to be treated with calming etc, affecting further 11% of population 	<ul style="list-style-type: none"> ● Good potential for transfer to other cities and has already been requested
Burgos	11.15	<ul style="list-style-type: none"> ● Successful elements can be used at other locations 	<ul style="list-style-type: none"> ● The general safety plan approach has value for other cities
Malmö	8.03	<ul style="list-style-type: none"> ● Further junctions could be fitted with cycle detectors, but possible conflicting priority with buses and other vehicles limits potential; could be tried at peak hours at some key junctions ● Many other cycle lanes could be enhanced ● Campaigns could be held more often 	<ul style="list-style-type: none"> ● Important that implementation of physical measures is accompanied by information/campaigns to increase awareness and use
Odense	11.10	<ul style="list-style-type: none"> ● Measure could be used at all secondary schools in Odense 	<ul style="list-style-type: none"> ● Can be transferred to other cities in Denmark quite easily ● Can be transferred to other cities in Europe with required translations and local filming
Venice	11.09	<ul style="list-style-type: none"> ● Not applicable as covers whole city 	<ul style="list-style-type: none"> ● A package of complementary sub-measures is recommended as being more effective than one big measure ● School children cycling projects need strong involvement of teachers and parents ● High quality facilities required to increase cycling levels

6 Conclusions and Recommendations

6.1 Conclusions

Cycle infrastructure (lanes and parking)

1. The provision of additional cycle lanes and facilities (often in conjunction with other measures) is generally associated with increased cycle flows (1% Ljubljana, 3% Preston) and increased percentage of trips made by cycle (modal split) (2% Preston, 7% Burgos).
2. Strong and very visible promotion of cycling (e.g. Burgos) in conjunction with significant improvements to the infrastructure helped to change the minds of planners and politicians and the travel habits of citizens. Public support for such measures was generally very high (e.g. 96% in La Rochelle, 99% in Burgos).

Cycles on buses

3. Carrying cycles on buses to leisure destinations was largely successful and popular, though in the two cases studied the operational costs exceeded the revenue. The leisure destinations need to have good cycling facilities (tracks, parking) and attention needs to be given to the time taken to load and unload the cycles, as well as the waiting areas at the bus stops.

Cycle rental and loan schemes

4. Rental schemes with 8-12 locations and 100-200 cycles operate quite effectively in the central areas of modest sized cities such as Burgos, La Rochelle and Krakow, but for larger cities a more comprehensive coverage is required, such as in Toulouse with the 253 rental locations and 2400 cycles available. In Toulouse there were 1.8 trips per cycle/day compared with 0.2-0.8 trips/cycle for Burgos / La Rochelle / Krakow. The scale of operation is clearly much greater in Toulouse, and in terms of running costs per trip, Toulouse at 2.6€/trip is the lowest and compares with a range of 3.6€- 4.1€/trip across the other cities.
5. Misuse and vandalism was a serious issue affecting the use and attractiveness of the rental schemes.
6. Overall, the cycle rental schemes were generally appreciated and used at a satisfactory level. They were never intended to provide a net income but to be run as a net cost to the city authority. But in return the schemes have reduced the need for some trips within the cities, particularly short distance, being made by car, thereby reducing fuel use and emissions.
7. Cycle rental can be seen as a good way of encouraging cycling in a city, which is likely to have longer term benefits, but is quite expensive and once started may be politically difficult to stop.

Safety improvements for cyclists and pedestrians

8. Encouraging children to cycle or walk to school, either by themselves or in groups reduces the need for parents to use their cars for the school trip, thereby saving fuel, energy, emissions, as well as helping to establish good travel habits for the future.
9. All of the safety measures are likely to have contributed to an improvement in safety, but it is only the net effect on safety within each city that may be observed. For Burgos a reduction of 13% in the number of accidents was recorded from 2005 to 2007, but across the five cities the perception of change in safety seems to be only mildly positive.

6.2 Recommendations

1. The applicability of the above measures and development of cycling in a city will depend very much on the existing state of cycle use and facilities. A city with good cycle infrastructure may consider introducing a cycle trip planner or cycle rental scheme, while for one with poor infrastructure or safety problems it is essential to address these issues first.
2. In conjunction with significant improvements to the infrastructure and facilities using a combination of measures, strong and very visible promotion of cycling helps to change the minds of planners, politicians and the travel habits of citizens.
3. High importance must be given to the safety and security of cycling and walking; measures to prevent vandalism and misuse of facilities, such as rental bikes, need to be considered.
4. When taking cycles on buses attention needs to be given to the time taken to load and unload the cycles, as well as the waiting areas at the bus stops for cyclists, non-cyclists and pedestrians.