



Sustainable Urban Transport Plans

Preparatory Document in relation to the follow-up of the
Thematic Strategy on the Urban Environment

Annex

25 September 2007

***Europe Direct is a service to help you find answers
to your questions about the European Union***

**New freephone number:
00 800 6 7 8 9 10 11**

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (<http://europa.eu>).

Luxembourg: Office for Official Publications of the European Communities, 2007

ISBN 978-92-79-06955-0

© European Communities, 2007

Reproduction is authorised provided the source is acknowledged.

Sustainable Urban Transport Plans
Preparatory Document in relation to the Thematic
Strategy on the Urban Environment

Annex

25 September 2007

Disclaimer

This paper is the annex to the document on Sustainable Urban Transport Plans in relation with the Thematic Strategy on the Urban Environment. This document is not legally-binding but represents a synthesis of the information and experience available to the Commission. It is intended as a summary of the current state of the art with respect to best practice on sustainable urban transport which recognises the diversity between conurbations across the EU. The document should be seen more as a procedural aid and a reminder of the key elements and good practice that could be considered when developing Sustainable Urban Transport Plans at local levels. It aims to assist the consultation on the Green Paper on urban mobility and further developments on SUTPs will be undertaken in the context of the follow-up to the Green Paper.

Comments on this document can be sent via e-mail to : tren-urbantransport@ec.europa.eu

CONTENTS

WEB LINKS TO RELEVANT LEGISLATIONS AND POLICIES	6
DATABASES, REVIEWS, CASE STUDIES, MANUALS AND NETWORKS.....	8
TECHNICAL PAPERS ON MOBILITY MANAGEMENT MEASURES	20
<i>1 - Land use and transport planning coordination</i>	<i>21</i>
<i>2. Traffic calming</i>	<i>35</i>
<i>3. Fostering cycling and walking</i>	<i>43</i>
<i>4. Promoting and improving collective transport</i>	<i>53</i>
<i>5. Urban road charging.....</i>	<i>64</i>
<i>6. Access restriction for the most polluting vehicles.....</i>	<i>76</i>
<i>7. Parking management.....</i>	<i>83</i>
<i>8. Promoting low-emissions and low-noise road vehicles</i>	<i>89</i>
<i>9. Urban freight management</i>	<i>100</i>
<i>10. Soft and smart measures.....</i>	<i>111</i>

WEB LINKS TO RELEVANT LEGISLATIONS AND POLICIES

Sustainable Development

<http://ec.europa.eu/environment/eussd/>

Urban environment

http://ec.europa.eu/environment/urban/home_en.htm

Air quality

<http://ec.europa.eu/environment/air/ambient.htm>

<http://ec.europa.eu/environment/air/cape/index.htm>

Environmental noise

<http://ec.europa.eu/environment/noise/home.htm>

Climate change

http://ec.europa.eu/environment/climat/home_en.htm

Environmental assessment

<http://ec.europa.eu/environment/eia/home.htm>

LIFE+

<http://ec.europa.eu/environment/life/index.htm>

Clean urban transport (including green paper on urban transport)

http://ec.europa.eu/transport/clean/index_en.htm

Energy efficiency

http://ec.europa.eu/energy/action_plan_energy_efficiency/index_en.htm

http://ec.europa.eu/energy/intelligent/projects/index_en.htm

Fuels

<http://ec.europa.eu/environment/air/transport.htm#2>

Cohesion and cities

http://ec.europa.eu/regional_policy/consultation/urban/index_en.htm

Research

<http://ec.europa.eu/research/fp7/>

DATABASES, REVIEWS, CASE STUDIES, MANUALS AND NETWORKS

I – DATABASES

LIFE databases

- **LIFE projects database**

- **information on recent LIFE projects relevant to urban environment**

URBAN AUDIT

The Urban Audit collects information on the living conditions in 258 large and medium-sized cities within the European Union and the candidate countries (EU27). The Urban Audit builds upon the success of the Urban Audit Pilot Project (1997-2000) which demonstrated that the collection of comparable urban statistics across the EU was feasible and useful.

One of the main goals of the Urban Audit is to allow mayors and other locally elected officials to compare their city directly with other cities in Europe. Such comparisons can facilitate the exchange of experience and improve the quality of local urban policies.

UITP Mobility in Cities Database (MCD II)

This database contains a wealth of information which can be used to support research on various aspects of mobility in urban areas. It enables a sophisticated analysis to be made of the latest evolutions in urban mobility economics and the most successful mobility policies to be identified. In particular, the data will show the evolution of the public transport market share in a changing environment, and will help further develop a set of arguments in favour of public transport and sustainable urban mobility.

The MCD CD-Rom is a source of information of primary importance to organizations with an interest in mobility issues and officials in charge of urban planning and transport policies. The database contains a set of 120 indicators collected in 52 cities worldwide. The easy-to-use interface enables the database to be searched by theme, location, or a combination of the two. Graphs can be generated for an easy visual comparison of city performances. Data can be easily exported into a spreadsheet format for further use and analysis.

KonSULT

KonSULT, is a knowledgebase on sustainable urban land use and transport. The current version of KonSULT is a prototype. The Knowledgebase will be of benefit to transport professionals in developing urban transport strategies and in selecting, designing and implementing specific measures. It will assist politicians and other decision-makers, as well as community organisations and other interest groups, in understanding the role and potential of different measures. It will provide a key source for those involved in transport research and teaching.

[SURBAN database](#)

The European Academy of the Urban Environment is aiming to encourage exchange of experience amongst decision makers in all spheres of sustainable urban development by means of conferences, seminars and workshops, publications and the database SURBAN. SURBAN is the test version of the database on internet on urban development, supporting the CEM-network of Central European Metropolises. It provides access to detailed information on cases of good practice in European urban development

[DOCAPOLIS](#)

DOCAPOLIS is a collaborative space reserved to all those which work in the urban logistics: academic research teams, consultancies, decision-makers, authorities, logisticians and carriers. You can use freely a multi-media documentation base, a thematic dictionary like a last or to come events diary on urban logistics.

[INTEGAIRE good practice database](#)

INTEGAIRE project delivered a comprehensive searchable database that includes the examples of good practice in the filed of local air quality management. The database is available from section “ Good Practice Database ” (top right of home page)

[MANAGeENERGY database](#)

ManagEnergy database provides with regularly updated Good Practice case studies in the field of energy management.

[SUTP efficiency regarding air pollution, CO₂ and noise](#)

A study has been carried out for DG Environment with a view to provide an overview of and analyse the existing knowledge about the efficiency of specific transport measures and combinations thereof regarding air pollution, CO₂ emissions and noise. The study has supported the newly adopted Thematic Strategy on the Urban Environment and has informed the current guidance on Sustainable Urban Transport Plans (SUTP). Main outputs of this study are a [report](#) and a [database](#) summarizing results of identified assessments.

[SMILE local experiences database](#)

SMILE project enabled collecting **170 successful and replicable practices** for sustainable mobility. The database contains good practices related to the following fields:

- Integrated Approach / Urban Transport Plans
- Mobility Advice & Campaigns
- Urban planning
- Responsible car use / Mobility Plans,
- Public transport,
- Cycling,
- Walking / Pedestrians,
- Intermodality,
- Traffic calming / Living streets,
- Parking,
- Goods delivery.

[CALM bluebook & database](#)

The CALM *BlueBOOK* is the result of a survey of European research projects in the field of environmental noise. It has been created by CALM II and is based on the CALM Project Database. The publication is provided as a printed booklet with an integrated CD ROM which contains the entire content of the booklet in digital format and the complete CALM Project Database (status March 31, 2006) for offline use, but offering all search routines. The *BlueBOOK* will be freely distributed on noise conferences and CALM events. An online version of the *BlueBOOK* CD ROM is also posted on this website. Its database routines access the even current status of CALM Project Database

II – REVIEWS & CASE STUDIES

[VIBAT Project](#)

VIBAT project has been carried out for the UK Department of Transport. It examines the possibilities of reducing transport emissions by 60 per cent in 2030 through a modified backcasting and scenario-building approach.

There are three main elements to this innovative research project. The first is to set targets for 2030 and to forecast the business as usual situation for all forms of transport in the UK over that period, so that the scale of change can be assessed in terms of achieving the emissions reductions. The second is the description of the transport system in 2030 that will meet the reduction target. This takes the form of two alternative visions of the future that will push the technological and the behavioural options, separately, and in combination. The third stage is the backcasting process, where alternative policy packages are assembled to lead to the image of the future, together with their sequencing in terms of when implementation should take place.

The benefits of scenario building are that innovative packages of policy measures can be developed to address far-reaching emissions reduction targets. This allows trend-breaking analysis, by highlighting the policy and planning choices to be made by identifying those key stakeholders that should be included in the process, and by making an assessment of the main decision points that have to be made (the step changes). It also provides a longer term background against which more detailed analysis can take place.

BUSTRIP

BUSTRIP is uniquely positioned to show European cities how to deliver sustainable transport whilst generating economic growth. The core objective of the project is to develop in extensive city/peer co-operation SUTPs in 11 cities and one regional authority in BSR that are on a different stage on their transport planning. BUSTRIP will produce SUTP toolbox of techniques, collecting all the learning experiences and best practice from the partner cities.

Urban Transport Benchmarking

The Urban Transport Benchmarking Initiative has been exploring and comparing best practice examples of urban transport delivery in cities across Europe since September 2003. The final reports from years one and two of the Urban Transport Benchmarking Initiative are available for download from this site. An interactive benchmarking tool that uses the data collected in Year's One and Two of the Urban Transport Benchmarking Initiative is also available for use.

ICLEI case studies

Several case studies use successful examples of local environmental and development management to present key concepts for implementing sustainable development at the local level. The given examples are from all over the globe. Key replication aspects are abstracted and contacts are provided, as well as a short bibliography for further research.

TRANSLAND land use practice

(see also individual city case studies)

The EU research project TRANSLAND is a study on innovative policies and future research needs in the field of integrated urban transport and land-use planning. TRANSLAND serves two objectives. It looks backward in identifying good planning practice examples, insights from conducted research in this field and institutional conditions and barriers for integrated policy making and it looks ahead to advise on best planning practice and to recommend future research and policy development.

Energies-Cités - Catalogue of good practice case studies

Energie-Cités has a portfolio of about 400 European good practice case studies in sustainable local energy policies. The 3 to 5 page case studies provide complete information on the action carried out. After general information about the city and a brief introduction to the subject and its general context, the action is presented in detail: local players involved, costs, positive and negative evaluation, prospects and one or more local contacts. These good practice cases can be looked up in a regularly updated on-line database at <http://www.energiecites.org> .

Club innovations in local transport website

This website aims at presenting the studies or experiences relating to innovations in the field of transport in France and in Europe.

UTOPIA DSS

This tool provides structured decision support for transport planners, policy-makers and fleet operators in medium and large cities who perceive that they may need to introduce initiatives based on new transport concepts and cleaner propulsion systems in order to tackle local problems.

Good Practice Examples of Sustainable Urban Transport

This paper elaborated by the German DIFU presents concepts which illustrate how an integrated planning approach can improve mobility in urban neighbourhoods without interfering with sustainable transport development in the city and the region as a whole. Moreover, the social, economic and ecological dimensions of sustainable transport development are given equal attention, as far as this was possible.

Assessment of air quality plans and programmes reported under the EU legislation

This report presents findings under the service contract “Assessment of Plans and Programmes reported under 1996/62/EC”, which has been awarded by the Environment DG to the Austrian Federal Environment Agency (Umweltbundesamt).

Within this project an in-depth assessment of air quality plans and programmes has been carried out. The study also assesses the difficulties faced by authorities in establishing air quality plans or programmes. One main focus of this report is on traffic-related measures, since highest pollution levels are often recorded at traffic hot spot sites.

III – GUIDANCE & MANUALS

PILOT

PILOT is a European project, which will demonstrate the preparation of sustainable urban transport plans (SUTP) in four European cities: Braila, Evora, Lancaster and Tallinn. In parallel, building upon the experience of these four cities and relying on experts from leading local authorities and organisations in this field, PILOT will propose tools, guidelines and recommendations for the elaboration of sustainable urban transport plans in other European regions and local authorities.

PLUME

The LUTR cluster links several different projects in the area of sustainable urban mobility, including land use, transportation, and the environment. The common objective is to develop strategic approaches and methodologies in urban planning that all contribute to the promotion of sustainable urban development. This includes issues of transportation demands and related land use planning, the design and provision of efficient and innovative transportation services including alternative means of transportation, and the minimisation of negative environmental and socio-economic impacts.

TRANSPLUS

TRANSPLUS is an EC-supported research project in the LUTR (Land Use and Transport Research Cluster) under the City of Tomorrow Programme. This Web Site provides details of the project, and, as work progresses, will enable access to project findings

PROSPECTS

PROSPECTS (Procedures for Recommending Sustainable Planning of European City Transport Systems) was funded under the European Commission's Environment and Sustainable Development Programme, with the purpose of providing cities with guidance in generating optimal land use and transport strategies to meet the challenge of sustainability in their particular circumstances.

TRANSLAND

The EU research project TRANSLAND is a study on innovative policies and future research needs in the field of integrated transport and land-use planning. TRANSLAND serves two objectives. It looks backward in identifying good planning practice examples, insights from conducted research in this field and institutional conditions and barriers for integrated policy making and it looks ahead to advise on best planning practice and to recommend future

research and policy development. Important activities within TRANSLAND to fulfil these objectives are: identifying existing good practice and its transferability; over viewing administrative and legal provisions influencing integrated policies; deriving recommendations for enhancing instruments and planning procedures at the EC level; and selecting and prioritizing areas for further research and institutional development.

[SMILE Guidance](#)

The SMILE database is a tool for local authorities to: find in-depth information and to exchange their experience and transfer their know-how, in the field of Sustainable Urban Transport Policies and Initiatives.

Available online:

- **Local Experiences Database:** A compilation of 170 successful and replicable practices for sustainable mobility.
- **Welcome to 14 European Cities... An Invitation to take Action:** A catalogue offering study visits to cities with innovative measures and policies. Available in English and Spanish.
- **Towards Sustainable Urban Transport Policies:** Recommendations for Local Authorities. Available in English and Spanish.
- **Sustainable Mobility for All:** Experiences of European cities and towns in designing specific measures to meet the needs of special target groups. Available in English and Spanish.
- **Public Transport: A Pillar for Sustainable Mobility:** Recommendations on public transport for both local authorities and public transport operators. Available in English and Spanish.
- **Guidelines on Noise Abatement Planning Principles:** Recommendations for road traffic management at the level of local government. Available in English and Spanish.

Save energy, save the climate, save money – [guide](#) for local and regional governments

The Council of the European Municipalities and Regions (CEMR), in collaboration with Energie-Cités and Climate Alliance, has published a guidebook "Save energy, save the climate, save money - A guide for local and regional authorities" aiming at helping municipalities and regions to use energy in a sustainable way.

In this guidebook you will find among others ten action steps that can help local and regional decision makers to start implementing sustainable energy policies. The publication also contains a pool of ideas, concrete measures and good practice examples in the different areas of planning, design, construction, running of facilities as well as in the provision of services.

How can local and regional governments take action to achieve sustainable energy? What are the links between local energy policies and climate protection? How to apply for European

funding? How to get help; how to find ideas for action; and where to get support for exchanging experiences? Find the answers in this publication.

[Achieving sustainable mobility in Europe's towns and municipalities \(CEMR\)](#)

CEMR's publication on its manifesto on sustainable mobility is available. The text of the manifesto was adopted at the meeting of CEMR's transport committee, in Bologna in October 2004. The [publication](#) includes the manifesto and various study cases based on European municipalities.

[Victoria Transport Policy Institute – TDM encyclopedia](#)

Transportation Demand Management (TDM) is a general term for strategies that result in more efficient use of transportation resources. This Encyclopedia is a comprehensive source of information about innovative management solutions to transportation problems. It provides detailed information on dozens of demand management strategies, plus general information on TDM planning and evaluation techniques. It is produced by the Victoria Transport Policy Institute to increase understanding and implementation of TDM.

[INTEGAIRE Guide for the Cities](#)

This guidebook has been written by INTEGAIRE, a network of air pollution experts from cities and research institutes. This guidebook addresses main aspects of air policy making in cities (governance aspects, legislation, assessment, planning and measures).

[EST guidelines \(OECD\)](#)

The EST Guidelines have been developed within OECD cooperation framework to enable economic development and individual welfare without causing undue health and environmental impacts and depletion of finite resources. These guidelines represent a desirable and feasible approach for the transport sector.

IV – PORTALS, NETWORKING & CAPACITY BUILDING

OSMOSE portal

OSMOSE (Open Source for MObile and Sustainable city) is a new portal that aims at providing all those interested in innovative urban transport and mobility concepts with a complete source of information.

CIVITAS initiative

The CIVITAS Initiative helps cities to achieve a more sustainable, clean and energy efficient urban transport system by implementing and evaluating an ambitious, integrated set of technology and policy based measures. Within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects are taking part.

The [CIVITAS Forum](#) provides a platform for the exchange of ideas and experiences between the 17 participating CIVITAS II demonstration cities, and other cities that are committed to introducing ambitious, clean urban transport strategies. Cities participating in the CIVITAS Forum will benefit from the shared expertise of Europe's most advanced cities in the field of urban transport. It is open to all cities that want to learn more about the usefulness of individual measures that support clean urban transport, and the best ways to combine and integrate them on a large scale. Participating cities have to prove their political and technical commitments to introduce ambitious, integrated urban transport strategies.

LUTR cluster

The LUTR cluster links several different projects in the area of sustainable urban mobility, including land use, transportation, and the environment. The common objective is to develop strategic approaches and methodologies in urban planning that all contribute to the promotion of sustainable urban development. This includes issues of transportation demands and related land use planning, the design and provision of efficient and innovative transportation services including alternative means of transportation, and the minimisation of negative environmental and socio-economic impacts.

ELTIS platform

The European Local Transport Information Service is Europe's portal for local transport news and events, transport measures, policies and practices implemented in cities and regions across Europe. The aim of ELTIS is to provide information and support a practical transfer of knowledge and exchange of experience in the field of urban and regional transport in Europe. It should give the user the opportunity to explore best practices from European cities and regions, to search for specific transport solutions and to be informed about the state of the art in a given transport application.

EU PORTAL

PORTAL (Promotion Of Results in Transport Research And Learning) is a three year project co-financed by the European Commission within the 5th Framework Programme which aims to accelerate the take up of EU research results in the field of local and regional transport through the development of new education and training courses and teaching materials. The beneficiaries of the project will be education and training organisations providing courses and organisations and individuals interested in enhancing their knowledge and skills base in these topics. The PORTAL project consortium involves the active participation of partners from 24 countries in Europe.

EPOMM

EPOMM is an international partnership aiming to promote and further develop Mobility Management in Europe, and fine tune the implementation of Mobility Management between the EPOMM member states and other countries in Europe. EPOMM provides a forum for all those interested in Mobility Management: representatives from EU member governments, local and regional authorities, researchers, major employers, transport operators and other user groups.

EUKN (EU knowledge centre)

The EUKN is a European initiative in which 15 EU Member States, the URBACT Programme and EUROCITIES participate. Its primary aim is to share knowledge and experience on tackling urban issues. The EUKN facilitates the exchange of valid, standardised and demand-driven knowledge in order to support policy makers in developing effective urban policy.

EXTR@

EXTRA is connecting transport research solutions to European transport policy. Through this site you can find out how European transport research programmes and projects can help to develop guidelines and innovative tools to support sustainable mobility. You can check out European and national governmental programmes and other research funding mechanisms related to transport within the European Research Area. You can also search the database of European and national projects to access different levels of project status. Thematic findings are provided once final results are available while policy implications are analysed across results contributing to specific themes and presented in thematic reports.

CALM network

CALM II aims at enhanced and cross-sectoral coordination of the European transport noise research involving the most relevant stakeholders. It will facilitate the networking of organisations, the coordination of activities and the exchange and dissemination of knowledge. The database contains Noise Research Projects and related information with

special focus on EU projects and national projects within the EU. The CALM BlueBOOK is the result of a survey of European research projects in the field of environmental noise. It has been created by CALM II and is based on the CALM Project Database.

URBACT (Transport & Environment)

URBACT, a Community Initiative Programme facilitates the networking between cities from all the Member States around three larger objectives: 1) Develop trans-national exchanges between URBAN I and URBAN II cities, those cities having benefited from an Urban Pilot Project, and all cities with more than 20.000 inhabitants in the New Member States of the Union. 2) Draw lessons from the analysis of their experiences, policies implemented locally and propose innovative approaches to those difficult issues. 3) Disseminate towards the actors in all European cities the experiences in those different areas, the lessons learned and the resulting proposals for approach. The website <http://www.urbact.org/> constitutes the prime platform of exchange between cities, the presentation of analytical summaries of examples of practice, the process of capitalisation and the principal tool of their dissemination.

INTEGAIRE

INTEGAIRE is proposing to establish a European platform on air pollution for city professionals in order to continue the life-long learning process on air quality and ensure the involvement and collaboration of all interested stakeholders within cities and at European level.

IMPACTS

IMPACTS is an international Network of European and North American Capital and Major Metropolitan Cities for exchanging information and experience on Urban Mobility and Transport Policies. IMPACTS website provides valuable information on cities experiences in the field of urban transport demand management schemes (click on 'conferences')

TECHNICAL PAPERS ON MOBILITY MANAGEMENT MEASURES

1 - Land use and transport planning coordination

Key points

Urban sprawl is defined here by using three key concepts: low density, uncoordinated urban growth and spatially segregated land use (e.g. residential areas; shopping centres, retail and services; industrial areas).

Urban sprawl is experienced in many European conurbations and systematically yields ever increasing car dependency and car travel lengths, which subsequently yield negative environmental impacts.

Coordinated land use and transport planning is therefore absolutely necessary to avoid or curb down these detrimental trends. Evidence supports the general guideline that denser, more compact, mixed use and large settlements tend to exhibit greater propensity to travel by public transport and cycle or walk as well as to generate shorter journeys.

Administrative and political barriers usually impede accurate integration of land use management and transport planning for a whole conurbation. Though, long run land use policies designed towards smart growth and underpinned by continuous and coordinated political willingness and appropriate legal framework are more than ever necessary in order to underpin urban transport policies.

Lessons drawn from experience and research

Practically, coordinated urban development should primarily be oriented with the view to increase accessibility to non-car modes, limit car travel distances, proactively restrict space for cars and reallocate road space to other transport modes, renew and improve quality of central urban areas well connected to public transport and non motorized modes of transport.

Core measures presented below are based on an exhaustive review of good practices in the EU. They focus on public transport oriented development, short distance structure development and car-restriction oriented development. Other measures or instruments could also be envisaged and implemented in order to support such policies and foster less car intensive development. European Land Use and Transport Research (see in particular SCATTER and PROPOLIS results) as well as US initiative 'smart growth' identified such measures and good practices.

1-Public Transport Oriented Development

Public Transport Oriented Development includes several mechanisms to intensify the location of housing and other activities near urban rail transport, subways and tram stations, in the inner cities, as well as in the metropolitan area to catch commuter flows.

- Improving public transport accessibility in existing settlements:

This includes the revitalisation or extension of light rail lines and tramways - or the continuous development of bus systems in smaller cities. New stops with good transfer options are to be provided within walking distance of the existing settlements, to facilitate modal shift, although this is not always sufficient to change the consolidated habits of the population. The revival of a tram as well as the establishment of a new station can revitalise and enhance the function of city centres and smaller sub-centres, as well as create new development site opportunities in the periphery.

Orleans new tram service

A new mobility policy has been developed in order to reduce car traffic and improve public transport. The creation of a polycentric structure of 'support centres' providing every day services and the establishment of a tram service linking them to the city centre has become the main issue of the mobility policy of Orleans.

In Fleurt-les-Aubrais, the second largest town of the department, the projects that have been launched after the second world war and during the rush of the reconstruction period were rather disorganised and without a vision of real harmonisation. Without a historical centre, the town's various neighbourhoods were developed without any connections between them, and no trace of communal identity.

The new tramway route goes through some of these areas bringing together sub-centres with central functions and supporting the creation of a true centrality near the town hall, the main shopping centre and public amenities. Therefore, the tram service is the backbone of Fleurt-les-Aubrais.

This new tram is meant to support the spatial development and sustain the adjacent centres. To create a real centre, social and cultural amenities and dwellings are being put in place.

- New public transport oriented settlements:

Concentrating urban growth and sub-centre development around public transport nodes and corridors is a practical way to apply the ‘decentralised concentration’ concept. Already existing centres will be enlarged or new centres created only if a public transport system is being developed simultaneously in the immediate vicinity.

Existing rail networks are often recognised as important corridors for axial development, aiming to reduce the continuing urban sprawl and provide higher accessibility to collective transport modes. Developing land near rail lines and stations is one core element of the policies in a number of studies. Activities are mostly focused on the revitalisation of undeveloped spaces in inner cities, but also on the development of sub-centres in the urban regions.

A new urban development strategy is to improve the accessibility of the means of public transport by opening up new stations or reactivating former ones in combination with the revitalisation of tramways or bus lines. These measures frequently go hand in hand with the improvement of possibilities for passengers to change from one means of transportation to another (integration of transport services). However, in order to co-ordinate new residential and commercial settlements with public transport networks, co-operation with other municipalities is becoming a key factor. This could be more easily achieved or promoted if a regional location policy existed, pointing to the development of town centres as well as the clustering of commercial activities nearby public transport nodes and corridors.

During the realisation of public transport oriented sub-centres (including new residential settlements) immediate provision of good quality public transport services is seen as very important. In the instance that a light rail or tram station is still in the construction phase, a suitable bus service is essential but may prove less effective at preventing the onset of car-dependency.

Sub-centre development and the metro network in Vienna

The Vienna strategy is to reach a polycentric development. This is to be done through two different approaches: one is the development of an existing area, while the other is a new development on a former industrial site.

✓ The metro extension for the densified Eastern-Donaustadt (Vienna)

A Master Programme in Eastern Donaustadt designs the extension and prioritisation of a high standard network of public transport. This includes the extension of the U2 metro line until 2008 from the city to Stadlau, the increase of capacity of the commuter train line S80 and the extension of the tramway line 28 from Aspern to Essling. Next, the development of settlement axes combines the creation of high density close to the public transport nodes with a vital mix of functions.

✓ The Gasometer city in Vienna

The “Gasometer city” responds to the axial development along the public transport lines and aims at the revitalisation of “Erdberg Mais”, a former industrial area. The old Gasometers have been adapted for residential use connected with shopping and entertainment possibilities and the extension of the U3 to Simmering. The Gasometer city can be easily reached through public (own subway station on the U3 line, at 8 minutes from the

city centre) and private (1.200 parking spaces) transport. With this good car accessibility the planners missed the opportunity to set an example for sustainable development. For non-motorised traffic, the “Gaswerksteg” reconstructed bridge provides access for pedestrians and cyclists to the beautiful area of the Prater.

- Renovation of railways stations:

Stations are centres of mobility and gateways to the city, and these should no longer be poor and ugly backyards. In order to renovate the railway station, several measures are to be combined. First, the transparency and functionality of the station as a transport node must be ensured. It is necessary to give clear information and orientation about transport connections and to improve the co-ordination of interchange. Easy access to trains, and increasingly to other means of transport, for instance tramways, buses, bicycles and park and ride (P&R) facilities, has to be provided. In addition, the environment of stations, including the exterior appearance, has to be re-valued. An appealing design of the station building, containing preservation of historic building structures, may enhance the integration into the urban environment. This includes, for instance, the creation of attractive public streets and squares between the station and the urban surrounding, as well as the establishment of a mix of functions around the station in order to concentrate urban life in the immediate surroundings. The station must provide good accessibility for pedestrians and cyclists. The quality of the immediate environment around the stations has to be completed with an attractive offer inside the stations. A functional mix with several public and private services and shops is desirable.

- Renovation of areas surrounding stations:

A higher density and concentration of population in the vicinity of the station could be endorsed by a diversity of uses near the station, e.g. work-places, living, shopping, leisure-time or cultural facilities and services, etc. With these facilities located around a station the area gains more attractiveness and vitality for inhabitants of the adjacent neighbourhoods. Furthermore the development of cheap housing may contribute to better mobility of people on lower incomes who are often dependent on good public transport accessibility. In addition, a reduction of parking requirements in building regulations, or the introduction of maximum rather than minimum parking standards, related to the quality of public transport supply can contribute to a higher degree of public transport utilisation. Another innovative accompanying strategy might be organisational measures such as the inclusion of a public transport pass within the price for new housing in the vicinity of the station.

Development of housing states along a reactivated rail station in Munster-Mecklenbeck

- ✓ Removal of the station - In order to achieve better accessibility and an appropriate design and equipment for the station, the reconstruction has to be removed to another place near the centre of Mecklenbeck. It will not be reactivated before 2005, because additional measures for infrastructure are delaying the process.
- ✓ 1000 new flats near the railway station - With 80.000 inhabitants, approximately 1000 new flats are going to be built in direct vicinity to the railway line to Coesfeld and Recklinghausen. The housing development plan dates back to the 70s and works under the public private partnership concept, as the plots are still privately owned.
- ✓ Removal of a main road to smooth traffic organisation – With the purpose of facilitating a smooth organisation of traffic, an important main road will be removed. All measures for transport

2-Short-distance Structure Development

Short-distance Structure Development aims to create a pedestrian and cycling friendly site development, and to facilitate “door-to-door” travel without using the car but drawing on a mix of alternative transport modes. Short distance development may facilitate in particular **walking and cycling**, which are the most environmentally friendly, healthy and sustainable means of transport.

Walking & cycling may represent a real alternative to motorised modes for many journeys (typically about 50% of urban journeys are less than 3 km). Promoting these modes is a way to reduce the negative impact of transport and, at the same time, increase citizens’ well being and health. Nevertheless, during the last decades many measures promoted individual motorised modes often neglecting the needs of pedestrians and cyclists. Walking and cycling conditions have deteriorated, and an increasing number of trips is now made by car. Increasing journey distances due to suburbanisation, as well as a lack of attractive design within towns, prevent the use of slow modes.

Walking requires safe and attractive design and direct connections between urban facilities, as well as segregation from other modes of transport (including cyclists). By the same token, only extended and safe cycle networks, bike parking facilities in strategic places (e.g. major employers, railway stations etc.) and the possibility for longer journeys to carry a bicycle by rail can encourage people to cycle.

Therefore, planning for pedestrians and cyclists must consider their specific needs, namely short and direct connections without neglecting the elements of safety and convenience. In addition, the creation of attractive conditions for walking and cycling should be supported by ‘soft policies’. Besides publicity, this means also the creation of a cyclist friendly climate.

- Short-distance mixed-use development.

As short journey distance is a main reason for choosing non-motorised modes, the urban structure is of prime importance to promote walking and cycling. Empirical evidence shows that in some of the large European cities bicycles are the fastest mode of transport for distances up to 3 kilometres (door-to-door travel). In existing districts, density can be increased by building up top floors for dwellings and offices, filling up empty sites with new buildings, shopping areas, leisure facilities etc. However, this kind of option must mainly take place in cities with a continuously growing population. Additionally, high density mixed-use structures can lead to positive social conditions since they are in most cases used throughout the whole day, reducing feelings of insecurity for people using non-motorised modes.

The compact city in a sustainable environment (Aalborg)

The city council of Aalborg has followed the principles for a sustainable environment policy laid down by the EU and the Danish Government. The Master Plan is extended from 1998 to 2009. Its main goal is to obtain a good match between the functions and services of each area to reduce the need for trips in the region and increase the accessibility of sustainable modes. This typology acts as a backbone to see if a specific area can accommodate new housing. These efforts are followed by improvements in the cycling network. Furthermore, public

institutions have collaborated with private companies that have provided company cycles as an alternative to company car.

- Usage of inner city brownfield sites:

In urban development planning, priority should be given to city areas that have lost their original function. Inner city locations provide short distances to the city centre as well as to existing cultural and public facilities. In addition, the usage of inner city brownfield sites influences the general image of the city and improves its attractiveness. Although it will hardly be possible to implement a sufficient number of working places for inhabitants in a quarter, shops, schools, green spaces etc. should be offered within walking or cycling distance.

Redeveloping for pedestrian use in Tübingen

Südstadt, in the south of Tübingen is a brownfield site that has been redeveloped in an innovative way. Previously this area was used by military and is located at 5 km from the city centre. The redevelopment framework plan established the objective of providing short distances by implementing mixed use and giving priority to pedestrians. This is achieved thanks to a balanced ratio of working, living and leisure places in each district. Social aspects, such as integration of minorities have been considered. Moreover, the goal is that as many trips as possible are done by non-motorised modes, and with this objective, motorised individual traffic is restricted.

- Development of a walking/cycling strategy:

As the provision of short travel distances is on its own insufficient to encourage people to use non-motorised modes, the measures already mentioned have to be completed by an attractive network for pedestrian and cyclists, and the development of a comprehensive marketing campaign to influence mode choice. A hierarchical city-wide cycle network should be created in an attractive environment connecting different locations and facilities. Cycling and pedestrian networks on a quarter level must be linked to networks of higher hierarchies. Simultaneously, conflicts between cyclists, pedestrians and motorised modes must be reduced to improve the safety and attractiveness of cycle tracks and foot paths.

- Improvement of information and orientation:

This measure is an important 'soft' policy. Pedestrians and cyclists should feel that they are respected and welcome as travellers. Public relations work can help to make people aware of the advantages of walking and cycling increasing the acceptability of these mobility options. Besides, as walking and cycling are very sensitive to detours, people should be informed how to reach destinations improving their navigation in the city. Improved information systems can link together the different parts of the city and encourage people to walk, cycle or to take the bus. Improvement of orientation for people using non-motorised modes takes place city wide as well as in smaller areas where a cluster of cultural, public facilities etc. is located.

Bristol

Bristol city is providing travel information and better urban design to promote non-motorised and public transport modes. Currently there is the feeling that the city lacks a strong visual identity failing to guide people to the local attractions. Therefore, the initiative “Bristol Legible City” is based on the relation between urban design and fostering non-motorised modes.

The first phase aimed at pedestrians in the city centre, arranging a new signage system. This includes a large number of map panels to identify facilities, public transport routes. Interactive information points have been installed to provide online information.

In the future, it is also planned to extend the signage system for the need of the cyclists. The interactive information points will be upgraded to provide a journey planning facility, which is already available in other cities.

- **Pedestrian and cyclist friendly urban design:**

Altogether, pedestrian and cyclist friendly site development consists of various measures supporting each other. Green corridors (for example trees between streets and cycle tracks / footpaths) help to improve both the visual and the climatic situation reducing negative impacts of motorised modes. Tracks in an attractive urban environment may encourage people to walk or cycle even if trips are over longer distances. Altogether, planning for pedestrians requires high creative quality in a confined space and thus, conscious dealings with buildings, places between buildings, colours, vegetation etc. The promotion of walking is often combined with measures restricting car accessibility, such as traffic calming and moderation of speed.

Improvement of the urban environment in Aalborg

One of the objectives of the Traffic and Environment Plan is to limit the nuisance caused by traffic, especially in the city centre. The reconstruction of Østerågade is part of the plan and it includes the creation of better and safer conditions for pedestrians in the extensive shopping area, with open spaces.

Car free central place at Østerågade

Although Østerågade is an attractive area with traditional buildings and shops, traffic volumes had lead to a poor visual impression. Thus the reconstruction of Østerågade included the extension of pedestrian spaces as well as the establishment of a high quality urban environment.

The most significant changes of Østerågade were a major reduction in the width of traffic lanes, converted into wider pavements, and the use of high quality granite surface materials. Now the whole Østerågade is signalled as a 30 km/h area with limited access for private cars and distribution vehicles. The pedestrian area is currently completed and in use.

3-Car free oriented development

Car free oriented development aims to limit the intrusion of cars in the urban environment, and reduce by this way their negative impacts on noise, pollution, safety and aesthetics of towns and neighbourhoods.

Restrictive measures on car mobility may have a low priority in political agendas since they are not very popular among car users. The combination of **push and pull measures** (the so-called “carrot” and “stick” approach) is, thus, the main approach to implement projects aiming at car restriction.

The development of transport corridors within and between urban regions should avoid exclusively car-oriented developments. However, it is well known that corridor developments have grown in a very car-dependent manner. Main road corridors always attracted activities and stores and other car attractive services due to their specific advantages (e.g. availability of space for building and car parking at low prices compared to urban centres). An integrated land use and transport management policy is therefore necessary to control the development of large car oriented structures along main roads.

At the town level, car restriction policies mainly aim to limit the extent of public and private parking space, and in particular the use of parking places by non-resident user groups.

Two approaches related to car restricted orientated development can be distinguished: projects related to planning of new urban developments, and projects dealing with reallocation of existing urban space.

Planning new car restricted developments:

One of the more radical forms of car space restriction is “car free development”. This is premised on the assumption that for non-car owners it is more attractive to live in an environment where the impact of cars on noise, pollutions, safety or aesthetics is reduced or absent. There is also some evidence that a potentially wider market segment for car free housing exists, despite the absence of an adequate offer by conventional housing development. However, there are also less radical forms of car-restricted neighbourhoods, ranging from the simple unavailability of parking places within the quarter to articles in the lease contracts prohibiting the dwellers to own their own car (sometimes this is coupled with a car sharing scheme). In any case, mobility in these new developments should be mainly based on public transport, car sharing and on a good infrastructure for pedestrians and cyclists. A comprehensive environmental concept is often associated to this type of development (e.g. low-energy buildings, high proportion of green area, etc.), which is generally supplemented by the emphasis on the social aspect (e.g. high number of facilities of common use, increment of the living standard, etc.).

GWL terrain in Amsterdam

In the centre of Amsterdam an eco-estate has been built, consisting of approximately 600 households in the relative high density of 100 households per hectare. Inhabitants had to sign a declaration of intention to support the car free character of the project. This measure is softened with the presence of parking facilities on the edge of the estate. Yet, inhabitants are excluded from using the parking facilities in the neighbouring districts. This context makes cycle use attractive, also for short moves outside the project.

Car free housing in Camden

In traffic congested and polluted areas, where land space is at a premium, we have been encouraging the development of car free housing schemes since 1997. In car free housing schemes there is no on-site car parking except for disabled drivers.

Car free housing developments are secured through the planning agreements between Camden and developers. The development of car free housing is encouraged in locations that are easily accessible by public transport, near a range of amenities, including shops and leisure activities and within a controlled parking zone.

Camden's approach to modern urban living is supported in Government planning policy guidance and the Mayor of London's Transport Strategy and London Plan. Up to summer (August) 2004, Camden had granted planning permission for 2,523 car free housing units (in 287 residential schemes), saving approximately 5,046 car trips each day once they are all built.

More information are available [here](#).

- **Parking regulations in location policy and in building codes:** this may be seen as ancillary to planning new car restricted developments. The well known ABC-principle can be quoted as a major example of a location policy including parking regulations. According to this principle (invented and implemented on a large scale in the Netherlands), when an area can be reached by an optimal way through public transport, the parking space will be reduced (A-locations). When public transport is available and car accessibility is good, parking space can be reduced to a limited extent (B-locations). Finally, public transport is almost absent and car dependency is at a maximum for C-locations.

Dutch ABC-policy

The ABC Policy is designed to reduce the growth of car travel and reinforce urban vitality. This policy aims at matching the mobility needs of businesses and amenities with the accessibility of the different locations. In order to achieve this, it is assumed that the limitation of parking places in A and B locations is balanced with adequate public transport accessibility. In this way commuting is facilitated and the public transport alternative legitimates a restriction of parking facilities.

The Policy tries to allocate companies to locations with matching accessibility profiles, but also tries to improve the accessibility of locations according to the mobility profiles of the present companies.

As an example, the movement of the Dutch Ministry of Housing, Physical Planning and Environment to an A-location close to the central station of The Hague is successful. While before about 40% of the employees used their car to commute, after the removal this percentage reduced to 28%. The use of public transport grew from 30% to 65%. In total, around 70% of the employees substituted the traffic mode.

- **Reallocation of existing urban public space:**

This includes several measures, such as private car accessibility regulation, parking policy or reallocation of road space. **Accessibility regulation** measures allow only certain types of vehicles to enter in a specific area. Here, a selective restriction is usually made considering the characteristics of individual vehicles and/or their usage (such as time of day/ week, vehicle type, user type or duration of stay). Application of such measures over a sufficiently large area can be facilitated if traffic management tools are also used.

Car free city centre in Gent

The final goal of the plan for the inner city is a substantial increase of the quality of life and a multimodal accessibility. The main considered aspects are:

- ✓ Urban design, as one of the tools to create a qualitative environment and support the acceptance of inhabitants about new urban culture
- ✓ Space for cyclists and pedestrians mobility as well as for public transport, keeping out unnecessary traffic
- ✓ Parking routes and guiding towards parking accessibility

With regard to the restrictions to enter the inner centre, P&R facilities will be further elaborated along public transport axes. It will be implemented as well payment for parking places where high parking pressure exists. In high density residential areas, extra parking can be created.

Finally, **reallocation of road space** involves giving back space formerly used by car traffic to other uses (e.g. public transport, cyclists, pedestrian). This can be realised through the removal of on-street parking located in key transport corridors and the introduction of further bus lanes, cycle-lanes, pedestrian facilities and low traffic speeds zones. The aim is to reduce long stay parking spaces in/ near the city centre, usually replacing them by parking at park and ride sites.

Road Hierarchy Review in Bristol - "Scope Route"

The Road Hierarchy Review involves changing the categories of the routes to emphasise their role as arteries for public transport, walking and cycling, and consequent reallocation of road space. On this basis, Bristol is promoting the "environmental cells" combined with "home zones". The idea of environmental cells is that main roads shape a strategic network and the spaces in between them would be termed environmental areas, where pedestrians and non-transport urban functions are given priority. Home zones are residential streets in which road space is shared between drivers of motorised vehicles and other road users, including pedestrians and cyclists.

An example is the Centre area of Bristol. It is surrounded by the City Centre Loop which diverts traffic around the city centre. These works are now complete enough to allow the planned pedestrianisation of part of the centre. This "Scope Route" is an example of a positive outcome of the Road Hierarchy Review.

Good practice

Copenhagen municipal plan 2001

Main elements of the Municipal Plan of Copenhagen reported below show a comprehensive and horizontal strategy for the 12 coming years, combining urban development, transport and environment related requirements with the view to ensure 'sustainable urban and transport pattern'.

Urban development policy

'(...) The City of Copenhagen's urban development strategy supports a traffic structure that has been based on public transport services, primarily the railway network, and an overall road network, which is to spare the densely built-up urban areas for through car traffic to the greatest possible extent and which gathers the traffic on a few regional roads to keep local areas as uncongested as possible.

- *One of the overall objectives of the Municipal Plan is to develop a sustainable urban and transport pattern in which urban development and traffic infrastructure are harmonised so that traffic requirement is met by the largest possible proportion of public transport services and the lowest level of individual car traffic.*

The City of Copenhagen constitutes the central part of the characteristic Finger City structure of the Greater Copenhagen Area. This high traffic accessibility gives the municipality special opportunities of utilising and developing the public transport system. Both urban development and urban conversion make it possible to relocate travel destinations and consequently change the traffic pattern. In connection with new localisation, the choice of means of transportation may be influenced. A location close to station strengthens, other things being equal, the competitiveness of public transport, increases the number of passengers and makes possible a continued improvement of the possibilities of public transport on market terms.

- *It is an objective that urban development is to be localised close to stations so that an environmentally sustainable urban and transport pattern is promoted and that urban development is of high quality in terms of architecture, urban planning and the environment.'*

Urban development strategy

'An overall objective is to maintain Copenhagen as a well-functioning centre for trade, industry and service and to develop the city into an attractive residential environment with a sustainable urban and transport pattern as a fundamental basis. The localisation of workplaces and dwellings is to support the use of environmentally friendly types of transport: public transport, cycling and walking.

The urban development strategy for Copenhagen lists the order of priority for major construction and development possibilities in the municipality in accordance with two criteria: closeness to a station and amenity value. The close-to-station areas around the best served stations are given the highest priority regarding the location of traffic-generating functions and densely built-up areas. It will still be possible to implement continuous conversion and modernisation in connection with urban renewal and new construction on small sites that are not necessarily close to stations. (...)

The urban development strategy for Copenhagen is primarily based on the Finger City structure in the Greater Copenhagen Area and on the location of the municipality in relation to the public transport structure, including in particular the locations along the regional and local railway networks and their respective accessibility for passengers from the whole Greater Copenhagen Area.'

The sustainable urban and transport pattern objective

This objective, deeply described in the Municipal Plan, aims at implementing a threefold approach:

‘- Coordinated planning of urban structure and infrastructure aimed at avoiding urban sprawl and reducing the overall transport need and consequently energy consumption and pollution

- Great emphasis on utilising and reusing the existing urban structure through conversion and renewal of existing areas, as, other things being equal, a denser urban structure will result in shorter travel distances and reduce the inclusion of new areas for urban purposes

- Optimal utilisation of the existing traffic infrastructure both in terms of resources and environmental protection and out of consideration for the social investments that have been made in public transport facilities in the Greater Copenhagen Area’

The close-to-station principle

‘The objective of the close-to-station principle is to locate new workplaces and dwellings so that as large proportion of home-to-work travelling as possible can take place by public transport without passengers having to change or with only one change being required. This will increase the competitiveness of public transport in relation to individual car traffic and consequently improve environmental conditions and living conditions in the inner parts of the Greater Copenhagen Area. (...) Central localisation of urban functions is (...) a significant factor in achieving a transport pattern based on public transport.’

The Municipal Plan sets areas close-to-stations where urban development shall take place as a priority. It provides map showing stations and development areas concerned.

The Finger City structure

The Greater Copenhagen is characterized by a clear, simple and well-functioning primary urban structure that is the result of 50 years of regional planning. Since 1989, the five regional entities in the Greater Copenhagen Area have worked together to maintain the Finger City structure in accordance with the government requirements. The Finger City structure consists of:

- ‘An urban pattern in which the continuous urban area in Copenhagen and the nearest neighbouring municipalities constitute the palm of the Finger City and in which the rest of the urban areas are located in the five urban fingers stretching towards Helsingør, Hillerød, Frederikssund, Roskilde and Koge.

- A public transport system that is structured around radial railway lines in each urban finger and high-class cross-city bus routes and railway lines between the urban fingers. The system has most recently been extended with Oresund Line to the airport and Sweden and will be further supplemented with Metro lines from the inner urban areas to Orestad and the airport.

- A road structure consisting of radial motorways and expressways along the urban fingers and in the ring road system for handling the flow of traffic across the fingers around the most densely built-up areas of Copenhagen. The system has most recently been supplemented with the Oresund Motorway.

- A city centre structure that consists of the historical centre of Copenhagen (City) and the traffic junctions where the radial railway lines intersect the cross-city connections.’

Source: City of Copenhagen – Municipal Plan 2001 (www.kk.dk/kommuneplan)

(contact: kommuneplan@of.kk.dk)

References

EU Land Use and Transportation Research: <http://www.lutr.net/>

This research cluster links several different projects in the area of sustainable urban mobility, including land use, transportation, and the environment. The common objective is to develop strategic approaches and methodologies in urban planning that all contribute to the promotion of sustainable urban development. This includes issues of transportation demands and related land use planning, the design and provision of efficient and innovative transportation services including alternative means of transportation, and the minimisation of negative environmental and socio-economic impacts.

See in particular :

PLUME [report](#)

PLUME [final conference](#)

TRANSLAND: <http://www.inro.tno.nl/transland/>

The EU research project TRANSLAND is a study on innovative policies and future research needs in the field of integrated transport and land-use planning.

TRANSLAND serves two objectives. It looks backward in identifying good planning practice examples, insights from conducted research in this field and institutional conditions and barriers for integrated policy making and it looks ahead to advise on best planning practice and to recommend future research and policy development.

TRANSPLUS: <http://www.transplus.net/>

Transplus draws upon research to develop guidelines for all urban stakeholders on effective tools for reducing car dependency in European cities and regions and promoting economic, social and environmental improvement

PROPOLIS: <http://www.wspgroup.fi/lt/propolis/>

PROPOLIS developed and tested integrated land use and transport policies, planning tools and comprehensive assessment methodologies in order to define sustainable long-term urban strategies and to demonstrate their effects in European cities.

SCATTER: <http://www.casa.ucl.ac.uk/scatter/>

This work improved the understanding of the mechanisms of urban sprawl and its impacts through review of sprawl impacts and measurement techniques. Main results are: a qualitative and quantitative analysis of sprawl in six case cities ([Bristol](#), [Brussels](#), [Helsinki](#), [Milan](#), [Rennes](#) and [Stuttgart](#)); a review and evaluation of policy measures dealing with urban sprawl, using land use/transport simulations; measurements of sprawl and creation of an urban sprawl monitoring tool; recommendations to cities that consider implementation of suburban public transport.

The project recommends cities which wish to develop suburban public transport to consider below measures in order to prevent, mitigate and control urban sprawl:

- tax on suburban residential development
- tax on offices located in areas poorly served by public transport
- implement road congestion pricing
- reduce fares of public transport only in central areas
- regulate land use and land rent
- make urban centres more attractive for every household by appropriate housing and urban design
- set up inter-institutional cooperation
- develop symbolic and cognitive actions

Smart growth (US): <http://www.smartgrowth.org/>

Smart Growth is an US initiative providing guidance and toolkits to cities in order to put into practice smart growth. 200 policies are described in guides available below:

‘Getting to smart growth’: <http://www.smartgrowth.org/pdf/gettosg.pdf>

‘Getting to smart growth II’ <http://www.smartgrowth.org/pdf/gettosg2.pdf>

[COST 332: Transport and Land-use Policies](#)

COST 332 aims to promote better understanding by public authorities of the potential and conditions for successful co-ordination between transport planning and land-use policies, in order to avoid the many costly dysfunctions resulting from the absence of spatial and temporal coherence between several policies.

Main deliverables:

- literature based studies of institutional arrangements for co-ordination, and of interactions between transport and land-use policies, including comparison and validation of national approaches
- case studies (around ten) involving the selection of institutional arrangements for co-ordination, assessment of case study feasibility, inquiries, comparison of initial results and drafting of case study reports
- theoretical model and operational conclusions and recommendations.

2. Traffic calming

Key points

Traffic calming is the process of slowing down traffic so that the street environment is safer and more conducive to pedestrians, cyclists, residential life and shoppers.

Traffic calming has the potential not only to lessen the direct negative impacts of road traffic, but to foster urban environments which are more human and interactive, more beautiful, and more economically successful due to the greater social vitality possible in a city's public spaces.

Experience gained in Europe and elsewhere demonstrates that well designed traffic calming schemes can be significantly beneficial. Such schemes are moreover usually well supported by the public.

Lessons drawn from experience and research

- Designing traffic calming schemes is to be seen as an opportunity to reverse the usual way of designing our urban spaces by putting walkers, bikers, users of public transport and other non-car modes of transport in the core of the urban design.
- As a consequence, when designing traffic calming scheme car accessibility is not anymore the primary goal. Reallocating road capacity to non-car modes of transport and making living places more attractive become the priorities in areas where car traffic used to be the dominating activity. Such schemes should therefore be designed in a way that car traffic has to adapt to other uses and users of the urban space, not the opposite. It is indeed on urban roads that the majority of casualties occur, particularly as far as pedestrian and pedal cyclists casualties are concerned.
- In areas where both population and road network densities are high, it is recommended to implement wide-areas schemes - such as '30 km/h speed limit zones' and 'Home zones' - that aim at the same time to lower speeds, smooth driving conditions, reduce traffic flows by concentrating traffic on a limited number of arterial roads and vehicle speeds as well as favour slow modes of transport and public transport.
- It is far to be enough just to install speed limit signs. Traffic calming is best done by physically altering the street environment through different road textures, changing the

geometry of the road through chicanes, neck-downs, speed plateaus and other traffic engineering devices, introducing new street furniture designed to create a more human, safe environment and by planting attractive landscaping. Urban traffic management systems, intelligent speed management systems can play a positive role to lower average speed of traffic flows and subsequently yield safety, environment and energy related benefits.

- Noise, emissions and energy consumption from some vehicles, particularly heavy vehicles, can in some cases increase due to increased gear shifting. Pursuing at the same time speeds reduction and smoother driving conditions, is therefore recommended in order to yield significant and robust environmental benefits, particularly when traffic calming measures aim to very low speeds (20, 30 km/h). This needs appropriate measures to minimize uneven driving conditions.
- Particular attention should be paid to the design of any traffic calming scheme. Traffic calming schemes should mainly combine physical measures that compel drivers to slow down, dissuade or divert transit traffic, enhance urban design, reallocate road space to non-car modes and be generally self-enforcing.
- With these broad objectives, traffic calming can also be of benefit to urban regeneration, housing renovation schemes and city beautification schemes (e.g. Freiburg in southern Germany). These assist more deeply in reducing automobile dependence by bringing urban activity back to areas of the city that are inherently less dependent on the automobile (i.e. denser central and inner areas of cities built more around transit and non-motorised modes). Traffic calming can have a positive impact on the character and environmental quality of neighbourhoods, making them much more desirable.
- Attention should be paid to cost-benefit analyses because some benefits (health, amenity) are usually poorly if at all taken into account by such analyses, giving a biased weight to time loss for car traffic.
- The effect on noise of the different traffic calming measures depend very much of the precise design and implementation of the measures as well as on how they are accepted by the drivers.
- Generally it can be concluded that reductions in average noise levels (L_{Aeq}) of up to 4 dB can normally be achieved but in special situations even higher reductions may be reached. It is beneficial to combine traffic calming measures and the use of noise reducing pavements.
- On typical urban roads, it is generally possible to obtain noise reductions of 3 to 8 dB (L_{Aeq}) by combining the use of noise reducing pavements and traffic calming measures.

On roads with higher speeds, the potential for noise reduction may be up to 10 dB (L_{Aeq}) or even more.

- Generally noise reducing pavements have a better reduction effect on noise from light vehicles than on noise from heavy vehicles. This means that if a traffic calming scheme reduces the percentage of heavy vehicles the beneficial effects of the noise reducing pavements will be increased.
- The effects of traffic calming on air pollution are often similar to its effects on noise levels. Air pollution has been shown to be less when vehicle speeds are at 30 km/h than at 50 km/h; however the style of driving has a great impact upon this.

Good practice

Extended 30 km/h zones in European cities

In Zurich, The Hague, Graz, Freiburg in Brisgau and Lille, 30 km/h zones have been and are being developed to cover large areas.

Graz: 77% of the city road network is covered by 30 km/h speed limit zone since 1992; this policy is strongly supported by 80% of the inhabitants as it yielded very positive results with regard to safety and noise.

The Hague: all streets of every residential district are or will be covered by 30 km/h speed limit zone; to date half of them are.

Zurich: all districts are included in 30 km/h zones (122 in total)

Freiburg in Brisgau: since 1990, every residential districts are covered; this concerns 60% of the city road network.

20 km/h zones in Switzerland

In Switzerland a new zone with a special speed limit of 20km/h was introduced. In these zones the pedestrians have precedence compared to motorised vehicles and it is only allowed to park vehicles on specifically marked places. Such zones were for example put introduced in Bern, Thayingen, Genf, Burgdorf and Solothurn.

See [case study](#) for more details.

Lille Métropole: ambitious speed moderation strategy for the whole conurbation

Convinced that the moderation of road traffic speeds is an important aspect, the authority responsible for the urban transport plan of 'Lille Métropole' has developed a traffic calming strategy for the whole conurbation (85 municipalities, more than one million inhabitants).

Extensive work has been carried out with a view to determine a clear hierarchy of the road network. As a result, 4 categories of roads have been identified; for each of them is set a particular speed limit (90, 70, 50 or 30 km/h). For each category, a specific scheme is to be implemented with a view to ensure a similar treatment of the road space and its surroundings. As a result, people easily identify the category of space where they drive, bike or walk. This better ensures that people adapt their travelling attitude to the space where they are.

This large traffic calming scheme is being implemented step by step. It includes the development of a large number of 30 km/h zones that will cover 60% of the road network corresponding to more than 2 000 km length where accessibility to cyclists and walkers is the priority although car traffic can still access with moderated speeds.

More information is available [here](#).

Effects of traffic calming schemes in Denmark

COWI has assisted the Danish Road Directorate with the evaluation of the traffic calming schemes in 21 towns.

The general result of the traffic calming schemes was a reduction in the average traffic speed by 10 km/h. In towns with new roundabouts the average speed was reduced by 15 km/h. In some towns the average speed was reduced by 30-40% (17-26 km/h).

Reduction in traffic speed yield by each of the different measures (e.g. gateways, roundabouts including mini-roundabouts, pedestrian refuges and central refuge islands for narrowing the carriageway, chicanes, road humps, including flat topped humps) has also been assessed.

The work concludes that by investing approximately 0.4 - 0.6 mill. € per km in small urban areas, positive effects can be obtained on traffic safety, risk perception, and the environmental quality of the area.

More information is available [here](#).

Positive effects of traffic calming in Gothenburg (Sweden)

In Sweden, the 'Vision Zero' is a long-term national objective according to which 'nobody should be killed or seriously injured as the result of traffic-accidents in the road-transport system'. Since 1978, the City of Gothenburg has developed a thorough and continuous traffic calming strategy aiming to drastically reduce the number of killed and seriously injured road-users.

To date, 3 000 traffic calming measures have been implemented. They comprise many techniques: humps, plateaus, raised pedestrian crossings, raised footpaths and cycle-paths, central islands for bus stops, roundabouts, raised intersections, road cushions, lateral deflections etc.

The pedestrian and cycling networks have been expanded and interconnected. Accessibility to public transport has been improved as a result of reduced traffic flows on many streets. Bus and tram stops have become more accessible and safer. Road traffic levels in some 267 streets or avenues have been dramatically reduced; 650 000 vehicle km per day have been moved from local roads to major roads without significant impacts on travel times.

The socio-economic benefit is estimated at €850 million on the period 1990-2003 whereas the direct investment and maintenance cost amount to €21 million on the same period. Between 2003 and the reference period 1985-

89, the annual number of killed and seriously injured people have decreased by 47%. Noise levels reduction ranges from 5 to 9 dB ($L_{Aeq-24h}$) in streets where traffic calming measures have been implemented.

More information can be obtained [here](#).

Gloucester: front runner city in the UK

Gloucester (100 000 inhabitants) has been selected by UK authorities in order to demonstrate the efficiency of traffic calming strategies in significantly reducing the number of road accidents. Supported with a budget of € 7.4 million, a pilot project has been implemented between 1996 and 2001 according to guidelines designed by the Institution of Highways and Transportation.

After a thorough diagnosis, below measures have been implemented:

- Adopt road hierarchies that reflect a road's function and the mix of traffic that it carries
- Shift of traffic to more adapted roads by several measures such as access restrictions, obstacles on shortcuts, insertion of bus lanes etc.
- Moderation of speeds by several techniques such as awareness raising (news papers, information on penalties, speed displays), physical modifications of the roads (narrowing streets, speed reducers, urban design) and controls.
- Measures aiming to facilitate cycling and walking (e.g. extended speed limited zones, modification of roundabouts, insertion of cycle paths, road signs with particular attention around schools)
- Coordination of all road safety actions for the whole conurbation

Supported by a strong management team, this project was successful: 9.5% decrease of the number of accidents, 48% decrease of serious injuries, clear reduction of speeds, strong support from the part of the public, clear shift towards cycling and walking for journeys to school.

Rotterdam: pilot project on A13 on speed adaptation

In May 2002, the Dutch authorities implemented a pilot project on the highway A13 aimed to cap speeds below 80 km/h. The A13 carries in average 140 000 vehicles or more per 24 hours, including almost 10% heavy duty vehicles. The objective of this project was to see whether air quality could be improved in Overschie, a municipality of Rotterdam.

An intelligent speed management system based on cameras connected to signs displaying speeds above 80 km/h was implemented along a stretch of 3 km. The system has been effective in reducing fluctuations in traffic speeds and limiting speed limit breaches, particularly at night.

It has been estimated that these effects yielded 15-25% reduction of traffic NO_x emissions and 25-35% PM_{10} emissions. The measure had a positive impact on air quality around the road as reductions between 1 and 5 $\mu g/m^3$ were experienced until 200 metres far from the road for both NO_2 and PM_{10} .

Rotterdam estimates an approximate 15% reduction in transport CO_2 emissions within the scheme.

Noise impacts are down 50% (3 dB) within the scheme. It is indicated that around half of this is due to the speed reduction and half due to a quieter road surface.

Rotterdam reports that collisions within the speed control zone have reduced by 50% although they are cautious in stating that this will be observed in the long-term.

All in all, the benefits outweigh the costs by a factor of 3 to 6.

Public perception has changed and road transport is perceived to be less of a nuisance as a result of the scheme.

The authors of the ex-post study note that the effects of a speed control zone depend on the local situation (traffic composition, level of congestion, initial speeds and driving conditions). At other locations where these are very different the scheme may not be as effective.

References

TDM Encyclopedia

The *Online TDM Encyclopedia elaborated by the Victoria Transport Policy Institute* includes a comprehensive source of information about traffic calming techniques. See corresponding chapter [here](#).

ITE report on state of the practice (Canada)

This report contains a synthesis of traffic calming experiences to date in the United States and Canada. The report draws from detailed information collected on traffic calming programs in twenty featured communities, another 30 communities surveyed less extensively, and a parallel Canadian effort by the Canadian ITE (CITE) and the Transportation Association of Canada (TAC).

See the report [here](#).

Trafficcalming.org (USA)

This website serves as a practical guide to traffic calming and neighbourhood traffic management, including international and US history, a toolbox of calming devices, measured results from traffic calming and current programs around the world. It provides very detailed information on implemented traffic calming techniques, based on a large number of very useful photos that help in understanding how those techniques should be applied.

Browse the website [here](#).

Traffic calming techniques by Jeff Kenworthy

Below website provides useful recommendations and report case studies on traffic calming schemes.

See more details [here](#).

Manual for Streets in the UK

The Department for Transport and the Department for Communities and Local Government have commissioned the development of a Manual for Streets that will give guidance to a range of practitioners on effective street design.

This Manual is intended to help bring about a transformation in the way streets are designed and to show how street design considerations can help improve the local environment quality and contribute towards creating sustainable and mixed communities.

For more information, see the [manual](#).

Guidance on setting local speed limits in the UK

On the 8th August 2006, the Department of Transport issued a circular providing guidance for setting all local speed limits in the UK.

This guidance is to be used as the basis for future assessments of local speed limits, for developing route management strategies and for developing the speed management strategies required as part of the Local Transport Plan process.

Chapter 5 and chapter 7 of this guidance respectively focus on urban speed management and on quiet lanes and home zones.

For more information, see the [circular](#), [Home Zone schemes](#) and [Home Zones](#) webpage.

PRIMAVERA project: a review of current traffic calming techniques

PRIMAVERA project has examined the various traffic calming techniques developed in Europe, and considers their suitability and effectiveness for implementation on both residential and main roads.

See [here](#) the review of current traffic calming techniques

SILVIA project: combining traffic calming measures with low noise road surfaces

SILVIA project provides decision-makers with a tool allowing them to rationally plan traffic noise control measures.

The main final product is a Guidance Manual on the Utilisation of Low-Noise Road Surfacing integrating low-noise road surfaces with other traffic noise control measures including vehicle and tyre noise regulation, traffic management and other noise abatement measures.

Other reports provide decision-makers with comprehensive knowledge on relations between traffic management and noise control, as well as with recommendations to practitioners on traffic calming techniques aimed at reducing road traffic noise. Main ones are reported below:

See [SILVIA project](#) website and below related reports:

- [Guidance manual for the implementation of low-noise road surfaces](#)

- [Traffic management and noise reducing pavements](#)

Reclaiming city streets for people: chaos or quality of life?

This handbook sets out some case studies where road space has been reallocated for other uses. It shows that such schemes can be highly successful; they can significantly help in implementing sustainable transport options in cities. These case studies demonstrate the importance of well planned integrated strategies, combined with effective public consultation and communication.

For more information, see the [handbook](#).

3. *Fostering cycling and walking*

Key points

In many European cities, there is often a huge potential to increase cycling and walking journeys. Efficient policies aimed to foster these transport modes can contribute to the improvement of the urban environment, the reduction of transport related green house gases, the reduction of energy consumption, the reduction of public space consumption and the protection of health of the urban citizens by notably increasing their physical activity.

According to the champion cities, drastic improvements of walking and cycling modal share require long term political willingness, good quality and safe walking and cycling infrastructures and cycling dedicated services. Such improvements should be underpinned by consistent measures (land use, parking, traffic calming) aiming to dissuade car use while fostering at the same time walking and biking together with collective transport.

Facts and figures

- In the European Union, though many trips are short, most are made by car.
- More than 30% of car trips in Europe cover distances shorter than 3 km and 50% shorter than 5 km.
- These distances can be covered by bicycle within 15–20 minutes or by brisk walking within 30–50 minutes, providing the recommended amount of daily physical activity.
- In many European cities, modal share of bicycle trips is less than 5% (all modes and motives counted).
- For few exceptions like Dutch, Danish and Swedish cities the bicycle modal share may reach between 20% and 30%, and even more (35% of commuter trips in Copenhagen, 50% of short distances trips up to 7 km in Groningen).
- In developed countries, physical inactivity is the second most important risk factor for ill health, after tobacco smoking.
- Current travel behaviour contributes to over 30% of adults being insufficiently active during a typical week, and to a prevalence of obesity that increased by 10-40% between the late 1980s and the late 1990s.
- Increasing the % of travels done by walking and cycling is a clear way to reduce CO₂. In Germany it has been estimated that shifting 30 % of car trips less than 6 km to cycling or walking would bring down CO₂ emissions of road transport by 4 % at low cost

What do they say?

World Health Organisation

'Promoting public transport and safe walking and cycling is crucial for achieving transport that is sustainable for health and the environment.'

'National and local governments should frame policies and provide incentives to ensure that

- walking, cycling and other forms of physical activity are accessible and safe;

- transport policies include non motorized modes of transportation; (...)'

See: <http://www.euro.who.int/transport> and <http://www.thepep.org/>

Transport Commissioner Barrot

« (...) le vélo peut jouer un plus grand rôle pour contribuer à rééquilibrer les modes de transport (...). Cet objectif exigera évidemment de rationaliser l'utilisation de la voiture privée – particulièrement dans les villes. (...) rouler en vélo est une manière efficace d'utiliser l'espace de la route, (...) c'est un mode efficace et bon marché, propre (...) il permet de rendre la vie en ville saine et agréable.

Sans de bons équipements pour le vélo et des espaces pour les piétons, les transports publics ne peuvent fonctionner correctement. (...) nous devons nous assurer que le vélo est sûr et attrayant en termes d'infrastructures et de services afin d'exploiter entièrement ce potentiel – particulièrement dans les villes.

(...) de plus en plus de personnes font trop peu d'exercice, (...) les experts commencent à considérer l'obésité comme une épidémie. Cette épidémie induit des coûts de santé élevés à la fois pour les personnes concernées et pour la société. Ceci milite pour une mobilisation des autorités publiques en faveur du vélo. (...) »

Excerpt from Commissioner BARrot's speech at VéloCity conference – Dublin 2005

Lessons drawn from experience and research

In addition to the land use planning related measures mentioned in another chapter, the following measures are usually recommended to promote walking and cycling:

- A continuous targeted increase in journey times for walking and cycling

National cycling targets

The National Cycling Strategy (NCS) of the UK has as its central target, to double the number of trips by bicycle (on 1996 figures) by the end of 2002, and quadruple the number of trips by bicycle (on 1996 figures) by the end of 2012.

Denmark's national target is to increase the bicycle's share of trips in urban areas by 4% by 2005, backed up by traffic funds. Finland has a target to double cycle use from 1993 to 2005 and halve accidents from 1993 to 2000 and they expect considerable socio-economic savings (Finnish Ministry of Transport, 1993).

The Dutch Bicycle Master Plan showed that national targets and a national strategy for cycling may have a significant influence on local policies. An evaluation study involving 19 local authorities showed that the intensity of planning for the bicycle has increased because of measures taken for the needs of cycle use (known as pull-measures), and by restricting car use (known as push-measures).

- Health, environment and social departments should work more closely with transport authorities to achieve their objectives
- enforce the priority for pedestrian and cyclists over motorised traffic
- pay a particular attention to crossing facilities in order to allow early detection and good visibility for all road users; and aim to use crossings which prioritise pedestrians first, then cyclists, then public transport (for example, chose zebra crossings over toucans and address safety issues by slowing and reducing volume of motorised transport).
- enhance inter-modality for cyclists, by e.g. allowing them to get on trams, buses and trains with their bicycles;
- develop synergies between cycling, walking, car-sharing and collective transport to win market shares over private car trips;
- develop continuous, interconnected, safe and comprehensive cycling networks and develop dedicated services and equipments to facilitate parking, hiring and mending;
- activate major employers, big factories and shops to provide enough safe parking space for cyclists
- reallocate existing road spaces and green areas to walking paths, cycle lanes and tracks in order to strike a better balance between transportation modes;

By French law on air quality adopted in 1996, cycling lanes or tracks must be incorporated while building or renewing urban roads (motorways and express ways excluded).

- extend 10/20/30 kph zones, home zones and strolling zones, where public space is redistributed with the view to moderate road traffic driving conditions, offer larger and safer spaces to both pedestrians and cyclists as well as to public transport;

Belgium: 'Code de la rue', a national regulation favouring slow transport modes in streets

Entered into force since January 2004, the 'Code de la rue' is a regulation allowing a better allocation of streets space and offering better safety conditions. The core principle is that the street should not mostly be devoted to traffic; space should be more and better dedicated to other transport modes, with particular attention to the weakest users.

Main characteristics and guidelines cover:

- development of more friendly spaces by a better design or renovation of public spaces
- carefulness principle protecting the weakest users
- new measures related to zones allowing right of way to pedestrians (such as walkways crossing streets) and limiting traffic speed at 20 km/h
- contra-flow cycle lanes and tracks in every one way street
- extension of areas where traffic speed is limited to 30 km/h, with particular focus on neighbourhoods of schools

More information: <http://www.ibsr.be/> (see brochure on Code de la Rue)

- jointly plan walking paths and cycle tracks with new collective transport and road infrastructures whenever and wherever appropriate to improve the connexions and the density of pedestrian and cycling networks;
- monitor and improve regularly the safety (vertical and horizontal signs) and comfort (maintain rolling quality of surfaces, lightening) of the existing pedestrian and cycling networks;
- consult and involve stakeholders (bikers, residents, and health, environment and community professionals) during planning stages and implementation of development that include walking and cycling measures
- increase awareness of road users in order to improve their understanding of walking and cycling policies

Good practice

Copenhagen: the city of cyclists

Cycling is a socially acceptable means of transport and it is not uncommon to see Danish ministers or mayors cycle to work. Bicycle traffic in Copenhagen has grown in recent years. **Currently, one third of Copenhageners cycles to work.**

In Copenhagen, cycle planning is an integral part of mainstream urban transport planning. The Copenhagen cycle **track** network of some **307 km** complemented by 9 km of reinforced cycle lanes was built over the course of almost a century. Copenhagen bicycle traffic is thus considered a distinct traffic category separated from motorized traffic and pedestrian traffic.

With the **City Bike** service you can take a free ride in the city centre, by putting a coin into the lock– when you return the bike to any City Bike rack you will get your money back (caddie system).

However, Copenhagen still endeavours to enhance cycling, in the framework of an ambitious though realistic cycle policy for the period 2002-2012. It is summarized below:

Targets:

- Increase proportion of people cycling to workplaces from 34% to 40%
- Halve injured and killed bikers
- Increase proportion of cyclists feeling safe from 57% to 80%
- Increase average cycling speed by 10% for trips over 5 km
- Improve cycling comfort so that cycle tracks deemed unsatisfactory does not exceed 5%

Main measures:

- Extension on cycle tracks and reinforced lanes (16.5 M€): 51 km extension is planned
- Completion of green cycle route plan (67 M€): 21 cycle (100 km) routes are planned to be built and upgraded through parks and green urban areas
- Improving cycling conditions in city centre: upgrading cycle lanes to reinforced cycle lanes in six major roads of the city centre, remove one-way road restrictions for cyclists in historic centre, achieve 40 kph zones, create link-ups in historic centre
- Combining cycling and public transport: removal of restrictions to bikers on commuter trains and metro, improvements of parking facilities at terminals, planning of bicycle parking areas around new stations, increase rate of lockable and covered parking areas along suburban rail lines
- Bicycle parking: progressive replacement of car parks by bike parks in residential areas, allowance for shops owner to build cycle racks on street where room is available, enforcement of bicycle parking standards in biggest shopping centres, planning of increased parking places for bikes in city centre, supervision of bicycle parking places to mend broken ones
- Improved signalling (0.7 M€/year): moving back stop lines for cars, marking white or blue crossing for cyclists on road intersections, working out design solutions for road intersections which increase both effective safety and safety feeling of cyclists
- Better cycle track maintenance (1 M€/year): measuring comfort of surfaces, replacing uneven sections with very smooth asphalts, repair existing surfaces designated by cyclists, removing kerbs when renovating tracks, systematic signalling of maintenance works to increase acceptability of cyclists
- Better cycle track cleaning (0.56 M€/year): cleaning major cycle tracks every weekday, cleaning tracks crossing shopping areas and squares on Saturday and Sunday mornings, systematic snow clearance
- Campaigns and information: cycling promotion campaigns started in 1995 and continue to be an integral part of the cycling policy; the 'We bike to work' campaign is an annual event; information about what the

City achieves to develop cycling is annually reported to citizens; a very practical and comprehensive map is disseminated and regularly updated

Monitoring and reporting: the annual Bicycle Account

Annual Bicycle Account is published. It provides a very useful input for cycle planning.

Based on an annual survey, it shows first the way cyclists rank (0 – 10 scale) – according to their personal views - various aspects of the cycle policy: overall evaluation of the policy, cyclists' security, density and width of tracks, track maintenance, lane maintenance, feasibility of combining cycling and public transport, bicycle parking, city information. The cyclists for instance ranked the overall cycle policy 8 out of 10 which reveals that according to cyclists themselves, Copenhagen is a good city for cycling.

The Bicycle Account presents in addition key figures resulting from annual monitoring of targets related achievements made:

- Km cycled on major roads
- Km driven by car on major roads
- Cycle track length
- Cycle lane length
- Green cycle route length
- Funding for cycle track maintenance
- Number of serious cyclist casualties
- Rate of serious casualties per km
- Rate of signal intersections adapted for cyclists
- Rate of cycling trips to work
- Rate of cycling tracks with unsatisfactory surface
- Cyclist travelling speed
- Cyclist security

More information are available in: http://www.vejpark.kk.dk/byenstrafik/cyklernesby/uk/cykelpolitik_uk.pdf

Camden Walking Plan

In 1997 Camden adopted [Camden's Green Transport Strategy](#), 'Taking steps for a people friendly Camden'. This document places a strong focus on encouraging walking as a way of getting around and central to the strategy has been the Camden Walking Plan, which sets out a series of practical actions being taken by the Council including:

- significantly improved [pavement surfaces and removing clutter](#)
- regular street cleaning
- better footway facilities for the disabled
- new green man and zebra crossings
- street lighting renewal and improvement programme
- seating and pedestrian signage
- Streets for People area-wide improvements focussing on walking
- [Camden Street Warden Service](#)
- Camden and Islington Health Walks
- [measures to improve air quality](#)
- [School Travel Plans](#)
- [Workplace Travel Plans](#)

Camden also has a number of [road safety projects](#) aimed at making streets safer for pedestrians (particularly vulnerable users) and encouraging walking including:

- 20mph zones and local safety schemes
- safer routes to schools projects
- school crossing patrols
- pedestrian skills training
- road safety drama for older people

Progress on the Camden Walking Plan targets is annually reported.

More information: <http://www.camden.gov.uk/ccm/navigation/transport-and-streets/walking-in-camden/>

Lyon Vélo'v: des vélos en libre service

Since 19 May 2005, a pool of more than 2000 bicycles is made available at 173 stations in Lyon's conurbation, during 7 days per week and 24 hours a day.

Depending on the season ticket, the use is free for the first half an hour or for the first hour. Every one can ride a bike from one station to another at very low price. Vélo'v initiative is an incentive to biking.

The Vélo'v stations are mainly located close to public transport stations and are concentrated in the centre of Lyon and Villeurbanne. The stations are located at 300 meters far from one to the other.

Other French cities have implemented or are going to implement similar solutions ([La Rochelle](#), [Nantes](#), [Paris](#), etc.)

Profitable walking and cycling tracks in Norwegian towns

Best estimate of future walking and cycling traffic leaves no doubt that building walking and cycling track networks in the towns Hokksund, Hamar and Trondheim in Norway is profitable to the society. Net benefit-cost ratios in these cities are approximately 4, 14 and 3, respectively.

Compared to the relatively low net benefit-cost ratios for other transport investments, investment in walking and cycle tracks in Norwegian cities is a chance for the transport sector to make investments with considerably higher profitability to society than has been seen for a long time.

The net benefit-cost ratio of completing the walking and cycling network depends of how many kilometres are missing. In Hamar, a small town north of Oslo, only 2,1 kilometre are missing and the benefit of building this part is as much as 15 times the cost. In Trondheim, the third largest town in Norway, as much as 80 kilometres calculated to 600 million NOK, are missing. Even here the project is highly profitable with a benefit five times the cost.

More information is available at: <http://www.vti.se/nordic/2-02mapp/cycle.htm>

Geneva: an extended plan for pedestrian

Geneva's plan for pedestrian aims to coordinate legal issues, develop concrete measures on the whole territory of the municipality, to implement innovative solutions and trials with a view to reassure the most sceptical public and to create a dynamic process of awareness raising.

Actions of the plan aim to foster strolling, beautify particular places in each neighbourhood, ease walking, remove obstacles and implement extended traffic calming schemes.

Between 1996 and 2004, this plan enabled the treatment of more than 40 kilometres of strolling areas, the creation of more than 100 safe pedestrian crossings on major roads, the implementations of 40 schemes targeted to schools and extended traffic calming schemes in residential areas.

See [here](#) for more information.

References

BYPAD platform: <http://www.bypad.org/>

How good is the cycling policy in your city? Is it effective and efficient? How can you improve it?

There is a tool for this purpose. It is called BYPAD and was developed by an international consortium of experts between 1999 and 2001 as part of an EU project. BYPAD is based on European best practice, which means that measures recommended in BYPAD have been successfully implemented in European cities.

BYPAD stands for Bicycle Policy Audit and is based on the methods of quality management, which have already been used in the business world for many years. Cycling policy is considered as a dynamic process whose strengths and weaknesses are analysed. In this context, the focus is not only on the measures and results of cycling policy, but also, in particular, on the question of how this process is incorporated into political and administrative structures. This in turn enables problem areas to be analysed, new areas for activity and potentials for improvement to be identified, strategic partners to be found and sustainable solutions to be developed.

More than 40 cities in 15 countries have already been convinced of the advantages of BYPAD and have started improving the quality of their cycling policy with simple, fast-working and above all cost-efficient measures. Everyone in the city benefits from BYPAD through increased mobility and improved quality of life.

SPICYCLES (Promoting Cycling by implementing Bike Sharing, Awareness Raising, Cycling Planning, Local partnerships)

The project SPICYCLES will demonstrate that the modal share of cycling can be increased in European cities through a combination of measures of both technical and political nature. Starting from a benchmarking on the cycling systems of 6 sample cities (Barcelona, Berlin, Bucharest, Göteborg, Ploiesti, Rome), 4 types of actions will be carried out and tested at the local level.

These actions include: introduction of bike-sharing schemes; implementation of communication and awareness raising campaigns; integration of cycling planning in the overall spatial and transport planning; special actions to

build local partnerships. Similarities and differences among cities, barriers and success, as well as conclusions on their transferability will be highlighted.

Project website: <http://spicycles.velo.info/>

ASTUTE (Promotion of Cycling and Walking in Cities and Companies)

ASTUTE is a three-year project, funded by the European Commission, Intelligent Energy Executive Agency (IEEA). Working in 6 urban areas (Budapest, Dublin, Granada, Graz, London and Siracusa), ASTUTE seeks to overcome the organisational barriers that prevent an increase in the use of walking and cycling in European cities.

Project website: www.astute-eu.org

VeloInfo: <http://www.velo.info/>

Cities will use VeloInfo to find bibliography and experts on cycling policy. Cities can also find other cities, to learn from each other's experiences and best practices. New potential users entering the VeloInfo web site will be invited to use an interactive tool that helps them to find search terms and documents relevant for their specific situation.

Besides, the guided tour tool gives a rough estimation of what can be achieved by implementing cycling policy, in terms of, e.g., reduction of exhaust emissions, congestion, and traffic safety.

Experts may use VeloInfo to enlarge their expertise and to find other experts and local authorities that need support in developing cycling policy. All users participate in a network, which operates as a literature database, an expert system, and also as a discussion forum. VeloInfo thus offers a forum for the exchange of ideas, data, experience and expertise.

WALCYNG: <http://www.cordis.lu/transport/src/walcyngrep.htm#results>

The purpose of WALCYNG is to sort out conditions and measures which may contribute in replacing short car trips with walking and cycling.

The project outcome aims both at road users who could replace their short car trips, employers who could support and benefit from a modal change among their employees, and authorities and decision makers who can influence on modal split by changing frame conditions.

ADONIS: <http://www.cordis.lu/transport/src/adonisrep.htm>

The overall objectives of ADONIS were to:

- present a catalogue of best practices for promoting cycling and walking. Compare and contrast cycle/pedestrian-minded and non-minded cities
- provide new knowledge regarding behavioural factors affecting modal choice for short trips in urban traffic

- increase cyclists' and pedestrians' safety through the identification of important human factors which may contribute to traffic accidents; and
- provide a comprehensive overview with general recommendations and guidelines to promote walking and cycling for urban decision makers within the EU.

Demonstration sites (case studies): Amsterdam, Barcelona, Copenhagen and Brussels.

Reports and CD-ROM on best practice can be requested to Danish Council of Road Safety Research, E-mail: imb@rft.dk, tel.: +45 39 68 04 44, fax: +45 39 65 73 62

PLUME: walking and cycling as solutions

PLUME project developed guidance to policy makers in order to better integrate walking and cycling in urban transport policies, see: http://www.lutr.net/deliverables/doc/SR_WalkingCycling.pdf

WHO Guidelines for walking and cycling

WHO is developing guidelines on walking and cycling as a tool to support and promote sustainable and healthy transport modes.

The guidelines will provide a common methodological framework and practical tools to decision makers to improve cost-benefit analysis of transport and land-use policies, by including health effects that have so far not been much considered.

See: http://www.euro.who.int/transport/modes/20021107_6

PROMPT: <http://virtual.vtt.fi/virtual/prompt/index.htm>

The general goal of the project is to promote non-motorized transport in cities with particular focus on pedestrian traffic. For this purpose PROMPT aimed at finding solutions to improve city living conditions and the quality of cities for pedestrians. It identified best practices as well as to develop new tools and generic solutions for problem identification, problem solving and implementation of proper measures.

See also PROMPT guidebook: <http://virtual.vtt.fi/virtual/prompt/guidebook.pdf>

National Policies to Promote Cycling (ECMT)

This report brings together the experience of 21 countries and 7 municipalities in developing and implementing policies and measures to promote cycling as a means of travel.

Based on the findings of the study, a Declaration on National Cycling Policies for Sustainable Urban Travel was agreed by ECMT Ministers at their 2004 Ljubljana Council. With this Declaration, Ministers recognized for the first time the importance of a national policy and institutional framework for promoting cycling.

See: <http://www.cemt.org/topics/urban/urbpub.htm>

ELTIS website on walking

45 case studies about walking are made available at [ELTIS website](#).

4. Promoting and improving collective transport

Key points

Urban transport policies aiming to foster use of collective transport instead of car driven alone can yield emissions reductions. In some European cities, development of public transport corridors and tramways for instance has notably gained much success due to its environmental performances particularly when inserted in busy avenues circulated by road traffic.

Several cities in the world including European cities have shown that market share of collective transport can reach levels greater than 50% of motorised and mechanised trips at conurbation scale whereas public transport market share is often below 20% in many European cities. At Helsinki for example, 70% of the passengers are transported by public transport during rush hours.

These cities taught us that implementing attractive collective transport requires a long term commitment in favour of fast, reliable, seamless and regular public transport services, combining land use planning measures and a package of ‘push and pull’ as well as innovative transport measures.

Acceptability and credibility of public transport depend also much on its energy efficiency and emissions related performances. In order to maintain current environmental advantage of public transport, efforts are still necessary given that environmental performances of private cars are improving due to faster renewal pace of car fleets.

Lessons drawn from experience and research

- Successful SUTPs develop a vision on what should be the right place of public transport at medium and long term: they set targets on modal share of public transport (% of all journeys made with mechanised and motorised transport modes) to be attained by a given timetable, and monitor attainment of these targets by regular transport surveys.
- They comprise a clear supply strategy – master plan - based on several and supplementary levels of collective transport supply, e.g.:
 - *A backbone network based on radial and orbital lines providing high transport capacity (passenger per hour), high commercial speed greater than average car speed, competing with private car towards city centre, connecting major residential districts and suburbs to central zones with high density of activities (major businesses and administrations, universities, shopping centres), providing excellent quality of supply (punctuality, frequency, time coverage, comfort); this*

level of service can be provided by rail, light rail, tramway, tram-train circulating on dedicated infrastructures

- *Intermediate network: smaller capacity vehicles (e.g. buses, trolleys), high spatial accessibility with denser network of stops, falling back passengers onto backbone network, good commercial speed equivalent to car ensured by right-of-way at crossings and dedicated routes*
- *Flexible and innovative solutions: semi collective solutions (minibus, taxi-bus, vans, car-sharing) based on public-private partnership, demand-responsive solutions (internet, mobile phone), connecting interchanges stations or terminals of backbone network or intermediate network to the outer areas of the conurbation, with different levels of service depending on the period of the day and the demand in the collected zones*

HANNOVER mobile: mobility package making public transport attractive

<http://www.gvh.de/eng/1453.htm>

The Greater Hannover Transport Association started a “cutting edge” service innovation in October 2004: for the first time worldwide, a comprehensive “mobility package” is offered to the customers.

HANNOVERmobile means the full integration of public transit, car-sharing, taxi, delivery services, bicycle services and many more. Many of the services will be invoiced with just one monthly “mobility bill”.

The mission of HANNOVERmobile is to offer hassle-free “one-stop mobility”. Instead of spending time on choosing the right solution and signing up with a multitude of providers, the customer has immediate access to a comprehensive “mobility menu” from which he or she can choose at any time the right service for the given needs by using his “all-in-one” access-card.

- They strive to keep speed and regularity under control: these parameters are crucial for the competitiveness of public transport, as they are much related to operating costs; more, energy consumption, emissions and noise dramatically increase at lower speeds in urban driving conditions. Even a 5 kph increase may have a significant impact in this respect as usually commercial speed is less than 20 kph in dense urban areas. Several means can ensure a good command of speed:
 - *Reserved corridors and dedicated infrastructures ensured by physical separation: these solutions are the best to ensure speed and regularity; they are successful for tramways in German, Swiss and French cities; they are applicable to buses lanes at lower cost; they support and are supported by traffic calming schemes; they give the opportunity to improve urban design, reallocate road space to other transport modes than private car*
 - *Use intelligent transport systems: such systems are implemented for decades in Swiss cities and delivered good results; also called operating support systems, they can optimise capacity of specific axes and trigger right-of-way in favour of public transport at road crossings that is an effective solution to master speed and punctuality even during rush hours*
 - *Design of stops and vehicles: these solutions can facilitate ticketing and accessibility (low floorboard) and therefore can reduce average time to get on board or get off the vehicles*

Lemgo: a new bus system with high frequency

In Lemgo (Germany) as in many other German cities, traditional bus service has been replaced by a new bus service: high frequency, strict compliance of the schedule, short and fast lines, greater number of stops, vehicles design and central interchange area allowing people to have connexions with other public transport lines.

The number of passengers per year has increased from 80,000 to 1,900,000 in 3 years. The new system is simple, reliable and visible. Every 15 minutes, 6 low floor buses arrive in a 3 minutes interval at the same interchange. Passenger can therefore quickly have a connexion to 5 other bus lines from the same interchange.

Karlsruhe: an attractive light rail system

Instead of introducing a new and costly rapid transportation system, the existing tram system in Karlsruhe was modernised and extended by making use of German Rail tracks. The project also included the introduction of exclusive right of way (today 80%) for trams at most crossings and the use of vehicles able to handle the 750 Volts DC tram environment as well as the German rail 15.000 Volts AC system.

Today the Karlsruhe light rail rolls on a network of 400 km and stretches far out into the region even connecting the city of Heilbronn in the neighbouring Neckar region. Its success is demonstrated by the high level of patronage and is mainly due to its convenience – no interchange between outer and inner parts of the line, central tram station – and the existence of a regional master plan that provided a favourable framework for the development of the solution. The regional master plan is an important success factor as it created a final system layout, allocated the roles of different modes in the overall scheme and identified the consequences for urban planning.

Applications of this solution can now be found in other cities. Second generation projects as Kassel, Nordhausen, Chemnitz or Zwickau have brought serious innovation to TramTrain by adapting and widening of the original Karlsruhe idea.

To know more about light rail solutions: <http://www.lightrail.nl/>

Right-of-way for public transport

Malmö

Buses spend a large amount of time, 11%, waiting at traffic lights. Prioritized traffic lights for bus lanes could solve this problem. The introduction of bus priority systems at 42 traffic lights is included in the project. Traffic light priority systems are one of the most important actions to increase bus accessibility and maybe the action that can be most effective. By 2004 all city buses and some regional buses were equipped with GPS and computers that can communicate with traffic lights, so in this project measures are only needed to install equipment in the traffic lights in order to establish a priority system. The objective pursued by Malmö is to decrease the intervals from 10 minutes to 7,5 minutes without decreasing intervals for buses.

Toulouse

Bus priority systems have already been tested on a small scale within the city centre of Toulouse; it has been concluded that real efficiency will only be reached when priority systems will be considered as operational at level of the agglomeration of Toulouse and fully integrated within the existing exploitation systems. Several measures are therefore envisaged and being implemented such as: evolution of the Urban Traffic Control (UTC) system in order to apply new type of bus priority actions, particularly systematic / absolute priority; extension of the UTC at the level of the agglomeration; development and evaluation of public transport priority systems at the junctions, especially for the high quality bus corridors.

Several cities are operating or plan to implement similar schemes in Europe, such as Zurich, Praha, Genova, Tallin, Debrecen etc. More information is available at: <http://www.civitas-initiative.org/>

- They strive to facilitate inter-modality to increase the number of combinations and possible journeys by public transport
 - *Coordination at conurbation/regional level*
 - *Attractive interchanges (P+R, rail stations equipped with parking facilities for all modes of transport)*
 - *All modes (cycling, taxi, car, bus, walking)*
 - *Ensure fluid connexion between regional/urban networks (tram-train)*
 - *Services to customers to increase attractiveness of interfaces*
 - *Information: mobility agencies/centres, reduce uncertainty, enable wide set of vectors*
 - *Integrated pricing (e.g. car sharing + public transport)*

- They implement attractive and acceptable pricing and report on costs for every modes of transport
 - By developping transport account to report on the costs and monetized benefits of each transport modes
 - By designing equitable, flexible, multimodal, affordable fares and subscriptions

- They modernize ticketing systems (e.g. smart card without contact)
 - *Easy validation*
 - *One electronic ticket for all modes of transport*
 - *Fast and liable payment*
 - *Customised and multiple fees*
 - *Integration with other uses*
 - *Assurance of lower fares for users*

Innovative multimodal public transport contracts, services and electronic ticketing in Toulouse

Based on an innovative interoperability chart between the different public transport authorities, Toulouse aims to totally renew and improve its ticketing and tariff system. Electronic support and multimodal pricing should encourage an increased use of the public transport services and provoke multimodal behaviour.

The ticketing system needs now to be renewed by 2006 with a contact less ticketing system following different goals: an interoperable system with a high level of reliability, able to contend with fraud and offering new opportunities in transport services. The development of the new urban public transport ticketing system will start at the end of 2004. The objective is to install this new system in the middle of 2006.

One of the main interests of this new system will be to propose new type of products, especially for the multimodal development.

Within the development of the new public transport ticketing system that should be launched in 2006, the aim of the public transport operator and authority is to propose new types of public transport products and develop innovative integrated / combined tickets to final users.

One of the other objectives would be the integration of new services on the public transport smart card

(development of a multi-services card) and the integration of public transport application, with an electronic purse and a dedicated service card for students (access to the restaurant, the library...).

For more details, see: http://www.civitas-initiative.org/measure_sheet.phtml?lan=en&id=208

- They develop new services & equipments
 - *In stations and stops (e.g. fun-shopping and partnerships between stores and public transport operators in order to favour common customers)*
 - *In vehicles and carriages*

- They respond to customers' needs and expectations:

Collective transport users are primarily customers of transport services, with different expectations that should be regularly monitored. Actions developed in order to meet their expectations should be reported to them, on a regular basis. Main expectations are usually: safety, prices, accessibility, frequency, time (travel time, punctuality, wait), information, comfort, cleanliness, humanity, quality/attractiveness of travelling spaces (corridors, landscape, gateways), technology (ticketing, NTIC connexions), trade & services supply.

- They keep the energy and environment related advantages of public transport:

Public transport is currently significantly more energy-efficient and environmentally friendly than the average private car, consuming in average 3 times less energy (3 times less CO2 emissions) per km and passenger transported. These figures take into account the current occupancy factors, proving that a policy aimed at fostering modal shift in favour of public transport - increasing occupancy factors of public transport - would bring much energy and environment related benefits. Though, attention should also be paid over time to these performances by appropriate renewal and retrofitting of fleets in order to keep public transport environmental advantage compared to cars driven alone.

Lille: large scale introduction of biogas and increased use of public transport.

'Lille Métropole' is an intercommunal structure (85 communes and 1,2 million inhabitants) working in close cooperation with its belgian counterparts. It is a base for distribution and a node for major routes north-south and east-west in Europe. Lille has built up a strong public transport network.

Through TRENDSETTER project, Lille has much focused on improving public transport. Specific measures are presented below.

1) Biogas production and usage:

- increasing massively the biogas production (locally from waste and sewage treatment)

- 128 new clean busses in Lille Metropole fleet replacing diesel busses, adaptation of the bus depots and lines and construction of a new compression unit

- 120 new clean vehicles in the staff pool and a new compression unit

2) Encouraging public transport use by introducing a combination of new infrastructure that improves quality and incentives:

- 1 new High service Bus Route
- 2 intermodal interchanges points
- development of a pricing scheme for all public transports, an integrated ticketing and specifications for a smart card system
- increased public transport safety and reliability
- increased intermodality between the different public transport means and between private cars and public transport
- development of an efficient co-operation between all public transport authorities (local consortium)
- company mobility plan for Lille Metropole staff, development of a comprehensive approach on the metropolitan level between the requirements of mobility (cars, public transport and freight transport).

3) Lille adopted below targets for Trendsetter:

- 85% clean public transport journeys in year 2005
- Rise of 21% in public transport passenger travels from 1998 to 2005

The clean vehicles fleets will permit to cut pollution:

- reduction of fossil CO2 emissions up to 41,000 tons a year by 2005
- reduction of NOx emissions up to 850 tons a year by 2005
- reduction of particulate matters up to 26 tons a year by 2005
- reduction of 50% of the bus noise level.

See: <http://www.trendsetter-europe.org/>

Shifting from car to public transport brings significant CO2 savings

For every per cent shift of transport in German towns from cars to public transport modes (pkm) CO2 emissions would drop by 240,000 tonnes. A 5 % shift would reduce CO2 emissions by 4 million tonnes, provided public transport capacity can absorb extra demand without expanding vehicle mileage. If public transport would transport twice its current volume, CO2 emissions would drop by 4 million tonnes even though vehicle public transport mileage would have to increase.

See Joint expert Group on Transport & Environment – Working Group report on Reduction of energy use in transport 18.1.2006 in: <http://forum.europa.eu.int/Public/irc/env/transport/home> (go to LIBRAIRIE)

French tramways: a success story

Electric tramways have gained much success in French cities in the past decade, particularly after adoption of French air quality law in 1996 which requires urban mobility plans ('plans de déplacements urbains') to be developed with a view to promote public transport while ensuring a high level of environmental protection. To date, more than 300 km of tramways have been built in major French cities such as Bordeaux, Caen, Clermont-Ferrand, Grenoble, Montpellier, Mulhouse, Nancy, Nantes, Nice, Orléans, Paris conurbation, Lille, Lyon, Rouen, Strasbourg and Saint-Etienne.

This tremendous success is likely due to its numerous attractive intrinsic characteristics (good accessibility, high capacity, comfort, low noise, zero local emissions). Moreover tramways insertion in streets with busy traffic provides a good opportunity to renew derelict urban areas, remove road traffic and give back space to cyclists and pedestrians.

With regard to ambient noise, electric propulsion such as tramways usually yield significant benefits. Services of French Department of transport (Certu, CETE Lyon and CETE Strasbourg) have assessed that insertion of tramways in busy streets usually yields significant reductions of ambient noise levels because of both traffic volume and average speed reductions. Such noise reductions range between 2 and 7 dB(A) depending on the period of the day, the location of the track, the initial volume and speeds of road traffic. Particular attention should however be paid to annoyance yield at specific spots where airborne noise, screech noise and ground-borne noise may occur. Solutions exist to manage these cases, and should be envisaged in the planning stage: screech abatement equipments on vehicles and tracks, track maintenance, slab design and grass planting close to the track (sources: SerdB and SILENCE project at: <http://www.silence-ip.org>).

New tram in Paris

The bus line that currently serves the south part of the Boulevard des Maréchaux will soon reach its maximum capacity and so equipment of a different scale was needed. The new tram will replace the bus line and will stop at 17 stations on a total length of 7.9 km. It will be opened in autumn 2006. It will be connected to the subway and bus lines on its route, and with the tram line coming from La Défense. In the future, this tram line might go around Paris.

The South Maréchaux tram will be able to transport around 100,000 passengers per day in much more comfortable conditions than the bus, and will be completely accessible to disabled passengers. The new tram will have right of way at traffic lights because of its capacity to accommodate up to 304 passengers. Its average speed will reach 20 km/h and its frequency will reach four minutes during peak hours.

The construction of the new tram will enable re-development of a wide avenue, currently a real urban motorway around Paris, into a more peaceful boulevard reducing car traffic by 25%. The width of the roadway will be narrowed, that should reduce car speed to a more satisfactory level. The implementation of this project comes with a wide program aimed to improve the urban environment and quality of life. The objective is also to reallocate urban space by creating areas for pedestrians and bicycles. Cycle lanes will be built and walkways developed around the tram area and about 10,000 trees will be planted.

Source: www.impacts.org (see news – November 2005)

- Implement integrated policies in order to foster usage of public transport:
 - *Land use: priority to settlements around stations and collective transport lines with high accessibility, parking standards for new buildings, car-free housing in areas well connected to public transport, space reservations for future collective transport infrastructures and stations (see also related chapter).*
 - *Parking: attractive prices in P & R for users of public transport, regulation of existing supply for commuters and trade customers in areas well connected to collective transport, supervision to avoid illegal occupancy of dedicated lanes and stops (see also related chapter)*
 - *Road design and traffic calming: design of stops, parking areas for buses, road signs, road geometry for public transport vehicles, traffic calming schemes developing reallocation of road space to public transport and non motorized modes to enhance its accessibility*

- *Transport pricing: implement fair pricing in order to reflect external environmental costs of each transport mode in order to provide clear economic signals to the attention of people and foster environmentally-friendly travel behaviours*
- *Travel plans: develop attractive public transport pricing for employees, dissuade company cars, reduce parking supply at workplace*

Zurich: an integrated strategy and long term commitment in favour of public transport

Zurich has successfully promoted the use of public transport, cycling and walking, while controlling traffic and parking. Public transport accounts now for 27% of all journeys.

Zurich transport strategy is based upon below principles:

1. making public transport faster, and keeping it attractive.
2. road traffic and public transport management by means of a dynamic control system.
3. effective management, planning and supervision of parking, on- and off-street.
4. good living conditions, through traffic calming in residential areas with City-wide 30km/h speed -limits and directing traffic onto the main road network without increasing its capacity, as well as parking restrictions for non-residents.
5. good conditions for walking and cycling. People can also rent a bike for free for the whole day. With more than 300 bikes at six stations, this facility has now run for its eighth summer season. The costs are met by advertisements on the bikes.
6. soft policies for a sustainable mobility management. Information, such as the ‘Zurich mobil’ package for new residents (includes facts about mobility, car-sharing concept, combination of a season ticket for public transport and cheap access to a rental car), advisory board, public awareness and education, new offers in the mobility behaviour etc.
7. project management staff from all City Council departments ensure that all measures are implemented in the same direction. Even the smallest decision – irrespective of whether it concerns public transport, private car transport, parking policy, etc. – must be taken in the light of the overall plan.

FREIBOURG im BRISGAU

Freiburg im Breisgau reversed its transport patterns over a 15 year period in favour of non-car modes.

Freiburg is a small German city of around 250,000 people. Its car ownership rate has been growing steadily in common with that of Germany as a whole and is only marginally below the national average.

However, due to a combination of restrictions on car use, mainly in the form of a pedestrian and traffic calmed central and inner area, the provision of facilities for bicyclists and pedestrians, a good public transport system, and a compact land use pattern, car use has remained constant.

From 1976 to 1991 total daily trips showed 30% increase but car trips showed only 1% increase, whereas public transport use increased by 53% and cycling by 96%. This meant that the car's share of motorized transport trips actually dropped from 60% to 47%.

Freiburg is a good example of a city which has had a coordinated approach to physical planning directed towards enhancing the quality of life in the city.

- Strengthen public transport sector image

The public transport sector needs to strengthen its image towards both the customers and decision-makers. There is a strong need for the public transport sector to communicate and promote its strengths and benefits more intensively to the general public. A pro-active approach towards communication, handling of complaints and customer retention should help improve the customer focus of public transport organisations and their relation with the customer.

References

VOYAGER: <http://www.voyager-network.com/>

VOYAGER project aims to consolidate current experience and to create a vision and make recommendations for the implementation of attractive, clean, safe, accessible, effective, efficient and financially European local and regional public transport systems for the year 2020'.

CONNECT: <http://projectapps.vtt.fi/Connect>

The CONNECT project has created Europe 's leading source of information on Flexible Transport Systems.

This is achieved by a continuously updated **Virtual Library**, which contains information on the many different aspects of flexible transport. The Virtual Library contains documents, reports and presentations on many different aspects of flexible transport.

CONNECT has set up a common information system, which gathers and manages information about on-going research, the state-of-the-art and good practices in flexible transport and its supporting technologies. The Virtual Library contains currently over 300 different documents on Flexible Transport.

The Virtual Library has a matrix structure as shown in the table (*right*) classified according to passenger transport, freight transport, urban transport, rural transport. Documents are characterised by meta data to improve searching.

The documents in the library can be browsed, according to the areas covered by the document, or text and metadata can be used to search in the library.

The CONNECT Virtual Library is continuously under development, and material is continuously integrated. No registration is required to access the more than 200 public documents in the CONNECT library.

NICHES: <http://ange.archangelis.com/typo3/niches/>

The **NICHES** project (see Working Group 1 on new seamless mobility services) deals with innovative public or semi-public forms of public transport such as on demand bus services, public bicycles and lift sharing services, all very.

TELLUS WP7: http://www.tellus-cities.net/index_56_en.html

The objectives of WP 7 of TELLUS project are the following:

- Demonstrate and assess a set of initiatives to stimulate the use of collective passenger transport and its quality of service
- Integrate Public Transport and cycling by realising 3 guarded bicycle parking sites in the Rotterdam city centre and expansion of bicycle parking spaces at 20 public transport locations
- Integrate public transport and car use by a large scale expansion of Rotterdam Park&Ride capacity (1600 extra places)
- Optimize the use of the river Nieuwe Maas-Nieuw Waterweg by enhancing passenger transport systems over water
- Improve accessibility through public transport of Rotterdam by introducing Automated People Movers
- Produce clear recommendations for the modernisation of the organisational and financial frameworks for future urban public transport in Berlin
- Introduce an environmentally optimised river shuttle in Goteborg

EU PORTAL: <http://www.eu-portal.net/>

EU PORTAL provides a compendium containing results of EU research-projects and complementary results of national research-projects about 'integrated transport chains'. A complete list of the projects, consortia, and cited literature is given at the end of the compendium.

See: written materials > integrated transport chains

CIVITAS initiative: <http://www.civitas-initiative.org/>

Several experiments aimed at fostering and improving public transport are reported in 'CIVITAS measures', under the category 'Collective passenger transport'.

PRIMAVERA project

The main objectives of the PRIMAVERA project are to develop, test and produce recommendations for the application of integrated traffic control and management measures for urban arterial roads incorporating: queue control, public transport priority and environmental protection.

The report on Public Transport Priority Systems covers the below aspects:

- It lists possible fields, within traffic and travel management and control systems, where bus priority features may improve the effectiveness of the control action. For each field the expected contribution to the bus priority feature is described.
- It presents the typical conditions where a bus priority scheme is required to perform an improvement in travel conditions. Problems and characteristics of each scenario are highlighted and solutions are suggested.
- It describes the opportunities offered by the adoption of dynamic signal control systems which are equipped for bus priority. An overview of vehicle detection/location methods is also provided as the level of performance achievable with these systems depends on the knowledge of travelling vehicles. This is the core of the document as it deals with advanced telematic systems.
- It describes the solutions offered by the current technology for vehicle location/detection to satisfy the requirements of bus priority systems.

See [here](#) the report 'Public Transport Priority Systems: Opportunities and Recommendations'

5. Urban road charging

Key points

Urban road pricing can be defined as a way of requiring payment from road users in return for allowing them to drive in certain urban areas.

Two main categories of urban road pricing schemes can be distinguished, depending on their transport policy objectives: financing pricing and regulation pricing.

Financing pricing

This category of pricing scheme is not usually implemented to solve environmental problems. The main objective is to raise funds in order to finance infrastructure building and operating (bridge, tunnel or road) or transport services. The primary aim is not to influence the behaviour of road users.

The charges and the implementation time are determined in order to ensure the financial balance of the investment and operation of the infrastructure.

Trondheim and Oslo have implemented such urban road pricing schemes.

Regulation pricing

The objective of regulation road pricing is to influence the travelling behaviour of road users. The price provides a signal to road users in order to reduce congestion due to road traffic (congestion pricing) or to reduce environmental impacts of road traffic (environmental pricing).

Congestion pricing is based on the ‘user-pays’ principle. Road users with a high time value will be ready to pay for driving and will be repaid with better driving conditions. Other users will modify their behaviour, for example by cancelling or postponing their trips, changing mode or destination. London and Stockholm’s schemes clearly belong to this category (see following reports on these experiences).

Environmental pricing is based on the ‘polluter-pays’ principle (or ‘internalisation’ of external environmental costs principle). Polluters (road users) pay for the environmental external costs (air pollution, climate change and noise) they cause to society. Road users are expected to modify their behaviour by travelling less and/or using clean vehicles and/or shifting to less polluting modes, all of which lead to environmental benefit.

Both regulation pricing systems provide double dividends because they allow funds to be raised to finance equitable and sustainable urban transport programmes (e.g.: collective transport improvements, 30 kph zones, cycling network development, noise reduction measures, etc.).

It should be noted that congestion pricing and environmental pricing are not antagonistic, although their initial objectives are different. Congestion pricing can bring environmental

benefits and environmental pricing can lead to reduction in time delays. Actually, regulation pricing could be designed to reduce both congestion and environmental externalities.

Lessons drawn from experience and research

In highly congested and polluted cities, it may be worth considering the implementation of urban road pricing schemes to influence the travel behaviour of road users in order to reduce congestion and traffic related environmental impacts (regulation pricing).

Regulation pricing alone cannot achieve the ultimate objective of ensuring the sustainability of urban mobility. However, regulation pricing schemes “packaged” with other measures can bring substantial environmental benefits and it has also been shown that this can bring funds to underpin implementation of sustainable transport policies and make urban transport more equitable.

The expected costs and benefits of such schemes have to be estimated for each city situation (case by case). Pilot testing may be the most practical first step to confirm expectations, to refine the instrument and to develop public acceptability.

Ideally charges should vary according to the distance driven and environmental performances of vehicles (e.g. EURO standards based classes, CO₂ emissions and noise type-approved values) in order to give the right signal to road-users (the less you travel and the cleaner your vehicle, the less you pay). The Mayor of London has announced his intention to differentiate the charges according to CO₂ emissions for instance. Second best systems such as flat rate charges may need to be implemented as they are easier to design and enforce. Experience shows that even the latter option may yield significant CO₂ and energy consumption related benefits.

Acceptability and equity

The following recommendations may be useful to build acceptability:

- Urban road pricing scheme is an instrument that is useful as part of an overall urban transport policy. Its objectives should be clearly formulated (see London’s case) and be consistent with the wider urban transport policy
- The decision making process should be transparent and should facilitate dialogue between stakeholders

- Communication and marketing approaches should be implemented to facilitate the design and promote the development of any urban road pricing scheme
- It should be clearly stated how the revenues will be used; they should be used in a transparent way and could usefully be dedicated to financing of sustainable urban transport programmes and to solving equity issues raised by implementation of the scheme
- Equity issues should be duly considered, studied and discussed before any decisions; they can be addressed through pricing modalities and use of scheme revenues (financing collective transport to increase accessibility of low income people).
- The objectives of any urban road pricing scheme should also address the main expectations of the people affected.
- People need to be convinced this solution is absolutely necessary to ensure a sustainable urban transport system.
- Practicalities of the scheme should be easy to understand; a step by step approach is recommended to allow further adaptations of the scheme (e.g. prices, perimeter); start with simple pricing modalities (e.g. congestion pricing based on flat rate), progressively refine towards more sophisticated system over time (e.g. differentiated pricing according to environmental performances)
- Building acceptability is not only a task before implementation of the scheme; it should be permanently sought, particularly through regular and transparent reporting on the achievements and the various (economic, environmental, social) impacts of the scheme inside and outside its perimeter. Dedicating revenues from road pricing scheme to transport can improve the political acceptance of the scheme.
- The acceptability and effectiveness should be openly reviewed after a pre-specified period

Seeking synergies

When developing a pricing scheme, synergies with other measures should be sought:

- synergy with parking policy in order to avoid duplication of pre-existing parking charges

- synergy with collective transport policy for equity motives, because introduction of road charging in central areas might increase exclusion of outer low income people who cannot afford to pay the charge and might live far from collective transport stations,
- synergy with land use policy, because charging schemes are likely to apply to central areas and might, if not coupled with appropriate land use policy, accelerate urban sprawl outside the zone (e.g. settlement of shopping areas and offices outside the charging zone to avoid paying the charge)

- Synergy with road traffic management policy: traffic flows can also be improved through the removal of obstacles, traffic light management; the same reduction of congestion can then be obtained with a lower charge and will thus be easier to get through politically

Good practice

London and Stockholm experiences demonstrate that road pricing can lead, in the enforcement area, to significant reductions of road traffic flows and related emissions - particularly CO₂ emissions - and fossil fuel consumption, increase travelling speeds, reduce delays, induce modal shifts towards more sustainable modes of transport and trigger support from residents and businesses.

London's scheme shows that these drastic reduction of traffic related air emissions inside the pricing area are however not enough to obtain significant impacts on the local air quality inside the zone. The influence of the background air pollution plays a significant role in this matter. It should be noted in this respect that Greater London is 1579 km² in area whereas the pricing area is only 22 km². Emissions from road traffic outside the pricing area probably affect local air quality inside the enforcement zone more than road traffic emissions within it.

Therefore the size of the pricing scheme and the need for supplementary measures are important issues if significant reduction of air pollution is sought. It should also be noted that because it primarily aims to reduce congestion, the general charges are not differentiated according to the emissions performances of vehicles (though derogations apply to some categories of lower emissions vehicles). As far as air quality management is concerned, other measures are likely needed to obtain significant impacts; it's worth noting in this respect that London is planning a 'low emission zone' (see chapter on 'Access restrictions') in order to attain air quality limit values.

London and Stockholm's experience also show that ambient noise levels inside the pricing area have not been much affected by the pricing schemes. Road traffic noise emissions are indeed far more sensitive to other factors than traffic volumes. Supplementary measures would therefore be needed to obtain significant road traffic noise reductions.

Last, London and Stockholm demonstrate that monitoring and regular reporting are crucial to gain success and acceptability.

London's congestion charging scheme

Situation before implementation of congestion charging

- The charging perimeter used to be the most congested area of the UK
- Average speed of inner road traffic was typically 14 kph
- Vehicles used to stop during 50% of travelling time
- Congested time used to increase

Mayor's transport priorities

- To reduce congestion
- To make radical improvements in bus services
- To improve journey times reliability for car users
- To make distribution of goods and services more efficient

Main characteristics of the congestion charging scheme (2003-2005)

- The central London Congestion Charging Scheme was introduced on 17 February 2003.
- Charging zone: the charging area corresponds to the centre of London and is marked off by the inner ring road - 22 km² - 150,000 inhabitants - 1,200,000 jobs (major part of businesses, media, tourism and governmental activities take place)
- Charging periods: 07:00 to 18:30, Monday to Friday
- £5 charge per car per day (moving into or within the zone) in 2003, £8 charge per day in 2006
- Rebate of 90% for residents within the zone
- 25,000 exempted vehicles (23% of vehicles initially circulating inside the zone): NHS vehicles, taxis, minibuses, buses, coaches, two wheelers, emergency vehicles, military vehicles, public service vans, low emissions vehicles (electrical, alternative fuel, bi-fuel light vehicles; alternative fuelled light duty vehicles complying with Euro 3 standard),
- 688 cameras connected to automatic number plate recognition technology
- 1,200 road signs dedicated to signalling congestion charging area

Impacts on road traffic (2004/2003)

- 50-60% of car trips concerned have been transferred to public transport services
- 15-25% of car trips concerned have been transferred to taxis, biking, walking and motorbikes
- 10% increase of car occupancy
- 15% reduction in the volume of traffic (vehicle x km) circulating within the zone
- 18% reduction in the total traffic volume entering the zone during the charging hours
- 30% reduction in delays (minutes per km) during charging hours within the zone
- 17% increase of average speeds of cars from 14.3 to 16.7 kph within the zone
- reduction of congestion on inner ring road and major London roads
- no evidence of detrimental traffic effects on roads outside of the charging zone neither on radial traffic approaching the zone
- no boundary - related effects

Impacts on collective transport (2004/2003)

- bus supply increased by 14,500 seats
- 14,000 passenger increase in daily use of public transport
- large scale improvements of the bus network in London
- continued growth in bus patronage and service levels in and around the zone
- 7% increase of average bus speed
- 30% reduction of waiting time for buses
- significant improvement in reliability of bus journey times inside and outside the zone

- decline of underground travel to central London
- no significant change in rail travel to and from central London

Environmental impacts (2004/2003)

- 12% reduction in NO_x and PM₁₀ emissions within the charging zone
- 19% reduction of CO₂ emissions within the zone
- 20% reduction of transport fossil energy consumption within the zone
- not possible to detect 'congestion charging impact' on ambient air quality
- no evidence from sample measurements of significant changes to the ambient noise levels

Costs, benefits and revenues (2004/2003)

- £ 130 millions annual costs: administrative costs (£ 5 millions), scheme operation (£ 90 millions), additional buses (£ 20 millions), charge payer compliance costs (£ 15 millions)
- £ 180 millions annual benefits: time savings (£ 155 millions), reliability benefits (£ 20 millions), fuel and operating savings (£ 10 millions), accident savings (£ 15 millions), negative benefits due to transfer from car to collective transport (£ -20 millions)
- £ 50 millions net benefits (environmental benefits not taken into account)
- £ 97 millions net revenues spent on: bus network improvement (80%), road safety (11%), walking and cycling (6%), safer routes to school (2%), distribution of freight (1%)

Public opinions

- 57% of residents are in favour of the scheme (against 46% before it started)
- 73% of businesses think the scheme is efficient

Monitoring and reporting

Transport for London report on the achievements of the scheme on a regular basis. To date, three annual reports on impacts monitoring are available and accessible on a dedicated website:

http://www.tfl.gov.uk/tfl/cclondon/cc_monitoring.shtml

Recent developments: differentiated fees according to CO₂ emissions

The Mayor of London, Ken Livingstone, announced on 14 November that he will take forward the policy of reducing London's CO₂ emissions by introducing emissions-based charging to the existing congestion charge scheme. See the details on the differentiated fees [here](#).

More information on London's road charging scheme is available at: <http://www.tfl.gov.uk/congestioncharging>

Stockholm trial

On 2 June 2003, the Stockholm City Council decided to launch road charging trial. The formal decision on implementation was made through the Swedish Parliament, which adopted the Congestion Charges law on 16 June 2004. The trial has been supported by state funding.

The trial started on 22 August 2005 with extending public transport capacity. Congestion charging followed and was implemented between 3 January 2006 and 31 July 2006.

Political objectives

- reduce congestion,
- increase accessibility
- improve environment

Operational targets

- Reduce traffic volumes on the busiest roads by 10-15%
- Improve the flow of traffic on streets and roads
- Reduce emissions of pollutants harmful to human health and of carbon dioxide
- Improve the urban environment as perceived by Stockholm residents
- Provide more resources for public transport

Charging principles

- Charges are applicable between 6.30 am and 6.30 pm.
- they are due for every passage in the charging zone
- daily charge is capped to €6
- charges vary according to time:
 - €2 during full peak period (7.30-8.30 am and 4.00-5.30 pm)
 - €1,50 for the following periods: 7.00-7.30 am, 8.30-9.00 am, 3.30-4.00 pm and 5.30-6.00 pm
 - €1 during other periods.
- no charges are due on Saturdays, Sundays
- one charge decision per day

Enforcement aspects

- automatic plate recognition (plates are photographed)
- amount of due charge shown at control point
- car owner is responsible for paying the charge
- penalties range between €7 and €50 if the charge is not paid (amount vary according to delay of non payment)
- direct payment cars equipped with transponders

Exemptions

- emergency vehicles

- vehicles with disability permits
- foreign vehicles
- transport services for disabled persons
- taxis
- motorcycles
- buses over 14 tons
- vehicles using alternative fuels (electric, ethanol, biogas)

Main facts and figures

Comprehensive monitoring and evaluation have been carried out before, during and after the trials. Main results are reported below. Figures compare the situations in 2006 with the trial being implemented versus the 2005 situation.

Car and truck traffic

- 19% reduction of number of car trips towards and out of the inner city (- 100 000 car trips) on 24 hour period
- 22% reduction of car trips towards and out of the inner city during charged period
- 10% reduction of truck trips towards and out of the inner city during charged period
- smaller reduction in morning rush hours, greater reduction in afternoon rush hours
- 30% reduction of journey times in morning rush hours on road axes towards the charged area
- 50% reduction of journey times in afternoon rush hours on road axes towards the charged area
- no significant change of road traffic volumes on orbital roads

Public transport

- 16 new bus routes to the inner city
- 197 additional buses purchased
- higher frequency on existing bus routes towards and inside the inner city
- increase of rail supply (new departures, longer trains)
- 6% increase of the number of people using public transport (+ 40 000 travellers per day)
- 8 or 9% increase of the journeys made by public transport to, from and through the inner-city

Parking

- 2 800 additional parking lots provided before launch of the trial
- total of 13 800 parking lots available in park-and-ride spaces
- 23% increase of cars parked in park-and-ride spaces

- park-and-ride free of charge for commuters with public transport card

Local air quality and ambient noise

- 13% reduction of PM10 emissions in the inner city
- 8.5% reduction of NOx emissions in the inner city
- 14% reduction of COV emissions in the inner city
- 20 or 25 fewer premature deaths per year yield by road traffic emissions reduction
- no significant changes of ambient noise levels

CO2 emissions

- 40% reduction inside the charged area
- 2 or 3% reduction in Stockholm County

Road safety

- 5 to 10% reduction of the number of injuries in the inner city (40 to 70 less injuries per year)

Economic impacts

- no significant negative effect on retail, positive effects even experienced in inner City (+10%)
- benefit yield by decrease of journey times = €64.4 millions per annum
- benefit yield by better road safety = €13.4 millions per annum
- benefit yield by better health due to better environment = €9.7 millions per annum
- levied charges = €82 millions per annum
- running costs = €21.5 millions per annum

Building on the positive results demonstrated by trials and good acceptability of the scheme, a referendum on the permanent implementation of congestion charges took place on 17 September 2006. 53% of voters supported the permanent implementation of the charging scheme.

More information available at: www.stockholm.se/miljoavgifter and www.stockholmsforsoket.se

Detailed facts and results are available at: http://www.stockholmsforsoket.se/upload/Hushall_eng.pdf

Review of road pricing schemes by the Commission for Integrated Transport (UK)

The Commission for integrated Transport in the UK has reviewed existing road pricing schemes worldwide, with a view to:

- Provide a factual and easily accessible database summarising the main features of schemes currently in operation;

- Examine whether there are lessons to be learnt for the UK work.

At present, the review includes 22 case studies of road pricing practices across 14 countries. Further studies will be added as information becomes available.

This thorough review is available at: <http://www.cfit.gov.uk/docs/2006/wrrp1/index.htm>

IMPACT conferences

IMPACT website provide valuable information on cities experiences in the field of transport demand management schemes: www.impacts.org (click on 'conferences')

ECMT conference, Paris, June 2006

At ECMT conference in June 2006, several representatives of cities and national administrations shared experiences on road charging, with particular focus on monitoring and enforcement technologies.

Presentations are available at: <http://www.cemt.org/topics/taxes/Paris06/index.htm>

UITP workshop, Stockholm, May 2006

UITP has organised a workshop on urban road charging in Stockholm on 12 May 2006. All presentations can be downloaded from the UITP electronic library Mobi+, see: <http://uitpdata/docroom/>

References

IMPRINT project: www.imprint-eu.org

This project aimed to:

- bring together policy-makers, operators, researchers and other stakeholders in order to promote the implementation of fair and efficient transport prices.
- organise five high profile, international seminars where the needs of policy-makers and the findings of research will be synthesised and debated.
- produce high quality reports summarising research and putting forward recommendations on how to implement the required pricing reforms.

Key conclusions are available in: <http://www.imprint-eu.org/public/key-concs.pdf>

CANTIQUÉ project

The CANTIQUÉ project aims to inform policy makers on the use of non-technical transport measures to improve air quality and reduce emissions of greenhouse gases, mainly CO₂.

CANTIQUÉ deliverables are available in: <http://forum.europa.eu.int/Public/irc/env/transport/library> (go to 'Studies, research, etc.' folder).

UNITE project: www.its.leeds.ac.uk/projects/unite

The UNITE project is designed to support policy-makers in the development of pricing and taxation policies for the transport sector and refers to three aspects: transport accounts, marginal costs and integration of approaches.

See in particular deliverable 3 on 'Marginal cost methodology'

AFFORD project: <http://www.cordis.lu/transport/src/afford.htm>

The approach of the AFFORD project consists of the following steps:

1. Identify and define practical measures to implement marginal cost pricing;
2. Assess the effectiveness of these measures in internalising transport externalities and affecting demand;
3. Examine institutional barriers affecting the implementation of these measures;
4. Assess the public and political acceptability of these measures, and define solutions to improve acceptability if needed.

The output is a set of policy guidelines for the introduction of marginal cost pricing in Europe, in the context of urban transport and also more generally.

CAPRI project: <http://www.its.leeds.ac.uk/projects/capri/>

The objective of the Concerted Action on Transport Pricing Research Integration is to bring together the results of research studies that relate to the role of pricing in transport policy development.

MC-ICAM project: <http://www.strafica.fi/mcicam>

MC-ICAM is a research project funded by the European Union which examines policy reform in the pricing of transportation. In particular, it examines optimal implementation (or transition) paths from a situation with low pricing of transportation to a situation with socially optimal pricing, in which users bear the full marginal social cost of their activities.

MC-ICAM evaluates the different paths by examining how they affect social welfare over time, the technological and institutional changes which they generate or require, and the political support for marginal cost pricing which they induce over time. Some of the work consists of theoretical analysis. Other work examines selected geographic areas, providing both descriptive studies (of institutions, attitudes, etc.) and numerical estimates of optimal implementation policies.

The project produced policy recommendations about how to implement marginal cost pricing.

PROPOLIS project: <http://www.wspgroup.fi/lt/propolis/>

PROPOLIS developed and tested integrated land use and transport policies, planning tools and comprehensive assessment methodologies in order to define sustainable long-term urban strategies and to demonstrate their effects in European cities.

Urban Transport Pricing: cluster of EU projects

The European Commission is currently funding 6 projects under the Key Action Sustainable Mobility and Intermodality of the Fifth Framework Programme for Research, Technological Development and Demonstration to explore the technical, financial, operational, political and social issues of implementing urban road pricing projects.

See further information [here](#).

CIVITAS demonstration activities on road pricing

CIVITAS cities such as Stockholm, Genoa, Rotterdam, Toulouse are involved in experimenting or assessing demand management and revenue raising strategies based upon integrated pricing strategies by means of introducing full scale area-wide or city-wide pricing schemes. They reflect on how to incorporate integrated strategies for road and cordon pricing, possibly in combination with innovative use of pricing of parking and of public transport.

For further information, see [here](#).

6. Access restriction for the most polluting vehicles

Key points

Regulating access for some categories of vehicles is being developed in the EU, Japan and Korea with the view to reduce air pollution. Such access restrictions are often called 'Low emission zones' (LEZs), 'Environmental zones' or 'Clean zones' and concern central parts of conurbations.

In several European cities, such access restrictions might need to be considered in order to comply with air quality limit values for PM₁₀ (to have been attained by 2005) and NO₂ (to be attained by 2010) and the consequent obligation to draw up air quality management plans if these limits risk being exceeded in compliance with EU law. They may also be considered with the view to manage environmental noise and the consequent obligation to draw up noise action plans in compliance with EU law.

Such schemes are worth considering because they may bring many side benefits such as accelerating the introduction of cleaner and low noise vehicles in businesses and public fleets, boosting the market for cleaner and lower noise vehicles, reducing congestion, reducing CO₂ emissions, reducing energy consumption, improving road safety and protecting cultural heritage of city centres.

Overall, the environmental benefits will depend on the categories of restricted vehicles, size of perimeter and enforcement means. However, experience and feasibility studies show that, if well enforced, access restriction based low emission zones are potentially an efficient way to reduce road traffic related emissions.

Lessons drawn from experience and research

The most important issues to tackle when designing LEZ are the definition of the restriction criteria, the design of the zone and the means of enforcement.

- Although LEZ should not be considered as a panacea, they are worth considering in the framework of an integrated transport strategy. Combined with road pricing, parking policy or traffic calming measures or other modal shift policies, they are potentially very efficient.
- Access restrictions should be designed by seeking synergies between air quality management, environmental noise management and CO₂ emissions reduction. Its objectives should be clearly expressed and take into account the local environmental situation.

- To be compatible with the Treaty, any restrictions affecting intra-Community trade have to be *necessary (e.g. ambient air pollution or ambient noise risk exceeding limit values), proportionate and non-discriminatory*. The report of EC Working Group on Environmental zones provides more legal details in this respect (see further reference). It is recommended to consider these issues with the relevant Member State department
- When access restrictions are the result of air quality situation, it is recommended that restriction criteria refer to EURO classes
- When access restrictions are the result of ambient noise situation, noise related restriction criteria could be included and based on pass-by noise emission levels measured according to type-approval methods laid down in Directive 70/157/EC. Such restrictions could be envisaged under noise action plans required by Directive 2002/49/EC. The enforcement perimeter should be designed taking into account results of strategic noise maps.
- It is recommended that access restrictions modalities allow retrofitted vehicles to enter the restricted zone in order to encourage such upgrading and ensure equal treatment of these vehicles.
- In order to avoid discriminating restrictions, it is strongly recommended to implement transparent certification schemes by sharing information on certified retrofitted equipments and certification modalities. As announced in its strategy on air quality the Commission will consider establishing a common framework in this respect with a view to overcome implementation problems.
- Databases developed and published on the web¹ by national notified bodies responsible for vehicles emissions and noise EU-certification provide useful information to enforce such schemes.
- It is recommended that when defining restriction criteria, impact assessments are made for several options in order to identify possible trade-offs and select options that strive to yield benefits related to better air quality, less ambient noise exposure and less CO₂ emissions. It is useful to consider short, medium and longer term impacts.
- Cost-benefit analysis is particularly worthwhile to help in identifying the best options, since many options are possible depending on the environmental targets, the categories of vehicles banned, the size of the zone and the means of enforcement. Nevertheless, the final decision will also much be influenced by the feasibility and cost of implementation and enforcement.

¹ http://europa.eu.int/comm/environment/co2/co2_database.htm

- A relatively large enforcement zone will likely be necessary to achieve a significant effect on air quality and environmental noise. For example, the feasibility study of the Low Emission Zone in London concludes that the appropriate size should be the entire Greater London area.
- Restrictions should pay attention to interferences with through-traffic roads, as the impact on the transport infrastructure may be large and enforcement uneasy.
- The perimeter of the zone should also be clear for road users. In existing cases, the most common boundaries for the zone are natural and physical barriers, ring roads, and administrative borders.
- Clear signs and information boards with maps of alternative routes are necessary if the system prohibits access for certain groups of vehicles in a larger area. Information campaigns with posters, brochures, websites and the media will be needed to explain the meaning and goals as well as enforcement procedures.

Good practice

Malmö, Stockholm, Lund, Göteborg

The four Swedish cities were the first to introduce LEZs a few years ago.

Objective

The main objective was to improve environmental conditions in particular air quality (NO₂ and PM) and noise.

Enforcement zones

The four cities have adopted the following criteria to choose the enforcement zones:

- Many dwellings
- Pedestrians and bikers on the streets
- Environmentally sensitive buildings
- Parks and green areas which could be harmed by environmental impacts from traffic
- Heavily affected by air pollution and noise

The 4 zones could be described as relatively large, covering the larger central urban areas. The restrictions are applied on all roads with the exception of some major trunk roads. Their characteristics are the following:

Stockholm: 35 km² – 250 000 inhabitants – 280 000 jobs

Göteborg: 15 km² – 100 000 inhabitants – 100 000 jobs

Malmö: 9 km² – 80 000 inhabitants – 50 000 jobs

Lund: 4 km² – 17 000 inhabitants – 19 000 jobs

In Stockholm the total volume of traffic within the environmental zone is about 500 million vehicle x km per year. The share of heavy duty vehicles (trucks and buses >3.5 tonnes) is about 5%, i.e. 25 million vehicle x km per year.

Access criteria and time of application

Restrictions are enforced by municipalities for heavy-duty diesel powered vehicles with a gross weight over 3.5 tonnes. The basic requirement is that heavy duty vehicles older than 8 years are not allowed to enter the environmental zone. Exemptions can be made for retrofitted vehicles e.g. with an approved after treatment device or exchanged engine. The restrictions are applicable to all vehicles, Swedish and foreign. The requirements are applied continuously, no time differentiation.

Modifications of the access criteria are now envisaged in order to base them on emissions instead of age of vehicles.

Compliance and enforcement means

The age of the vehicle may be verified by a sticker confirmed and provided by the concerned municipality. The vehicle registration certificate could also be used to verify the age. The municipalities also monitor the compliance by visual inspections of the traffic. These inspections are carried out on a regular basis by the Road department and Environment department of the concerned municipality.

According to the control in Stockholm, 80% of the heavy-duty vehicles were 8 years old or younger, i.e. they met the basic requirement, 10% were retrofitted and met the requirements that way. This means that 90% of the vehicles met the requirements and 10% of the vehicles entered the zone illegally. Entering the environmental zone against the regulations is considered as a violation against local traffic regulations and subject to a fine of about 600 SEK (65 €).

Information, consultation and public awareness

The concerned municipalities have developed posters and brochures describing the regulations. This information is available in Swedish, English and German. In addition information on the regulations can be found on the official websites of the municipalities.

Impacts

Environment

Evaluations of the environmental effects have shown a significant decrease of emissions of PM10 and NO2 and from heavy-duty vehicles. An evaluation in Stockholm 2001 showed that the emissions of PM10 from heavy-duty vehicles were reduced by 40% and of NO2 by 10% (compared to a 0-alternative, with no environmental zones).

Costs

A year after implementation, a cost/benefit analysis was performed for Göteborg, comparing environmental gains with costs for industry. Based on a survey of measures taken by industry during the first year, costs were calculated to 128 million SEK for the period 1996-2001.

Comparison: Costs/Benefits

Benefits were estimated to 101 million SEK for the same period (lower estimations). Hence estimated costs were higher than the estimated value of benefits. However, according to the urban areas themselves, attention should also be paid to the value of increased technological progress. Others have highlighted the argument that higher values for environmental benefits should be applied in pure urban areas.

See also: http://www.tellus-cities.net/media/en/Goods_WS05_Goods_Management.pdf

Greater London Area

Proposed London Low Emission Zone

Early in 2006, Transport for London (TfL), on behalf of the Mayor of London, Ken Livingstone, consulted on proposals to introduce a Low Emission Zone (LEZ) in London. Following that consultation, TfL made some amendments to the proposal and is now consulting on the details of the proposed London LEZ. The consultation closes on 2 February 2007. The following information about the London scheme is based on the information provided for the consultation. It is worth noting that a number of other cities in the United Kingdom are considering potentially introducing similar LEZ schemes, although none is expected to do so before London.

The consultation documents, and other reports (e.g. feasibility study, impact assessments) relating to the proposed London LEZ can be found at: <http://www.tfl.gov.uk/tfl/low-emission-zone>

Objectives

The objectives of the proposed London LEZ are:

- To move London closer to achieving the air quality objectives (and EU limit values) for 2010, in support of the UK Government's Air Quality Strategy and the EU's Air Quality Framework and Daughter Directives; and
- To improve the health and quality of life of people who live and work in London, through improving air quality.

The LEZ, which would cover the whole of Greater London, and would operate 24 hours a day, 365 days a year, would seek to achieve these objectives by deterring the use of the most individually polluting vehicles in London, which are diesel-engine heavy goods vehicles (HGVs) over 3.5 tonnes, buses, coaches, heavier light goods vehicles (LGVs) between 1.2 tonnes and 3.5 tonnes and minibuses. Encouraging such vehicles to meet specified emission standards to drive within the LEZ would reduce the concentration of PM₁₀ and NO_x in the air, and so improve the health of people living in, working in and visiting London.

Access criteria

In order to drive within the LEZ without charge, vehicles would have to comply with certain Euro standards. Non-compliant vehicles could still drive within the LEZ but their owners would have to pay a daily charge in order to do so. It is proposed that the daily charge would be £200 (approx. €300) for HGVs, buses and coaches and £100 (approx. €150) for heavier LGVs and minibuses.

From 2008, HGVs, buses and coaches would have to meet the Euro 3 standard for PM in order to drive within the LEZ without charge. From 2012 this standard would be tightened to Euro 4 for PM. Heavier LGVs and minibuses would be included in the LEZ from 2010, and would have to meet a standard of Euro 3 for PM.

Under the proposals, operators would have a range of options available to them for making their vehicles compliant with the LEZ. Operators may choose to fit particulate abatement equipment, replace or re-engine their vehicles, reorganise their fleets so that only compliant vehicles operate within London or pay the daily charge. TfL is working with other organisations to ensure that sufficient information is available to operators about their options for complying with the LEZ. A helpline where operators can get more information about the current consultation has been established.

It is proposed that a small number of vehicle types would be exempt from the scheme. These include agricultural vehicles, military vehicles, historic vehicles, non-road going vehicles which are allowed to drive on the highway and certain types of mobile crane.

Under the current proposals, private cars would not be affected by the LEZ, although the Mayor of London has asked Transport for London to consider the feasibility of potentially including such vehicles within the LEZ at a later stage.

Enforcement

It is proposed that the London LEZ would be enforced using Automatic Number Plate Recognition (ANPR) cameras similar to those used successfully for the enforcement of the Central London Congestion Charging Scheme. The cameras would be located across Greater London and would be both fixed and mobile. TfL would build a database of compliant and non-compliant vehicles using data provided by the UK vehicle licensing agency (DVLA) and other data sources. The cameras would read the number plates of vehicles in the LEZ and check whether a payment had been made for non-compliant vehicles. If such a payment were not received by the by the end of the day after travel within the LEZ, a penalty charge notice would be issued to the operator.

It is likely that affected vehicle types licensed outside the UK would need to be registered with TfL before they could be brought into the LEZ, as there is no Europe-wide vehicle licensing agency from which TfL could obtain the necessary information. This would enable TfL to determine whether the vehicle was compliant (because of its age or because it had pollution abatement equipment fitted) or whether a charge should be paid. In the case of retrofitting, TfL would accept evidence from other certification agencies in other European countries. TfL is working with other cities and certification schemes across Europe to establish the equivalence of these certifications. Should the Mayor of London approve the scheme, TfL would run a large-scale publicity campaign to make sure operators were aware of the requirements of the scheme and how to comply with it, including via the internet. Information and registration procedures will be made available in a large number of languages, including all EU official languages.

Projected Impacts

Emissions and Air Quality

The proposed LEZ is projected to reduce the area of Greater London exceeding the daily PM₁₀ limit set down in EU legislation by some 7.4% in 2008 and by some 14.7% in 2012. It would reduce the area exceeding the annual PM₁₀ objective by some 16.2% in 2012. It would also reduce the area of Greater London exceeding the annual mean NO₂ objective by some 15.6% in 2012. It is not anticipated that the proposed LEZ would have a significant impact on carbon dioxide (CO₂) emissions.

Health

Modelling suggests that in 2012 the proposed LEZ would result in around an 18% reduction in the number of people in London living in areas exceeding the annual PM₁₀ limit value, and around 16% reduction in the proportion of people living in areas exceeding the annual NO₂ limit value. The reductions are expected to be most significant for deprived communities who tend to live in areas of poor air quality. Over the period 2006 – 2015, the total monetised value of the health benefits (inside and outside London) of the LEZ are estimated to be between £160m (€240m) and £240m (€360m) (UK DEFRA methodology) and between £240m (€360m) and £640m (€960m) (EU CAFE methodology)

Economy and Business

Whilst some sectors of the economy could be adversely affected by the proposed LEZ, others would benefit. Sectors that could potentially be adversely affected include small construction businesses, tourist coach operators and small businesses, particularly those with heavier LGVs. The bulk of these costs would likely be passed onto UK consumers, but these costs are likely to be spread over a large area and as such would constitute a very small proportion of household incomes. Ancillary sectors such as the pollution abatement equipment industry and the vehicle maintenance sector are likely beneficiaries of the proposed LEZ, as it would increase demand for vehicle parts, accessories and retrofitting services.

Next steps

The consultation will run until 2 February 2007. TfL will then prepare a report to the Mayor on the consultation. The Mayor will then decide whether or not to go ahead with the LEZ. Should the Mayor decide to proceed with the LEZ scheme, the next steps in the process would be:

- Spring 2007 – launch of LEZ enquiries service
- Summer 2007 – registration opens for those operators who need to register with the scheme

- Autumn 2007 – operators are able to pay the daily charge for non-compliant vehicles in advance of the introduction of the scheme
- February 2008 – scheme to commence for diesel-engine HGVs over 12 tonnes
- July 2008 – scheme to commence for diesel-engine HGVs between 3.5 and 12 tonnes, buses and coaches
- October 2010 – scheme to commence for heavier diesel-engine LGVs and minibuses
- January 2012 – emissions standard to be tightened to Euro IV for PM for diesel-engine HGVs over 3.5 tonnes, buses and coaches.

If the Mayor confirms the Scheme Order, a significant operator information campaign would take place to increase operator awareness of the LEZ. The earliest a LEZ could be operational in London would be February 2008.

Source: TfL 2006

References

Commission Working Group on Environmental zones

<http://forum.europa.eu.int/Public/irc/env/transport/home>

(go to LIBRARY - WG reports – 2004 WG Environmental zones final report)

CIVITAS initiative:

Several experiments aimed at introducing low emission zones are described in www.civitas-initiative.org

(go to CIVITAS measures > access restrictions).

They concern Roma, Venice, Debrecen, Göteborg, Suceava, Norwich, Stuttgart, Stockholm, Malmö, Lund

7. Parking management

Key points

Parking management has either been neglected or used wrongly in the past, many cities assuming that parking should be abundant and free in order to facilitate access to road vehicles.

Parking policy making is a difficult task, being the matter of numerous and sometimes contradictory expectations from the part of various stakeholders involved. Parking is indeed a complex area for it must consider a wide variety of needs which vary according to the periods of the day, the economic activities, the parking users, the parking locations, the transport means. Variety of parking statuses and lack of coordination of parking policies in a same conurbation add to this complexity.

Parking policy is however an important lever in restricting car traffic demand and implementing modal shift. Swiss example shows that a good parking policy is definitely an important tool in maintaining and enhancing the 'urban quality' of our towns and cities. It also plays an important role in the success of intermodal passenger transport systems.

Lessons drawn from experience and research

- Parking policies should be coordinated at conurbation level.
- Parking policy should consider several categories of parking users (residents, visitors, local and distant commuters, urban freight operators, collective transport users, cyclists).
- Parking policy should consider several categories of supplies (public/private, on/off-road).
- Parking policy should consistently combine several parking instruments (regulation, pricing, supply, communication).
- In many cities, a minority pays for their parking. Controlling compliance with parking rules is an important element of any parking policy. It is possible to improve compliance without necessarily increasing the rate of offences. Quality of controls could be rather improved by better training of supervisors and better criteria triggering supervising (including randomly supervision).

- Residents should be encouraged to leave their car parked at home. Implementing attractive car-parking fees and subscriptions for residents is a possible effective solution. Pricing offers could cover car-parking for one car per household and attractive subscription to collective transport, car-sharing or bike renting as an incentive to modal shift. Existing on-road and off-road parking supply should be reallocated to residents first, especially in city centres and mixed (residential-business) quarters where parking spaces often lack for residents.
- Parking policies should also target commuters by managing their parking availabilities as availability of parking at workplaces is highly correlated with intensive car-use to work.
- On-road and off-road parking supplies should be duly regulated or charged for this category of users. Collective transport should particularly constitute a real alternative for commuters.
- To support this, park and ride should also be developed and priced in order to encourage commuters to shift to collective transport.
- Travel plans should be developed involving major businesses with the view to reconsider parking supply at work places and foster alternatives to private car.
- Moreover, in business areas well connected to public transport, parking supply should be reallocated to other users or other purposes than commuters' parking.

Commuting in French cities

Commuters' cars freeze public space during 95% of the day time

Commuters journeys are typically 30 % of all journeys though their average length is higher than the one of other journeys (commuting is 45% of veh x km in Paris conurbation)

70/75% of commuters having on/off-road parking place available at work go to work by car whereas only 35% go to work by car when they don't have parking place at all available at their workplace

- Parking policies should equally consider public and private parking supply. The latter is more difficult to control though it may represent the main supply.
- Land use planning and building regulation are therefore essential for they could proactively limit parking space for cars and require minimum parking space for bicycles in new settlements.

ABC policy in the Netherlands sets a maximum number of parking spaces per employee for offices and economic activities in areas well connected to public transport.

- Public transport supply is mainly focused on town centres and radial axes converging to city centre. Parking policy in city centres may thus have a negative effect on the competitiveness of public transport, in particular if parking supply is abundant and cheap.
- More, dissuading parking in city centres influence modal choice and can significantly boost the use of public transport

Number of parking spaces per 1000 jobs (included parking provided by businesses and shops)	< 100	100 – 250	250 – 500	> 500
Market share of public transport (% of motorized trips)	40%	27%	19.5%	9.5%

Source: UITP – Mobility in Cities Database – data collected in 2001 from a sample of 50 towns

- Consistency of parking policy with other measures should be checked; e.g.: development of charged parking without effective control of payments, development of parking areas in city centres to facilitate shopping without restrictions for commuters; development of peripheral park and ride facilities for commuters without controlling parking supply at workplace in city centres
- Foster use of cleanest vehicles: cleanest vehicles could be favoured by lower fees and dedicated parking supply in order to encourage people to own and use these kinds of vehicles
- Parking control measures are another way to reduce car traffic and the number of cars on the street in commercial or residential areas. Here, a number of different approaches have been identified, e.g. reducing the supply of spaces, restricting the duration of parking or the opening hours, regulating their use through permits or charging and/or promoting the pre-booking of parking. Special measures may be adopted to target the needs of different groups such as local residents. However, the impact of this kind of measures depends very much on a gradual implementation, the coordination over time and space of parking restrictions, and the coupling with complementary measures (e.g. park & ride).

Good practice

Graz (AT): Lower parking tariff for low emission vehicles

Low emission vehicles can get a 30 percent reduction of parking fees in Graz. This new differentiated parking system is expected to encourage more citizens to use low emission vehicles. Drivers of non low emission vehicles have to pay €1.20 per hour, whereas low emission vehicles pay €0.80 per hour. Hence, the scheme gives real benefits to low emission vehicles and provides a popular selling point of the new system.

In order to get the reduction, the car has to comply with EURO 4 emissions standards (all new cars sold after 1 January 2005 must comply with EURO 4 emissions standard) and be low CO₂ emission. Petrol cars have indeed to emit less than 140 gCO₂/km whereas diesel cars have to emit less than 130 gCO₂/km and be fitted with particles trap.

To get the special fee the drivers will have to register their vehicle at the city council. Then they will get a special parking coin ('Umweltjeton') and a special sticker.

The sticker is an official document that is filled out by the city and includes the car number, type of car, colour of the car and the official seal of the city of Graz. The Umweltjeton and the special sticker are free, so no extra registration fee is applicable. The sticker is valid for two years; the user can apply for a time prolongation of the sticker. The Umweltjeton is to be inserted into parking machines to trigger the fee reduction. Once inserted, the parking ticket is marked in the upper corner with a U meaning 'Umweltticket' (environmental friendly ticket). The sticker has to be located on the dash board behind the windscreen to be clearly visible for the enforcement team.

Source: CIVITAS initiative www.civitas-initiative.org

Paris (FR): a parking policy that favours residents, electric and small vehicles

Paris recently reviewed its parking policy and gave the priority to residents with the view to encourage them to leave their cars close to their homes and use other modes of transport.

In order to dissuade commuters and visitors to use their cars and park them into Paris during the major part of the day, free parking is totally being replaced by priced parking. From now on, 80% of on-road charged parking is accessible to residents; this parking possibility is effective where there is a yellow stick on the parking machine.

In districts close to their homes, parking fees applicable to residents are very low: €0.50 per day compared to almost 2.30€ before. Residents have a special parking card that has to be let on the dash board behind the windscreen together with the parking ticket. During periods of high air pollution, parking is free for residents. Residents benefit from 20 to 30% fee reduction in off-road public parks.

Electric vehicles can park on-road for free during the first two hours. Low fees apply to these vehicles as well as to small vehicles (less than 3 meters length) in public off-road parks. A special parking card is delivered to electric vehicle owners by the municipality in this respect. Fast battery recharging equipments are available in parking areas where electric vehicles can benefit from those advantages.

Bern (CH): an effective package of parking measures

Bern has an active and well-documented parking policy strategy. It can be considered as a good example as it comprises many types of possible *parking policy measures*:

- In the central districts of the city of Bern parking fees of 2 CHF/h are levied. Local authorities agree that in the next years a spatially differentiated parking fee system should be introduced including a doubling of the parking fees. Beside of parking fees parking time restrictions are the other main instrument of parking policy in the central districts of Bern.
- Visitors of large events in the main sports stadium or in the exhibition centre have to pay parking fees of 5 CHF per half day and of 10 CHF per day. Public authorities introduced the Blue Zone in almost all residential areas. Parking time for non-residents is limited to 90 minutes; residents can buy a park card for 20 CHF per month or 240 CHF a year.
- A Park & Ride (P+R) concept describes management schemes to be kept by the operators of P+R facilities and locations criteria that should be taken into consideration when the provision of new P+R facilities is planned.
- The government of the Canton of Bern has drawn up guidelines for parking policy measures (e.g. introduction of parking fees that include the cost of land use and maintenance and the investment cost) of the car parks of the public administration.
- As there is no legal basis to force private firms to realise parking policy measures on existing car parks, the public authorities have worked out the handbook "Implementation of parking policy measures" to make available useful information for firms intending to introduce voluntarily parking policy measures.

Vienna (AT)

Car-free housing

This project (in German "Autofreie Mustersiedlung") is Vienna's first car free development. As one central pre-condition, residents oblige themselves to not own a car. Instead of 250 parking-spaces (one per housing unit, as designated in legislation), only 20 had to be built, which serve as Car Sharing parking-spaces and to park bicycles. The aim was to create a car free housing project with some 250 flats/units. Good public transport services and car sharing facilities in the settlement guarantee mobility to the tenants, which oblige themselves to not own a car. Financial savings by not building a parking garage were used to create common facilities (such as bicycle repair shop, sauna, common rooms, public laundry, solar water heating, green space, etc.) to increase residents' quality of life.

Parking Space Management

The Parking Space Management of Vienna consists on the limitation of the parking time. The objective is twofold: reducing motorised traffic by reducing long-term parking of non-residents, and improving safety for pedestrians by reducing illegal parking.

The results were positive, with a decrease of slot capacity utilisation in the streets (thus shortening the waiting time for parking), a reduction of illegal parking and over all the sceptic attitude of most of the population before the implementation of the measure turned into a largely positive one.

Source: SMILE database <http://www.smile-europe.org/frame22.html>

References

COST 342: <http://www.cordis.lu/cost-transport/src/cost-342.htm>

Objectives

The main objective of COST 342 has been production of guidelines in order to increase the available knowledge on best practice in parking management and in parking policies and their effect on mobility and the economy. These guidelines contain information, including examples of case studies, on the effect of the various management measures and policies.

The deliverables of COST 342 are:

- A report describing standard parking management measures and the standard procedures for the description and analysis of parking policy measures.
- Reports on the national inventories (Switzerland, Austria, The Netherlands, Belgium, Latvia).
- A Guideline of best practices on parking management and of best practices on parking policy.

Final report is available here: <http://www.crow.nl/shop/productDetail.aspx?id=789&category=90>

Parking management under CIVITAS initiative

Several cities implement parking management demonstration measures under CIVITAS initiative.

See: <http://www.civitas-initiative.org/> (go to CIVITAS measures > Access restrictions)

Parking management: strategies, evaluation and planning

Victoria Transport Policy Institute has described and evaluated more than two-dozen of parking strategies. It investigated problems with current parking planning practices, discussed the costs of parking facilities and the savings that can result from improved management, described specific parking management strategies and how they can be implemented, discussed parking management planning and evaluation, and described how to develop the optimal parking management program in a particular situation. Cost effective parking management programs can usually reduce parking requirements by 20-40% compared with conventional planning requirements, providing many economic, social and environmental benefits.

More details are available in: http://www.vtpi.org/park_man.pdf

Certu's handbooks on parking policies

The Certu (the French Center for the study of urban planning, transportation and urban facilities placed under the authority of Transport Minister) elaborated several handbooks to the attention of cities on parking policies and good practice on parking management.

8. Promoting low-emissions and low-noise road vehicles

Key points

Over the last few years a wide range of innovative concepts for making urban transport more efficient, competitive and sustainable have been developed in Europe. However, the full deployment and mainstreaming of those innovative concepts has not been fully taken up by urban transport authorities all over Europe.

Several cities in Europe are paving the way by developing ambitious strategies aiming at including environmental performances in every day to day practice or decision with a view to foster use and ownership of cleaner, quieter and lower CO₂ – thus more energy efficient - vehicles. Such strategies have a great potential to bring about decisive noise or emissions abatements.

The possible instruments in hands of local or regional authorities are numerous: programmes on retrofitting, retiring, and replacing polluting engines; increasing the use of cleaner fuels and vehicles in public fleets; designing and enforcing local regulations favouring cleanest, quietest and most energy-efficient vehicles; and investing in pollution control technologies, public education etc.

Lessons drawn from experience and research

- Technologically neutral specifications can be referred to in local mobility management measures to reward cleanest vehicles and penalize the less environmentally friendly, for instance based on type-approval related performances based criteria (e.g. EURO classes, pass-by noise emission certified in accordance with Directive 70/157/EEC, CO₂ emission in g/km certified in accordance with Directive 93/116/EEC for cars) ; it is likely that this way is the most cost-effective to get cleaner, quieter, more energy efficient and lower CO₂ vehicles
- Pioneer cities consider establishing access restrictions to most polluting and noisy vehicles, as it is without a doubt a powerful instrument to influence fleets private and public green procurement (see relevant paper in the same section)
- They encourage and guide the development of green public procurement for renewal of private and public fleets; pave the way, by setting an example starting with city's captive fleets and disseminate the results and lessons brought about by the experience to other public owners of captive fleets

- They support and implement retrofitting (exhaust after treatment, engines) of captive fleets (public transport, taxis, companies cars, urban deliveries, urban utility vehicles) as it may be cost-effective solutions in order to reduce harmful emissions, particularly fine particles; pay however attention to certification, aspects of retrofitting equipments, warranty of vehicles, quality of fuels used with retrofitted vehicles; here again, it is important to consider technology neutral specifications in order to get to cost-effective solutions
- They foster and reward use of cleaner vehicles in local regulations, schemes and decisions: parking supply, parking fees, car-sharing schemes, travel plans, road charging, land use regulations for new housing, urban delivery schemes, traffic calming schemes, incentive schemes
- They support and foster the development of alternative fuelling schemes, with a view to consistently support incentives schemes and encourage reduction of our dependence on fossil fuels
- They pay attention to the staff management: training, capacity building is necessary to have thorough knowledge about the available technologies (benefits, drawbacks)
- They build acceptability and support by trials and demonstration projects
- They implement a strong communication strategy with the cooperation of environmental and energy agencies in order to thoroughly inform the public on environmental performances and energy efficiency of vehicles; communicate on existing ratings and labelling systems and support their dissemination
- [Public databases](#) on noise, emissions and CO₂ published by certification bodies and scientific organisations could be exploited in order to raise public and fleet owners awareness on large differences across categories of vehicles and in the car market and get support to set performances based specifications

Good practice

Stockholm's paving the way towards market breakthrough for cleaner urban vehicles
--

Stockholm has managed to start a market breakthrough for clean urban vehicles through long and decisive work, including a cross-party political unity. Currently more than 3 % of all vehicles sold in Stockholm are ethanol, biogas or electric hybrids. Prognosis is that we reach 5 % by the end of the year and 8-10 % in 2 more years.

The ambitious package of implemented measures is presented below.

1-Testing new technology, e.g.

- Electric, biogas and ethanol vehicles
- Electric two-wheelers
- Electric-hybrid lorries
- Ethanol buses
- Fuel cell buses
- Biogas production and distribution
- Emission tests of factory made and converted vehicles

2- Making clean vehicles available in Sweden through large joint procurement (gathering 3,000 buyers made Ford develop and introduce an ethanol car at the Swedish market. This is now No 6 on the top-10-list of sold vehicles

3-Providing/promoting clean fuelling facilities

- Fast charging for electrical vehicles
- Free normal-speed electrical charging
- 7 biogas stations
- 26 ethanol stations

4-Information

- National web site
- National and local newsletters
- Seminars
- Advertisements
- Meetings with companies
- Co-operation with car-dealers and fuel companies
- Test fleet for potential buyers

5-Incentives

- Discount on parking for clean vehicles
- No congestion charges for Clean vehicles

- Requiring clean vehicles when procuring transport services
- Making Clean vehicles cheaper through common procurements
- Subsidies to especially expensive Clean vehicles (Trendsetter)

6-Pushing for national incentives/changing of obsolete legislation, e.g.

- CO2 and Energy tax discount for biofuels
- Discount on Company car tax for Clean vehicles
- No congestion charges for Clean vehicles (a national law and an EC statement was necessary to make this possible)
- Make it legal to give parking discounts to Clean vehicles
- Make it legal to convert to ethanol propulsion
- Make national authorities to buy Clean vehicles
- Promote a national definition of Clean vehicles

Results and outlook:

All inner-city buses (250) are either ethanol or biogas (bio-methane). 3 of them are also fuel-cell, but that is just a pilot. The aim is to change all 2,200 buses for clean ones by 2030.

There are currently 9 biogas (=bio-methane) waste-trucks, another 25 will come next year, due to requirements in the service procurement

Taxi is also coming - two companies have ordered 200 biogas vehicles, and other companies are likely to follow, due to requirements in procurement.

Heavy duty vehicles will be further concerned.

London's strategy for cleaner taxis

The Mayor of London's Taxi Emission Strategy is part of the move to bring London closer to meeting national and EU air quality objectives for 2010. In 2006 the process to eventually get all older taxis in London to meet the stricter Euro 3 regulations gets underway. Around 10,000 taxis, which are pre-Euro or Euro 1, must meet the new emission standard as they are presented for the annual test between July 2006 and June 2007. In the region of 6,000 Euro 2 taxis must also meet the new standards as they are presented for their tests between July 2007 and June 2008. Any not meeting the Euro 3 regulations will be removed from service.

For more details, see [London's strategy](#) for cleaner taxis.

Graz (AT): Lower parking tariff for low emission vehicles

Low emission vehicles can get a 30 percent reduction of parking fees in Graz. This new differentiated parking system is expected to encourage more citizens to use low emission vehicles. Drivers of non low emission vehicles have to pay €1.20 per hour, whereas low emission vehicles pay €0.80 per hour. Hence, the scheme gives real benefits to low emission vehicles and provides a popular selling point of the new system.

In order to get the reduction, the car has to comply with EURO 4 emissions standards (all new cars sold after 1 January 2005 must comply with EURO 4 emissions standard) and be low CO₂ emission. Petrol cars have indeed to emit less than 140 gCO₂/km whereas diesel cars have to emit less than 130 gCO₂/km and be fitted with particles trap.

To get the special fee the drivers will have to register their vehicle at the city council. Then they will get a special parking coin ('Umweltjeton') and a special sticker.

The sticker is an official document that is filled out by the city and includes the car number, type of car, colour of the car and the official seal of the city of Graz. The Umweltjeton and the special sticker are free, so no extra registration fee is applicable. The sticker is valid for two years; the user can apply for a time prolongation of the sticker. The Umweltjeton is to be inserted into parking machines to trigger the fee reduction. Once inserted, the parking ticket is marked in the upper corner with a U meaning 'Umweltticket' (environmental friendly ticket). The sticker has to be located on the dash board behind the windscreen to be clearly visible for the enforcement team.

Source: CIVITAS initiative www.civitas-intiative.org

Lille: large scale introduction of biogas and increased use of public transport.

'Lille Métropole' is an intercommunal structure (85 communes and 1,2 million inhabitants) working in close cooperation with its belgian counterparts. It is a base for distribution and a node for major routes north-south and east-west in Europe. Lille has built up a strong public transport network.

Through TRENDSETTER project, Lille has much focused on improving public transport. Specific measures are presented below.

1) Biogas production and usage:

- increasing massively the biogas production (locally from waste and sewage treatment)
- 128 new clean busses in Lille Metropole fleet replacing diesel busses, adaptation of the bus depots and lines and construction of a new compression unit
- 120 new clean vehicles in the staff pool and a new compression unit

2) Encouraging public transport use by introducing a combination of new infrastructure that improves quality and incentives:

- 1 new High service Bus Route
- 2 intermodal interchanges points
- development of a pricing scheme for all public transports, an integrated ticketing and specifications for a smart card system
- increased public transport safety and reliability
- increased intermodality between the different public transport means and between private cars and public transport
- development of an efficient co-operation between all public transport authorities (local consortium)
- company mobility plan for Lille Metropole staff, development of a comprehensive approach on the metropolitan level between the requirements of mobility (cars, public transport and freight transport).

3) Lille adopted below targets for Trendsetter:

- 85% clean public transport journeys in year 2005
- Rise of 21% in public transport passenger travels from 1998 to 2005

The clean vehicles fleets will permit to cut pollution:

- reduction of fossil CO2 emissions up to 41,000 tons a year by 2005
- reduction of NOx emissions up to 850 tons a year by 2005
- reduction of particulate matters up to 26 tons a year by 2005
- reduction of 50% of the bus noise level.

See: <http://www.trendsetter-europe.org/>

Berlin: New Forms of Financing-Contracts for Natural Gas Vehicles

See [TELLUS website](#)

CATCH cities

CATCH was a demonstration project in the European Commission's Life-Environment Programme. It supported the EC's Sixth Environmental Action Programme by promoting sustainable mobility in order to improve air quality. CATCH was implemented in Liverpool (UK), Suceava (Romania) and Potenza (Italy).

CATCH adopted an innovative and multi-disciplinary approach to reducing air pollution in Liverpool (UK), driving forward and demonstrating both hard measures, such as the provision of clean buses (hybrids, retrofitted) and new bus services, and soft measures, such as personal travel plans, calorie mapping and the production of new transport policies.

The success of CATCH was evaluated through advanced pollution monitoring techniques and the impact on community health was evaluated by using a Health Impact Assessment (HIA) methodology. Related schemes were also implemented in Romania (Suceava) and Italy (Potenza) and the results are being used for best practice guidance throughout Europe.

See [CATCH website](#)

La Rochelle: a long tradition in favour of cleaner and quieter vehicles

CIVITAS cities

Biodiesel

[Biofuel use in Cork City Council](#)

Cork

Optimisation of the bio-diesel collection system	Graz
Bio-diesel taxi fleet & bio-diesel service station	Graz
Transition towards clean vehicle fleets in Genova	Genova
Solutions for alternative fuels in Toulouse and complementary measures to achieve a 100% clean fleet	Toulouse
Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana	Ljubljana

Biogas

Introduction of CNG-powered Vehicles	Berlin
Biofuel use in Cork City Council	Cork
Compressed Natural Gas Buses	Barcelona
A new clean, low floor Public Transport bus fleet in Nantes	Nantes
Implementation of a compressed gas station in Nantes	Nantes
Clean-vehicles in Bremen	Bremen
Transition towards clean vehicle fleets in Genova	Genova
Deployment of CNG buses and LPG boats in Venice	Venice
Introduction of CNG-powered Vehicles	Berlin
Introduction of clean waste collection vehicles	Göteborg
Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels	Toulouse
Operation of bio fuel and CNG vehicles and framework conditions for alternative fuel use in Debrecen	Debrecen
Solutions for alternative fuels in Toulouse and complementary measures to achieve a 100% clean fleet	Toulouse
Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana	Ljubljana

Fuelling stations

Implementation of a compressed gas station in Nantes	Nantes
Bio-diesel taxi fleet & bio-diesel service station	Graz
Deployment of CNG buses and LPG boats in Venice	Venice

[Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels](#) Toulouse

LPG

[Clean Fuel Vehicles in Bristol](#) Bristol

[Deployment of CNG buses and LPG boats in Venice](#) Venice

Hybrid and Electric vehicles

[Clean Public Transport Fleet: Trolleys and EURO 4 Buses](#) Roma

[Biofuel use in Cork City Council](#) Cork

[Clean Public Transport Fleet: Electric Buses](#) Roma

[Clean Fuel Vehicles in Bristol](#) Bristol

[Transition towards clean vehicle fleets in Genova](#) Genova

[Electric Vehicles for the distribution of goods](#) Rotterdam

[Clean public and private transport fleets](#) Rotterdam

[Clean & silent public transport fleet](#) Bucharest

Procurement and tendering

[Promoting the introduction of clean vehicles in public and private](#) Göteborg

[Operation of bio fuel and CNG vehicles and framework conditions for alternative fuel use in Debrecen](#) Debrecen

[Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana](#) Ljubljana

References

[SILENCE project](#)

SILENCE, a research project funded by the Sixth Framework Programme of the European Commission, aims to develop an integrated methodology and technology for improved control of surface transport noise in urban areas. Issues that will be covered, include noise control at the source, noise propagation, noise emission, and the human perception of noise. SILENCE will provide relevant and world-leading technologies for efficient control of surface transport noise, innovative strategies for action plan for urban transport noise abatement and practical tools for their implementation, and will bring about a significant reduction of people's exposure to noise, especially in urban conditions.

SILENCE research is both vertically and horizontally integrated. Two vertical working areas – I) Vehicle Noise and Source and II) Transport Infrastructure, Operations and Management – integrate both rail and road sectors within urban environments. The horizontal sub-projects integrate road and rail in terms of analysis, parameter definition and applications such as scenarios.

Q-CITY project

QCITY will propose a broad catalogue of experimentally validated technical solutions and will address the cartography of noise, developing noise maps and action plans as envisaged by EU Directive 2002/49/EC.

About thirty partners from ten countries will work together for four years, starting with an inventory of existing solutions and identification of weak points. They will then propose improvements and develop and test prototypes. Specific areas of interest will include:

- Transport intermodality;
- Restriction of circulation;
- Road coatings;
- Architecture and town planning;
- Incentives for the use of quieter vehicles;
- Hybrid vehicles;
- Guided collective transport.

Nine sites have been selected for testing new schemes and prototypes:

- Antwerp will test a system of quiet buses;
- Athens will test anti-vibratory tram soundproofing;
- Augsburg will implement new city planning measures;
- Brussels will test quiet trams on quiet rails;
- Caen will look at guided tram-bus vehicles;
- Gothenburg will test poro-elastic road surfaces;
- Ostend will implement new freight operations in a harbour environment;
- Stockholm, site 1 will test new traffic control measures;
- Stockholm, site 2 will test new suburban trains;
- Stuttgart will implement restrictions on heavy lorries.
- Quiet vehicles and new tyre designs will also be tested in various cities.

NICHE cities: New Non-Polluting and Energy-Efficient Vehicles

See [NICHE project website](#) and particularly [Working Group 3 deliverables](#)

2005 European symposium on clean vehicles and fuels at Stockholm

For further information, see the [presentations](#).

NETMOBIL cluster projects

For more information, see [NETMOBIL website](#)

Cleaner fuels for road public transport - UITP

For further information, see [UITP report](#).

UTOPIA project

See [UTOPIA project](#) website and Commission [Joint Research Centre website on UTOPIA](#)

CLEANER DRIVE project

See [CLEANER DRIVE project website](#)

STARBUS

<http://ec.europa.eu/energy/intelligent/projects/doc/factsheets/starbus.pdf>

CLEANER BUSES and TRUCKS (French ADEME)

See [further information here](#) on results of national pilots programmes on cleaner trucks and buses.

ELCIDIS: <http://www.elcidis.org>

The ELCIDIS project is a form of co-operation between CITELEC, the European Association of cities interested in the use of electric vehicles, and 6 cities (La Rochelle, Erlangen, Milan, Stockholm, Stavanger, Rotterdam). It demonstrated the possibilities for a more efficient city distribution system operating with clean (hybrid) electric vehicles. The deployment of (hybrid) electric vehicles is common to all cities involved in the project. The organisation of the logistic system will vary according to the local situation in the cities.

OECD: Can cars come clean? – Strategies for low emissions vehicles

This report identifies policy options and makes recommendations on market-oriented actions to promote the purchase of the most environmentally friendly vehicles. It assesses the impact of a wider use of low-emission vehicles, drawing on experience to date, research results and the responses to a survey from 18 OECD countries.

The main section – Policy Options – presents in non-technical language, the current and expected performance of conventional and innovative technologies. It is for policy makers worldwide, economists and the casual reader.

For further information, see [here](#).

Technical measures to reduce emissions of existing heavy duty vehicles and captive fleets

This project was commissioned by the Environment DG to identify cost effective technical measures to reduce PM and NO_x emissions from existing heavy duty vehicles and produce concrete policy proposals for the European Commission to support their use.

Technical measures are defined in this project as technical interventions that lead to lower pollutant emissions per vehicle km under comparable operating conditions, and those identified for detailed assessment included retrofits and cleaner fuels. The project also produced data and scenarios to enable the Commission to undertake cost effectiveness modelling of the most promising technical measures, to assess their potential impact and costs.

A wide range of technical measures were reviewed. The review of the technical measures found that the most promising were diesel particulate filters (DPF) for reducing particulate emissions and selective catalytic reduction (SCR) for reducing NO_x. The most promising fuels were diesel water emulsion and dual-fuel natural/biogas, although they were less promising in terms of cost effective emissions reduction than the existing diesel vehicles fitted with DPF and SCRs.

The final report of this project is available [here](#).

9. Urban freight management

Key points

Although indispensable for the economy of the cities, urban freight transport may significantly affect attractiveness and quality of life of European cities.

Urban freight transport is an important source of noise (early morning, evening and night-time), air pollution and CO₂ emissions.

Urban freight road traffic tends to increase in many cities due to world-wide supply chain management (reducing the number of warehouses, centralizing inventory) and shorter life for products.

Moreover, the retail sector seeks to minimize cost by saving storage space and reducing stocks, leading to more frequent just in time parallel deliveries.

Urban freight environmental and energy impacts can be considerably minimized by rationalizing urban distribution and deliveries together with improving environmental performances of fleets.

Urban freight traffic in European cities

Marseille and Bordeaux (source : <http://www.tmv.transports.equipement.gouv.fr/>)

Urban freight traffic (transit traffic excluded, households trips to purchase included) is:

- 10% to 15% of all urban movements, half of which are household movements
- 13% to 20% of urban road traffic (veh x km)
- 15% to 25% of road occupancy
- 30 to 50% of urban transport CO₂ emissions and fossil fuel consumption
- 40 to 55% of NO_x emissions
- 50 to 70% of PM₁₀ emissions
- 10 to 15% of the urban freight vehicles are EURO1 vehicles which emit between 4 and 9 times more pollutants (depending on the pollutant) and 6 to 10 times more noise than EURO4 vehicles.

Paris (source: www.deplacements.paris.fr)

- 32 millions tons of freight per year
- 89% is transported by road
- 8% is transported by waterways
- 3% is transported by rail
- deliveries are made exclusively by road
- freight is 20 – 25% of road occupancy
- freight emits 60% of road traffic related PM₁₀ emissions,
- freight emits 26% of road traffic related CO₂ emissions
- freight emits 20% of NO_x emissions

Berlin's conurbation (source: www.impacts.org)

- *light and heavy duty vehicles account for 11% of urban road traffic volumes (veh x km),*
- *they account for 50% of road traffic related PM₁₀ emissions*

Urban transport and land use policies tend to neglect urban freight by traditionally focusing on passenger transport. A recent survey² showed that lack of suitable infrastructure for deliveries, bad accessibility to city centers, noise and air pollution emitted by freight vehicles and during deliveries are the major problems according to transport departments of cities.

The development of supermarkets, hypermarkets and big shopping areas (fun shopping) at the outer periphery of the cities, close to connections to major roads and highways with huge parking places, dramatically increases road traffic in conurbations. These areas are usually poorly connected to collective transport and cycling networks. Their location and size have a direct impact on distances traveled by car to purchase which represent a significant part of urban freight movements.

Settlement of hypermarkets in the periphery: impacts in French conurbations

- purchase motive is 50% of freight movements in French urban areas
- each year, total surfaces of medium sized supermarkets increases by 2 millions m² and are mostly located close to outer highways and peripheral roads of agglomerations
- the previous trend occurs to the detriment of central shopping areas the total surface of which decreases
- 68% to 85% of clients going to peripheral hypermarkets use their car
- one third of the clients going to central shopping areas use their car
- for the same purchase amount (100€ per week), a customer of a peripheral hypermarket drives 20 km, though a customer of a central market drives 5 km

Source: conference on urban freight management 2005, see: <http://www.ville-en-mouvement.com/>

Final part of the logistic chains is usually not optimized. As a result, important part of urban freight traffic is 'last mile' deliveries that are prominently achieved in parallel with light road duty vehicles (e.g. Dublin: 55% of deliveries are made by light duty vehicles, 40% by heavy duty vehicles). More, these vehicles have often poor environmental performances, low load rates and usually return empty after delivery (e.g. 75% of deliveries in French cities).

² BESTUFS project - City Inquiry 'European Survey on Transport and Delivery of Goods in Urban Area' - 2001

CO₂ and fuel consumption reductions yielded by optimized urban logistics

ADEME, the French agency for the environment and management of energy, has assessed potential impacts on CO₂ emissions and noise of several urban logistics schemes.

This assessment shows the following striking results:

- round deliveries made by heavy duty vehicles can bring about 3 to 4 times more CO₂ emissions than parallel light duty vehicles deliveries;
- peripheral hypermarkets based logistics can bring about 60 times more CO₂ than equivalent supply based on city shops with heavy duty vehicles distribution
- peripheral hypermarkets based logistics can bring about 15 times more CO₂ than equivalent supply based on e-trade with light duty vehicles

Source: 2006 ADEME's presentation to the Commission Working Group on CO₂ from transport

Deliveries at night and early morning seemed a good idea in order to avoid congestion periods. However, noise resulting from such activities may disturb sleep and increase conflicts and complaints.

Lessons drawn from experience and research

- Statistical data on freight movements and freight transport modeling tools should be developed to design knowledge-based policies and build common knowledge
- Cooperation between stakeholders should be strengthened, because it is crucial to build highly acceptable solutions to improve freight transport.
- Urban freight policies and regulations (e.g.: access and parking restrictions for delivery vehicles) should be designed and coordinated (time, categories of vehicles, road signals) with municipalities belonging to same conurbations
- Land use and building regulations should duly take into account the needs of loading and delivery bays
- Traffic regulations should foster the renewal and retrofitting of urban freight fleets by low emissions, energy efficient and low noise vehicles; favouring low emissions freight vehicles could be enforced by regulations on road pricing, parking charges, access

restriction based on emissions criteria (see chapter on 'access restriction'), access to delivery and loading bays

- Access to peripheral shopping areas by alternative means of transport (railways or undergrounds for goods transportation, collective transport and cycling infrastructures and services for customers) should be more systematically developed
- Extension of shopping areas in periphery of urban areas should be limited or, if the case should arise, oriented towards public transport corridors while development of shopping areas in central areas should be supported
- 'last mile' urban deliveries should be managed (e.g.: urban distribution centers allowing stocking the goods, with parking capacity for delivery vehicles, staff to help operation of goods, and delivery ancillaries, use of cleaner, larger capacity and fuller delivery vehicles in round rather than parallel deliveries)
- Regional distribution centers should be developed to consolidate supply chain efficiencies
- Low noise vehicles and ancillaries should be deployed especially for night-time (typically 23h-7h) and evening (typically 19h-23h) deliveries of foodstuffs and freight loading operations
- Spaces dedicated to delivery and loading bays could be more systematically planned in public parks, squares, parking areas and pedestrian areas
- Rail urban freight has potential for exploitation beyond the current situation. It could provide an alternative to current road-based logistics systems. However, attention is to be paid to rail freight facilities that may be important generators of road traffic in their own for deliveries and collections. More, frequency of services, operational integrity, organization and cooperation with terminals and local road operations, operational costs are key parameters to keep under control on order to provide a level of service as attractive as road-based model without sacrifice of rail mode intrinsic environmental benefits.

Good practice

More efficient distribution in Stockholm and Graz

The delivery vehicles clog the shopping areas in big cities and are often only partly loaded. But half empty trucks and small delivery vans from different suppliers could reload their goods and co-transport it to the customers. This has been done at three logistics centres in Stockholm and Graz in. The result is better load rates, less emissions and more efficient distribution, meaning fewer vehicles in the area and thereby better living and working conditions.

Construction materials

One logistics centre was built at the entrance of one of the largest constructions sites in Stockholm where 8,000 apartments are being built. Since people started to move into their new apartments during the construction period, the goods transportation on the site had to be reduced. Therefore, all goods were unloaded at the logistics centre and delivered more efficiently or stored for later just in time delivery. *The project has cut down the number of delivery vehicles remarkably. Both emissions and congestion have decreased a lot compared to a situation without a logistics centre. The carbon dioxide emissions were reduced by 90 percent.*

The logistics centre also offered storage, which the customers valued highly and are willing to pay for. The storage protects goods from getting stolen or damaged by rain. There has been a huge interest for the project, and it has been presented in at least 50 seminars.

Retail goods

In Graz, a logistics centre was established to avoid chaos when a five-level garage was being built beneath the city's largest shopping centre. Deliveries to the shopping centre were coordinated and then co-transported by low emission vehicles from an external warehouse at the southern city border.

The number of vehicle kilometres was reduced by 56 percent, which also has more than halved the emissions and energy use. The project has not needed as many vehicles and storage facilities as first presumed. This means extra cost savings and environmental savings, which further point towards the big potential for the system. Graz will now extend the project to the hospital area.

Restaurant supplies

Small and very narrow streets in the Old Medieval Town of Stockholm make distribution traffic chaotic and cause environmental problems. A logistic centre was set up nearby the Old Town, where restaurant supplies are reloaded and co-transported with small biogas-fuelled vehicles.

As a result, the average number of deliveries to each restaurant is down from six to only one delivery per day. *There is a big potential to reduce the total number of vehicle kilometres further if more restaurants join the project.*

In general, logistics centres tend to be profitable when a critical mass of users/customers is reached. However, laws and regulations can cause problems and delays when logistics centres are established and put into operation.

Special delivery circumstances and permits for food deliveries may be obstacles.

A main conclusion from all three projects is that a logistics centre is more efficient and successful when the area is well defined and has evident clogging problems, like the narrow streets of European old cities.

Source: TRENDSETTER project (goods distribution) <http://www.trendsetter-europe.org>

Zurich: transportation of garbage by tram

Zurich has developed an innovative way to transport household garbage (100,000 tons per year). Initially, garbage was only transported by trucks which used to be stuck in traffic jam. As a result collecting garbage became less and less cost-efficient and illegal depositories increased.

Measures

- It was then decided to collect garbage by tram from nine collection points located in areas where car ownership rates are low.
- Traditional tram rolling stock has been modified to include containers ('Cargo-Tram') for an initial cost of 32,000 € Compression containers have been developed to increase capacity to stock bulky goods.
- A new urban recycling distribution centre has been settled from where garbage is transferred from Cargo-Tram to trucks, in order to be transported to recyclers and incineration plants.

Annual positive impacts

- Saving of diesel fuel: 37 500 litres
- Reduction of distances travelled by trucks: 5 020 km
- Reduction of emissions: 4 911 kg CO₂, 81 kg NO_x, 2.3 kg PM₁₀

Source: www.impacts.org

Paris: combined approach to rationalize and green urban freight transport

Since 2002, Paris is implementing an ambitious urban freight policy in cooperation with major stakeholders. A plan has been elaborated and is supplemented with voluntary agreements according to which freight operators in partnership with the city commit to implement good practices to improve urban freight transport.

Political objectives are: to manage urban freight transport entering and leaving Paris (shift to rail and waterway), to optimize urban deliveries in downtown neighbourhoods by developing more environmentally-friendly logistic practice, and to control environmental impacts of urban freight transport.

Main measures adopted or under development

- Urban freight is the matter of dedicated policy guidelines in the local transport plan and land use plan
- Urban freight traffic regulation favours clean urban freight vehicles (parking, access)
- Technical guidance has been developed to better design delivery bays
- Delivery bays are planned close to shopping areas (30 minutes stop allowance)
- Internet information platform will be dedicated to freight operators in order to better manage freight traffic and access to delivery bays
- Urban delivery centres (more than 1 600 m²) are being developed to manage last mile deliveries of small size packages (La Petite Reine initiative), rationalize the distribution of replacement parts (Consignity initiative), the delivery of urgent parcels post (Chronopost initiative) and the delivery of natural foods to households (Natoomobile initiative)

- Logistics platforms connected to existing peripheral railway are planned
- Studies are launched to assess to which extent urban underground and railways can be used to transport goods to the city centre
- Initiatives aiming to foster use of clean urban freight vehicles are underway with city partnership: NGV heavy vehicles (3.5 tons and 19 tons) for deliveries to central supermarkets, fully electrical heavy duty vehicles (10 tons) for deliveries to hairdressers, perfumers and drugstores, electrically assisted tricycles (see 'La petite reine' initiative), fully electrical scooters for the delivery of urgent letters, electrical trolley to carry on parcels and letters downtown

Source: www.deplacements.paris.fr

Aalborg : IT solutions and access restrictions favouring cleaner and full heavy duty vehicles

Aalborg is facing problems due to heavy duty vehicles in city centre. Aalborg has built voluntary cooperation between main stakeholders and developed traditional solutions (regulation and institutional) to rationalize urban freight transport.

Aalborg is now developing intelligent technologies (IT) to underpin the implementation of its policy and optimize freight transport in restricted central areas. The IT solutions enable entrance and slots booking for deliveries, load optimisation and route planning services to the different carriers.

Load factors of vehicles (60% of maximum capacity during last 3 months), emissions performances of vehicles (Euro 3 or Euro 4), and time windows are the main requirements taken into account by the regulation of the restricted areas and managed by the IT system. When access is denied, deliveries can be made by local clean delivery fleets.

First results are successful and showed that deliveries in the restricted areas have been more coherent and more efficient. Average time spent by delivery has been reduced by 9%.

More information at: www.edrul.com

Dutch PEAK programme: technologies to reduce night-time noise caused by deliveries

After an exhaustive assessment of noise caused by urban freight activities in various cities of the Netherlands, the Dutch government enforced the so-called 'PEAK law' in order to limit noise emitted by night-time deliveries to downtown shops. Following peak noise L_{Amax} limit values are enforced: 65 dB(A) during evening (19h-23h) and 60 dB(A) during night (23h-7h). Their enforcement falls under the competence of local authorities.

In order to develop practical solutions to comply with the legally binding noise limit values, the PEAK programme has been launched. It covers a wide range of low noise solutions: transfer of knowledge, quiet behaviour, optimal loading and unloading bays, distribution vehicles up to 7.5 tons, distribution vehicles over 7.5 tons, refrigerated transport installations, portable forklift trucks, roll containers, pallet trucks, shopping trolleys, electric and hybrid propulsion. To date, many ones are available. A technical guidance is available and is regularly updated to take into account the latest developments.

La Rochelle: cleaner and quieter urban deliveries down town

In 1997, the authority responsible for urban transport in the whole conurbation of La Rochelle decided to rationalise the distribution of goods in the conurbation and to reduce emissions and noise of urban deliveries.

The approach consisted in planning urban distribution centres located at the periphery of the down town area where freight carriers coming from the outer of the conurbation download the goods with heavy vehicles rather than transporting them further in the core city and deliver them to the customers.

The goods are clustered according to the place of their destination. They are uploaded from the distribution centres and delivered by electric and hybrid light duty vehicles. The resulting overall freight traffic (ton kilometres) is reduced and the goods are carried out by almost zero local emission vehicles. The distribution centres are equipped with electric terminals that enable charging their batteries.

At La Rochelle, the management of the urban distribution centre has been entrusted with a private operator. After a trial period of a few years when the operator has been subsidised, running costs of the centre are mostly paid by traders. The solution is successful according to most stakeholders: carriers can avoid wasting time in delivering down town, traders and residents appreciate better traffic and parking conditions and noticed the general improvement of their local environment.

Amsterdam: goods delivery by cargo tram.

Amsterdam is not the only city that is exploring the distribution potential of trams. Dresden (Germany) has a regular CarGoTram service, run by the world's longest tram trainsets (59.4 m), carrying car parts across the city centre to its Volkswagen factory. Vienna (Austria) and Zürich (Switzerland) use trams as mobile recycling depots. Kislovodsk (Russia) had a freight-only tram system that was used exclusively to deliver bottled mineral water to the railway station.

The Amsterdam CityCargo's approach is:

- CityCargo will use Amsterdam's tram infrastructure to distribute goods in the city. There is considerable flexibility in routes thanks to the dense tram network.
- Distribution centres called Cross Docks will be created in the Osdorp suburb that is connected to the tram network. They will be established as close as possible to the A1, A2, A4, A5 and A9 motorways to prevent haulage overburdening the already congested A10 ring road. Amsterdam Schiphol Airport is also nearby. Inbound goods arriving at the airport can be taken into the inner city aboard the freight trams.
- Goods will be transferred to the trams in the Cross Docks. They will be sorted by delivery area before being loaded aboard the trams for the journey to inner-city transshipment hubs.
- From the hubs the goods will be delivered in a finely-meshed network by electrically powered "e-cars". These vehicles will be used for "the last mile" to the delivery address.
- The freight trams will be allowed to load and unload outside the goods delivery window.

See the details of this case study [here](#).

References

BESTUFS: <http://www.bestufs.net/>

BESTUFS II aims to increase the awareness of urban freight transport best practice for all those actors involved in its functioning and to stimulate innovative solutions that will enhance its sustainability in the urban area.

Furthermore, it seeks to foster co-operation between domain experts, research institutions, urban transport operators and city administrations in order to encourage the identification and dissemination of City Logistic Solutions (CLS) that are considered best practice both within Europe and other parts of the world.

See in particular: http://www.bestufs.net/conferences/2005-06-23_amsterdam.html

eDRUL: <http://www.edrul.com>

eDRUL - eCommerce Enabled, Demand Responsive Urban Logistics - is a research and innovation project in the field of e-logistics piloting innovative urban freight distribution schemes, advanced IT solutions and integration with e-Commerce / e-Business infrastructures to support on-demand planning of the distribution of goods. The project is investigating, developing and demonstrating innovative e-logistics solutions taking as a reference four different European sites: Siena, Lisbon, Aalborg and Eindhoven.

Cityfreight: <http://www.cityfreight.org/>

The objectives of the CITY FREIGHT project are the following:

- Identify and analyze working of innovative and promising logistic schemes in the seven countries represented in the project consortium as well as the urban policies which could accompany their implementation in order to promote a more sustainable development;
- Set up a list of criteria and a common assessment method for evaluating those logistic schemes and the related accompanying policies (legal framework, land use planning, road traffic regulation, pricing,);
- Analyze their internal technical, economical and environmental efficiency;
- Design, for one city or one urban region in each country, one or more implementation scenarios of these schemes and related accompanying policies;
- Assess and optimize the scenarios according to the criteria of a sustainable development of the city;
- Present guidelines for implementing integrated strategies that could be recommended as "Best Practices";
- Disseminate and exploit the Best Practice Guidelines through collaboration with the Local Authorities for the design of concrete implementation plans of integrated strategies in each of the case study cities.

TELLUS: http://www.tellus-cities.net/index_122_en.html

Work package 9 of TELLUS project is lead by Göteborg and focuses on new concepts for the distribution of goods, along the following objectives:

- Demonstrate and asses a set of new concepts for the distribution of goods aiming at a reduction of vehicle kilometres, smart land use and implementation of clean vehicles
- Demonstration of a 13,5 km long system of underground tube transport for multiple users, in the Rotterdam port as a substitute for road transport of goods

- Introduction of an innovative 24-hour system for business-to-business (B2B) and business-to-consumer (B2C) distribution system making use of distribution portals on at least six strategically located Park&Ride and carpool facilities around Rotterdam to minimise vehicle kilometres and emissions in residential areas by e-commerce deliveries. Safety at the P&R sites is increased because of the presence of the personnel at the distribution portal.
- Promotion of an inner city logistic centre in Berlin, permitting a modal shift combining railway and inland navigation with Compressed Natural Gas(CNG)-powered utility vehicles
- Design of a financing model that will allow hauliers in Berlin to cost-optimised modernise the vehicle fleet to CNG propulsion
- Introducing an inner-city environmental zone in Göteborg with demands on load rates as well as on emission levels

DOCAPOLIS : <http://docapolis.com/>

DOCAPOLIS est une banque de données destinée à tous ceux qui travaillent sur la question des marchandises en ville, qu'il s'agisse d'équipes de recherche universitaires, de cabinet d'études, de représentants des pouvoirs publics ou de professionnels. Elle permet d'accéder librement à une base documentaire multimédia, à un dictionnaire thématique ainsi qu'à un agenda proposant une sélection d'évènements passés ou à venir sur la logistique urbaine.

FIDEUS: http://www.urba2000.com/forum_fideus/

The objective of FIDEUS is to provide a complementary set of vehicle solutions to support an innovative approach to the organisation of urban freight transport, in line with political strategies to safeguard the "liveability" of cities, while being compatible with efficient logistics.

FIDEUS promotes a co-ordinated approach involving the automotive industry, logistics companies and city decision-makers. The aim is to make available appropriate vehicles, to ensure that delivery operations are efficient, and that cities have the necessary information and tools to be able to define and manage effective mobility policies for goods traffic.

To provide such solution requires a rethinking of distribution logistics in the context of the whole delivery chain. Since there is no single optimum vehicle, FIDEUS proposes a complementary range of three vehicle types, including an innovative "clean" goods carrier, an adapted 3.5 ton van and 12 ton truck. These all incorporate advanced technologies and equipment, including a "urban goods container" to improve operational efficiency and minimise the environmental impacts.

NICHES project: <http://www.niches-transport.org/>

The mission of NICHES (New and Innovative Concepts for Helping European transport Sustainability) is to stimulate a wide debate on innovative urban transport and mobility between relevant stakeholders from different sectors and disciplines across Europe. NICHES will promote the most promising new concepts, initiatives and projects, moving them from their current 'niche' position to a 'mainstream' urban transport policy application.

Its [Working Group 2](#) will explore innovative concepts on space management, inner city night deliveries and home deliveries using locked boxes. See particularly the state-of-art final report.

START: short term actions to reorganize transport of goods

The START approach is based on close collaboration between public and private partners and the combination of positive incentives, more coercive regulations and enhanced logistics. The project will be carried out in four front running European cities: Göteborg, Bristol, Ravenna and Riga, and the follower city Ljubljana.

Exchange of experience between the different stakeholders is organized in a structured way through thematic workshops, public European events for stakeholders, demonstrator fact sheets and evaluation results. The START cities will develop regulations for new and expanded restricted areas and implement these area

restrictions. In addition, the START cities will implement consolidation schemes in new areas and with new participants. A business model will be developed and additional services will be implemented.

A complete programme of incentives will be implemented directed at raising awareness among freight companies about energy efficiency and to stimulate more sustainable behaviour by promoting the introduction of clean vehicles (CNG and Bio-fuels); developing “extras” for clean vehicles and trucks with a high load rate; and promoting and training drivers for eco-driving and maintenance of vehicles.

START website: www.start-project.org

See also: <http://europa.eu.int/comm/energy/intelligent/projects/doc/factsheets/start.pdf>

CIVITAS cities focusing on urban goods transport

CIVITAS cities (Norwich, Genoa, Berlin, Stockholm, Bremen, Toulouse, Graz, Winchester, Bristol, Göteborg, Rotterdam, Barcelona, Malmö, Venice) are experimenting new concepts for the distribution of goods by means of introducing innovative freight logistics services using clean and energy efficient vehicle fleets, dedicated infrastructure and information services.

See: <http://www.civitas-initiative.org> (go to CIVITAS measures – Urban goods transport)

10. Soft and smart measures

Key points

People attitudes and behaviours directly influence the way they travel; attitudes and behaviour are therefore key aspects to be considered by urban transport policies.

Smart and soft mobility management measures address these aspects; they aim to better manage urban mobility by providing better information and opportunities with a view to help people reduce their car use while enhancing the attractiveness of alternatives.

They are fairly new in Europe as part of mainstream transport policy, mostly relatively uncontroversial, and often popular. Such measures can efficiently underpin most demand management measures that could be envisaged by urban transport plans, and have a very important potential with regard environmental benefits.

They include travel plans, travel awareness campaigns, and public transport information and marketing, mobility centres, car clubs, car sharing and car pooling schemes, teleworking, teleconferencing and home shopping.

Lessons drawn from experience and research

- Provided they are implemented within a supportive policy context, soft measures can be sufficiently effective in facilitating choices to reduce car use, and offer sufficiently good value for money; therefore they merit serious consideration for an expanded role in any sustainable urban transport plans.
- The changes in traffic levels that could be yield by smart and soft measures are quite large and could produce substantial reductions in congestion. Research shows that well conceived soft measures integrated with other transport improvements can significantly reduce private car traffic and car dependency.
- However, in the long term, these measures alone might tend to attract more car use, by other people, which could offset the impact of those who reduce their car use. Therefore, those experienced in the implementation of soft factors locally usually emphasise that success depends on some or all of such supportive transport demand management measures in order to avoid the risk mentioned before. Such measures, some being highlighted in this guidance, concern re-allocation of road capacity, measures to improve public transport service levels, parking control, traffic calming, cycle networks, congestion charging or other traffic restraint, other use of transport prices and fares, speed regulation, or stronger legal enforcement levels.

'Smart Choices' in the UK initiative demonstrates that every £1 spent on well-designed soft measures could bring about £10 of benefit in reduced congestion alone, more in the most congested conditions, and with further potential gains from environmental improvements and other effects, provided that the tendency of induced traffic to erode such benefits is controlled.

Car-sharing schemes, car clubs

Building on Bremen experience, [MOSES project](#) consolidated the principal European experiences in the field of car-sharing. It demonstrated that:

- Each 'shared car' replaces 4 to 10 private 'owned cars' (e.g. in Bremen, about 700 private cars have been replaced by car-sharing as far as 3100 customers are concerned)
- Each car-sharing user has reduced its annual car mileage by at least 28% and up to 45% because the pay-as-you drive principle is an incentive to drive less (e.g. in Bremen, a reduction of about 5 million kilometres driven by car per year has been achieved)
- The use of public transport and other modes of environmentally friendly transport has been increased
- Car-sharers use less polluting cars with better emission standards - and usually smaller cars with low CO₂ emissions
- All in all each car-sharing user has reduced its car mileage related CO₂ emissions by at least 39% and up to 54%

For more information, see the following sources of information:

- [Research DG website](#) on car-sharing

- [IEEA webpage](#) on MOSES project and Bremen experience

- Car clubs or (car-sharing schemes) are part of the several measures included in the smart & soft mobility management package. They are a pay-as-you-drive alternative to owning a car. It gives all the benefits of clean modern and reliable cars without the hassle and hidden costs of car ownership. Car Club members only pay for what they use and do not have to worry about tax, insurance, servicing or repairs.
- Car clubs can be used in conjunction with business. Businesses that currently operate company cars can obtain the services of a car club operator to manage their fleet. This will reduce fleet management costs and time. This will also result in a more efficient use of business vehicles, with vehicle and trip sharing. Employees and local residents can use the vehicles out of hours as well.
- From the perspective of the city, car-sharing offers a number of advantages – not least because a single shared car can save a lot of valuable public space, with estimates ranging anywhere from four to ten cars depending on the city and the project. Car-sharing permits major economies of parking spaces. Research estimates that 10% of Europe's car owners in urban areas can be persuaded to take up car-sharing within a decade.

- And since it is not only very costly to build and maintain parking spaces but also because they tie up urban land that can be used for other more pressing things for the community. Studies in cities around the world in which car-share has become part of their transportation arrangements show that the switch to car-sharing also works to improve environment drastically, and works to encourage increased use of public transport as well as more use of bicycles and walking through combined mobility.
- Car-sharing does not compete with public transport it is complementary with it, particularly with the view better connect residents of low density areas to public transport where it is usually hardly accessible. Several municipal transport undertakings already run car sharing schemes, and a number of others – e.g. the Swiss national railways – have a joint discount card.

Car –sharing in Europe

Car sharing began in Switzerland in the 1980s with the first co-operative car fleets. These cars were positioned throughout Swiss cities and members could gain access to them at any time. In 2003, Switzerland had 44 000 car sharers using a fleet of 1 750 cars located in 350 municipalities. Over the last 20 years, more than 100,000 Europeans – mainly in Switzerland, Germany, Austria, the Netherlands, Belgium, Sweden and Denmark – have switched over from individual ownership to shared car use.

London's car-sharing consortium

A car-sharing consortium was set up a few years ago and covers now seven London boroughs (Brent, Ealing, Islington, Kensington and Chelsea, Lambeth and Merton). This consortium has come together to introduce car clubs to London on a wider-scale. Car club members are able to use cars from every borough. Cars are available to all, with membership at just £12 per month and hire times dependent on the journey rather than fixed time periods; this means that car clubs increase transport accessibility to those previously unable to hire or buy a vehicle due to costs. Funding for the start up and piloting of car clubs has come from the London's Congestion Charging scheme.

For more information, see [here](#).

Travel Plans

- Personalised travel plans may address residential areas, businesses, schools and deliveries. They may cover commuting journeys made by employees as well as other categories of journeys (deliveries, appointments, meetings, etc.). The main objective is to implement tailor-made transport solutions which are better for the environment, the safety and which yield money savings (less fuel consumption, less vehicle maintenance, less purchase or leasing costs).
- Basically, travel plans should be elaborated by following five steps: firstly, assess the potential (possible interests, motivations) for implementing a travel plan ; secondly, elaborate a diagnostic of the current situation with regard to travel habits, travel means and travel rationale; thirdly, identify possible scenarios to shift to more environmentally an energy-efficient modes of transport and draw up several scenarios including related actions and budget; fourthly, communicate with a view to internally promote the benefits

of the travel plan and wider the number of people concerned; fifthly, assess how the plan is perceived and implemented with a view to improve its efficiency and expand its scope progressively.

- Personalised travel planning schemes usually result in moving a proportion of all car trips to other modes of transport. Some personalised travel planning schemes are more successful in reducing car km travelled by the participants than others; such differences in results are to be considered against the background and context of each situation as well as against the method and approach employed for the personalised travel planning. All in all, experience shows that well tailored personalised travel planning in a well chosen area could realise very attractive cost per car km per year savings.
- Workplace personalised travel planning schemes: these work better in workplaces where there is some disincentive to use the car - for example traffic congestion on the journey to work, or limited or expensive car parking. In these cases, the personalised travel planning interventions should be perceived as offering viable, practical solutions to a problem, rather than just providing a choice. Working shifts makes it harder for staff to change their travel behaviour due to limited provision of public transport out of normal hours, a perceived reduction in safety whilst walking at night, and the difficulty in car sharing when working shifts.
- Residential personalised travel planning schemes: the best reductions in car use are achieved for trips for shopping and for leisure. For areas where walking and cycling to work were relatively common, a shift from car trips to walking or bike trips was easier in areas where the population was made up of a greater number of households without children, and where the distances travelled to work for leisure or to the shops were shorter.
- Personalised travel planning in schools: key elements to its success are enthusiasm from the school staff and receptivity of pupils. Pupils may be receptive if they can see the benefits to them, the wider community and the environment, of changing the way they travel to school, and therefore it is important that this is put to them effectively by their teachers. The use of a teachers' pack may help to facilitate this. Maximising the take up rate can be achieved through the use of appropriate incentives and individualised marketing. These could include reduced price or free bus travel, discounts on cycle equipment or walking clothing, as well as provision of travel information pertinent to the individual pupil.

Pilot personalised travel planning projects in the UK

In December 2002, the Department of Transport awarded grants to 14 Local Authorities in England to run pilot personalised travel planning projects. Of these, seven targeted residential populations, six targeted workplace populations and two targeted schools (one Local Authority covered two types of target population).

The aim of part-funding the pilots was to improve understanding of the relative effectiveness of the different approaches to personalised travel planning, including individualised marketing, use of travel diaries and personalised journey plans, and to identify best practice in their application.

Robust evaluations carried out for the Department of Transport have shown that the majority of the 14 personalised travel planning pilots showed some degree of success at either reducing the number of car trips made by participants, changing the modal share for car trips, or reducing the total number of car kilometres travelled by individuals each year. In total, the pilots cost £894,554 and delivered an estimated saving of approximately 11.4 million car km in a year. The average cost per car km saved was £0.08.

For further information, see the [evaluation of the 14 pilot parts](#) made for the UK Department of Transport as well as [TravelSmart](#) website.

Companies travel plans in ‘Nantes Métropole’

In Nantes conurbation, 72% of 500 000 commuting travels are made by car. As foreseen in its ‘plan de déplacements urbain’, Nantes Métropole - the authority competent for the ‘plan de déplacements urbain’ – therefore encourages travel plans for public and private companies with a view to reduce commuting by car.

For companies where such travel plans are implemented, every employee can have a 30% public transport fare abatement; half of the abatement is financed by Nantes Métropole provided that the company finances the other half.

This incentive is subject to a formal agreement between Nantes Métropole and each company. By signing the agreement, the company commits to increase the number of commuting employees using public transport by 20% at least within three years. Progress is monitored in order to assess whether the agreement could be beneficially prolonged beyond three years.

Nantes Métropole has started by adopting its own travel plan covering 2 200 employees. The short term target is to sign agreements with other major public employers such as the hospital and municipalities; that will concern more than 10,000 employees.

For further information, see [here](#).

Mobility centres

- In order to drive implementation of urban mobility management measures on a day to day basis, setting up mobility centres may be efficient. These centres can help shift to more environmentally and energy efficient modes of transport.
- Such centres - that recently appeared in a few European cities - usually have the following missions. They make available information about transport possibilities by non-car transport modes. They promote travel plans for businesses parks and other major activities. They provide businesses with methodological advice on how to set up a travel plan. They suggest appropriate solutions. They solicit and federate key transport actors. They steer networks with a view to share good practice and experience. They manage urban travel surveys in order to evaluate their results and provide the community with elements about travel needs and facts in the City.

Travel choice centre in Peterborough

A new 'Travelchoice' Centre has been opened in Peterborough; it is just one of many schemes run as part of Peterborough City Council's 'Travelchoice project' which aims to tackle the negative effects of traffic congestion in Peterborough by encouraging the use of public transport, cycling and walking.

A host of new and improved services and facilities will now be provided, including:

- Public transport information (journey planning advice, application for and renewal of concessionary bus passes, bus timetables, train timetables, local area guides, national Express bookings, eurolines bookings, shaw's days out);
- Cycling information (cycle maps, cycle leaflets, cycle revolution programmes);
- Walking information (Ramblers Association local walks programmes, Peterborough City Trail booklets, other walking advice and information);
- Car-sharing
- Text-and-Go bus times on mobile phones
- Transport to health care

Ecomobilité Agency at Chambéry (FR)

This local agency has been created following a decision of Chambéry métropole, the authority responsible for the plan de déplacement urbain for the agglomeration of Chambéry with a view to promote more environmentally-friendly, safer and more energy efficient transport modes. The 'Ecomobilité Agency' particularly focuses on promoting alternatives to car driven alone.

The Agency missions are as follows:

- management of the city bike-station;
- promotion and development of travel plans for businesses and schools;
- promotion of car-sharing;
- promotion of cycling with a particular focus on students;
- implementation of measures aimed to prevent bicycle theft.

References

MOST project

MOST stands for Mobility Management Strategies for the Next Decades. MOST pilot projects in 32 European locations implemented Mobility Management strategies both in "traditional" (companies, schools) and new thematic sectors (tourism, events and new sites in their planning stage). This led to improved accessibility and a change in attitudes towards sustainable mobility.

MOST investigated various policy frameworks and implementation strategies, and set up standardised

monitoring and evaluation tools. As a result, MOST has deepened its understanding of success and failure factors, and showed ways of integrating Mobility Management into general transport policy.

ASTUTE project

ASTUTE project focuses on behavioural change through the use of 'soft measures' such as education, training and publicity. ASTUTE will deliver valuable input to overcome the organisational barriers that prevent an increase in the use of walking and cycling in European cities.

The four targets of ASTUTE are:

- 10% increase in levels of cycling and walking
- 100 businesses with a Travel Plan in place
- Develop and implement a 'toolkit' for application across the EU
- Create and provide a predictive tool for policy-makers

TAPESTRY project

The overall aim of the TAPESTRY project is to increase knowledge and understanding of how to develop effective communication programmes to support sustainable transport policies in Europe.

For further information, see revised deliverable 3 ['Campaign Assessment Guidance'](#) of TAPESTRY project.

PLUME report on travel demand management

PLUME is a dissemination action aiming to transfer the final Land Use and Transportation Research (LUTR) results to a broad range of end users in order to facilitate and speed up their implementation. One of its deliverables is a synthesis report on travel demand management.

For further information, see [PLUME deliverable 8 - synthesis report on travel demand management](#).

'Smart choices' (UK)

'Smart choices' is an initiative of the UK department of Transport in order to assess the potential of smart and soft mobility management measures. 'Smart choices' report draws on earlier studies of the impact of soft measures, new evidence from the UK and abroad, case study interviews relating to 24 specific initiatives, and the experience of commercial, public and voluntary stakeholders involved in organising such schemes.

The assessment of a 'high intensity' scenario identifies the potential provided by a significant expansion of activity to a much more widespread implementation of present good practice, albeit to a realistic level which still recognises the constraints of money and other resources, and variation in the suitability and effectiveness of soft factors according to local circumstances.

The main features of the high intensity scenario would be:

- **A reduction in peak period urban traffic of about 21% (off-peak 13%);**
- **A reduction of peak period non-urban traffic of about 14% (off-peak 7%);**
- **A nationwide reduction in all traffic of about 11%.**

The effects of the 'low intensity' scenario, in which soft factors are not given increased policy priority compared with present practice, are estimated to be considerably less than those of the high intensity scenario, including a reduction in peak period urban traffic of about 5%, and a nationwide reduction in all traffic of 2%-3%. These smaller figures also assume that sufficient other supporting policies are used to prevent induced traffic from eroding the effects, notably at peak periods and in congested conditions. Without these supportive measures, the effects could be lower, temporary, and perhaps invisible.

For more information, see [Smarter Choice](#) website, [SUSTRANS](#) website

Mobility Counsellor: a new mission, a new profession - how to encourage travel plans for business parks

Relying on feedback from France and other EU countries, and on the demand expressed, this handbook provides recommendations on setting up a mobility counselling service and suggests a comprehensive job description for the profession of mobility counsellor. It enumerates the tools required in order to encourage the business park managers to get involved in a travel plan initiative.

For further information, see [here](#).

Toolbox for mobility management measures in companies

This toolbox has been developed under the EU SAVE II programme. It is a search facility to help companies develop their own mobility plan, and to help them promote effectively the use of public transport, collective company transport, car-pooling, walking and cycling for home-work journeys. It has been developed by a consortium of European specialists in mobility management.

This toolbox is made available [here](#).

MIDAS project

MIDAS will be implemented by partners in 6 case study cities which are representative of a wide part of the enlarged Europe: Liverpool (UK), Aalborg (DK), Cork (IE), Clermont-Ferrand (FR), Bologna (IT) and Suceava (RO). The cities will share recent experience with urban land use and mobility planning and will implement specific case studies in MIDAS, linked to the overall urban plans.

The main outcomes of MIDAS will be:

- A series of policy recommendations regarding the use of soft measures within city mobility plans and their potential contribution to EU energy objectives.
- Assessments of the effect of MIDAS measures on public attitudes to sustainable mobility
- Reductions in traffic levels, energy consumption and pollution in each city as a result of the case studies
- Transfer of knowledge and experience to decision-makers in other cities, particularly in New Member States

Car sharing: an overview of the Australian Government

The Australian Department of the Environment publicized in 2004 a thorough overview on car sharing that provides meaningful information and guidance about car sharing schemes.

See the report [here](#).

OECD report 'Communicating environmentally sustainable transport'

The overall purposes of the OECD report are to explore how soft measures could best contribute to the attainment of environmentally sustainable transport, promote understanding of its requirements, help determine how soft and hard measures can be combined to be effective towards environmentally sustainable transport, and develop recommendations concerning the use of soft measures in changing transport-related behaviour that could serve as advice to policymakers intent on achieving progress towards environmentally sustainable transport.

For further information, see the [OECD report](#).

