HOW TO ACHIEVE SUSTAINABLE MOBILITY IN LOW DENSITY METROPOLITAN AREAS. EUROPEAN BENCHMARKING

M.E. López-Lambas, Andrés Monzón
Transport Department – Civil Engineering
TRANSyT-Transport Research Centre. Universidad Politécnica de Madrid
melopezlambas@caminos.upm.es

ABSTRACT

Transport is one of the four priorities of the EU Thematic Strategy on Urban Environment. Cities concentrate 80% of European population and transport is a key element for their economic vitality. However it also produces pollution, noise, global warming, congestion, etc.

Some cities have faced this problem through integrated strategies which takes account of the interrelations among land use patterns, transport supply and, last but not least, the role of the different modes of transport, in a sort of co-modality that includes walking and cycling. Sustainable Urban Transport Plan for cities or Company Management Plans for big industries look for those objectives.

This paper presents some experiences around Europe: Holland, Spain, France and the UK. These good practices show how to combine the right level of provision of infrastructures to attend mobility demand, but taking care for quality of life and environmental standards in new urban and business developments. The paper points out which are the key elements of a mobility plan, its phases, measures and the importance of a well designed public participation procedure.

1. INTRODUCTION

Nowadays it is almost a tautology to state that all of Europe's cities need to tackle the environmental problems that they face and, as time goes on, that need increases since problems do so.

According to the Thematic Strategy on Urban Environment (TSUE)[1], between 1995 and 2030, the number of kilometres travelled in urban areas is predicted to increase by 40% and, in Europe, the car fleet has trebled in the last 30 years, and the problems will be worse with the enlargement of the EU. Traffic is a major source of air pollution (such as NO2, PM10, etc.) [1], and that urban traffic accounts for 40% of transport-related CO2 emissions; then it seems to be clear that" business as usual", if cities do not accept the challenge to respond adequately to these patterns, and nothing is done so as to overcome effects such as excessive dependence on the private car and urban sprawl, things only can get worse. To avoid it, promoting sustainable urban transport which help to mitigate the foreseeable consequences.

Indeed, the urban sprawl is another major problem associated to the increased mobility in urban areas, that arises from the decentralisation of office and housing developments, and that proves the links between land use and transport and the need to deal with both issues together to tackle this puzzle where economic, social and equity issues must fit.

It is therefore envisaged that the capital cities of Member States and cities with more than 100,000 inhabitants, should implement a Sustainable Urban Transport Plan (SUTP), currently obligatory in countries such as France and the United Kingdom [2]. Indeed, some Member States have started to adopt such those plans -or some elements at least – and this papers will deal with them in the proposed – maybe a little pompously- "benchmarking exercise".

The figure below shows the increase in petrol uses and, hence, in energy consumption and polluting emissions, as population density grows.

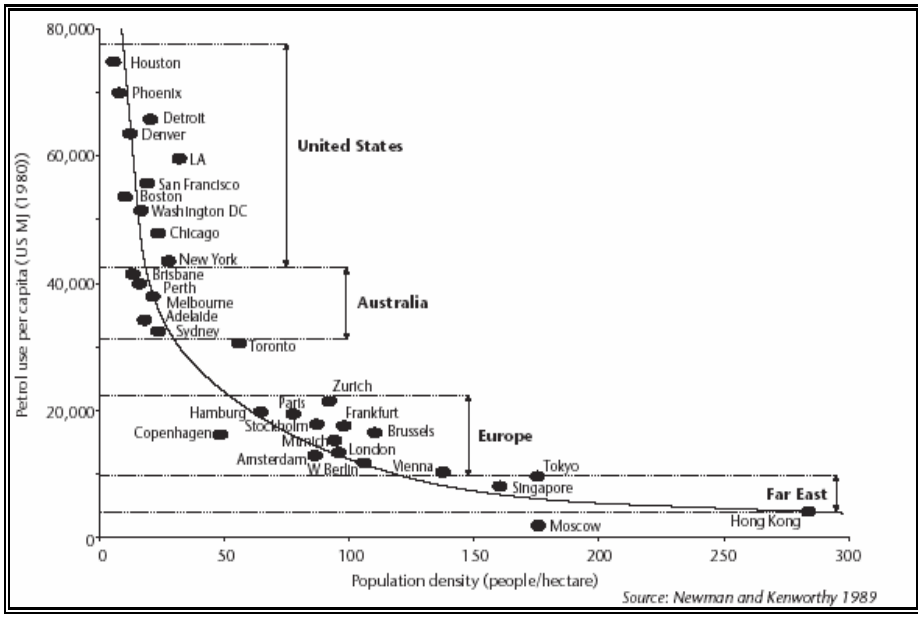

Figure 1 –Petrol use reduces at higher housing densities
Source: COM (2004)60

All this leads to a simple question: regardless of the wide range of possible solutions and the importance of taking them all into account, any approach to urban sustainable mobility should remark the integration of transport and land use planning – town planning and traffic planning, if you prefer-, apart from the fact that is also needed to set targets, to monitor progress and, last but not least, to consult citizens, businesses and other stakeholders [1]; dialogue and cooperation which, in our view, is one of the most remarkable things of the SUTP approach.

2. WHAT A LOCAL TRANSPORT PLAN MEANS

Generally speaking, we could state that the goal of a SUTP is that of achieving sustainable ways of transport in cities; that is to foster travel patterns compatible with sustainable development goals: economic growth, environmental quality, social equity and liveable cities.

As main characteristics, a sustainable urban transport plan would cover the whole urban area, seeking to reduce the negative impacts of transport and to tackle the rising volumes of traffic and congestion, because of which they would be linked to regional and national plans and strategies. Furthermore, they should cover all modes of transport, looking for changing the modal split in favour of more efficient transport modes, i.e., the so-called soft

or friendly modes, such as public transport, cycling and walking. So, independently of the cities' peculiarities[1], all of those features should be born in mind by one and by all of those involved when designing one of these plans.

The backgrounds of SUTP are the so-called French Plains de Déplacements Urbains [3] and the Local Transport Plans [4], in the United Kingdom. Since the goal of this paper is not going into detail of both precedents, suffice is to say that they are policy documents that involve the main tools to define and organise the trips in the city, aiming to end up with the private car hegemony.

2.1. The Plains de Déplacements Urbains (France)

Since transport plans define the principles of the organisation of transport for urban areas, urban transport plans has to manage the traffic flow and the parking policy [6], by developing sustainable means of transport and intermodality. To implement those Urban Transport Plans (called PDU: Plans de Déplacements Urbains, literally "urban trips"), in France three main steps were took in 1982, 1996 and 2000, by passing three key regulations: the Law on Domestic Transport, the Clean Air Act and the Law on Urban Solidarity and Renewal, respectively [5]. Within the framework of the first one, PDU's were not compulsory and both elaboration and implementation tools were not so accurate; the second one, made urban transport plans obligatory for those urban areas with more tan 100,000 inhabitants and, finally, the last one put the stress in the link between mobility and town planning, with two new orientations: the improvement on road safety and the implementation of an integrated fare and ticketing system.

Up to now, and very briefly, as main results, PDU's have put the urban transport plans on the political agenda, and that has been translated into the implementation of a lot of tramways, the construction of exclusive bus lanes, a decisive parking policy, the deep involvement of the stakeholders and the increasing in the number of travel plans, among others important outcomes. Nevertheless, is always difficult to assert to what extent the good effects on urban mobility are only due to PDU's, since population ageing or price of fuel, for instance, can also influence on mobility patterns[7].

2.2. The Local Transport Plans (UK)

Very briefly, LTPs are landmark documents that require authorities to plan a five year programme for managing transport services within a comprehensive and multi modal strategy for the achievement of local and national objectives [8], i.e., must be consistent with the national plans and goals, both in transport and other issues. After the five years period, the plan is evaluated by the Local Transport Authorities and their reports serve as basis for the national funding.

The first round of LTPs were launched for 2000/05, following the Transport Act issued in year 2000, that gave to the local authorities the competencies to implement those plans and, in order to help the authorities to do so, the Government launched a guide that sets the following objectives:

- To protect the environment

1 There are industrial cities, historical cities, dormitory cities, etc., each one different from another, with its own needs and characteristics, which means that one size does not fits all. In other words, not all the successful measures implemented in one city will be equally successful in other.

- To improve passengers safety
- To promote the sustainable growth of the economy
- To provide global accessibility, especially for those without a car
- To integrate land use and transport policies

A remarkable aspect of the LTPs is the indicators set to evaluate the outcomes against the objectives. Currently there is a new guide for the second round of plans (2006/2011).

3. WHAT'S ON IN SPAIN?

Spanish regulations and policy documents states that cities with more than 100,000 inhabitants should implement a SUTP, although informed opinion has it that the limit should be lower, i.e., 50,000, since this is the minimum number of inhabitants for a municipality to provide public transport services according to the law [9]. Anyway, the implementation is on voluntary basis, obviously very conditioned by financial constraints among other (legal and technical barriers make the difference as well).

Nevertheless, the Mobility Act passed by the Catalan Government in 2003 [10] is the first- and the only one up to now- that states the Urban Mobility Plan (UMP) as one of the planning tools needed to achieve the mobility goals at territorial scope. In this sense, the UMP is the basic document to set the sustainable mobility strategies for all Catalan municipalities, always in line with the master mobility plans. So, all the municipalities obliged to provide public transport according to the local regulations, are obliged to implement an Urban Mobility Plan as well, although the Metropolitan Transport Authority must inform about each one of them.

Following the definition provided by the guidelines included in the Spanish "Guide to elaborate and implement UMP" [11], a sustainable urban transport plan is a bunch of performances that aim to implement more sustainable travelling modes (such as walking, cycling and public transport) in the city; i.e., transport modes that make compatible the economic growth, the social cohesion and the defence and protection of the environment, in this way ensuring a better quality of life for all the citizens [12].

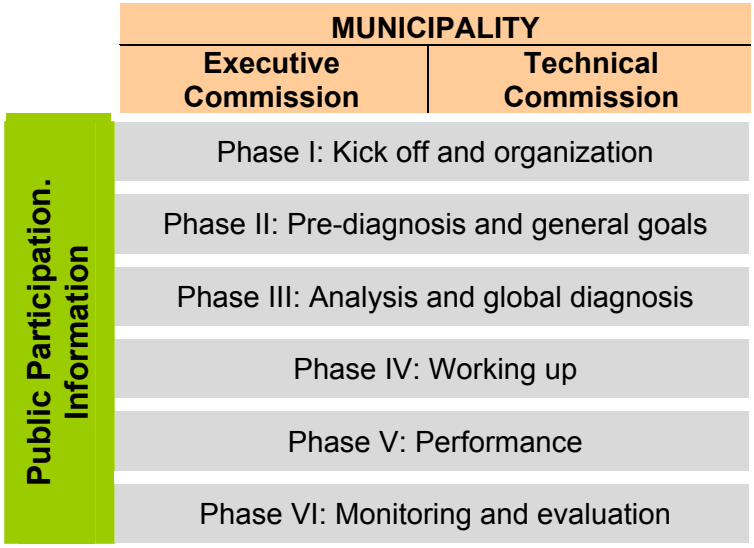

Figure 2 – Methodology for implementing SUTP [11]

In this sense, the above mentioned Spanish guide provides an approach to tackle the problem stating the phases of the plan, a number of indicators and key elements for success, and the absolutely needed public participation procedures. This said, *grosso modo*, the stakeholders involved in the elaboration and implementation of a SUTP, could be grouped in three main categories, i.e., local government and authorities, transport companies and operators, and the citizenship through the local and neighbour associations, business, lobbies, etc., in such a way that public participation – in a well designed process- is a key issue for the right development of the plan that, without it, will lose not only its legitimacy but its opportunities for success. Furthermore, since the implementation of some measures is responsibility of several and different administrations, the collaboration and coordination between them is more than needed.

Very schematically, those are some measures to be implemented by means of a SUTP, grouped by intervention areas [11]:

a) Traffic management and control (TMC)
b) Parking management (PM)
c) Fostering public transport (PT)
d) Recovery urban quality (UQ)
e) Mobility management through specific measures (MM)
f) Improvement mobility for impaired people (MIP)
g) Urban freight transport (UF)
h) Integrated mobility and land use policies (MLU)
i) Environmental quality improvement and energy saving (EQ/ES)
j) Improvement in transport to large activity centres (TLC)
k) Safety improvement (SI)

Following the headline of this paper – how to achieve sustainable mobility in low density metropolitan areas-, we should mainly focus on c), h) and j), which are the most suitable measures to be performed in that kind of areas in order to get the main goal of sustainable mobility, since that goal is how to avoid the use –or rather, the abuse- of the private motorized car.

Table 1 – Table eligible measures in a SUPT

TMC	Traffic calming, speed limits 30km/h, etc.	Junctions regulation: bus priority& trams	Ring roads: only when connecting routes		
PM	Blue areas, more parking spaces	Park & ride			
PT	***Interchanges (design, location city integration)***	***Bus only lanes, HOV lanes***	***Network enlargement, frequency, fleet renewal, interchanges***	***Integrated tariff system***	***New technologies: information, ITS, etc.***
UQ	Pedestrian zones	Cycle lanes	Bicycle loans	Bicycle parking	
MM	Park & ride	Transport on request	Carpooling/ Carsharing	Urban tolls	
MIP	Road accessibility	Adapted PT stops and vehicles			
UF	Traffic control for heavy vehicles	Limited timetables	Transport Centres		
MLU	***Pedestrian zones***	***Integrated public transport/urban planning***	***City and neighbourhood friendly design***		
EQ/ES	Fleets: electrical, gas, bio diesel; Low emission zones	Tax incentives for buying or renewal	Cycle lanes and pedestrian itineraries		
TLC	***Location***	***Company buses (shuttle/routes)***	***Specific PT lines; cycles parking; cycling facilities***	***-Tele working -Flexible/ compressed timetable***	***Company transport season ticket***
SI	Road signs improvement	Junctions improvement	Flows division: one space for mode		

Regarding the temporal scope, the measures included in the Plan may be developed through three different frameworks: short term (2 years); medium term (2-4 years); long term (4-8 years)

4. SOME EUROPEAN EXPERIENCES: A BENCHMARKING EXERCISE

4.1 Grenoble (France)

Grenoble city is located in the central part of a metropolitan area made up of 26 communes, in an area of 307 km^2 with a population of almost 400,000. The Grenoble Metropolitan area has 2 public transport authorities. The *agglomération de Grenoble* puts the PDU into practice, since it is in charged of the mobility management, the environmental protection, the economic development and the urban solidarity. The PDU began in 2000 with a time horizon of 10 years.

Main objectives

The main goals to be achieved by 2010 are:

- A sensitive traffic decrease: from 54% to 48%
- An increase in the use of public transport: from 14% to 17%
- An increase in the use of bicycles
- The upholding and consolidation of trips on foot: 27%

Regarding environmental goals

- To reduce up to 50% PM10 emissions, NOx, CO
- To reduce up to 50% the number of people exposed to polluting levels superiors to the annual average

Measures
There are two main projects regarding public transport in the one hand and infrastructures on the other. The first one plans the enlargement of the tram network, the reorganisation of the metropolitan buses network together with the set up of new lines and exclusive lanes and the improving of the links between the railway suburban network and the urban trams through a "tram-train" system. The other measures makes reference to the improving of the infrastructures, through the construction of a free toll tunnel, the increase of capacity of the A-489 highway and several performances regarding land use zoning in both urban and suburban areas.

Funding
The budget for year 2000 earmarks the large sum of money (up to 1.158,2 Meuros) for investments in public transport (61%), followed by parking measures, and was shared among the municipality, the central government and private banks.

Stakeholders
Apart from the funding institutions, the so called "S*yndicat Mixte des Transports en Común*" played an important role together with the "*agglomeration de Grenoble*" (known as *Metro*). The Syndicat is made up of the region, the department and the urban transport authorities, and is entitled for the elaboration and monitoring of the master plan of the *agglomeration*.

Public participation procedures
The public participation was focused on an information campaign, surveys on the mobility organisation for 2010, awareness campaigns and promotion of the trips on foot to school and working place.

Objectives against results: monitoring
The follow up Committee is made up of the *Syndicate*, *Metro*, the 23 municipalities, business representatives, University, citizens associations, transport operators and the Urbanism Agency. The Committee monitors the projects and surveys and they meet twice a year. Their main conclusions drawn from the 2000 household survey compared to that from 1992 were:

- The use of private car has decreased up to 1%
- Modal share for public transport keeps the same: 14%
- The use of bicycle has decreased up to 2%
- The number of trips on foot hast increased from 27% to 30%

Despite of the modest results, it can be seen a slight change in the mobility patterns, in a context of increasing motorisation rates, especially in the outskirts.

4.2. West Yorkshire (United Kingdom)

West Yorkshire is a metropolitan county located at the Northwest of England, with a population of 2.1 million inhabitants. The city of Leeds is the economic centre, with 42% of the employment. Most of the trips are inner trips since almost 70% of the population live and work in the same district. The Transport Authority of West Yorkshire is entitled for the development of the Local Transport Plan (LTP), which is a strategy for five years, in a coordinated way for all the districts, in line with the National transport objectives.

Main objectives
The first LTP (2001-2005) set the following and classical sustainable main objectives:

- Economic:
  - To provide opportunities to foster economy and competitiveness
  - To improve the efficiency of the transport system
  - To set infrastructure standards to guarantee safe mobility for people and goods
- Social:
  - To improve safety and reduce the number and severity of road accidents
  - To promote social inclusion and equal opportunities to transport access
- Environmental:
  - To improve the environmental quality by reducing transport impacts on air quality and noise.
  - To participate in the national and international endeavour to reduce the transport contribution to the global greenhouse emissions

Then, as specific goals, the LTP sets:

- To reduce the traffic increase rate in order to decrease the absolute traffic volume levels
- To foster a higher rate of public transport trips, bicycle and walking, as alternative modes to private car
- To encourage the use of railways and fluvial navigation as an alternative to trucks
- To improve the integration of transport modes at both political and strategic level

Measures

The first LTP 2001-2005 put into practice the following measures:

- High Occupancy Vehicles (HOV) lanes in the peak hours with variable messaging panels
- Public transport.
  - Improvements on buses services, through Quality Bus Partnerships[2]
  - Construction of 3 new tram lanes in Leeds (21 km)
  - Guided bus systems in Leeds and Bradford, in such a way that the central lane permits a shared use with bicycle
  - Improvement on interchanges
- School buses.
  - Design of bus routes aiming to reduce the number of children going to school by private car. Children register previously through a telephone number, and bus drivers together with school responsible are in charge of the children supervision during and after the journey
- Infrastructures
  - Improvement on the Leeds ring road
  - Some improvements on railway stations and rolling stock
- Bicycles
  - 23 new km of bike lanes and other supporting actions
- Other performances
  - Park & ride
  - Bus priority
  - Pedestrianisation and Areas 30

2 These Quality Contracts mean a commitment between the local transport authorities and the bus operators, through which the first commit to improve the road infrastructures and the latest to introduce new and better buses, increasing the frequency and quality in such a manner.

Funding
Major resources came from local taxes and central government (apart from the direct incomes from the different services. So, in 2002/03 the budget for West Yorkshire LTP was 136.9 million Euros, from which central government financed 65.3 million (44.6%). To get this sum of money from the government, the LTP is evaluated yearly through an Annual Progress Report.

Stakeholders
Local Transport Authority, Central Government and bus operators.

Public participation
The public participation process is articulated through a consultation process with the local community.

Objectives against results: monitoring
The monitoring process is developed through a series of 100 indicators, 17 of which are obligatory. The results of the process determine the allocation of resources, together with the achievement of the goals set by the national government.

The main results, according to the annual report 2004/05, have been as follows:

- Number of children death or injured has decreased by 46% (regarding the base level 1994/98)
- Number of accidents with minor injuries has decreased by 14% (regarding the base level 1994/98)
- Number of fatalities or severe injures in road accidents have decreased by 18,1% (regarding the base level 1994/98)
- Traffic in a typical working day has increased only to 1% since 1999 (while 5% was expected)
- Railway use has increased by 29% since 1999/2000
- The number of registered cyclists has increased for the first time since the beginning of the plan
- Walking trips in peak hours have increased to 28% in the five main urban centres of the region
- 94% of the rural households are now at 800m distance from a bus service with a frequency of one hour or less.

4.3. Barcelona (Spain)

The Barcelona Metropolitan Region (BMR) comprises the regions of l'Alt Penedès, Baix Llobregat, Barcelonès, el Garraf, Maresme, Vallès Occidental and Vallès Oriental, with a total of 164 municipalities. It spans a surface area of 3,237.1 km^2, and has a population of 4,841,365 inhabitants (2006).

The Mobility Plan of the BMR has been launched following the National Mobility Guidelines, included in the Law 9/2003 for Mobility. These Guidelines are the general framework for the implementation of the law contents. The Metropolitan Transport Authority (MTA) is in charged of the Mobility Management Plan (MMP), which means, in this sense, that MTA is a pioneering institution among its European equivalents, since it has extended its area of action to beyond its responsibilities in public transport.

For the implementation of the plan, a 2012 scenario has been designed presuming the effects of the actions and measures to be taken for sure, but without changes in the current trends and behaviours [17].

Main objectives

The main general objectives of the MMP to be achieved by 2012 are:

- To improve mobility
- A better energy efficiency
- To face the environmental, economical and social challenges.

More specifically, and in short, the objectives are based on:

- To reduce the number of daily trips as well as the average trip distance
- To foster the rationale use of the private car
- To promote the use of public transport and non mechanized modes
- To encourage the efficient use of the energy resources: decrease greenhouse emissions and use alternative fuels

Measures

Measures are articulated by performance axes, such as the coordination between urbanism and mobility, mobility management and improving of the modal share, fostering quality in railways, sustainable accesses to the big areas of activity, etc. Among all of the, the most remarkable are the following:

- Parking restrictions
- Promotion of car sharing, car pooling and van pooling
- Traffic management measures: bus priority, exclusive bus lanes
- ICT applications to public transport
- Bicycle: infrastructures and facilities
- Tax incentives for public transport users…
- ….and so up to 90 measures

Funding/Stakeholders

The funding of the plan is 100 % MTA (500.000 € approximately), and the stakeholders involved in the proposal are:

- Territorial Policy and Public Works Department, as the main one.
- Others:
  - Ministry of Developing
  - ADIF (Railways infrastructure agency)
  - Catalan Institute for Energy (ICAEN)
  - Barcelona provincial council
  - Metropolitan Transport Company (EMT)
  - Metropolitan Transport Authority (ATM)
  - Catalan Transit Service (SCT)

Public participation procedures

To elaborate the MMP, the MTA has developed a participation process, with institutions, technicians and the public, through seminars, working groups, information campaigns and digital *fora*, from which 13 instrumental studies have came up, grouped in 7 categories, such as transport costs, land, population and location of activities, environmental impact evaluation, mobility management, etc.

Objectives against results: monitoring
Given the fact that the plan has just began, the only way to "*monitor*" the expected results, is through the scenario designed to that purpose for 2012. And the analysis shows the following:

- Minimise average trip distance: from 6,77 km to 7,04 (objective: 0 growth)
- Modal share:
  - On foot: -5.61% (objective +3%)
  - Public Transport: 2.56% (objective +7%)
  - Private car: 2.46 (objective -10%)
- To reduce externalities: 3% (objective 0%)
- To reduce fuel consumption and transport energy intensity: objective -5.8% far from reaching.
- Reduction of CO2 emissions: 10.14% (objective -20%)
- Reduction of air pollution due to transport:
  - NOx (objective -34.87%)
  - PM10 (objective -31.46%)

  Both are more or less reached, but additional measures are needed.
- Social and environmental costs: objective 0, i.e, the least possible
  - Public transport: -5% (objective -4%)
  - Private transport: -8% (objective -4%)
  - Passengers: -7 (objective -4%)
  - Freight: 12 (objective -4%)

So, except for freight, the goals are mostly achieved.

As main conclusions drawn from the study, we can state that one size does not always fit all; so measures that work out fine in one field do not work in another (such as urban and inter-urban areas), and the commitment of the institutional agents responsible for each measure is absolutely needed as well as citizen's information and participation campaigns.

4.4. Burgos (Spain)

The city of Burgos is what we could call "a lineal city", with 160,000 inhabitants. It is, basically, a historical and industrial city, with most population living in the west side where the enlargement of the city took place (80%). It spans a surface area of 108 km^2. The agglomeration area has an extension of 175 km^2 with 248,000 inhabitants. Its industrial character provides a high rate of inter provincial traffic and, furthermore, an airport is currently under construction and the high speed train is coming soon.

The Urban Mobility Plan is being developed under the CIVITAS II initiative (VI EU Framework Programme), so its time horizon is closely associated to the project, *i.e*., 2005-2009 [16].

Main objectives
As the proper project points out, with the CIVITAS Initiative, the EC aims to generate a decisive "breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen". In more specific terms, the Burgos Mobility Plan aims to:

- Reduce the emissions due to transport
- Minimise the traffic impacts in sensitive areas
- Make citizens aware about their responsibilities regarding the objectives

- Give priority to the public and collective transport over private
- Improve safety and transport accessibility to the most sensitive groups, such as children, elderly and impaired people
- Recover the public space for citizens and improve road safety

Measures

To get the above mentioned goals, Burgos has put into practice the following measures among others:

- A bio-diesel local and national strategy aiming to introduce bio-diesel in public and private fleet up to a 5% at least
- Restricted access to the historical city centre through:
  - Pedestrianisation
  - Bollards
  - Cameras
- Parking strategy:
  - Construction of 3 off-street parking for more than 2,000 vehicles (still ongoing),
  - Development of a study to promote and manage car-parking facilities
  - Heavy vehicles parking and development of a new industrial and logistic area, which means, in practice, an extensive reorganisation of the road network
- Public transport improvement:
  - Information in bus shelters
  - New system of payment by contact-less cards
  - Improvement of the accessibility to the buses
- Bicycles: a city bike scheme free for all users, with a remarkable particularity regarding the usage and maintenance of the system: an organisation working in the field of social inclusion has been contracted to maintain and repair the bicycles as well as to move the bicycles each working day to the bike-loan points.

Public participation procedures

Effective communication is a key condition to achieve public support especially for some demand management policies such as access restriction, parking management, etc. To that purpose, a web page (www.civitas-burgos.org) has been set up that includes a forum for opinion and participation and shows different events as they are organised. It is, in short, a Mobility forum for the exchange of opinions and a channel to disseminate information that target the public and particularly stakeholder groups affected by and involved in the changeover to different modes of transport and mobility. These activities are being supported through a web site. Apart from that, three extraordinary meetings were held to ask for suggestions and opinions, and a selection process seeking ideas for different purposes was called, such as slogans to encourage people not to invade the bicycle lane. It is remarkable the hard opposition from shops and residents to the restricted access to the city centre, finally solved through a strong commitment after negotiations with all the

Funding/ Stakeholders

Approximately 8 million Euros is the cost of implementing the measures above: the Municipality receives 3 from the European Commission and gives other 3, and the Castilla-León Technologic Institute together with the Burgos Strategic Plan Association receive half a million each and they put the other half.

Objectives against results: monitoring

- Concerning bio diesel strategy, has been a complete success and the initial objective of 5% has been widely surpassed: in 2007 is 30% in the summer time and

12% in the winter time. 100% (instead 45% planned) of the clean municipality vehicles uses bio diesel
- Nowadays, the 90% of the city centre is free from private cars due to the 100% access restrictions
- New construction of 3 off-street parking: one of them is completely finished, the second is ongoing, and regarding the third one there are some problems respect to the location, which is not fine for the neighbours. Regarding the parking facilities, 33 information panels have been installed, as well as the payment minute by minute.
- Regarding bus public services, from 2004 to 2005 a slight decreased took place (1%). In 2006 it raised again up to 1%, but due to an increase in the number of lines and more frequencies.
- Regarding bicycles the data shows the good behaviour of the scheme:
  - 1,491 users card and 3,800 loans
  - From 22 to 42 km of bike lanes from 2004 to 2006, which fully fulfils the objectives
  - Number of cyclists per hour: 20

To finalise, Burgos has been named as Best City of the Year for Sustainable Transport and Mobility by the Spanish Ministry of Industry, in 2007.

4.5. Apeldoorn (Holland)

In The Netherlands the legal framework for Urban Mobility Plans are two documents - “Nota Ruimte” and “Nota Mobiliteit”- which state the general guidelines for urban and regional development and mobility, respectively. In that context, since 1999 the city has developed a Traffic and Transport Plan, that will be running until 2010, and that combines traffic management with urban design and environmental quality.

Apeldoorn has a population of 156,000, with a motorisation rate of 436 cars per 1,000 inhabitants, and it is well linked with other cities by train and by road. The enlargement of the city towards other border cities makes traffic growth with the associated phenomena of congestion during the peaking hours and weekends.

Main objectives
Starting from the key message that safety is almost more important than mobility, more specifically the main goals of the plan are as follows:
- Priority for bicycles and pedestrian in the city centre.
- Promotion of the bicycle and improvement of the public transport quality
- City centre free of car traffic
- Concentration of the road traffic in the ring road and roads in order to create residential areas almost free of cars
- Integrated Mobility Plans for industrial areas, business parks, schools and hospitals

Measures
The main measures developed are as follows:
- Pedestrianisation of commercial areas in the city centre. Freight transport has been restricted to a few hours, and a home delivery system has been implemented
- Bicycles has priority in the arterial roads to access the city centre
- A quality public transport: tickets at reduced price combined with park and ride, so drivers leave their cars in the outskirts and accede to the city centre by bus. There are special buses for schools, hospitals and business parks, together with a “call on a ride” system for elderly people.

- “Sustainable safety”: Pedestrian and cyclists have priority in commercial and residential areas, whilst cars have so in the ring road and in the exit/entrance roads to the city. Furthermore, all the streets are split into 3 categories at different speeds: 30 km/h in residential areas with traffic calming measures, 50 km/h in the intermediate areas and in the ring road, and 70-120 km/ out of the city.
- Parking information.

Public Participation procedures
Public participation was considered as essential for the exit of the plan. So, information meetings were frequently called, and there is a municipality web page with very detailed information on the planed measures.

Funding/Stakeholders
The total cost of the plan sums up to 8 million Euros per year until 2010, which means 120 million altogether, and comes from the municipality as main stakeholder of the plan. But there are other contributions from the province, public institutions and private companies.

Objectives against results: monitoring
Apeldoorn publishes its results each year, but they are pretty well awareness of the cause and effect relationship is not always clear. Anyway, they assume as main results the following:
- Road traffic accidents have decreased up to 50% from 1999 to 2004.
- General improvement of road congestion: a citizen survey shows an increase in the citizen satisfaction index from 7 to 8 in the same period.

5. CONCLUSIONS

Undoubtedly, modal split patterns depend greatly on the density of population, but also on other variables such as trip time and length. Consequently, if there is a desire to increase public transport journeys, action must be taken on the speed and regularity of PT services in order to be able to compete on a rigorous basis with cars. For instance, implementing measures to improve public transport such as the introduction of dedicated bus lanes for bus and taxi use and building a network of transport interchanges for shared use by different PT modes, etc. At the same time, it is applying restrictive measures for private car driving, especially in the CBD, through a pricing scheme for parking and pedestrianisation of historical zones, etc. [13]

In the convincing that the benchmarking exercise through the cities reviewed in this paper, has been made out not to penalise those who are not doing well, but to learn from those who are acting right, from the experiences here analysed we can draw some suggestions to foster the development and use of public transport as a way to improve mobility in low density areas in their “commuting relationships” with the main city:

- One of the elements that most intensively conditions modal distribution is the territorial factor. That makes necessary the control of urban sprawl through planning.
- Integration of urban planning and public transport. Nevertheless, physical planning influences the number of transport alternatives in people choices, offering opportunities to change, but other policies, such as pricing, are needed to further influence modal shift [18].

- Revitalization of urban centres and restrictive parking policies. Once for all it is needed a real coordination between land use planning and transport as a whole.

- Better balance in the use of the modes of transport, through affectation of urban space to public transport and soft modes -i.e., reserved lanes and other traffic priority systems-, access control schemes such as congestion charging, and parking policies.

- Support to public transport through sustained investment in public transport, establishment of organizing authorities with extended responsibilities, development of reserved routes and priorities for public transport. In fact, UITP recommends "*to maintain or step up investment in public transport to at least bring it up to the level of that for the road networ*k" [14]

- Improving public transport means to offer a high level of service so that automobile drivers will divert to public modes. This means a reasonable end-to-end travel time for public transport comparable to the travel time for an automobile, but at a similar cost (or, at least, in one's perception). Obviously, in this sense, the development of reserved lanes for public transport seems to be the only real alternative to the private car in terms of speed and regularity.

- Public transport should provide all city dwellers, motorised or not, with accessibility to jobs, education, services, shopping and leisure facilities. It is energy-saving, respectful of the environment and health of citizens and those outside low density areas, and all at fewer costs -in the broad sense of the word- for the community than the car [15].

But through the whole procedure underlies a key issue for the sake of success: a public participation process designed in an adequate and realistic manner. There is nothing shameful in the assertion "that not everything should be asked to everybody", but well understood that citizens must have the right to decide in matters that they are very sensitive to –such as mobility. So, it is needed to have clear from the beginning the desired level of participation in order to avoid false expectations -it is counter productive when decision has been previously taken-, and to be realistic: there are nonnegotiable items. In fact, more participation does not necessarily mean more representation.

At the end, it is all about what kind of city we would like to live in.

REFERENCES

1. COM(2004)60 final 11/02/04. Communication from the Commission to the Council, the European parliament, the European economic and Social Committee and the Committee of the regions. Towards a thematic strategy on the urban environment.
2. COM (2005) 718 final 11/0/06. Communication from the Commission to the Council and the European Parliament on Thematic Strategy on the Urban Environment. SEC (2006) 16
3. Centre d'Etudes sur les Reseaux, les Transports, l'Urbanisme et les Constructions Publiques (CERTU). Les Plans de déplacements Urbains. Guide Méthodologique. 1996
4. Department for Transport (DfT). Full Guidance on Local Transport Plans (on line). Second Edition. Draft for consultation. London, DfT 2004.
5. Loi d'Orientation des Transports Intérieurs (LOTI), 1982; Loi sur l'Air et l'Utilisation Rationnelle de l'Energie (LAURE) 1998; Loi Solidarité et Renouvellement Urbain (SRU), 2000

6. Benoît THOMÉ, Local public transport organisation in France: A new deal? Seventh THREDBO Conference, Molde (Norway) - June 2001
7. Thevenon, Jean (CERTU) “The urban travel plan in France: 25 years on. From UTP to SUTP?” IDAE, Espacios Urbanos Espacios Humanos..hacia una movilidad sostenible”, Madrid, March 14-15, 2007
8. Atkins Transport Planning, Local Transport Plans –policy evaluation. Final report, 2003
9. Ley 7/1985, de 2 de abril, Reguladora de las Bases de Régimen Local
10. Ley 9/2003, de 13 de junio de la Movilidad. Generalitat de Catalunya
11. Guía práctica para la elaboración e implementación de Planes de Movilidad Urbana Sostenible, IDAE, Madrid, 2006
12. European Council meeting 2340th - Transport / Telecommunications. Luxembourg, 4-5 April 2001
13. Monzón, A., Vega, L.A., López Lambas, M.E., Potential to attract drivers out of their cars in dense urban areas, Transport Research Board Conference, Washington, January 2007
14. Mobility in cities database, UITP, 2005
15. Mobility in cities database. First results, Jerome Pourbaix, May 2005
16. Ministerio de Medioambiente. Planes de Movilidad Urbana. Tecnologías de Reducción de Emisiones en el Transporte. Madrid, 21-22 septiembre 2005
17. www.atm.cat (web of the Metropolitan Transport Authority of Barcelona Region)
18. Mo.Ve International Forum on Sustainable Mobility in European Metropolitan Areas, Executive Summary and Policy Proposals, Venice 29-30 September, 2005