

WGT
Sub Group “Alpine Urban Mobility”

REPORT ALPINE URBAN MOBILITY

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The Sub - Group “Urban Mobility” has agreed the final text of the document “urban mobility report”, on the basis of the mandate given to the Working Group “Transport” in the meeting of the Alpine Conference held in Evian on 3rd of March 2009 and of the 41st Permanent Committee of the Alpine Convention held in Brdo pri Kranju of the 28th and 29th of October 2009.

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The Sub-Group thanks also Luca Cetara, Frederick Dooley and Francesco Geri of the European Academy of Bolzano, who have given their important contribution in the drafting of the Report.

The Document is made up of an introductory part stating the criteria and methodologies adopted and a part that contains the results of the analysis based upon the information received by the Contracting Parties.

In addition, the Sub-Group, on the basis of its activities and the acquired know-how, presents a set of possible recommendations on how to improve urban mobility in the Alpine towns which were considered in this report, in accordance with the mandate set by the Alpine Conference of Evian in 2009.

After the presentation of the report, announced for March 2011 during the Alpine Conference of the Alpine Convention, the Sub Group shall complete its work analyzing the peculiarities of urban mobility in the Alps focusing its attention on its interurban element.

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1 Mandate of the Working Group Transport¹

During the session held in Evian on 3 March 2009, the Alpine Conference, composed by the Ministers of the Contracting Parts, has assigned to the Working Group “Transport” (WTG) of the Alpine Convention the task to go into more depth on the issue of urban mobility and the metropolitan connections within the Alpine arch, aiming at highlighting the critical factors and the environmental impact, as well as recommending possible common structural policies in order to promote a sustainable mountain mobility as a whole and the possible structural measures targeted to offer a more effective mobility also from an environmental point of view.

(...)

“Transport” Group Work Mandate

By considering the works of other multilateral bodies interested in sustainable mobility, in particular the Zurich Group, the “Transport” Working Group will organize its new activities for the XI Conference with respect to the (...) themes listed as follows:

- *Sustainable mobility of people within the Alpine Space, at urban as well as interurban level in the context of the Alpine area. The Working Group will carry out the recommendations aimed at better developing a system of urban and interurban mobility in order to preserve the mountain environment, by meeting the Alpine population’s expectations, and by considering the necessity of preserving the biodiversity and attenuating the impact of climate change within the Alps. This work will focus on the Alpine agglomerates, and will consider the relations among agglomerates as well as among the agglomerates and the peripheral areas. The Working Group will base its work on existing good practices, will consider different instruments for a better urban mobility, will promote the search for a major efficiency in urban and interurban transports also from an ecological point of view as well as new sorts of urban logistics.*

(...)

¹ Permanent Committee of the Conference of the Alps, 03 March 2009, Evian. Report of the Presidency of the Transport Working Group

2 Legal framework on transport

Relevant legislation covering the transport and environmental issues regarding urban mobility can be traced in several sources at an international and national level. Namely, for the purpose of this report, we shall consider as a reference point the obligations and indications deriving from European Unions' legal instruments and International treaties such as the Alpine Convention.

The European Union

The European Union has addressed urban mobility through both a series of legislation documents such as Regulations, Directives and indications on the actions to take through the publication of an Action Plans, a Green paper and several communications made by the Commission besides other official opinions produced by other EU bodies.

Policies on transport are developed on the basis of what is stated by Title VI (art. 90 - 100) of the Treaty on the Functioning of the European Union.

There are many subjects comprising urban mobility covered by the Regulations and Directives approved by the EU.

Here are, among others, some brief descriptions of some of the most important pieces of legislation on the matter:

- Improvement of the quality of fuels to which the EU Directive on the level of sulphur for liquid fuels and on the quality of petrol and diesel makes reference. (Directive 93/12/CE and Directive 90/70/CE, at later staged amended by other implementing norms the most important of which is Directive 2003/17/CE)²;

² Relevant EU Directives considering fuels

- European Parliament and Council Directive 94/63/EC of 20 December 1994 on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations
- Council Directive 93/12/EEC of 23 March 1993 relating to the sulphur content of certain liquid fuels.
- Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels.
- Regulation EC N 1882/2003 of the European Parliament and of the Council of 29 September 2003 adapting to Council Decision 1999/468/EC the provisions relating to committees which assist the Commission in the exercise of its implementing powers laid down in instruments subject to the procedure referred to in Article 251 of the EC Treaty
- Directive 2005/33/EC of the European Parliament and of the Council of 6 July 2005 amending Directive 1999/32/EC
- Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC

- Differentiation of energy sources, as set by Directive 2003/30/CE in order to promote the use of biofuels and other renewable fuels substituting currently prevailing fuels in the transport sector (i.e. minimum quota in the EU market : 5,75% by 2010)³;
- Improving the emissions standards regarding pollutants and GHGs, through the implementation of a series of Directives that impose limits on vehicle certification⁴ according to the emissions per unit produced. Currently, the most important Directive 2005/55/CE regulates the classification of light vehicles according to the standards for emissions of pollutants and GHGs; specific directives in the same field apply to different types of commercial vehicles. In this field other EU directives on air quality⁵ can be included namely the frame work directive of the air quality 96/62/CE that defines for the Member Countries the criteria and uniform methods in assessing and managing the quality of air and of the environment and the following implementation directives regarding different kinds of pollutants (99/30/CE - 2000/69/CE - 2002/3/CE - 2004/107/CE);

Furthermore the EU Commission and other EU bodies have stressed the importance of urban mobility in achieving the objective of combating climate change and promoting cohesion in several of its communications⁶.

³ Relevant EU Directives considering energy efficiencies

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to constructions products.
- Council Directive 93/76/EEC of 13 September 1993 to limit carbon dioxide emissions by improving energy efficiency (SAVE)
- Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings
- Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council
- Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC

⁴ Relevant EU Directives considering vehicle standards

- Regulation (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information
- Regulation (EC) No 79/2009 of the European Parliament and of the Council of 14 January 2009 on type-approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC

⁵ Relevant EU Directives considering air quality

- Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air
- Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air
- Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons in ambient air

⁶ Relevant Communications by the EU Commission:

The latest initiative from the EU Commission was the publication of the Action plan on urban mobility.

The plan focuses the attention of EU bodies on six themes emerging from the 2007 Green paper “Towards a new culture for urban mobility” .

They are:

- Promoting Integrated policies
- Focusing on citizens
- Greening urban transport
- Strengthening funding
- Sharing experience and knowledge
- Optimizing urban mobility

Each theme comprises a series of actions that will all be launched by 2012.

The Alpine Convention

The Alpine Convention, an international treaty comprising the 8 countries that share the Alpine arc and the European Union signed in 1991, defines at art.2 lett. j) the general obligation regarding transport:

“the objective is to reduce the volume and dangers of interAlpine and transAlpine traffic to a level which is not harmful to humans, animals and plants and their habitats, by switching more traffic, in particular freight traffic, to the railways in particular by providing

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- Action Plan on Urban Mobility 2009 COM(2009) 490 30.09.2009
 - Commission communication of the 19th of June 2009 “ A sustainable future for transport: towards an integrated , technology-led and user friendly system”
 - Commission communication of 28th of April 2010 “ a European strategy on clean and energy efficient vehicles”
 - Green Paper of 25th of September 2007 “Towards a new culture for urban mobility”

The European Parliament resolutions on urban mobility:

Resolution 9th of July 2008

Resolution 23 April 2009

Opinion of the Committee of Regions 9th of April 2008

Opinion of the Economic and Social Committee of the 29th of May 2008

appropriate infrastructure and incentives complying with market principles, without discrimination on grounds of nationality,”

The Transport Protocol of the Alpine Convention, signed in the year 2000, defines more specifically the obligations regarding transport of the Contracting Parties of the Alpine Convention that have ratified it.

Here follows some excerpts of the Protocol which are relevant to Urban Mobility:

(...)

Article 1

Objectives

1. *The Contracting Parties undertake to pursue a sustainable transport policy which will:*
 - (a) *reduce the negative effects of and risks posed by intra-Alpine and transalpine transport to a level which is not harmful to people, flora and fauna and their environments and habitats (...)*
 - (b) *contribute to the sustainable development of the habitats and economic areas in which people living in the Alpine region dwell and work by implementing a transport policy which encompasses all modes of transport and is harmonised between the various Contracting Parties;*

(...)

- (d) *ensure the movement of intra-Alpine and transalpine transport at economically bearable costs by increasing the efficiency of transport systems and promoting modes of transport which are more environmentally-friendly and more economic in terms of natural resources;*
 - (e) *ensure fair competition between modes of transport.*

2. *The Contracting Parties undertake to develop the transport sector while observing the precautionary principle, the preventive principle and the polluter-pays principle.*

(...)

Article 3

Sustainable transport and mobility

1. *To enable transport to develop in a sustainable manner, the Contracting Parties undertake to contain, by means of a concerted transport and environmental policy, the negative effects and risks due to transport by taking account of:*
 - (a) *the importance of the environment so that:*
 - (aa) *the use of natural resources is reduced to a level which, as far as possible, does not exceed their natural capacity for regeneration;*
 - (bb) *harmful emissions are reduced to a level which is not detrimental to the absorption capacity of the environments concerned;*

- (cc) the input of substances into the environment is limited so as to avoid harming environmental structures and natural materials cycles;
- (b) the requirements of the population so as to:
 - (aa) allow accessibility for persons, labour, goods and services, while effectively preserving the environment, saving energy and space and meeting the essential needs of the population;
 - (bb) avoid endangering human health and reduce the risks of environmental disasters and the number and severity of accidents;
- (c) the importance of economic criteria so as to:
 - (aa) increase the profitability of the transport sector and internalise external costs;
 - (bb) encourage optimum use of existing infrastructures;
 - (cc) guarantee employment in undertakings which are performing well in the various sectors of the economy;
- (d) the need to take enhanced measures against noise because of the special topography of the Alps.

2. In keeping with the national and international transport legislation in force, the Contracting Parties undertake to develop national, regional and local strategies, objectives and measures which:

- (a) take account of the different environmental, economic and socio-cultural data and different needs;
- (b) make it possible to reduce environmental damage due to transport by putting in place economic tools combined with measures for regional and transport planning.

(...)

Article 7

General transport-policy strategy

1. In order to ensure sustainability, the Contracting Parties undertake to promote rational, safe transport management in a harmonised, cross-border network that:

- (a) ensures coordination between different carriers, modes and types of transport and encourages intermodality;
- (b) optimises the use of existing transport systems and infrastructures in the Alps, including through the use of electronic data transmission, and charges external and infrastructure costs to polluters in line with the damage caused;
- (c) encourages, by means of structural and regional planning measures, the transfer of the carriage of passengers and goods to more environmentally-friendly means of transport and to intermodal transport systems;
- (d) recognises and utilises the opportunities for reducing traffic volume.

2. The Contracting Parties undertake to adopt the necessary measures so as to ensure as far as possible:

- (a) the protection of communication routes against natural hazards;

- (b) in areas particularly damaged by transport, the protection of persons and of the environment;
- (c) the gradual reduction of emissions of harmful substances and noise by all modes of transport, including through the use of the best technologies available;
- (d) greater transport safety.

(...)

Article 9

Public transport

In order to maintain and improve the settlement pattern and the economic organization of the Alps as well as their attractiveness for recreation and leisure purposes in a sustainable manner, the Contracting Parties undertake to encourage the creation and development of user-friendly, environmentally adapted public transport systems.

(...)

Article 11

Road transport

(...)

3. However, in view of the geography and the settlement pattern of the Alpine region, which cannot always be efficiently served by public transport alone, the Contracting Parties shall recognise the need, in these remote areas, to create and maintain sufficient transport infrastructures for private transport to function.

(...)

Article 13

Tourist facilities

1. The Contracting Parties undertake to evaluate, in the light of the objectives of this Protocol, the transport impact of new tourist facilities and, if necessary, to take precautionary or compensatory measures to fulfil the objectives of this or other Protocols. Priority shall be given in this case to public transport.

2. The Contracting Parties shall support the creation and maintenance of low-traffic and traffic-free areas, the exclusion of cars from certain tourist sites and measures to encourage tourists not to arrive by car or use cars.

3 Expectations from the Report on Alpine Urban Mobility

Aiming at complying with the indications of the Mandate, the WGT internally set a specific “subgroup” (SG) of work, named “Alpine Urban Mobility” (acronym: “UMSG”), having the task of delving into the topic of urban mobility in the context of the Alpine area, and giving the task of presiding it and coordinate its activities to the Italian Delegation of the WGT of the Alpine Convention.

Consistently with what was agreed by the Parties, the activities regarding the period starting from December 2009 to September 2010 produced a check-up on the functioning and on the application of the solutions aimed at the sustainability of mobility systems in a defined cluster of urban areas, considered⁷ as representing the adopted political strategies with regard to mobility in the Alpine context.

The proposed check-up for the selected urban Alpine areas aims at providing with an overview on the functioning, the management and the regulation of the Alpine urban mobility, in order to widen the knowledge in this sensitive sector.

The activity of the SG was set up following a series of parameters⁸, but also leaving the possibility to the participants of selecting the most relevant information on mobility in urban centres for the drafting of the related contributions, in order to foster a broad and not binding collection of information. The analysis⁹ produced is qualitative and quantitative in nature. It has, firstly, gathered a series of detected issues and the solutions adopted within the urban centres which are the target of the analysis, and then it allowed the detection of some common characters with regard to the management of the mobility and to the tools adopted in such centres. According to a systemic approach, the components as well as the functional variables of the urban and extra-urban/ metropolitan mobility of the analyzed centres have been examined in an integrated method and not with respect to classifications by transport modality or by problems sorts¹⁰.

Urban mobility has been addressed as a system functionally integrated, where the variables (characteristics of the demand: residential, tourist, commercial traffic; of the offer: roads, railways, bus services, parking areas, informational systems, exc.) may be jointly considered, and their efficiency is measured mainly with respect to the whole quality of the functioning.

⁷ According to the assessments stated by the governments which are regularly taking part to the meeting of the subgroup, each on behalf of its own territory

⁸ See chapter 3.1

⁹ At the present state

¹⁰ At least where it is possible

A definition of "Sustainable Mobility"¹¹

The concept of sustainable mobility is strictly related to the definition of sustainable development. Though, the traditional source for the definition of the latter¹² does not refer to mobility with a comprehensive definition, though it recognizes that transport can be a cause of environmental problems and specific forms of pollution and undesirable emissions (including air pollution in cities and CO₂). Since then, several international organizations and regional institutions produced reports and positions on the matter¹³, and an abundant contribution from the research sector was also provided. In particular, from the 1990s on there have been several attempts to apply the concept of sustainable transport policy and to define the concept of "sustainable mobility". From the most common definition of sustainable development a few general principles have been derived. Generally they correspond to the three pillars of sustainable development (economic, environmental, social) and aim at assuring a certain quality of life to the citizens. A few elements that have been often considered when describing a model of mobility considered and sustainable relate to the domains of public health and environmental quality preservation, wise use all types of resources in a sustainable way, *i.e.* taking into consideration the limit-environmental values for assuring human and ecosystems' health and avoiding irreversible global effects. Thus, a sustainable transport system would seem able to contribute to economic and social welfare, without overexploiting natural resources, seriously damaging the environment or threatening human health.

Sustainable mobility is a common term in the field of transport policy, which has been used extensively in legal and policy planning, at different levels.

More specifically, according to literature and practice, such a system should strive to achieve some wide goals and a set of more specific ones¹⁴, which will be briefly presented below.

According to an analysis of the main documents and statements produced at the international level on the topic, sustainable mobility seems to be looking for some widely accepted goals, being consistent with the general definition of sustainable development:

- non-threatening long-term ecological sustainability of the environment where mobility phenomena happen - in accord with the classic environmental pillar of sustainable development;

¹¹ APAT: "La mobilità in Italia: indicatori su trasporti e ambiente", 2005.

¹² WCED, Brundtland Report, 1987

¹³ For example, the OECD, the World Bank, the World Business Council for Sustainable Development, the European Union

¹⁴ WWF and Legambiente 1998, OECD 1999, OECD 2000

- meeting the basic mobility needs of people, assuring the accessibility to appropriate means of transport as a way to achieve some basic human needs (e.g. traveling to work, moving freely over a territory, reach wider markets, etc.) - in accord with the social pillar of sustainable development;
- promoting intra- and inter-generational equity in the field of mobility, by assuring a certain level of accessibility to people living in the same period of time in different locations, and to future generation - in accord with the definition of inter-temporal sustainability clearly stated since the birth of sustainable development as a concept;
- searching for long-term economic sustainability of mobility policies and the implemented measures (especially in a context of reduced availability of funds) that can favor a wise public use of the available resources and savings for the citizens, taking into account the real costs and benefits, and measuring the externalities resulting from mobility and its regulation - in accord with the first pillar (economic) of sustainable development.

A non-comprehensive list of possible specific goals that a sound sustainable mobility policy generally seeks to achieve include the following ones, that can be read as a combination - derived from more than 20 years of practice in the field of sustainability - of principles that can be partly ascribed to the wide domain of sustainable development, partly to the domain of transportation:

- Enable a safe access, being at the same time economically viable and socially acceptable, to people, places, goods and services;
- Fulfill the needs of different categories in society and over different generations;
- Be designed in a way that is compatible with the health and safety of the public;
- Use renewable resources at a pace lower than their rate of regeneration and non-renewable resources at a lower pace than the rates of development of renewable substitutes;
- Assure generally accepted objectives for health and environmental quality;
- Protect ecosystems and avoid the excesses of critical loads and levels posing their integrity at risk;
- Do not aggravate adverse global phenomena, as for example climate change;
- Promote the economic well-being of people, communities and business;
- Promote education and community participation in decisions relating to transport;
- Involve experts from the environmental sector, healthcare, energy and urban development in an integrated planning process;
- Enable an efficient use of land and natural resources by setting up appropriate policies and tools;
- Preface the overall capacity of the system to peak performance of some of its components, efficiency and regularity at the maximum speed;
- Integrate the studies and policies dealing with mobility with all the other actions aimed to achieve accessibility that are often addressed within other policy areas, such as technological innovation and urban and regional planning.

A sustainable transport planning should consider the interactions between a complex set of issues, undertaking all the major components of sustainability (environmental, economic and social), and provide to integrated solutions for policy makers, aiming at multiple and synergetic objectives. An integrated vision and consideration of the concomitant aspects of mobility is at the basis of any approach to sustainable mobility, since it became clear how measures limited to a single dimension of sustainability are likely to fail¹⁵ in addressing a complex situation, where environmental pollution, traffic congestion phenomena, planning policies and instruments strictly interrelate and overlap, requiring a coordinated and cost-effective action.

A comprehensive and sustainable planning, involving expertise and practice from different sectors, has been considered an encouraging starting point in several urban centers, also in mountain regions. According to a widely appreciated trend, public and private choice in the field of mobility should be based on a set of measurable indicators, which has to be carefully composed and weighed and is expected to ground on relevant variables through which it could be possible to measure the progress of a community or a single organization toward the achievement of some goals, being in line with the principle of sustainable development.

In particular, the use of indicators of sustainable mobility in different fields and the resulting measurements and trends, can be seen as instruments to be used for several possible purposes, among which the following can be recalled:

- represent in a simple way the complex problems at play in the sector,
- understand the correlations and connections between different phenomena,
- identify and analyze the observed changes and problems in a systematic way,
- support the decision making process and the authorities, by providing a sound, updated and continuous information flow,
- promote innovation in all its forms and the integration of environmental considerations into sector policies,
- help anticipate problems and promote the adoption of long-term strategies,
- review the actions taken, measure their outcomes and the resulting trend over the mid and long run and monitor their effectiveness,
- make an environmental assessment of measures, decisions and the concrete consequences of policies with respect to broad and specific sustainability objectives.

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For example the use of more efficient vehicles and cleaner technologies may be important to tackle the problem of air pollution, but does not impact in a meaningful way on traffic congestion, road safety or accidents.

4 Selection criteria¹⁶ for the Alpine urban centres

The criteria employed for choosing the urban centres of towns to be analyzed were flexible and mainly based on strategic significance within the Alpine territories of the participant countries, as it is agreed by the national delegations that took part in the Subgroup. Such

¹⁶ The guidelines they agreed upon at the beginning of the work of identification and analysis of the topics were identified coherently with what was defined in the specific chapter dedicated to the “Best Practice for the Sustainable Alpine Urban Mobility”, within the framework of the Final Report of the Subgroup “Sustainable Mobility” (Paris - September 2008):

- Accessibility standard: it represents the level of communication between the urban area and the main communication networks (highways and railways). The accessibility standards are measured on the basis of “level of service” (for example: if along a generic artery/connection there is a bottleneck, the level of accessibility is not efficient).
 - “Traffic management” measures: in a city it is the management of the existing system. For example stop fares, one-way streets, ZTL, pedestrian areas and integrated and automatic traffic lights and VMS.
 - “Parking management” measures: these are included in the system of measures that should downsize road traffic in the urban centre. To create more parking areas outside the city centre and to increase public transport to connect these areas with the city centre, can reduce the number of vehicles in the city ring area. Moreover, these measures favour the reduction of traffic and influence the above mentioned point.
 - Tariff integration measures: this point concerns the use of an integrated system to improve urban accessibility and to increase the use of public transports or the reduction of the use of vehicles (for example integrated tickets for the parking - local public transport, or connection between parking area and urban centre through public transport or lifts at a convenient rate).
 - Infomobility solutions for innovative systems of sustainable mobility: these are solutions that involve directly the citizens, communicating in real time, through the internet or mobile phones, the situation of urban traffic in order to speed up the traffic.
- These common criteria have been chosen on the basis of identified “Best Practice” having the following characteristics:
- Size of their applicability - to verify if the transport and mobility system is large enough for the best practice to be considered as significant.
 - Effectiveness - to verify how the implementation of the best practice influenced the wealth of local people, both considering pollution reduction and traffic reduction.
 - Replicability - to verify if it is possible to apply a best practice developed in one urban reality to another one.
 - Innovation - to verify the environmental sustainability of the mobility system.

The whole activity of analysis and deepening of the mobility system of the selected Alpine cities had, as a constant point of reference, the above mentioned guidelines, and will allow the setting in an coherent and effective elaborative logic, an activity of improvement of the knowledge in the sector of the urban mobility within the Alpine context, which is characterised by originality as well as by analytic flexibility and by a systemic and comprehensive vision of the systems.

evaluation is based on a set of general characteristics that participants agreed upon, mainly comprising socio-cultural, economical and environmental aspects¹⁷.

4.1 Theoretical foundations

In particular, the experts indicated by the Parts of the Alpine Convention agreed on the following general criteria of the urban contexts to be analysed :

- Towns influenced by relevant and complex dynamics of people and freight displacement and mobility;
- Towns with tourist, residential, commercial and combined orientation;
- Size and economic activities of international relevance;
- Strategic location with respect to transAlpine communication framework;
- Polarization elements with respect to mobility at a regional level;
- Critical loop with effects on environmental and safety impact;
- Presence of solutions and measures finalized to sustainable mobility

These characteristics were singled out on the basis of some elements considered relevant, in the literature as well as in the practical experience, for the analysis of the mobility within the urban context. Through the gathered information it is possible to develop a general overview of the city and of its specific features (economic, social, physical, infrastructural data, etc.), with the aim of singling out the relevant characteristics of the analysed area. Following the choice of the cities to be analysed, the parameters on which each national contribution is referring to for analysing the mobility in the selected urban centres¹⁸ are:

- Population
- Catchment area of the urban centre
- GDP per capita (also other macroeconomic indicators may be useful)
- Main economic activity/sectors (e.g. trade, tourism, industry, services, public administration, etc.)
- Presence of large commuters' attractors and their typology (e.g. Universities, Hospitals, tourist attractions, etc.)
- Presence and dimension of tourist phenomena
- Description of the main tourist phenomena present in the area (if any, and if relevant for the city and having an impact on the urban mobility system)
- Local tourist attractors (e.g. description of and reference to significant tourist attractors in the city region)
- Significant, existing or planned, transport infrastructures (e.g. parking lots, railways, roads, etc.)

¹⁷ First Meeting of the Sub Group Urban Mobility, Rome 23 October 2009

¹⁸ First Meeting of the Sub Group Urban Mobility, Rome 23 October 2009

- Public transport network extension and composition (e.g. buses, underground, ropeways, cableways, tramways, etc.)
- Access to quality of public transport (e.g. based on existing customer satisfaction research, if any)
- Commuters and their share on the urban centre's population
- Information on private/personal mobility (e.g. No. of vehicles per capita, etc.)
- Innovative traffic management systems & technologies
- Use of info-mobility tools
- Innovative traffic management policies & tools (e.g. specific charges or fares, access limitations, congestion/pollution charging, permits, etc.)
- Presence of innovative mobility services (e.g. car sharing, car pooling, on-call buses, etc.)
- Presence of reference to existing binding or non-binding acts, plans, programmes, or projects concerning transport infrastructures, urban or peri-urban or regional mobility, etc.
- Level of traffic safety

Finally, guidelines to refer to for the analysis of the cities were defined by the Subgroup¹⁹, in order to facilitate the Presidency in the harmonisation of the national contributions. Such guidelines were defined by widely considering the criteria adopted in the previous works of the WGT²⁰ and they take into account the structural characteristics which are peculiar of an urban centre. They aim at defining distinctive features of the analysed urban centres, in terms of demography, economy, mobility, infrastructure endowment, transport planning, availability of advanced technologies, etc.

4.2 Identified urban centres

On the basis of these indications and of the availability of data and information provided by the Delegations which took part to the Subgroup, the following cities were selected:

- France: Annecy - Chambéry - Grenoble
- Italy: Aosta - Bolzano - Cortina d'Ampezzo
- Switzerland: Chur - Lugano - Luzern
- Germany: Rosenheim - Traunreut - Garmisch-Partenkirchen - Kaufbeuren
- Austria: Innsbruck - Graz - Salzburg - Rheintal (Polycentric Region)
- Slovenia: Kranjska Gora - Maribor

¹⁹ 1st meeting of the Urban Mobility SubGroup held in Rome on October, 23, 2009

²⁰ "Best Practice for the Sustainable Alpine Urban Mobility ", Final Report of the Sub Group "Sustainable Mobility" (Paris -September 2008)

For each of them, the national delegations provided the information they deemed as being appropriate with respect to the mobility systems and to their functioning.

4.3 Reasons & comments

The selected towns represent generally the urban layouts which can be found within the Alpine area. The towns present several differentiate features, with regard to the geographic and topographic localisation, as well as with regard to the diversity and complexity of the vocations prevailing in the social and economic life.

The Criteria which, as agreed²¹, have to be considered with respect to the modalities for the analysis of the targeted urban centres, in order to obtain the comparative analysis, include:

- a. A systematic and integrated approach to the mobility in the urban centre (not as a way or a typology of transport);
- b. Considering the quantitative and qualitative elements of the system, considered as relevant by the countries involved in the Subgroup;
- c. Considering the wider urbanised areas of the municipal territories considered on a administrative basis (urban sprawls characterized by important flows of commuters)
- d. The lack of a rigid model for editing the report with the purpose of singling out policies, problems and solutions which are peculiar to the urban centres analysed
- e. The necessity of selecting elements and critical aspects which are necessary for a vertical analysis concerning the systems of Alpine urban mobility, on the basis of common guidelines

Among the layouts which it was possible to identify in the cities that were considered for the analysis, urban polycentric reasons²², spread conurbation²³, small centres with strong tourist and commercial vocation²⁴.

²¹ Working Group Transport of the Alpine Convention - Meeting of the Sub Group Urban Mobility - Paris 13th of April 2010

²² As in the case of the Austrian (Rheintal polycentric region).

²³ For instance, the cities of Grenoble, in France or to a smaller extent Rosenheim (Germany). In the town of Grenoble many people have left to live on the outskirts. The area includes fewer resident employed workers (155,000) than jobs (189,000) generating very heavy commuter traffic. Each business day, 51,000 people go to work in the Grenoble agglomeration while only 16,000 leave.

5 The vertical analysis of mobility in the Alpine Urban Centres

5.1 An introduction to the “vertical analysis”

According to what was agreed by the Subgroup²⁵, the analysis of the national contribution was developed by following a *vertical approach*. Such approach consists of some basic-passages:

1. The definition of some themes to be analysed in terms of actions, policies and measures of management, measurement, planning and check of the relevant urban mobility for the urban centres localised in mountain or foot-mountain areas²⁶;
2. The selection of urban centres which have to be analysed, as selected with respect to criteria presented in the previous paragraphs²⁷;
3. The descriptive analysis of the management modalities for each of the themes identified in #1, in each of the urban centres selected in #2

Looking at the intersection of themes and cities is therefore possible identifying peculiar features and possible aspects in the mobility management policies within Alpine centres considered in this analysis. The expected result, which will be presented in its main feature within Chapter 5 of this Report, is mainly descriptive and it will be integrated with some best practices adopted in the different centres analysed, which have been identified on the basis of the common criteria which were previously recalled²⁸.

Following list can be found containing the themes which are transversal to the different Alpine urban centres analysed in the Report that will be individually analysed within Chapter 5, with respect to the application of the vertical analysis of the urban centres:

²⁴ As an example, Cortina D’Ampezzo (Italy) and Kranjska Gora (Slovenia)

²⁵ Working Group Transport of the Alpine Convention - Meeting of the Sub Group Urban Mobility - Paris 13th of April 2010

²⁶ These themes are represented in the x-axis categories within the tab through which the vertical analysis proposed in this report is explained.

²⁷ For a short discussion on the criteria employed for the selection of urban centres v. Chapter

3.

²⁸ For an analysis of the criteria proposed for the selection of best practices in Alpine urban contexts, cfr. in particular the endnote 5. The more relevant best practices will be presented in Chapter 5 of the Report.

- General policies on urban mobility system related to the common and specific crucial solutions
- Analysis and functional evolution of the Public Transport Services (bus, tramway, train)
- Mobility Management (circulation schemes, parking charging, P&R, biking)
- Innovative measures, with focus on infomobility and integrated telematic traffic management.

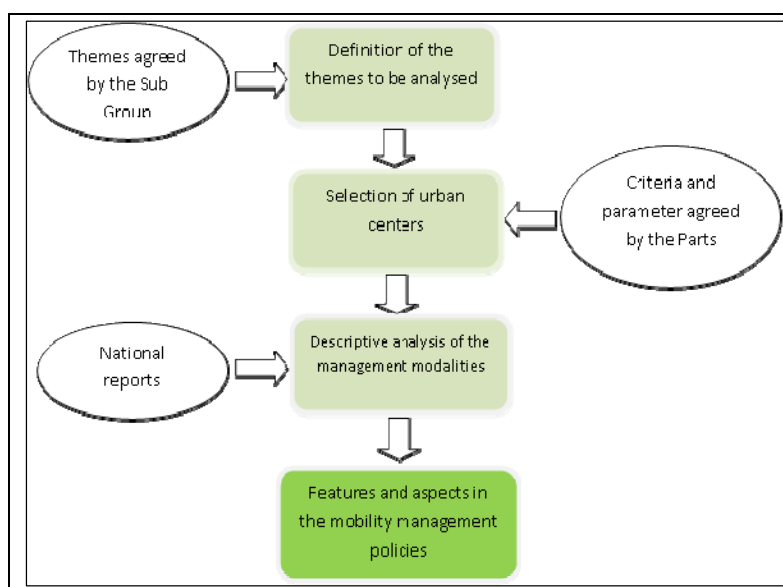


Figure 1: Vertical Analysis Workflow

6 Applying the vertical analysis: first results and best practices

6.1 Introduction on mobility policies in Alpine Urban Centres

The Urban Mobility Chapter of the WGT's document "Sustainable mobility in the Alps" (2008) already gathered some basic, qualitative remarks concerning the most common policies for sustainable urban mobility adopted in some Alpine urban centres²⁹. One of the resulting impressions was that the adopted policies in the field of mobility were often consistent with the economic structure of each of the analyzed towns³⁰. The resulting illustrative classification suggested that:

1. Where the town has a mainly commercial orientation, policies regarding mobility tend to move towards a more efficient use of commercial areas, by charging for parking spaces and by using time limits that will induce drivers to leave their car parked for shorter periods of time.
 2. In those towns where tourism and environment are a priority, it is ever more likely to see the development of limited traffic areas associated with the promotion of public transport.
 3. Industrial towns, on their side, use modal integration policies, whereas the cost of parking tends not to penalize workers and residents that leave their car parked for long periods of time³¹.
- In towns with a commercial orientation, mobility policies are finalized to an efficient use and accessibility of commercial areas, through complex parking management and time limits to implement the short-time parking.
 - In towns with tourism and environment orientations, car exclusion zones are introduced widely and public transports are improved, also with low-emission innovative means.
 - In towns with an industrial orientation, modal integration policies and park-pricing management penalize the long-time car parking and filter flows in the Central Business Districts

²⁹ To a certain extent overlapping the towns selected for the present report, and namely: Bolzano, Cortina d'Ampezzo, Cuneo, Courmayeur (I), Grenoble, Chambéry (F), Innsbruck (A), Lugano, Interlaken (CH). See: http://www.alpconv.org/NR/rdonlyres/B6B01C88-584D-4249-977B-CA2BAD4413F7/0/PC40_13_2_Datenbl%C3%A4tter_en_without.pdf

³⁰ It is essential to remind that the study performed in 2008 based upon few towns and had a purely qualitative nature. Moreover, the economic vocation identified for each of the analysed urban centres was mainly based on the feelings of the members of the group of experts who focussed on urban mobility in the framework of WGT.

³¹ See: Mobilità sostenibile nelle Alpi - Esempi di good practices e analisi del sistema di mobilità, November 2008, p.17. The document is available on-line at http://www.alpconv.org/NR/rdonlyres/3CEE99BF-8886-4AFD-B528-59D2BBA8C652/0/PC40_13_2_it_without.pdf

- Often Alpine towns perform trade, tourist and industrial activities at the same time (e.g. Grenoble, Bolzano, Rosenheim, Innsbruck, Salzburg e Maribor).

It is apparent that this is an oversimplified classification of Alpine urban centres³², but it can help understand some trends in policy making and explore the solutions that have been concretely implemented in some towns throughout the Alps.

It may happen that in some cities where service industry is well developed and (for example) a high presence of young people and students is registered, the mobility demand is characterized by erratic displacements, often accompanied by a car-oriented traffic³³. Accessibility standards become important and local lobbies (e.g. shopkeepers) can exert a pressure on traffic management decision makers. In these locations, local mobility policies could include at least some of the following possible measures:

1. A more efficient use of a higher accessibility to commercial areas can be achieved through appropriate parking management measures, such as short-time parking (e.g. free parking for the first 15 minutes) and incremental development of free-car & pedestrian areas;
2. An effective and efficient bus-ride service management should consider the peak hours, when students use the public transport, and the hours when the users' demand for bus services is much lower;
3. A more harmonic access of visitors (including tourists staying in the surrounding villages for holiday) to the city centre and shopping districts during the bad weather days especially during the tourist season (and in peak hours) can be achieved by controlling with appropriate technologies (e.g. ICT, infomobility systems, etc.) the access to the parking network and by managing ad hoc measures especially for short parking times;
4. Several rides within the city can be absorbed by human-powered mobility (walking, biking) or inter-modal solutions such as the "Bike & Ride" system, sometimes rather successful in the case of students & young people, with a positive effect on traffic congestion, less crowded public transport lines and improved public health.

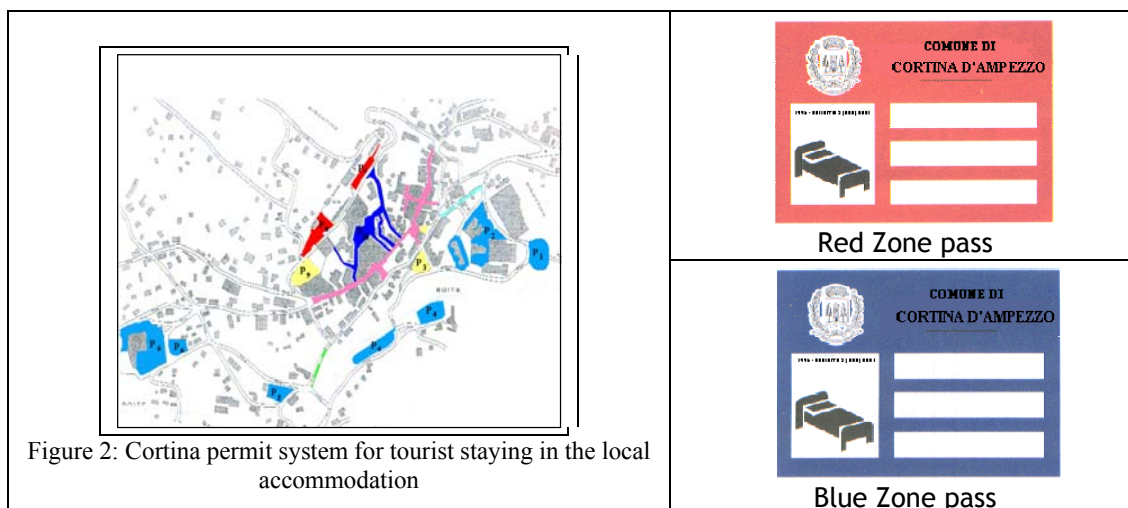
³² Another relevant feature to be considered is the conurbation type – which is likely to have a relevant impact on local mobility and the consequent policy choices.

³³ Some Alpine cities which may show at least some of these traits are **Grenoble, Annecy, Chambéry (France); Luzern, Lugano (Switzerland); Aosta, Bolzano (Italy); Maribor (Slovenia); Salzburg, Innsbruck (Austria); Rosenheim (Germany)**

In the towns, where tourism and the quality of the environment are rather a solid base for local economic prosperity³⁴, tourist and residential traffic may tend to overlap (at least during the tourist season), a positive attitude exists toward soft-mobility and sustainable means of transport, the presence of a relevant accommodation network is a distinctive territorial and economic feature and the demand is highly fragmented in space and time - being generally difficult to meet by public transport alone. In these locations, local mobility policies could include at least some of the following possible measures:

- 1) A better entertaining, cultural and natural experience can be provided to city visitors, by setting up car exclusion zones (pedestrian or traffic limited areas), especially in the historical districts of the town (often in the centre);
- 2) Improved connections to tourist and natural sites can be established with shuttle-buses from peripheral parking zones. To provide this service, low-emission shuttles can be employed and innovative mobility management tools implemented (e.g. “car-sharing” services)
- 3) The circulation of cars in the town (and especially in city centres) can be subject to the issue of a permit and/or the payment of different fares for residents and tourists staying in the local accommodation. Access to the city centre can be denied to some categories of users over limited periods of time (e.g. during peak hours, in the tourist season, etc.)

³⁴ Some Alpine cities which may show at least some of these traits are Grenoble (France); Chur (Switzerland); Aosta, Bolzano, Cortina (Italy); Kranjska Gora (Slovenia); Salzburg, Innsbruck, Rheintal polycentric region (Austria); Rosenheim polycentric region (Germany).



- 4) Noxious impacts of transit & trade traffic on public health, the environment and the local/urban congestion can be downsized by separating tourist-residential from trade-crossing traffic flows, for instance by diverting trade & crossing traffic on road networks not in the proximity to the city centre.
- 5) A more pleasant experience of nature and tourist beauties can be offered to visitors by establishing wide networks of walking and bike routes, reaching also the surroundings of the main urban centre.

Other cities know high levels of transit, commuting or in-out traffic, depending on their geographical location and local economic structure that is often based on industry or large trade centres³⁵. Such a situation is not infrequent in Alpine towns, especially in the valleys and in proximity to large European metropolises and their surroundings. Heavy vehicle flows may overlap with residential traffic flows, made up of lighter vehicles, especially in peak hours (morning & afternoon). Traffic congestion is influenced by business activity and commuters. In these cities, in absence of appropriate infrastructures, transit traffic adds up to local and commuters' traffic. In these cities, local mobility policies could include at least some of the following possible measures:

³⁵ Some Alpine cities which may show at least some of these traits are Grenoble, Annecy, Chambéry (France); Chur, Luzern, Lugano (Switzerland); Bolzano (Italy); Maribor (Slovenia); Salzburg, Innsbruck (Austria); Kempten, Rosenheim (Germany).

- 1) A reduction of traffic congestion in the city's central business districts, which can bring positive effects on the environment and the circulation's efficiency, could be achieved through an appropriate mix of modal integration and park-pricing policies, aiming at avoiding long-term parking of cars in and selecting traffic flows to the Central Business Districts;
- 2) Access from outside the city could be made much more effective for commuters and business travelers by reinforcing or setting up railway and tramway lines and improving service's frequency and capacity
- 3) The use of peripheral parking areas can be enhanced, with expected advantages with reference to traffic congestion & local pollution, by establishing a sound park&ride system and a parking toll framework, supported by an appropriate fare structure aiming at inducing a behavioral change through a net economic incentive to leave the private car outside the central business districts.

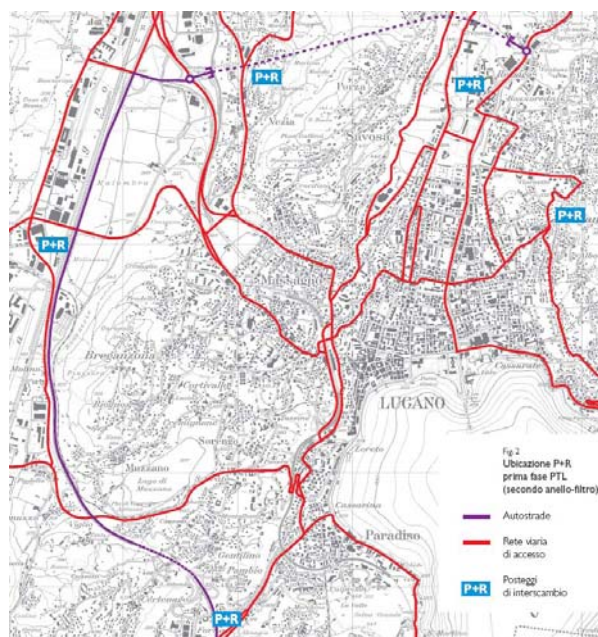


Figure 3: Park & Ride facilities in Lugano

6.2 General policies on Urban Mobility System: Overview of the Alpine Urban Centres (regional approach)

Urban mobility is an important element for growth and employment as well as a precondition for a sustainable development policy.

The future strategy of European Commission will revolve around the need to integrate the various policies of urban mobility in a joint action. The added value of European intervention could, for example, consist of:

- Promote the exchange of good practice at all levels: local, regional, national and European;
- Underpin the establishment of common standards and harmonisation;
- Offer financial support to those who are in greatest need of such support;
- Encourage research, the application of which would enable an improvement in mobility;
- Simplify legislation, if necessary.

At the European level is aimed at fostering the emergence of a "mobility culture" that includes economic development, accessibility, improving the quality of life and the environment through the development of themes related to:

- Improving the fluency of the urban traffic flows through the use of alternative forms of private transport and promote activities aimed at reducing the number of vehicles
- Reduce pollution through the promotion of actions to encourage research toward less polluting forms of transport and cross-border cooperation for the exchange of good practices.
- Efficiency of urban transport through the use of computer systems and telematic
- Improved accessibility through the coordination and enhancement of public transport
- Security, improving the status of existing infrastructure and the safety of existing vehicles with new technologies³⁶.

³⁶ Commission Green Paper dated 25.9.2007 "Towards a new culture for urban mobility" [[COM \(2007\) 551](#)Â final - not published in the Official Journal].

Mobility policies in the Alpine towns have to build upon some distinctive features of mountain mobility. In particular, the location of the urban centres and some geographical and physical factors can play a role in binding and shaping the possible mobility policies.

Some issues concerning mountain urban centres include the following ones:

1. Mountain areas are subject to frequent *temperature inversion* phenomena, favouring the concentration of polluting emissions
2. a trade-off is often recognized between higher *accessibility* standard (aiming at reducing the peripheral economic status of the Alps) and *environmental protection* of the fragile Alpine environment
3. many mountain cities are located along the main trans-Alpine corridors with *overlaps* of international freight flows, tourist displacement and local & urban traffic. Aiming to be aligned with the EU requirements in the field of transport and environment, the municipalities and other territorial administrations implement tangible policies aimed at meeting the goals set at the EU level.

Concerning general systemic policies for urban mobility in the Alps, the information gathered in this report still shows a limited coordination of policies, measures and actions for sustainable mobility and depicts a situation of lack of homogeneity between different Alpine countries, and often within the same country.

Some policies and measures could be shared at the regional level, if an improved coordination was developed on a larger scale and within multi-national and multi-level institutional platforms.

Under the current institutional conditions, having regard to the national and territorial differences and peculiarities of urban mobility in different Alpine towns, a reference can be found in the EU transport and environmental policies. Studies and principles developed or approved by EU institutions on urban mobility and transport in a fragile environment can be seen as a point of departure for research and implementation, with the needed adjustments, in the Alpine area too.

Considering what has arisen from the analysis of the national reports, that focuses on the Alpine towns which were selected in order to prepare this report, some measures have been adopted which tend to integrate mobility functions and consider mobility management as a complex system³⁷ (therefore, overcoming distinctions made by different types of service or by single mode of transport,).

³⁷ A positive example of concrete cooperation to the European level is shown by the Municipality of **Maribor (SLO)** that is connecting and cooperating with partner cities and thus implementing in practice the principles of international cooperation, recognition and understanding. Town twinning is a great opportunity for cities to exchange experience, knowledge and examples of best practice, which will enable them a more efficient and successful operation.

In general terms, a commonly recognised strategic goal regarding the limitations and regulation policies of the mobility demand of the individual car is being increasingly pursued by means of modal integration policies, where the main function is carried out by the network of “Park&Ride” facilities, exchanging parking areas located strategically in the proximity of the urban ring (ring road), allowing to rationalize through the inter-exchange of the different modalities of transport:

1. Public transport (by train in the wider cities; by bus in the smaller) lead line of integrated policies which are targeted to the optimisation of the accessibility standards ;
2. The individual mobility (by private car) for selected medium distance movements where a distributive capillarity is required also for passengers, that generally travel on routes which have external origin/ destination relatively to the urban unit;
3. The mobility by bike for short and medium distance movements requires capillarity, also within the urban unit, for a single user. Walking as basic, least polluting and most regular form of mobility for short distances (> 1 km) requires specific infrastructural preconditions regarding safety, attractiveness, convenience and regarding multifunctional urban facilities.

Exchange parking areas P&R, functioning as a drain on car traffic, linked by shuttle bus with low environmental impact on urban access and an integrated rate structure, are becoming a tool likely to be found in the Alps, even if they present organizational peculiarities and differences across the different cities.

In more advanced situations, the functions of integration of the system (also for the tariff) comprises also the regional railway stations, the stops of the extra-urban bus lines and the “bike&ride” stations, connected by means of bicycle routes.

The measures intended to limit the circulation of vehicles and parking tend to be linked to the mechanism of the system: the drain effect carried out by the P&R system is successful when the urban unit is regulated by measures that discourage car traffic, such as the creation of pedestrian areas and the limitation of tariff and parking periods according to criteria which are more penalising to cars in the centre rather than in peripheral areas.

In several Alpine cities, in particular those having a commercial orientation, such measures are not limiting potential consumers in accessing the urban centres, according to the available data. Measures intended to limit the retail freight distribution in the period and in the space of urban context belong to the same typology.

The applications which fall into the area of infomobility are also intended to foster the integration of the system by conveying the information to the users (VMS systems, dynamic markings indicators of the parking areas, website, etc), as well as through the automated management to the mobility systems (i.e. the integration of traffic lights, the electronic co-ordination system for the bus fleets, the check of the accesses to pedestrian areas, the data electronic-toll, etc.).

In some urban aggregates with a significant share of crossing traffic, (with the overlapping of light and heavy traffic on the same road arteries)and, at the same time, the presence of a substantial number of accidents and pollution phenomena, the aim of infrastructural projects is to create alternative routes which are external to the urban context and usually subject to an evaluation of the environmental impact .

Experience from Alpine towns

Austria

As a consequence of the relevant rate of commuters' traffic, strategic actions tend to have a wide scope - larger than the city boundaries (e.g. the greater Innsbruck area, & beyond). Most of perspective-policies require actions at the regional level (at least: NUTS 3) and focus on public transport (PT) and on the construction of new infrastructure or enlargement of existing one (e.g. expansion of the Regiobus-system; construction of city and regional rail routes; creation of new, or optimization of existing S-Bahn stops;). Central is the concept of densification of PT services (e.g. establishing "Regiobus" services reaching the sub-urbs & the city surroundings). Another goal is the substitution of bus services with railways (trains & tramway lines) connected to the Austrian national railway stations (see the Austrian Contribution on the Urban Mobility in the annex). Improvement in the dimension and quality of sidewalks, extension of bike tracks & consolidation of bike city & surroundings networks are taking place in the framework of the "Climate Active" city program ("Climate" Land Tyrol's funds are available to this end) and the establishment of an Internet platform providing route planning services is ongoing. Improving the accessibility of urban and more remote areas by public transport is a primary goal that is planned to be achieved e.g. by reducing the changes in routes & transport modes.

France

In the city of Grenoble mobility planning is integrated with the control of urban development and a local climate action plan (see the France Contribution on the Urban Mobility in the annex). In the other agglomerations considered in this report, the local planning authority adopted urban mobility plans aiming at improving public transport services in terms of integration with railway and reinforcement of the offer in particular to the peri-urban area. With reference to the region of the French Alps, government agencies are currently involved in drawing up some land use management guidelines, collected in a legal

instrument known as the “ Directive territoriale d’Amenagement” (DTA) for the entire region (Alpine Valley). This tool is expected to be overarching the spatial planning regulations issued by lower level of government.

Germany

National and regional transport policy is generally inspired to sustainability principles in Germany and Bavaria. Much attention is placed on public transport services (especially buses) at local and regional level. For instance, the County of Rosenheim is involved in a specific program promoting higher quality standards for public transport services, the increase of routes and rides to the city suburbs and some central traffic attractors such as the local hospital and University, and the construction of a central bus terminal in correspondence with the main railway station. Moreover, Rosenheim city is committed to safeguarding public transport services to and accessibility of the central districts of the city (provided the cost effectiveness of the service), improving coordination between bus and railway services, and promoting the use and quality of rail transport. Noticeable is the relevance of biking policies for urban sustainable mobility in Bavaria. In particular, the administration of the county of Traunstein, to which Traunreut belongs, implements a specific program aiming at closing the gaps along the existing cycle paths and setting up a bike tracks network connecting the city with other towns in the surroundings and with location of high natural and aesthetic value.

Italy

Policies for sustainable mobility in the urban centres in the Italian Alps focus on the implementation of a system of bypasses (to channel road traffic flows without interference from local traffic and reduce congestions in the built-up area), improvement of bike tracks and management of parking policies. Intermodality is promoted in different areas of the alpine territory, sometimes with innovative solutions that are also attractive for tourists (e.g. the "bike'n bus" service in Cortina d'Ampezzo that allows traveling by bus carrying a bicycle in the vehicle). Another goal which is often searched for is the avoidance of congestion and traffic jam phenomena in the city centres of the alpine towns. Such a goal has been achieved by means of mobility and organizational measures aimed, for instance, at speeding up the circulation of commercial vehicles, as it happens in Aosta, where the transport of goods in the central district is subject to strict municipal regulations. For any further information about the mobility in the Italian selected cities, you can see the Italian Contribution on the Urban Mobility in the annex.

Slovenia

General sustainable mobility policies in Slovenia focus on the mitigation of the impact of traffic on the environment, the human health and, more in general, the territory. Within the analyzed urban centres, traffic reduction is a core objective of the national policy. In order to achieve this goal, some relevant steps have been made: for instance traffic calming actions and measures restricting accessibility to urban centres have been adopted (e.g. access to Kranjska Gora is limited). Moreover, personal mobility producing a low impact on the urban and mountain environment is encouraged- In this regard, the recently issued

mobility plan of Maribor envisages the construction of new bicycle and walking paths. Moreover, the Municipality of Maribor also provides a positive example of concrete cooperation at the European level with its town twinning program. This approach demonstrated as a great opportunity for cities to exchange experiences, knowledge and examples of best practices in the field of sustainable mobility, which is likely to enable them to be more efficient and successful in their management policies.

Switzerland

In the three analysed cities, the transport policy for urban centres is focused on traffic management (including a reduction goal), prioritization of public transport, integration of transport infrastructure and speed limit of 30 km/h throughout the core city (as for example in Luzern). The strategy followed by the transport plan is essentially made up of two basic principles: facilitating the use of public transport and alleviating the main urban traffic problems (for example in the city of Lugano, the access to the city is reduced by car and there are new alternative connections to bypass the centre). Moreover the transport policy at the city level aims to enhance the existing network for walking, hiking and cycling, especially in the locations where a great number of tourist accommodations can be found (e.g. in Chur and Luzern). These intertwined measures together intend to alleviate the local problems connected to traffic, including pollution and congestion.

The integration of urban planning and transport planning is an ongoing process, based on the integrated development plan for settlement and traffic of the city of Luzern elaborated under the federal conurbation programme. The relevant instrument for the authorities with regard to the coordination of settlement and traffic is the cantonal plan for spatial development. The intermodal transport planning has so far been applied only in part (as in park-and-ride facilities at suburban railway stations and the bicycle parking station at Lucerne's central railway station). For the most part, planning is still based on separate plans for each different means of transport. Public transport, cycling and walking remain at the centre of the city's intermodal mobility strategy. In comparison, the integration within the public transport can be regarded as more advanced. Fare cooperation has been established by the canton Luzern and the neighboring cantons. A new cantonal management authority for the public transport has been established as of 1 January 2010. The consideration of walking and cycling at bus terminals and railway stations is a topic with a high priority in local traffic planning. Second priority is given to a bicycle station at the railway station. Already today there is a rent-a-bike station near the central railway station with 59 bicycles, including 8 electric bicycles for rent. Another bike-rental with five bicycles is at the youth hostel.

6.3 Public Transportation Services: Overview of the Alpine Urban Centres (regional approach)

The promotion of public transport represents a strategic policy option in the Alpine cities. The tendency to use the private car, increased by meteorological and morphological factors, as well as by the frequent distribution spread throughout the territory of residences, hotels, ski stations, natural parks, induce the administrations at improving and rationalising the public transport service, mainly through the functional and tariff integration.

In the cities which are linked by railway, the commuters' movements by means of proper regional lines are favoured. In fact, in some urban aggregations, these services tend to be competitive with the private car.

Also the regional lines are often integrated, at the main station of the city, by bus services for distributing the users within the urban context (shuttle-bus), more recently strengthened by means of bike&ride services.

In some Alpine cities, the distributive functions of the users in urban context are carried out by cable cars departing from the town centre ("urban funicular") connecting lower and higher parts of the town.

The transport network of the "last mile" in an urban context by means of public transport services represents for some Alpine cities a strategic option also for fostering the tourist long-path movements by railway³⁸.

To foster the use of train, many railway stations in the cities analysed in this report have new "kiss&ride" (spaces (where it is possible to stop the car just for few minutes), as to allow the private vehicle of carrying out an accompanying function, without producing the saturation of the parking areas close to the station.

A function which is simultaneously suitable for the accessibility as well to the distribution in an urban context seems to be carried out in an effective way by LRT ("Light Rail Transit") systems, as it happens in some centres which are employing electric and low-emissions (methane, hybrid, electric). vehicles

One of the most innovative and widespread use of the bus is finalised to transport customers within the urban unit ("shuttle-bus"), whereas, in parallel, limiting traffic and parking measures are introduced for the parking of private vehicles within the areas which are connected by the shuttle.

This function is generally assigned to buses of small dimension and to lines characterised by high frequency, preferential routes, growing capillarity of the stops and a tendency to serve

³⁸ A specific study concerning long-distance accessibility to Alpine tourist centres has been developed within a Subgroup of WGT of the Alpine Convention. For further details on its achievements, see the report of the above mentioned Subgroup.

(often along a circular route) the more important exchanging junctions (in particular network “Park&Ride” and railway stations).

Shuttle buses are likely to be low emission vehicles both because it has to cross the environmentally most sensitive areas of the town and for the features of the used vehicle (the minibus) that does not require particularly high performances for power and range, allowing the use of fuel systems that have performance limitations, but remarkable environmental advantages such as electric vehicles. Experience, also in the Alps demonstrate the growing use of these types of vehicles.

The available information on the Alpine cities analysed in this report suggests that the unitary pricing of the public transport use often represents a financing difficulty for the managers of the local public transport service.

The operating cost for the buses is no more covered by the same tariff incomes. Such services nevertheless are considered as part of wider environmental and health policies, as they address the main goal of reducing the presence of more polluting vehicles within the cities, thus making reference to the broader issue of transport externalities.

A tariff structure tends to be consistent with this role, as the public transport has to result competitive in respect to the private mobility and the cost of travel represents a fundamental element of competition if faced to the private means modalities.

The intention of making the bus competitive relatively to the car makes it an essential point ensuring the elements of quality of the public service, among them: functional integration, comfort, regularity, punctuality, frequency, reliability.

These elements require high investments and operating costs.

Such aspect widely explains the great differentiation of the operational choices which were carried out within the Alpine cities, where the management of the public transport call for a balance among the economic sustainability as well as the social and environmental sustainability of the system.

Experience from Alpine towns

Austria

The backbone of public transport in Tyrol is the ÖBB railway network, which runs from Innsbruck in four directions. This infrastructure assures good inter-urban services by train, which are complemented by regional bus lines. In the urban area of Innsbruck there is an appreciable level of integration between different transport modes. As noticed in the section on general mobility policies, PT is at the centre of the attention of Austrian approach to sustainable mobility in urban centres. In the region of Styria improvements were focussed on the timetables: on the axis Graz - Bruck an der Mur on working days every half hour a train circulates, in the morning rush hours additional trains are offered so that travelling every 15 minutes is possible. From 2007 to 2009 the number of

passengers rose 23 %. In the whole S-Bahn network in Styria the number of passengers increased more than 18 % from 2007 to 2009. Daily 32 000 passengers in average take a “S-Bahn”³⁹.

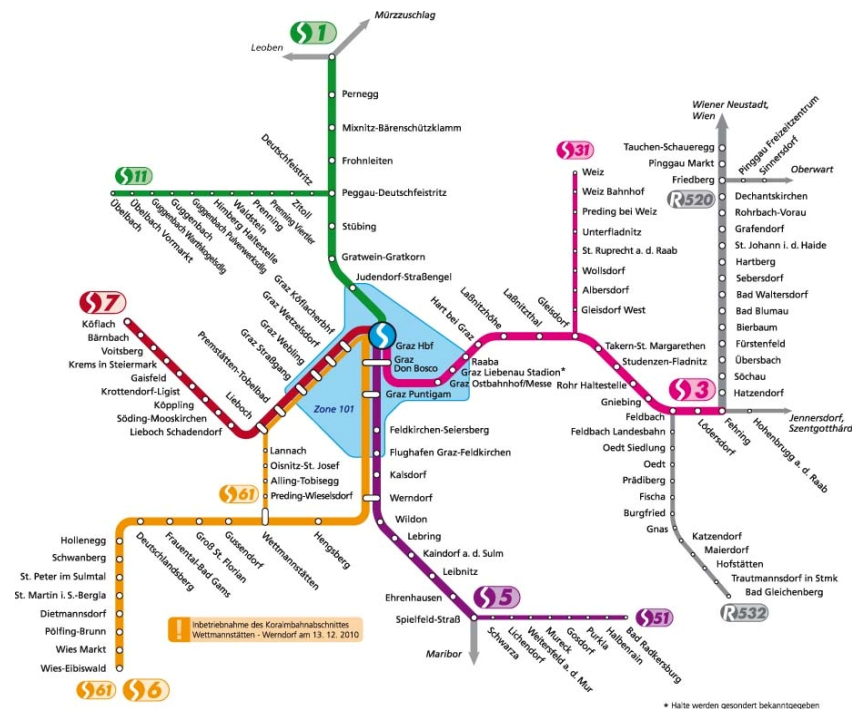


Figure 4: Network of S-Bahn Graz Source: www.verkehr.steiermark.at

In the city of Graz the functionality of the main station (Hauptbahnhof) was improved, moreover two new interconnection stations with the urban public transport were opened in the last few years: the station Don Bosco in September 2007 and the station Puntigam in the South of Graz already in 2006.



Figure 5: New interconnection station Graz Puntigam Source : www.fotocommunity.de

An articulated and complete integrated fare policy for public transport services is applied in the area of Innsbruck. Almost all routes of public transport in Tyrol are integrated into a single tariff system. The rates are graduated by a zone-system. Within the city of Innsbruck divergent rates to those of the regional Tyrolean transport system (VVT) exist. Price discrimination is applied through a set of different tickets, fares and reductions (normal price, economy price, miniprice, family-tickets, student-tickets, pupil- and apprentice's tickets, single-, weekly-, monthly- and annual tickets, zones, Regio-, Tyrol tickets).

The recipients of the tax allowance called 'Pendlerpauschale' (deducibility for professional commute > 20 km of distance), in addition are also eligible to apply for a restitution of an amount worth another 2 monthly tickets, as an incentive to use PT. On routes to and from Innsbruck in addition to regular zone-tickets one has to pay a core zone surcharge when transferring to solely urban routes of the IVB. The amount of this surcharge is between 0.80€ for single tickets and 259€ for annual tickets.

As a means to support the use of PT for leisure activities, ski bus traffic or the use of busses when wearing winter sports equipment usually is free or at least restitutions of the fare will be granted afterwards by the ski industry or other leisure facilities. In this context also cooperations with cinemas and various events exist in a quite big number.

A significant measure to promote the electric public vehicles, integrated with rail stations and Park&Ride network, is operating in Vorarlberg: the project VLOTTE, supported by the Austrian climate and energy funds with 4,7 mio € (in the first phase). One year after the project start, 75 electric powered cars are circulating in Vorarlberg and 32 supply points are available for recharging. The target are 250 electric powered cars and in addition electric bike and scooters. The contribution of public funds for the costs of electric powered vehicles is 30 %. For any further information about the Transport System in these areas you can see the Austrian Contribution on the Urban Mobility in the annex

France

In the three agglomerations under review the collective⁴⁰ transportation offer is much diversified. In Grenoble, the public transport services are efficient with a high rate of usage, on the contrary in Chambéry and Annecy the rate usage is lower than average. In general it is possible to state that there is a well developed road and motorway network and an insufficient railway network. For example a homogeneous railway network exists for east-west connections towards the cities of the Alpine Valley, although it is insufficient for traveling to Haute Savoie. Though, only a very heterogeneous and even deteriorated network

⁴⁰ Collective and individual transport

Given the importance of the different modes of transport, clarifying what collective and individual transport actually mean is a useful exercise of which it is possible to find an example in the 2007 Green paper on urban mobility published by the EU Commission (See reference below).

When speaking of the ways that people use to move about urban and interurban areas one of the most important distinctions that can be found separates individual modes of transport from collective ones.

Individual transport: it can be described as that kind of transport of passenger(s) that allows an individual to get around by using vehicle at his complete disposal or by walking.

Collective transport: it can be defined as a kind of transport of passengers regarding the movements of more individuals towards a common destination with only one vehicle.

Having defined these concepts it is still important, in order to better determine the scope of the report, to clarify some points.

Often collective transport is assumed as synonym of public transport (in the sense of being managed by a public authority and/or when referring to ownership). It should be made clear that when speaking of public transport this could be interpreted both, in a more general way, as a service of transport which is open to the general public and as referring to the management of the service or to the ownership of the vehicles. Collective transport is potentially decisive in the fight against urban pollution, in particular within the sensitive ecosystems such as those present in the Alps.

On the contrary, individual transport is conventionally assimilated to the use of means of transport used by only one individual passenger or that are privately owned.

For instance in car sharing schemes, the ownership of the vehicles and/or management of the service can be public whereas the vehicle is destined to individual use.

Having said this, for this report the distinction between public and private ownership and/or management means of transport is irrelevant, or worse misleading. In fact, there are cases that do not conform to the assumption that these concepts can be assimilated. For instance, the use of the taxi might be assimilated, in this sense, to the use of a private car, for example, by one or more individuals all going towards their working place. Similarly, collective transport can occur through the use of private vehicles (as in the case of car pooling schemes) made available for more users at the same time (for instance, in some tourist resorts in the Alps shuttle buses are available to hotel costumers giving them the opportunity to reach the desired destination using a private vehicle shared with other individuals hence reducing road congestions and the impact of traffic emissions on the environment). Another example are the policies for sustainable mobility adopted by those companies that provide shuttle buses to their employees that can be used as an alternative to the private cars; or those employees organizing, autonomously or in a coordinated way with their employer, car pooling schemes.

For the reasons mentioned above we will give precedence to the use of the term “collective” and, in any case, if the term “public” (as used in the national reports) is going to be used it should be considered as an equivalent of collective if not otherwise specified. The concepts illustrated above regarding collective and individual transport are useful for a critical approach to the matter.

Note: Green Paper “Towards a new culture for Urban Mobility” COM(2007) 551 final :(...) “Rethinking urban mobility involves optimising the use of all the various modes of transport and organising “co-modality” between the different modes of collective transport (train, tram, metro, bus, taxi) and the different modes of individual transport (car, motorcycle, cycle, walking).

for north-south connections is present. In the city of Grenoble the tramway services have been complemented with the two new tram lines C and D. For any further information about the transport system in Grenoble, you can see the French Contribution on the Urban Mobility in the annex

Germany

Public transportation plans that have been elaborated by most German counties in the Alpine region represent an integrated and detailed assessment of public mobility options on county level. Rail and busses are important means of transport particularly for larger cities and for the connection with other municipalities. Several cities, also including smaller ones such as Immenstadt, have established a municipal bus system as capillary urban extension of the Bavarian regional bus system. There are also different solutions aiming at giving people the possibility to move producing a low impact on the environment, as it happens for instance in Traunreut. As an industrial-type city, Traunreut features a better provision of public transportation options during weekdays compared to weekends. In Garmisch-Partenkirchen, also, there is an optimal fare integration system for local public transport services: in 2001, local transport agencies Gemeindewerke Garmisch-Partenkirchen operating the city bus, Regionalverkehr Oberbayern GmbH (RVO) operating regional busses and Eibsee Verkehrsgesellschaft mbH & Co. KG operating the Zugspitz railway have joined to form the "Transport Association Garmisch-Partenkirchen". For public transport customers, this resulted in a substantial simplification of the fare system and the possibility to travel by public transport within the region using only one ticket.

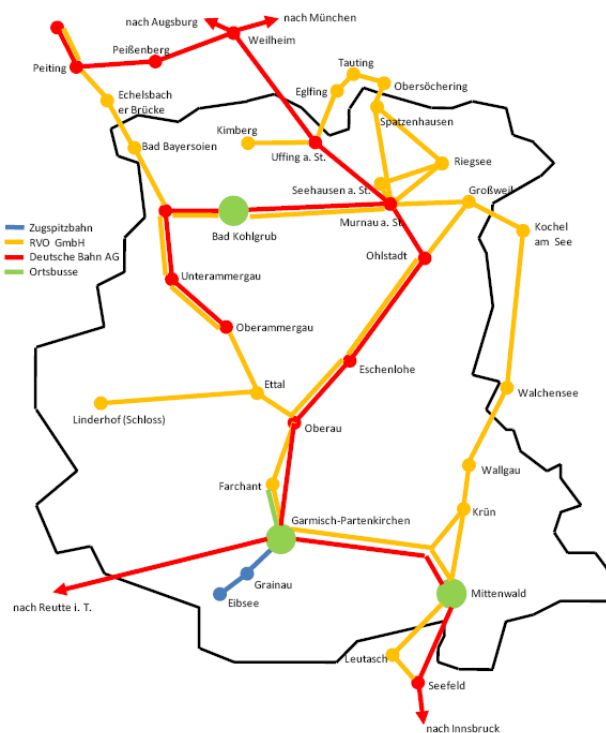


Figure 6: Public transport net in the district Garmish-Partenkirchen Source: Alpenforschungsinstitut 2009

The city of Rosenheim (D) is being serviced by 11 bus lines, characterized from a relevant operative integration: in sparsely populated areas of the county (e.g. Wasserburg), the provision of sufficient public transport intervals at least during the week is only feasible in combination with student transport;

- The pilot project Burgerbus Chiemsee (= Citizen bus Chiemsee) represents an innovative measure for low-demand rural areas. Volunteers (mostly retirees) operate a mini-bus leased from the regional transport association and serve hamlets and villages that are not adequately served by regular bus companies. The pilot project is in its seventh operational year and is providing mobility to roughly 30 customers per day.
- Towns and villages in the conurbation area of Rosenheim are serviced on an hourly basis; schedule and tariff coordination between different private bus service operators is considered poor.
- The Wendelstein-Ringlinie (= Circular line Wendelstein), the Inntal- and Mangfalltal night bus lines, the Wanderbus Samerberg (= hiking bus Samerberg) and the Chiemsee-Rundlinie (= Circular line Chiemsee) are considered to be good practices.

- Similar to several other tourist regions in the German Alps, free bike transport in regional trains is no longer possible, the respective agreement has been terminated by the DB Regio in 2009. An exception are services between Rosenheim-Muhldorf and Wasserburg-Forsting, operated by the DB-subsiary Sudostbayernbahn GmbH, on which free bike transport continues to be offered.

Italy

In the Italian Alpine cities the collective transportation offer is very diversified. The main Alpine resorts are accessible by bus or shuttle bus, regional and national train. In order to promote the use of public transport or means of transport with less environmental impact, some cities use alternative transportation services to reach landmark. Moreover there are also alternative means of transport being distinctive to mountain zones, as for example the use of cableway in the city of Bolzano. A virtuous example of fare integration services TPL is represented by the network "SASA SpA-AG" and "Auto Südtiroler Dienst" in the city of Bolzano: through subscriptions and the "value cards" you can get anywhere by any means public, from Innsbruck to Trento, using the same travel document and, with special discounts

Slovenia

In some Alpine urban centres, strong forms of incentives to the population's use of public transport exist. For example, in the town of Kranjska Gora vehicles for public transport are available free of charge for young persons which highlights the commitment of mobility policies to change the citizens' mindset toward an implementation of mobility with less environmental impact.

Switzerland

The railway system is the backbone of the Swiss transport system at the national and the regional level. Train connections from alpine centres to the main national and international cities and airports exist. In some cases (e.g. Lugano) there are also other specific means of transport (e.g. cableways, lake navigation, etc.). In Switzerland the modal shift, is considerably more favourable to the railroad than in the rest of Europe, in particular because of the competitiveness of regional rail services. In the town of Chur the ratio between "travel time by train/travel time by car" is between 0.9 and 1.2, making the train almost as competitive as the car. In the case of Lugano, three urban funiculars (City centre - main station; Monte Brè and San Salvatore) support the urban public transport service. Here, the funicular railway connecting the main station with the historical city centre is of particular importance, too.

In the city of Lugano the integration of all modes of transport is one of the strategic thrusts of the PTL. A relevant example for the integrated planning is given by the relatively new park-and-ride areas with a direct bus connection to the city centre. Arcobaleno, an organization of municipalities, aims to organize public transport for the all of Canton Ticino (incl. Moesano) and has fully standardized transport fares within the region. Season tickets are already completely integrated and steps (also single tickets) can be purchased. In the central area (main bus stop), the integration of all transport modes is ideally organized. At

new railway stops, national standards are applied. Thanks to the national law on equal opportunity for the disabled, access for walkers and cyclists will be improved in the coming years. For any further information about the Transport System in these areas you can see the Swiss Contribution on the Urban Mobility in the annex.

6.4 Mobility management: Overview of the Alpine Urban Centres (regional approach)

Mobility Management (also called Transport Demand Management - TDM) is a demand-orientated and integrated approach to passenger transport that involves a set of tools for supporting and encouraging a change in travelers' attitudes and travel behavior with regard to sustainable modes of transport⁴¹. The purpose of Mobility Management is to organize urban mobility more efficiently with an emphasis on sustainable practices. The central idea is to promote a modal shift in favor of more sustainable transport modes, which may be a valid alternative to car ownership. Mobility Management mainly makes use of "soft measures" aiming at inducing a behavioral change in the people. At the same time Mobility Management is considered to be part of the planning and policy process, as well as a constructive component for organizing mobility at the urban level. Looking specifically at car use, Mobility Management does not intend to eliminate car travel, but rather, to considerably reduce the amount of personal vehicle travel, particularly in urban areas.

Within this paragraph we will start describing the seemingly distinctive infrastructural facilities of mountain centres in the Alps and focus on the initiatives (including the longer-term planning process) aimed at reducing the use of private cars in the city centres. Then, we will introduce the Mobility Management measures adopted in the towns selected for this Report (in particular: parking, circulation, freight delivery, intermodality) and will provide examples of the experience recently developed by the Alpine towns.

With regard to the roads, a feature that is likely to be found in the great part of the Alpine towns is (comprising also those analyzed in this report) the frequent overlapping on the same road network, due to orographic reasons regarding size and limited capacity, of different kinds of traffic: residential, commercial, distribution, tourist and commuter traffic often overlap using different vehicles (the car, bicycle, the motorcycle the van, lorry).

With the improvement of the Alpine urban accessibility and with more contacts with surrounding areas, the map of the movements is getting more complex, often using an unchanged infrastructure. With reference to the road network it is possible to observe the use of the same routes for the great part of the origin-destination links: internal flows,

⁴¹ See DG Internal Policies - Policy Department B: Structural and Cohesion Policies - Transport and Tourism, Mobility Management. Note, 2009

relational flows with the hinterland and rest of the region, medium and long distance tourist flows, crossing flows (in particular regarding commercial vehicles).

These overlapping produce loss of efficiency and limitations to the efficiency of the system, reduction of safety standards and exceeding normal polluting emissions, in particular in mountain areas, subject to thermal inversion phenomena.

The Mobility management policies that have been promoted to face this situation tend to avoid the construction of new infrastructure for several reasons: environmental (the ecosystem in mountain areas is particularly fragile), orographic (in mountain areas space available is limited) financial and economic (the need to build galleries and viaducts makes the works very costly) and socio-cultural (the tendencies of residents to reject projects that are liable to modify the environment where they live and work).

There are however cases (for instance in Lugano and Bolzano) where the need to make road links and ring roads to get around the urban centre are deemed as the only viable alternative to reduce the overlapping of local traffic flows (mainly vehicles and light commercial vans) and crossing flows (mainly on heavy duty commercial vehicles).

Though, the above mentioned cases have to be seen as an exception to the rule. Generally speaking, town administrations in the Alps tend to promote measures aiming at managing the existing mobility system, instead of building new road infrastructure. This objective is commonly pursued by implementing actions aimed at rationalizing, integrating and making the urban mobility system more sustainable.

Circulation and parking management

The measures aimed at managing and regulating vehicles' circulation and parking in a town are usually dealt with jointly by the institutions responsible for mobility management. Measures on parking are intended to influence the circulation, and vice versa. Namely the behavior (and modal preferences) of people commuting within a urban centre is likely to be changed by appropriate and incremental policies⁴².

With reference to the measures aiming at managing and controlling the circulation of private vehicles in the city centres of the analyzed Alpine towns, measures have been implemented to limit the traffic in different time slots (for example, the "Limited traffic areas" in many Italian towns) in many cases transforming them in pedestrian areas and implementing traffic regulations that tend to ease the traffic flows without increasing the average commercial speed and to avoid the crossing of the most critical and sensitive areas ("traffic calming" measures). These actions are carried out both by proper signs (in many cases with the aid of VMS (Variable Message System) and remote management of access) and through the making of specific layouts of the road

⁴² OECD (2004), *The role of soft measures*, Report on a workshop 'Communicating environmentally sustainable transport - the role of soft measures', held in Berlin on 5 and 6 December, 2002

With reference to the measures aiming at managing the parking of private vehicles in the city centres, a distinction is made between residents and non-residents. The former can generally park their cars in proximity to their homes (according to specific permits or at preferential fares), the latter (also called “city users”) are subject to extended and sometimes complex fares and to the time limitation of parking in a more complex and differentiated way on the basis of where the parking lots are located and of the time slots.

The Park & Ride facilities, due to their low cost and broad availability, aim at reducing and make a selection of the flows starting from the peripheral areas, transferring the users of private vehicles to the public transport service (in some case to the bicycle) leaving the duty to manage the flows that have not been diverted by the “intermodal system” of the P&R to the parking regulation system inside the city centre.

This is a scheme that is increasing its presence across Alpine cities , that has the strategic aim to filter the car traffic imposing a penalty, through stronger fares, to the use of private cars as closer as they get to the city centre.

The scheme presents many differences in its effective implementations in each different town. It would appear that on the basis of the different orientation of the Alpine towns.

Recently, also in Alpine towns, regulation of circulation and parking (or stop) refers to freight delivery. As it happens in urban centres located in flat areas, stops and parking of trucks for loading and unloading are permitted only in specific lots and at certain time slots. In some towns, these vehicles can move only along some mandatory tracks on the urban network.

There is a tendency of assigning the activities regarding the distribution of the retail sector to smaller size vehicles and with a reduced impact on the environment, as the ones used in some centres in Vorarlberg, Austria.

In some cases the distribution of goods in the urban areas is a crucial node for which different solution are being proposed to limit the access in urban centres. An example is the “City Logistics” system used in several German towns.

The “City Logistics” concepts shall realize a consolidation of urban goods traffic. The aim is to reduce goods traffic in cities and to reduce the volume of traffic on the urban infrastructure. Freight traffic centers and transshipment centers are regarded as economic and future-oriented concepts. These distribution centers are interfaces to the traffic carriers - for local as well as or long-distance traffic - like road, rail, inland waterway, sea and air. City-logistics concepts have both positive and negative aspects:

Advantages	Disadvantages
<p>Saving costs by:</p> <ul style="list-style-type: none"> - consolidation of goods traffic - reduced volume of traffic on urban infrastructure - reduced time effort for pre-carriage and onward-carriage by combining the traffic carriers road, rail and inland waterway 	<p>Higher costs and risks for forwarders because of:</p> <ul style="list-style-type: none"> - additional turnover processes - warehousing costs
<p>Less volume of traffic in city centers because of:</p> <ul style="list-style-type: none"> - reduced number of delivery tours - Less number of traffic jams Reduced costs for costumers because of: - consolidation of goods delivery 	<p>Complex legal contracts for:</p> <ul style="list-style-type: none"> - transfer of liability in case of damages - financial regulations in case of defective performance
<p>Positive effects for the environment because of:</p> <ul style="list-style-type: none"> - reduction of traffic noise emissions - reduction of pollution emissions - saving fuel 	<p>Cooperation problems of forwarders, e.g.:</p> <ul style="list-style-type: none"> - lack of trust - agree on common marketing activities for the delivery service - no clear identification of the service provider at the time of delivery for the customer
<p>Forwarders save time as maneuvering in narrow streets and pedestrian precincts are no longer necessary</p>	<p>No flexibility in case of single deliveries</p>

Source: "Urban Mobility in the German Alpine Convention Area" - June 2010 German Contribution to the Sub-Working-Group Urban Mobility of the Working Group Transport of the Alpine Convention

Frequently, cycling is considered an effective way to move within the city centre mainly for people traveling alone and with no cumbersome loads⁴³. As a consequence cycling mobility management has become part of the set of policies available in the city centres.

In the Alpine towns too, the use of bicycles has been promoted with the use of incentives, both extending the network of bicycle paths, which allow the separation of motor vehicles from bicycle traffic, besides a better experience for the cyclist, and the use of bike sharing

⁴³ In some countries (e.g. Germany), it is possible to use bikes also to transport children or loads on a separate trolley. More, some special vehicles (e.g. tandem bicycles) can be ridden by more than a person simultaneously.

schemes that allow to rent a bike also for those journeys where origin and destination do not match thanks to a network of bicycles stations placed around the urban territory.

The “bike sharing” services are having a remarkable success in many Alpine towns (even though they affect the rebalancing of the modal split for still a not particularly elevated share), namely where the bike stations (integrated with parking areas, railway and bus stations) and the fare systems, collection have been located in a more rational way.

Experience from Alpine towns

Austria

An appreciable level of integration between different public and private transport modes is sought. Integrated tickets have been introduced aiming at stimulating the access to urban centres with PT (as it happens in Innsbruck), though room for further improving the presence of this measure is recognized by the competent administrations. Some Park&Ride facilities (two in Innsbruck) have been set up, in order to relieve the traffic congestion in the city's central districts. In the same field, new PT lines and correspondences to national railways have been planned, paying specific attention to the “regional” dimension of mobility. In this regard too, PT is considered the most adequate measure to drive the change in the Austrian urban and inter-urban mobility system. High level accessibility of the main attractors within the city along all the day is a specific goal in the inner urban centre; measures in this regard include the operation of new night lines. Currently some open issues are identified as pivotal for the future development of transport planning policies, clearly addressing the management of PTS, the improvement of whose comparative effectiveness (e.g. separate tracks in the city centre) and quality (e.g. improvement in the state of bus stops, especially outside the city centre and in the Innsbruck region) with respect to private mobility is perceived as a primary goal. It is noticeable how the mobility policy aims at diverting to PT the whole mobility system, with special reference to tourist and work-related mobility.

France

Mobility management in the three urban areas analyzed is entrusted to the autonomous administrative bodies charged with the task to coordinate policies and planning common to several municipalities (Communautés Urbaines). On the basis of the adopted mobility plans, is aim to the intermodality through greater integration of public services (integration of tools, construction of parking exchanges areas) with the private sector. Also in the sub urban areas plans are expected to improve frequency and efficiency of collective transportation to limit the private mobility. Positive experiences are also reflected encouraging the use of bicycle. In Annecy for example bike usage accounts 15.000/ 20.000 trips per day, which represent a share of 4,8% of all trips for all modes.

Students are the main customers of the bicycle rental service; a combination mountain bike offer is also available during the summer with a dedicated bus service to reach the summit of the Semnoz. An electric bicycle service is also currently being deployed.

Germany

The mobility management in the German Alpine area is focused on parking policy and a better integration of public transportation offers (schedules, time knots), whereas the role of cycling as urban mode of transport is not yet fully acknowledged in many cities. Often long-term parking is discouraged in the inner city districts. For example in Kaufbeuren space for short-term parking is provided in the historical centre. A significant example of efficient parking management is applied in the town of Rosenheim characterized by a combined “urban orientation”. Roughly 700 short-time parking spots are located in downtown, with an additional 3,500 located in parking lots and parking decks. Of these, roughly 1,000 are free-of-charge and located within walking distance of the downtown area. All major parking lots and parking decks are integrated in a routing system, which indicates free capacities in real-time on dynamic road signs. Additionally, the current occupancy of parking lots can be checked via telephone, internet, sms or wap-enabled cell phone. Through parking management, the municipality of Rosenheim tries to achieve:

- An effective use of the existing parking spots,
- Reduction of parking-related traffic,
- Improved accessibility for customers and visitors,
- Improved environmental and residential qualities

Depending on the local situation and demand, the downtown area of Rosenheim is subdivided into areas for short-time parking, residential parking and mixed parking. Short-time parking is organized in two different fare zones, the fringe of downtown being less expensive than the city core.

For the town of Garmisch-Partenkirchen the parking system is a crucial element of mobility policy and management. Due to its central-place-function and its popularity as day trip destination (downtown, Zugspitze, Partnach- and Höllental gorge), Garmisch features high traffic volumes in motorised individual traffic. 940 public parking spaces are located in the center of the city district Garmisch, of which 150 are not yet managed. In the outskirts (Alpspitz cablecar, Hausberg cablecar, Ice-sport-center), an additional 1,700 parking spaces are located

Italy

The mobility management in the Italian Alpine cities is focused mainly on the parking policy. In order to regulate urban mobility in some cases there is a parking management system composed by different tools (as it happens in Aosta) or a parking management system with different pass categories (as it happens in Cortina, with white, red and blue pass) that limit the vehicle circulation in the town centre. In cities with a higher and denser population other systems have been set up to manage local mobility as for example the restricted traffic zones and pedestrian areas (Bolzano). In Bolzano, the Urban Master plans to build a bypass road to the northeast of the city, through a system of tunnels, moving and upgrading the A22 from the bank of the Isarco River.

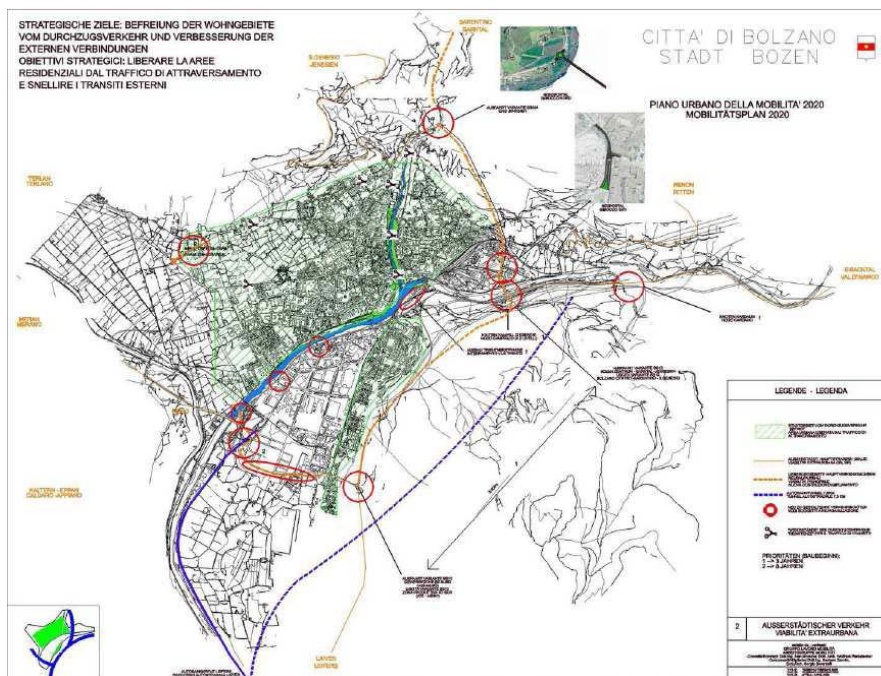


Figure 7: Master plan of Bolzano-Bypass to the northeast of the town

In Cortina, there is a special project that the bike path, about 37 km long, was derived by converting the disused stretch of railway. To enhance the cycling track in Cortina, a "Bike n'Bus" service was also set up, a bus with a trolley transports passengers and over 30 bicycles, in turn integrated with the railway station Calalzo.

In the town of Aosta is applied a policy on "Transit points", logistic platforms of small-medium size generally located in peripheral areas of the urban centre, with the function of collecting and warehousing goods, rationalizing into limited timetable the freight delivery and reducing noise and air pollution. A warehousing logistics platform inside the former Cogne area has been built, from which every day a reduced number of low emissions vehicles operate, being the only ones to have access to the area comprised between Piazza Arco d'Augusto and Piazza della Repubblica, for the delivery of goods to shopkeepers in the interested area.

Slovenia

Mobility management policies and measures adopted at the urban level in the Slovenian Alps have the primary goal of reducing the number of vehicles circulating on the territory. In order to achieve a reduction of the adverse effect of traffic on the environment, some

measures have been adopted to promote “soft” mobility such as the promotion of public electric vehicles (in Kranjska Gora) or the promotion of “car sharing” in the urban environment (Maribor).

Switzerland

Mobility management in the three analysed cities in Switzerland is focused on parking policies and multimodal transport facilities. For example, Lugano does not have a traffic guidance system in general, only one for parking and a special traffic management measure involves the regular temporary closing of the main axis along the lake in the weekend.

In the city of Luzern there is an innovative guidance system to multi-storey car park and a system to help the management of congestion in the region (dosage system). An example of the traffic flows management is the E35 (A2), the main European passage through the Alps: this route runs near the city of Luzern. In the tunnels bypassing the city, the E35 motorway carries 59,399 vehicles a day at Sonnenbergtunnel and 88,400 vehicles a day at the Reussporttunnel. This traffic, however, is mainly local and regional - only 16,500 of the vehicles actually cross the Alps at San Gottardo a day. Most of the transit traffic stays on the E35 motorway. Due to its location at the end of the lake, the city centre of Luzern also provides important connections on a regional level. This is especially true for connections to and from the north-eastern parts of the conurbation. At the same time, 180,000 vehicles pass through the cordon of the inner city centre and 250,000 pass through the cordon of the city region each day (in both directions).

The master plan of traffic in Lugano, provides the completion of the bypass system, with the construction of a road tunnel between Veduggio and Cassarate.

A significant operative case of specific parking management is applied in the town of Lugano, characterizing from a powerful “commercial vocation”. Free parking is usually available also at commercial centres outside the city of Lugano. A parking guidance system for 1,000 parking spaces in multi-storey car parks is about to be installed in the downtown area and in the planning stage for the surrounding areas.

In the town of Luzern there is a significant traffic management for walking and cycling: bicycles are given priority at some traffic lights in the city and some streets feature a separate bicycle lane. Luzern follows a policy of separating areas for walking and cycling, and tries to guide cyclists on bike lanes in the street. There is a bike rental station with several services at the central railway station. Besides, open spaces for bikes are available in various places across the town and at stations of the suburban railway. Nevertheless, covered bike spaces are especially close to the railway station.

6.5 Innovative measures, infomobility, Integrated Traffic Management Systems: Overview of the Alpine Urban Centres (regional approach)

Intelligent Transport Systems are systems based on the interaction between information technology, telecommunications and multimedia, and allow to address and manage toward a innovative and intelligent way the problems of both public and private, urban and extra urban mobility and meet the needs expressed both by operators and users of public and private transport. ITC's help to develop the policy on safety, efficiency, effectiveness, cost efficiency, all while respecting the environment.

The European Commission classifies as ITS:

“Intelligent Transport Systems (ITS) are advanced applications which without embodying intelligence as such aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated and ‘smarter’ use of transport networks.

ITS integrate telecommunications, electronics and information technologies with transport engineering in order to plan, design, operate, maintain and manage transport systems. The application of information and communication technologies to the road transport sector and its interfaces with other modes of transport will make a significant contribution to improving environmental performance, efficiency, including energy efficiency, safety and security of road transport, including the transport of dangerous goods, public security and passenger and freight mobility, whilst at the same time ensuring the functioning of the internal market as well as increased levels of competitiveness and employment. However, ITS applications should be without prejudice to matters concerning national security or which are necessary in the interest of defense”⁴⁴.

The main goals of ITS are:

- traffic management and mobility, implementing from existing operating platforms a decision support system in the management of urban mobility that enables the implementation of different policies for control of mobility and access that meet the specific needs of local government.
- The information for users, including improving communication and information to citizens in terms of timeliness and significance through the on board-vehicle information services, to promote compliance measures taken by the government, to allow more informed planning of movements with private car

⁴⁴ Official Journal of the European Union, DIRECTIVE 2010/40/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

- The management of public transport to improve mobility in areas with the reinforcement of Infomobility systems starting from the metropolitan areas and expanding the monitoring and control on the network until the extra-regional areas.
- The management of fleet and freight vehicles using the operating vehicles as data acquisition system to extend and improve the monitoring of traffic and to estimate the traffic in order to increase the extent and capillarity of the existing tracking information systems mobility to reduce the necessary infrastructure on the territory.
- automatic tools
- advanced control of the vehicle for safe transport to put at the disposal of local government a simulation tool that has the capacity to estimate and evaluate the impact of strategies based on different criteria to limit the access and to control traffic
- management of emergency and incident
- pursue a national standardization of management services and models related to Infomobility to ensure interoperability between vehicles and mobility management centers of the different territories.

The experiences regarding the implementation of integrated systems of info-mobility and ITS (intelligent transport system) for the ICT management of mobility in Alpine cities have shown the possibility of gaining on the short term (saving time, reducing traffic congestion, increasing safety and travel comfort, fuel economy, polluting emissions and of environmental impact) without large investments and without modifying the infrastructure.

The impact of ICT applications appears to be as efficient as the integration and the coordination of different processes of mobility at a technological level (through the information interaction between several control systems) and management (through a better coordination between the responsible institutions of urban mobility management services). New data transmissions technologies allow the integration of communication systems applied to collective and private transport. Traffic control and regulation activities can benefit from these advancements to more effectively influence rationalization policies of urban transport.

For what concerns the regulation of mobility in urban areas, the specialized and integrated functions of ICT are several and proven.

They can often be seen as technologies which can be applied in order to ease the application of specific measures, with advantages (reduction in the cost of implementation, improvement in data collections and their accuracy, feasibility of new policy schemes, etc.) both for service providers and final users. In the following lines we will present some innovations which have been introduced in the Alpine towns analyzed in this report.

➤ *Integrated and smart traffic lights*

Self regulating traffic lights, giving priority to public transport and reducing traffic congestions, are operated with smart controllers which are able to ensure the priority to public transport and to modify the traffic lights phases with the varying traffic intensity.

- *Real time traffic information to drivers.*
Providing simultaneously information to all users of the roads is obtained by using LED panels (VMS system) which are able to inform drivers on traffic conditions in the towns, availability of parking lots in downtown parking spaces. These actions are achieved also through specific websites and SMS information services.
- *Real time position of public transport*
The ICT management of public transport is aimed at improving the attractiveness of the service, through monitoring and just- in- time management of the service that include: verifying performances regarding the frequency and speed of single routes services; providing information to the costumer on waiting times at the public transport stops, besides giving journey times and the possibility of selecting routes and connections with other routes.
- *Access control*
The automatic management of access control at the entrance of the limited traffic areas and pedestrian areas can play an important role in adjusting and controlling the management of traffic within environmentally valuable areas in Alpine towns.
- *Fares collection*
The management of pricing systems, through automatic charging, allows the computer controlled management of financial transactions between public transport users and the system in an integrated way that comprises several mobility services (parking areas, public transport route service, bike sharing, ski lifts, etc.)
- *Logistics and goods distribution*
ICT solutions applied to logistics and to distribution activities of goods in urban areas is developing for what concerns functions such as the electronic data interchanges, management information system, vehicles localization and delivery management.

Experience from Alpine towns

Austria

In the selected Austrian cities there are some examples of technologies in support to the urban mobility management. For instance, in the big Austrian centres of Innsbruck, Salzburg and Graz a traffic management system has been installed on the motorways and the speed limit is automatically set by the level of air concentration (NO₂, PM₁₀) on motorways.

Busses circulation is managed and speeded up by means of an automatic controlled traffic light system in the city centre and in the surrounding regions. More, park management systems have been established to find a free parking stall and so is a centralized control of all the traffic lights in the city centres and the surrounding regions⁴⁵.

France

Only in Grenoble a project for implementation of an infomobility service is developing. As early as 2002, the Urban Community took the initiative of implementing a centralised multi modal travel management system to coordinate transportation network operators in order to optimise usage of the roadway system for public transportation, as well as to group network operators under the same roof, enable a shared view of the networks in real-time, manage the networks in the event of a crisis or power outage and to disseminate the multi-modal information to travellers.

A relevant application of ITS and Infomobility System is working in the town of Grenoble. Early as 2002, the Community of City implements a centralized multi-modal travel management system to coordinate transportation network operators in order to optimize usage of the roadway system for public transport, as well as to group network operators under the same roof, enable a shared view of the networks in real-time, manage the networks in the event of a crisis or power outage and to disseminate the multi-modal information to travelers.

A partnership protocol was concluded in 2003 between METRO (project manager), the Regional Council, the General Council of Isère, governmental departments, the city of Grenoble and the urban transportation organizing authority, to define the investment programmes and divide funding shares. The investment programme is based on a common building to house the different operator control stations on a daily basis (delivery in early

⁴⁵ Further details on the Austrian experience can be found in the attached national report, in the Appendix to this report.

2010); an operational ITS, to coordinate and centralize the information and implement global transport plans in the event of a crisis and disseminate information to the public and operators; a traveller information system to disseminate multi-modal information in real-time in a unified and complementary way to that of the operators.

Germany

There are different dynamic information systems to promote the use of public transportation and to improve parking management. For example in Rosenheim a dynamic information system has been installed at bus stops to provide real time information public transportation services and Kaufbeuren has installed an electronic travel information system via internet, called EFA, enabling passengers to plan inter-modal trips for random starting points and destinations within the region.

Italy

In the Italian Alpine arc there are a lot of initiatives that aim to promote the use of innovative technological systems to regulate traffic and to inform citizen on the mobility. Some of this services concern management system of the traffic data to improve the circulation of vehicle in the city (for example the MAPs system of Aosta). Moreover there are a lot of internet services to know the state of mobility in the urban territory (for example the telephone services for info mobility in Bolzano). Research inside and outside the Alps are being developed with regard to innovative ways to use already available data for advanced management of mobility, also during specific periods of time or on the occasion of major events (e.g. 5T system in Turin). In the town of Bolzano (ITA), there is an advanced integrated parking management system, managed by a very spread VMS network, routing the car users towards the free slots into the parking facilities localized in the centre of the town.

Slovenia

In Maribor, an advanced infomobility system has been developed under a EU-financed project dealing with partnership programs for the development of sound sustainable mobility policies in urban centres in Europe. The experience developed with this partnership project (Partner Initiatives for the development of Mobility Management services and transferring actions in sustainable mobility for European regions) allows the public authorities of Maribor to disseminate mobility management measures among residents of the town and in its wider region. Best practices from other partner cities can be used to communicate new ideas about mobility to citizens, and to enrich the contents of the public tender for the public transport operator. Moreover a growing attention exists for improving the cycling paths network in the town and in the surrounding region. Promotion campaigns for persuading citizens use bikes instead of cars are also expected to be launched. As a result, the integrated mobility management implemented in Maribor is considered as a suitable tool through which economic, environmental and health benefits can be simultaneously achieved for the town and its inhabitants or visitors, by introducing soft transport policy measures.

Switzerland

In the city of Luzern, for inhabitants and visitors, a mobility map with all relevant information on mobility (roads, cycle paths, walking paths, car-sharing sites) has been published. Information for recent settlers is available: public transport information and tickets to test public transport are provided. Real-time schedule displays exist at most major bus stops. It is planned to establish a mobility centre in Luzern between 2011 and 2014. At the first stage the emphasis is placed on a virtual mobility centre with web-based information and services.

Concerning information on the public transport Chur has real-time displays and real-time schedules. Furthermore, real-time information on the cell phone is available.

7. Obstacles and barriers to promoting “environment friendly” strategies for urban mobility

Most Alpine cities have set as strategic priority urban traffic management and promoting environmentally friendly solutions aimed at defining an environmentally sustainable mobility, able to provide a specific answer to the features of mobility in mountain areas.

The currently implemented solutions show the complexity and multi-subject approach needed to tackle the issue and it emerges that, so far, they have generated limited results, when solutions happen to be isolated measures, not inserted in an integrated and systematic logic of mobility.

A more integrated and systemic approach to urban traffic regulation, which appears to be required, poses the problem of a more complex management, requiring a specific know how which not always is available within alpine municipalities of small and medium size.

Moreover, there is an economic and financial sustainability problem that implies the need of striking a balance between many elements in order to find cost-effective measures aiming at implementing environmental sustainability.

Environmentally friendly measures are therefore mainly directed towards affecting the behaviour of the urban mobility demand, in order to improve the modal split to the advantage of the modes of transport that ensure a lower environmental impact.

As highlighted in the case studies illustrated in this Report, reference is made mainly to Travel Demand Management (TDM) measures, for the most part different from town to town, which tend to regulate the mobility of individual and collective means of transport in order to promote the use of services, systems and means which are less polluting and safer.

Hereafter, it is possible to find a summary of the critical aspects of each measure described in this Report most frequently implemented in alpine urban areas, in particular by underscoring the implementation barriers that hinder the development, effectiveness and diffusion of the mobility system.

Limited Traffic Zones and Pedestrian Areas

This measure aims at hindering or limiting rigorously access of private vehicles transporting people and goods in some city areas, in some cases in certain time slots during the day. Moreover, the possibility of determining the number of vehicles accessing the area according to visits (and hence of the stress produced on the urban mobility system) in some defined periods of the year often coinciding with tourist season represents a often used method for tourist centres.

The first obstacle in implementing effectively this measure and to the acceptance by road users depends on the discretionary possibility of granting authorizations to enter these areas,

according to the specific interest of residents and shopkeepers. Furthermore, the widespread use of multi-function cameras associated with ICT monitoring systems has facilitated the needs put upon the enforcement of such limitations and the control of roads entering the traffic protected area.

Park&Ride/ Bike&Ride facilities and system

This measure tends to reduce the access to the city of cars through the exchange with public transport and/or bicycle, which shall be performed in designated multi-function areas in peripheral areas of the city. The greatest difficulties in implementing such measure and its attractiveness towards potential users resides in the effectiveness of the integration with public transport, both in terms of frequency of the bus service, often too low, and in terms of the payment of the bus fare, often too complicated and not integrated between parking and bus service. These critical points are even more important for tourists in mountain areas, who carry also sport equipment, that slow down the loading and payment process. Moreover, in order to raise the effectiveness of these measures, attractive parking sites need to be installed outside the city centres -or at the stations along the train and bus-lines going there.

Park Pricing and Management

This measure has few obstacles (mainly the acceptance of residents and shopkeepers) to its implementation and it is very much used in alpine towns, as much as it is in many European towns, even though some differences exist from country to country⁴⁶ regarding quantity and quality, showing how the frequent use of private cars is important for most of these centres. However, there might be obstacles on the technical point of view regarding the different possibilities of paying parking fees. Furthermore, data on traffic flows and different types of traffic occurring in different areas of the town should be gathered and considered specifically in order to apply fares in an effective way.

The aim of such measure is to substantially drain traffic flows and increase the modal shift towards collective means of transport and bicycles. In fact, in the presence of a Limited Traffic Zone for example in the city centre, it is possible to charge a hourly price which is, in relative terms, higher in the vicinity of the urban centre and applying to it a time limit (i.e. the maximum parking time allowed is two hours). In some towns where commercial activity is intense, a balance has been struck with business interests, in some urban areas, by not imposing parking charges for the first 15/20 minutes of parking. Obstacles to the implementation of parking management and parking tariffs often are due to how an urban centre is identified with a certain typology of town by its features and how the local administrations try to favour an economic sector rather than another one.

⁴⁶ For example, according to literature data it is possible to estimate that in Austrian towns the ratio between parking slots for which a charge is due versus the number of vehicles equals 11 parking slots for 1000 vehicles; in the Italian alpine towns this ratio goes down to 6.

Bus Services (collective means of transport) and dedicated lanes

Measures aiming at the exchange and limitation of car traffic imply by themselves an incentive for using collective local transport which, therefore, should be improved and have an increased comparative advantage relatively to the (limited) use of the private car.

The bus services are made more attractive and efficient through the definition of dedicated lanes that make the service faster and more reliable, in particular on the lines entering Limited Traffic Zones.

This measure is by its nature cost effective and more easily accepted by users because it ensures speed and timely service. Dedicated lanes appear to be an investment on efficiency and timely service at a reasonable cost.

The biggest obstacle to the diffusion of dedicated bus lanes is the lack of infrastructure (the size of the road) in particular in towns with a mountain morphology with a lower extension of the road network. Therefore implementing it often requires expensive road works that cannot be easily repaid by ticket charges alone. However, in some cases, when possible, green roads are implemented, that is to say, roads which are exclusively dedicated to the passage of buses.

With regards to bus and other collective transport services, a further obstacle is often the existence of opposing interest between the managing bodies of collective transport (i.e. urban services and extra urban services) which end up in creating difficulties in developing a coordinated and harmonious action and therefore producing a series of problems, in terms of tariff integration, connections with local regional trains, the organization of the service according to specific needs of mobility (for instance, compatibility between tourist demand and the residential one). Moreover, collective transport services have high infrastructural and management costs that generally are a heavy burden on the budget of local authorities.

Promoting the use of bicycles

Measures aimed at promoting the use of bicycles are welcome being particularly suitable for urban mobility and the environment. The solutions that have been most widely used concern the extension of bicycle (and pedestrian) paths, in some regions also for interurban paths, and the diffusion of bike&ride interfaces, for the exchange between bicycles and other transport modes and bike rental services, both for non-tourist and tourist purposes.

In alpine towns, the biggest obstacle to a more extensive use of bicycles is the winter weather, infrastructural deficits and the specific transport needs of users (i.e. the need of carrying cumbersome goods) that limit greatly the potential users besides reducing safety conditions. These obstacles are very emotional and personal ones. All these points, weather, winter and goods transport could be dealt with if mobility behaviour was more flexible. But urging consumers to use more flexible modes of transport is very difficult to communicate .

Therefore it emerges that one of the biggest obstacles facing most of the people is adapting personal behaviour to a more flexible way of experiencing transport..

Moreover, bike rental services, require a particular organizational know how in particular in maintaining the constant availability of bicycles at the parking slots, balancing the number of bicycles among the many rental points and in organizing a tariff structure which is easily usable and integrated with the P&R, bus services and railway lines.

ITS Integrated System

The ICT solutions applied to urban mobility management are an important, innovative and environmentally friendly answer to improve roadsafety standards and to reduce the impact of pollution. When implemented in a widespread and integrated way, ITS can generate beneficial effects in selecting the movements inside the town, to the advantage of a modal split which is more favourable to environmental friendly transport.

It can support a just in time management of the mobility system in a town, operating on the access to traffic limited zones, on the directions to reach the closest parking available, on the traffic lights network, on integrated tariffs, on the management of bus fleets, on the information of users at bus stops and train stations, on VMS systems informing drivers, on the management of bike rental services and on the organization of logistics and delivery of goods within the city.

The obstacles to the diffusion of these systems are of many kinds:

- 1 The necessity that the ITS system is managed by an autonomous body without links to a kind of management logic which operates according to single transport modality or the view of a single transport company.
- 2 The need of conspicuous know how in the management, in particular when functions are multiple and integrated.
- 3 The need of continuous up dates of information in order to provide credible and reliable information to the customer.
- 4 Substantial initial investment costs and running costs (in particular for the specialized expertise required).
- 5 The problem of collecting data with the necessary quality and sharing them with the users (quality management and data security problems).

Car-Sharing Services

Lately a burgeoning number of car sharing schemes have been implemented in a growing number of towns, vey often with the use of fleet mainly comprising zero or low emissions vehicles. In combination with public transport, car-sharing services as offered by or in cooperation with national railways can contribute to closing the “last mile” gap.

Car sharing has been widely used in some specific areas, in particular where, for example, public investment has been higher and where the higher number of points of access to the service make the service more user friendly.

The critical elements of the car sharing service are of different nature:

- 1 It requires large financial resources for the start up and management costs of the system which are not likely to be amortisable in the short and medium term and that, therefore, will need financial backing by public authorities;
- 2 The need, in some cases, of specific and highly qualified know how in managing the service;
- 3 A sufficient base of potential users in the surrounding of delivery points according to the investment (urban centres in mountain areas are, in many cases, small or very small in size);
- 4 Generally the management costs for car sharing service are high, especially in the case electric cars are used. They require in fact special attention considering their lack of autonomy⁴⁷, frequent breakdowns and progressive reduction of battery charge. Moreover, scarcely diffused vehicle delivery points around the towns reduce the appeal of the service to potential customers.

8. Conclusions

On the basis of the analysis of the selected alpine towns, according to the experts a few elements indicating the positive change on going in the urban mobility system may be found together with some critical factors.

According to the analysis, the private car is still the most employed means to move within the alpine area, however with public transport, bicycles and walking accounting for high modal shares in urban areas. Therefore, several administrations have specifically implemented measures to mitigate the effects of the traffic on the alpine environment.

Several investments were implemented and planned by the alpine administrations for introducing and promoting in urban contexts collective means of transport which could be competitive and respectful to the environment, as well as technologies using alternatives fossil fuels, nowadays so largely spread. The engagement of the alpine administrations in favours of the collective public transport is plain. Nevertheless, in some cases the cost of collective transport is not economically sustainable at a local level and, in this sense, it was possible to determine that the administrators are induced to seeking the minimum environmental impact not only by collective transport services, but also through a mix of policies and measures of mobility.

⁴⁷ However the latest generation of electric cars are generally able to ensure 160 Km autonomy range with one charging cycle. Of course, infrastructural investments are required in the case a widespread charging network had to be put in place.

In this sense the systems for the inter-modality, realized through points for the interchange among different means of transport (i.e. private car/ train), are among the most effective and spread. In some alpine urban centres - for example - parking the car and using public transports or specific shuttle buses for the connection with the city centre is possible. The use of the intermodal exchange by the users is often encouraged through special rates. There are systems of integrated rates which are aimed at promoting the use of the public transportation services and at regulating the movements and the access within the urban centres in a sustainable way.

It has been found that the development of the “mobility plans” is one of the priorities for the local alpine administrations in order to foster the sustainability of the movements within the urban areas.

The high density of the population and the lack of space in some zones (especially where the existing infrastructures do not allow further structural intervention to reduce the traffic) are relatively common. In some cases, integrated systems of collective transport and a good management of the urban traffic (ex. through the introduction of restricted traffic areas or by forbidding the access to commercial vehicles and allowing the circulation only to public means within the historical centres) have at least compensated a “territory” which is less favoured due to orographic reasons.

Moreover, the alpine public administrations in the last few years are intended to promote actions fostering the urban movements through human powered transport (such as the bicycle and walking), which includes the construction and the improvement of small dedicated infrastructures (i.e. paths for bicycles, for skating and for pedestrians), which are often not adequately developed.

With respect to the technological innovations for sustainable urban mobility, peculiar attention has to be given to the use of electric vehicles and to the info-mobility.

Local administrations promote more and more the use of electric vehicles for their positive impact on the environment (e.g. electric cars and bicycles). In some cases the development of these technologies have fostered the improvement of the efficiency of transport means at an urban level (i.e. more means can circulate in the historical centres) as well as the impact of transports on health and environment (i.e. the electric engine is much less polluting than the traditional internal combustion engine).

The info-mobility allows offering timely informational services regarding timetables, the situation of traffic and other data on mobility within the urban centres. In particular, for public transportation the informational electronic panels at the bus stops have facilitated the informational service to the citizens, improving the effectiveness and user-friendliness of public transport. The integration of measures to reduce the traffic congestion (as the special bus lanes) and the technological innovations has considerably improved the efficiency of the

public transport, with respect to the punctuality and the numbers of users. Other means employed in order to diminish the urban traffic are the “dosage systems” (which may be found in the parks or in the city centres) that provide real time information to the users regarding the permission for accessing to specific city areas.

The regulation of the access to specific areas through monitoring systems and time slots allows a better management of the logistic and of the freight delivery, which have often a relevant effect on the traffic level within the urban centres, especially at specific hours. Measures to separate the fluxes of traffic and to divert the traffic due to heavy means outside the urban centres, through various infrastructures are also common (bypasses, connections, ring roads).

It is also clear that public transport is less efficient across some industrial and suburban areas than in the city centres, highlighting the relevance of establishing densified demand nodes in residential and commercial development. Nevertheless, other solutions (i.e. car sharing or shuttle buses) are employed in such areas for the collective transport of people, thus reducing the number of vehicles across the roads at competitive costs.

To sum up, according to the national contributions some indications arise regarding the suitability of the actions to be pursued in the medium term:

- 1 Integrating the planning of new infrastructures with the existing ones , considering the territory conformation , and a close integration of urban development and sustainable mobility development;
- 2 Signalling to policy and decision makers the importance of realizing actions, compensating limitations such as goods transport or bad weather conditions, targeted at spreading the use of human powered mobility using also professional marketing strategies.
- 3 Improve the collective local transport services on rails and other means (e.g. tram, trolley bus) in order to allow a better improvement towards rural areas and a better access to the urban centres where the local economy is concentrated, particularly for those rural areas which do not benefit from additional tourist transport offers.
- 4 Promoting cutting-edge services of real time information, also through the use of ICT and other information services. Integrate the technological innovations with the existing structures proves to be more economic and efficient than other solutions.
- 5 As commuter traffic is in many alpine towns identified as the major source of traffic impacts, priority should be given to public transportation strategies and offers that specifically address the needs of commuters.
- 6 Supporting the implementation of city logistic concepts which release the pressure of commercial transport impacts off town centres.

9. Proposed Recommendations

According to the mandate given by the Alpine Conference which was held in Evian in march 2009, the WGT Transport - Subgroup urban mobility has identified, on the basis of national reports sent by experts of each country, some good practices regarding urban mobility which are believed can be usefully shared among the Contracting Parties. The WGT Transport - Subgroup urban mobility finds it appropriate to present to the attention of the Alpine Conference the following recommendations:

Mobility Management

- Taking appropriate measures to reduce and manage the flows of vehicles, forestalling congestion phenomena and intense traffic deriving also from the peculiar physical, geographical, environmental and social features of Alpine urban centres, in order to make movements more effective and sustainable in urban areas. Therefore, it's important to promote measures for increasing the occupancy rate of private cars and to support measures for more efficient multimodal transport facilities and to improve the balance between all modes of transportation.
- Increasing the part of the modal split essential to promote measures for a safer and more attractive bike and pedestrian infrastructure.
- Developing an integrated sustainable mobility framework for urban mobility which considers the mutual interaction of urban development and mobility, regional interactions, the need of target-group oriented offers and better marketing of transport services.
- Implementing economic instruments, infrastructural measures and management practices aiming at achieving a better management and a shift in favor of more sustainable transport modes. Therefore, we suggest that each of alpine city to create and discuss basic principles for mobility pricing (for all modes of the local transport system) and charging measures.
- Calling attention to the effectiveness of coordinated or integrated fare policies, which give users, in homogeneous employment or mobility areas, the possibility of combining travel on different categories of networks through clearinghouse systems among relevant authorities.
- Continuing studies and actions aiming at assessing the externalities of transport in urban centres, also in order to define the tools able to suggest ways to internalize the external costs of transport and make them visible to the users of the road and promote, where possible, a changed attitude towards a mobility that is more favorable to the environment.

- Taking into due consideration, in order to properly shape the measures to be adopted, the results of scientific research, the fragility of the Alpine areas and the possible earmarking of the revenues deriving from road or pollution pricing schemes.
- Urban development should thus pursue a consolidation of settlements and basic facilities, thus reducing the need for involuntary mobility. Therefore accessibility planning, such as accessibility-action plans, embracing alpine cities and their hinterland are necessary.

Public transport

- Giving more attention to policies providing incentives to public transport aiming at confirming public transport as a valid alternative to the use of private means of transport. Regarding the interurban transport, it's essential to consider also cross-border connections between the countries of the Alpine Convention.
- Continuing in the design of tools fostering the use of local public transport, when economically sustainable, such as the single ticket and charging facilitations for different age categories, aimed at improving the quality of life in Alpine urban centres.
- Continuing to strengthen the collective transport services both within the urban centers and the sub-urban areas as well as between urban centers (inter-urban mobility) which have developed in the last decades and continue to grow.
- Improving the coordination of the time schedules and fares between different operators of transport services, both public and private, in order to provide an effective, efficient and widespread service to citizens.
- Improving the integration between different public means of transport, optimizing public transport and thus improving its relative attractiveness, and adopting parking management and inner-city access restrictions to motorised individual traffic that, when accompanied by improvements in public transport, contribute verifiably to increased passenger volumes in public transport.

Innovation

- Introducing innovative technologies (mainly ITS finalized to the integrated mobility management), which can be easily used by citizens and are sustainable both environmentally and economically.
- Promotion of sustainable urban mobility through marketing instruments in small and medium-sized alpine towns by local authorities and transport associations, developing a smart image of sustainable urban mobility, highly integrating ecomobility and motorised individual mobility.
- Promoting if economically sustainable and technologically feasible, through proper measures, the use of environmentally friendly vehicles and namely electric ones, also for public transport services.
- Operating in order to achieve a widespread diffusion of ITS systems available to the public according to an approach that favours interactivity, taking advantage of the information and economic possibilities provided by these tools and web technologies.
- Addressing sustainable mobility concepts that meet the mobility needs of the elderly in the Alpine cities and their hinterland, in light of the prediction of higher motorized individual transport among this group. According to available figures, these measures are comparably inexpensive for municipal authorities while having a considerable impact.

Main references

- Action Plan on Urban Mobility. COM(2009) 490 final, Brussels, 30.9.2009.
- COMMISSION OF THE EUROPEAN COMMUNITIES. A sustainable future for transport: Towards an integrated, technology-led and user friendly system COM(2009) 279 final. Brussels, 17.6.2009
- DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT. A sustainable future for transport. Publications Office of the European Union, 2009
- GREEN PAPER "Towards a new culture for urban mobility". COM(2007) 551 final, Brussels, 25.9.2007.
- DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT. PREPARATION OF A GREEN PAPER ON URBAN TRANSPORT: REPORT ON URBAN TRANSPORT IN EUROPE. September , 2007
- Permanent Committee of the Conference of the Alps, 03 March 2009, Evian.
- Report of the Presidency of the Transport Working Group.
- UITP. European Union Environmental Legislation Existing and Proposed Legislation and the Potential Impact on Public Transport. Third Edition, June 2009
- UITP (Union Internationale des Transports Publics) Position Paper. Response to the communication on A sustainable future for transport: towards integrated, technology led and user-friendly system COM(2009) 279 (final) of 17 June 2009. Passenger transport in urban areas.
- EEA (2006), Urban sprawl in Europe - The ignored challenge. EEA Report No 10/2006
- Sustainable mobility in the Alps. (Paris 2008) Examples of good practices and analysis of the mobility system.
- OECD (2004), The role of soft measures, Report on a workshop 'Communicating environmentally sustainable transport - the role of soft measures', held in Berlin on 5 and 6 December, 2002.
- CSST. Mobility Analysis for the city of Bolzano. March 2010
- Hochschule Luzern - Wirtschaft. Mobility Analysis for three Swiss Cities in the Alpine Space in Switzerland. Lugano, Luzern and Chur. Luzern, October 2010.
- F. Rauch, K.Schlosser . "Urban Mobility" in the Central Region of Innsbruck. Büro für Verkehrs- und Raumplanung Innsbruck, January 2010.
- Angelini P. et al, "SWOMM 2008 - "Urban mobility in the mountain regions" - Italian Ministry for the Environment, Land and Sea, with collaboration of EURAC Research, Bolzano 2008
- Convenzione delle Alpi - Comitato Permanente - Rapporto sullo Stato delle Alpi - Il Sistema dei Trasporti - Innsbruck, Bolzano - 2007
- CEMT-OCDE - Evaluation et Prise de Decision pour des Transports Durables - 2004
- Freight Leaders Group - Quaderno 13 - Il valore del tempo nel trasporto delle merci - 2004

- European conference of Ministers of Transport. Committee of deputies - Transport policies in the countries of central and eastern Europe - 2001
- Air pollution from road vehicles - L H Watkins - London - 1996
- National Contribution on the “Urban sustainable mobility”, Sub Group Urban Mobility of the Working Group Transport of the Alpine Convention.

Data sources:

www.alpconv.org

www.certu.fr

www.upt.fr

www.insee.fr

<http://doku.uba.de>

www.alpenallianz.org

www.vcoe.at

www.eltis.org

<http://cordis.europa.eu>

www.vvt.at

www.ivb.at

www.statistik.at

Annex - Summaries of national contributions

