COMPACT NR 01/2010

TRANSPORT IN CLIMATE CHANGE

A CIPRA BACKGROUND REPORT

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cc.alps in a nutshell

The Project “cc.alps – climate change: thinking one step further!” is organised by CIPRA, the International Commission for the Protection of the Alps, and financed by MAVA Foundation for Nature. Through the Project, CIPRA is helping to ensure that climate response measures in the Alpine region are in harmony with the principle of sustainable development.

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INTRODUCTION

Within the framework of the project “cc.alps – Climate Change: Think ahead!”, the International Commission for the Protection of the Alps (CIPRA) tested climate protection measures in the Alps. CIPRA compiles information on climate protection activities and adjustments to climate change in the Alps (hereinafter referred to as climate measures) and analyses the impacts of these climate measures on the environment, economy and society. CIPRA‘s aim is to make the climate measures, which comply with the principles of sustainable development, accessible to a broader public and to warn the public of those climate measures that have negative effects on nature and the environment as well as on social cohesion and the economy.

The “CIPRA compact” series comprises several thematic publications that take a critical look at climate measures in the Alps. The series covers the following activities in addition to the subject of “transport”: energy, building and refurbishing, energy self sufficient regions, spatial planning, tourism, natural hazards, nature protection, agriculture, forestry and water.

This CIPRA compact presents an overview of transport-related measures in the Alps to ameliorate climate change and promote adaptations to climate change. The second chapter explains CIPRA‘s key concerns: Without any change to our mobility behaviour, we will not attain the climate goals! On the one hand, automobile transport must become more expensive, and on the other, transport types benign to the environment must be promoted. Changed mobility behaviour will have a heavy impact on the economy and society. We need to face this challenge.

The third chapter analyses and describes each of the relationships in detail. The fourth chapter presents a summary of the author’s key findings and conclusions. The fifth chapter gives us an overview of exemplary climate-friendly transport measures in the Alps: klima:aktiv is a consultancy and financial assistance scheme of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management to reduce greenhouse emissions; Alpine Pearls is a network of up to now 21 holiday destinations that have committed themselves to the principle of soft mobility. Further examples are the CO_2-neutral and car-free Styrian “Alpine meadows” and the transport management at Parco Naturale Adamello Brenta in the Italian province of Trento. These examples show us how it can be done and encourage others to do the same. Finally, chapter six presents a collection of literature and background information for further reading.

2

DEVIATION TOWARDS CLIMATE

CC.ALPS: CIPRA DEMANDS ON TRANSPORT

Transport, in particular by car and truck, is one of the main causes of climate change. In the Alpine countries transport accounts for more than 25 percent of the release of greenhouse gases. Of all causes for climate change, traffic is the one with the highest increase in greenhouse gas emissions since 1990.This is a wrong development, running counter to the political objective to reduce exhaust emissions. In the Alps, the percentage of journeys made by car is higher than the European average.

Shall we continue along this road at full throttle? The scientific prognoses are based on the fact that exhaust gases from transport will affect climate even more severely in the future than today, if this is not countered. Less transport means more: better air, fewer hold-ups, more recreation value, and eased climate.

CIPRA requests:

INCREASE TAX ON MINERAL OILS, STOP TOURISM FOR FILLING

Petrol and natural gas must become evidently more expensive, in order to speed up a system change to renewable energies: manufacturers are starting to build smaller, lighter and less consuming vehicles; these are increasingly in demand, since customers feel every mile they drive in their pocket and want vehicles that save resources. Alpine countries, as well as the EU, must agree on a common price level for fuels, in order to stop rising tourism for petrol filling.

PUBLIC TRANSPORT, REGIONAL CIRCLES

Increased tax on mineral oil should also be utilised to provide better public transport for rural peripheral areas. Besides, regional economic circles should be promoted; if goods and wares are produced, bought and consumed in an own region, there is lower transport mileage and the climate is protected. It makes no sense to fight trends towards migration from rural areas with commuter flat rates and petrol subsidies; this would mean merely tinkering with the symptoms. It is more intelligent and sustainable to invest money in regional cycles and in new and attractive jobs. This way, in the long term, peripheral areas become attractive and worth living in; also for young people.

PRIORITY FOR BICYCLES AND PUBLIC MEANS OF TRANSPORT

The road network is sufficient. New roads – as is proved by many surveys – generate no regional economic added value and act to the detriment of climate and the environment. Funds for traffic infrastructures must be utilised in the future mainly for the promotion of public transport and bicycles.

ROAD PRICING FOR TRUCKS!

Switzerland shows the example: the imposition of charges for trucks has proved positive. They will be levied on the basis not of a lump sum but of mileage. These Road Pricing systems have been proven to reduce the emission of greenhouse gases and other negative effects of truck traffic such as accidents, respiratory illnesses and other damage to health, noise, jams, without detriment to the economy and consumers. Following the Swiss example, road fees must be introduced for trucks everywhere and for all road types in the Alps. Toll proceeds should be allocated, among other things, for climate protection measures, a shift from truck transport to rail, and noise protection.

TAKE TRUCKS TO THE STOCK EXCHANGE

In principle, various goods which are currently transported by trucks through the Alps can be transported by rail. Heavy motor transport must be reduced. We need an Alpine stock exchange in order to limit the number of trucks crossing the Alps. A benefit in the allocation of trespassing rights is that journeys can be subdivided equally on various passes. Alpine crossing by trucks should be treated as a limited resource, because of its environmentally damaging consequences: demand determines price. In addition, traffic management systems must be introduced, in order to shift goods transportation from road to rail. This “deviation” which is significant also for climate protection has consequences well above and beyond the Alps, if the shift of goods to rail is generally applied over long distances.

STOP AT 100 SPEED

It has been proven that limiting speed protects climate. In the short term and without high costs it is possible to reduce greenhouse gas emissions, but also particulate matter, nitrogen oxide and noise. Speed of 100 km/h on highways and 80 on local roads must be consistently checked, and any offence must be swiftly punished.

STOP TO BIOFUELS

Biofuels are not sustainable. They are cultivated in intensive and non-natural agriculture, often accompanied with forest felling and higher food prices in poorer regions of the earth. In some cases their production entails increased emission of greenhouse gases than what is saved with their combustion, for example in comparison to petrol.

FILL CARS WITH SUN

Electric cars may only serve as a solution where mobility needs cannot be covered other than by car. Only in this very limited way it will be possible to produce the necessary electricity directly from solar power. The expansion of water power stations to the benefit of electrical mobility is not a solution, since this energy is available to a large extent only in limited spaces and a massive exploitation cannot be conducted in an environmentally friendly way.

PACKAGES WITH SOFT MOBILITY

Those countries that have signed the Alpine Convention must promote environmentally friendly tourism more strongly than before. Also arriving and staying in remote tourist places is possible with public transport. That environmentally friendly mobility works and finds favour with guests is shown by the success of the Association ”Alpine Pearls“. Their objective is to put together at least 100 tourist eco-packages in the next five years and financially promote them also in their opening stage.

3

CLIMATE CHANGE AND TRAFFIC

3.1

EFFECTS OF TRAFFIC ON CLIMATE CHANGE

Traffic is one of the main drivers of climate change. In the year 2004, the contribution of traffic to climate change on the global average was 13.1% (IPCC 2007). In the EU it was 27.4% in 2005 and in the Alpine countries, the share is between 25% and 27%.

Table 1:
Development of greenhouse gas emissions caused by traffic in the Alpine countries (excluding waterway navigation and international air traffic).

	Share of traffic in %	Change 1990 to 2005	Share of automobile transport in traffic emissions
Germany[1)]	27 %	+ 1 %	93 %
France	34 %	+ 20 %	94 %
Italy	27 %	+ 27 %	92 %
Austria[1)]	26 %	+ 91 %	95 %
Switzerland	29,4 %	+ 8 %	97 %
Slovenia	29,6 %	+ 68 %	85 %
EU	27,4 %	+ 26 %	93 %

Source: European Environment Agency (2008): Climate for a transport change. TERM 2007: Indicators tracking transport and environment in the European Union. EEA-Report / No 1 / 2008

1) The differences between the individual countries are explained in part by trips made by car to buy cheaper gasoline. The inexpensive fuel prices in Austria contribute to the steep increase even though a share of actual emissions occurs outside of Austria.

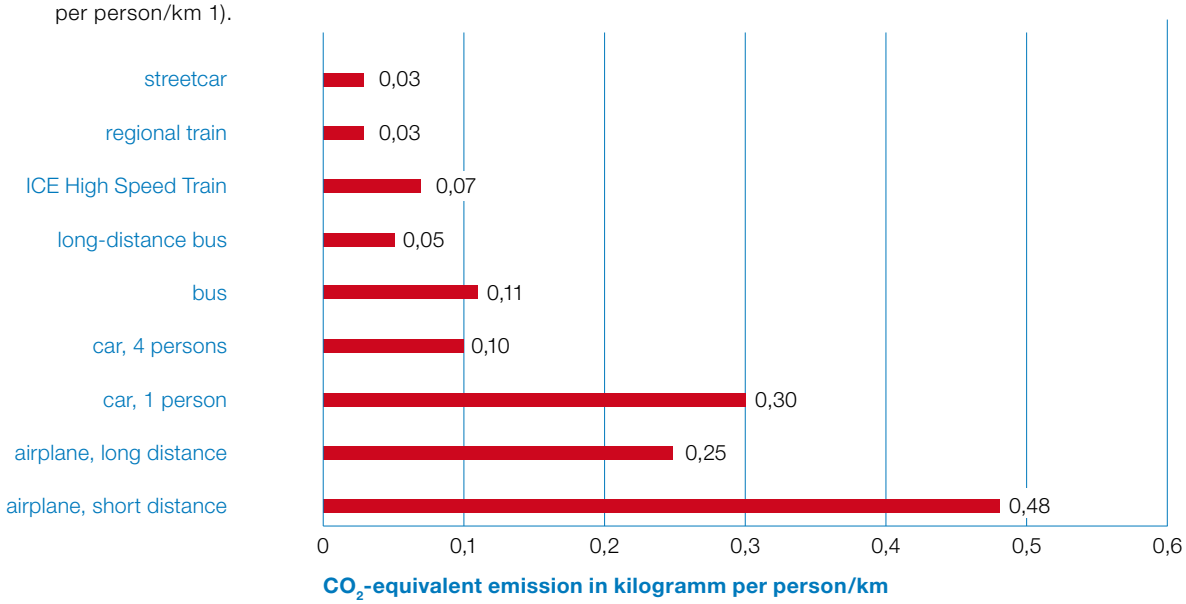
Figure 1:
Individual car traffic is one of the main causes for climate change.

Transport is also the sector in which the steepest increases in greenhouse gas emissions have been recorded since 1990 making it the main cause for the non-decrease of greenhouse gas emissions in the EU, contrary to the proposed goals. While emissions from energy production industry and households have decreased in the EU from 7 to 14%, emissions from transport went up 26% in the same period (EEA 2009). All forecasts reveal that greenhouse gas emissions from traffic will continue to increase unless counter measures are taken. The European Union defined a reduction target for greenhouse gas emissions of 20% by 2020 compared to 1990. If this target is to be achieved, then traffic must also be reduced.

The main cause of greenhouse gas emissions in transport is motorised road traffic that accounts for more than 93% of emissions. Almost 60% of which are due to individual passenger traffic and 40% to freight transport (UBA 2008).

The high share of individual car traffic in greenhouse gas emissions in the transport sector is not attributed only to the high contribution to transportation, but is also due to the higher greenhouse gas emissions per ton and person/km.

Figure 2:
Comparison of transport means by greenhouse gas emissions per person/km 1).



Source: BUWAL, Scénariòs de consommation respectueuse de l'environment: facteur, décisions et acteurs cles, www.ecoinvent.ch

1) The values determined depend heavily on the method of calculation. Depending on the assumptions, the values may be higher or lower.

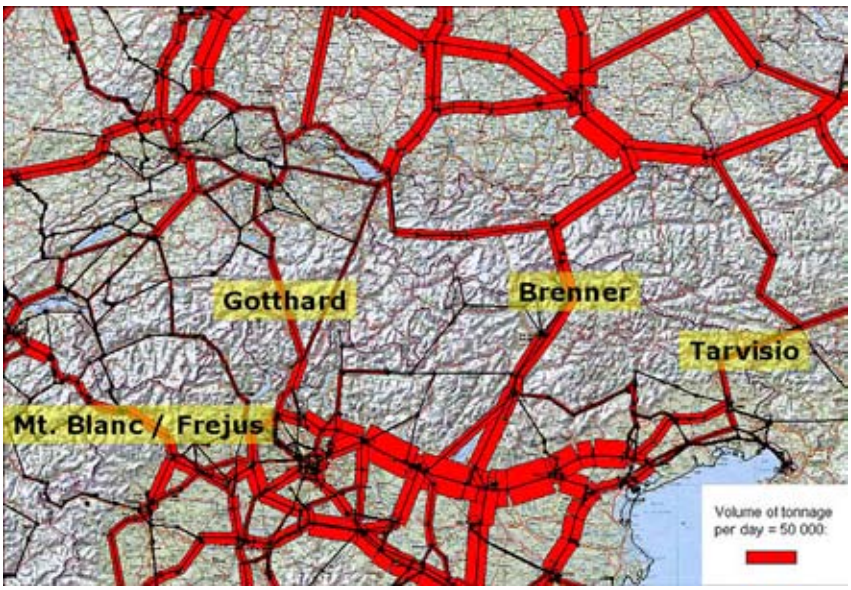
3.2 EFFECTS OF CLIMATE CHANGE ON TRANSPORT

Transport will be affected by climate change mainly due to the expected increase in extreme weather conditions. Intensive snowfall, higher risk of avalanches, heavy rainfall with flooding and mudslide risks as well as storms will trigger hindrances to local and regional transport. Apart from the direct transport hindrances, heavier damages to infrastructure installations and subsequently higher repair costs may be expected. The Alpine region will be particularly affected because of its exposed conditions (slopes, valleys) and the more frequent and extreme weather events expected. This means that apart from measures to avoid damages, adaptation measures are also necessary to secure the expensive transport infrastructure (avalanche barriers, high water protection).

3.3 TRANSPORT IN THE ALPINE REGION

The Alpine region is one with a relatively low level of traffic on roadways in comparison to the adjacent regions. The much heavier traffic loads, and therefore, greenhouse gas emissions occur outside of mountainous areas.

Figure 3:
Freight traffic load in and around the Alpine region on the high-priority roadways in 2004.



Source: Automatic traffic measurement on the high-priority roadway network of the Alpine states. In: Alpine Convention (2007): Report on the State of the Alps – Transport and Mobility in the Alps.

This does not only apply to freight traffic, but also to passenger car traffic.The low level of traffic volumes in the Alpine area is explained by low population density: Only around 25% of the Alpine space is permanently settled.

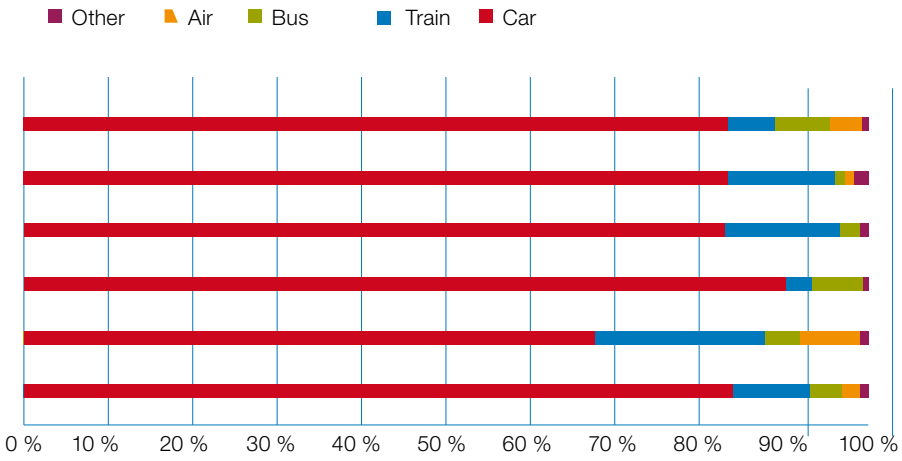
A look at the greenhouse gas emissions from traffic per resident reveals that the Alpine regions hardly differ from the regions outside of the Alpine area. The data available on the traffic behaviour of inhabitants in the Alpine area compared to those outside of the Alpine area show divergent results, but nonetheless it may be assumed that there is no significant difference:

However, a special feature of the Alpine region is the high share of leisure time and tourism traffic that regularly results in traffic overloads and jams during the main holiday travel times. Also at the tourism centres, the burden caused by leisure time and tourism traffic loads is high.

On average, 84% of holiday travel in the Alps is done by car. There are enormous differences between the Alpine countries. Switzerland may be viewed as an example of good practice with a share of 25% of railways and buses versus other Alpine countries.

Figure 4:

Choice of mode of transport for holiday trips (origin – destination) in the Alpine countries.



Source: Alpine Convention – Arbeitsgruppe Verkehr (2009): Nachhaltige touristische Mobilität in den Alpen – Entwicklung der Erreichbarkeit von Tourismusorten mit öffentlichen Verkehrsmitteln.

Anyone who speaks of transport in the Alpine region, of course, at first thinks of Alpine transit traffic. The Alpine valleys and passes are severely affected by very high noise level and air contamination in the valleys and massive interventions in the landscape for infrastructural development. As far as greenhouse gas emissions are concerned, transit traffic, which joins regions outside of the Alps, plays only a minor role.

This is because internal, destination and source traffic account for the largest share of mileage travelled by far. There are no consistent comparable data available for the entire Alpine area. Only Switzerland has data on travel distances and in this case only for trucks over 3.5 tonnes (heavy transport trucks). Transit traffic (including transit traffic outside of the Alpine region) accounts for a share of 10% to 13% of total distances travelled by heavy trucks in Switzerland (ARE 2004). In Austria, there are figures only for transport volumes (tonnes). In this case as well, the share of Alpine transit is 10% (BMVIT 2007). This means that the reduction of greenhouse gas emissions in traffic in the Alpine region should not just focus on transit traffic, but also concentrate on traffic that originates within the country. On the other hand, the reduction of road transit traffic over the Alps constitutes leverage if the goal of shifting long-distance traffic to rail or to avoid it altogether is achieved.

Figure 5:

The shift of traffic in transit across the Alps from road to rail reduces greenhouse gas emissions in the Alps and beyond.

4

AVOIDANCE MEASURES IN TRAFFIC AND POSSIBLE CONSEQUENCES

There are many avoidance measures in transport. Decision-making and implementation competences are distributed top down from the European to the local level. The magnitude of the effects also varies widely. In the following section, an overview is given of possible avoidance measures by decision level and effects. Subsequently, the particularly relevant measures are discussed with respect to their significance for the Alpine region. Not included are measures that relate to air traffic, as the regional dimension is irrelevant in this context.

4.1 MONETARY MEASURES

4.1.1 MONETARY MEASURES TO MAKE TRAFFIC THAT CAUSES HIGH GREENHOUSE GAS EMISSIONS MORE EXPENSIVE

These measures have the purpose of:

- motivating traffic participants to shift to other means of transport or use vehicles that use less fuel,
- encouraging vehicle manufacturers to develop and offer ones that have lower emissions
- reducing distances between activities though the spatial reorganisation of activities.

Table 2:

Selected monetary measures.

Avoidance measures	Decision and implementation level				Effects		
	EU	National	Regional	Local	Greenhouse gas reduction	„Side-effects“ [1]	
						positive	negative
Increase in mileage-linked tax (mineral oil tax)		•			very strong	Reduction of air contamination and noise; Greater traffic safety	Potential increase in social and spatial disparities, fuelling tourism
Automobile road pricing territorial coverage (spatial and time staggered)		•			very strong	Reduction of air contamination and noise; Greater traffic safety	Increase in social and spatial disparities, out-migration; No incentive to cut fuel consumption
Auto road pricing on highways		•	•		strong	Reduction of air contamination and noise; Greater traffic safety	No incentive to cut fuel consumption; Undesired diversion traffic
Truck road pricing territorial coverage (Swiss model of LSVA)	•	•			very strong	Reduction of air contamination and noise; Greater traffic safety	Transfer of additional costs to consumer possible
Truck road pricing on highways	•	•	•		strong	Reduction of air contamination and noise; Greater traffic safety	Diversion traffic
CO_2 trade in transport	•				very strong	Reduction of air contamination and noise; Greater traffic safety	Possible increase in social and spatial disparities
Increase and differentiation of automobile taxes by CO_2 emissions		•			weak	Reduction of air contamination	
Alpine transit exchange	•	•	•		strong	Reduction of air contamination and noise; Greater traffic safety	Disproportionately more expensive “short” transit distances
Reversal of tax reliefs for automobile traffic (e.g. commuter flat rate, Diesel fuels)		•			weak	Switch to public transport, decrease of /rural sprawl	Possible increase in spatial disparities; Cost problems for commuters in rural regions, out-migration
City toll				•	locally strong generally weak	Lower noise and air contamination; Recovery of public space	
Parking space management	•	•			locally strong generally weak		

1) Side effects refer to secondary effects that may be triggered by measures.

Source: Umweltbundesamt (2003): CO_2-Minderung im Verkehr. Berlin.
Steininger et. al. (2007): Klimaschutz, Infrastruktur und Verkehr. In: AK-Österreich: Informationen zur Umweltpolitik Nr. 175. Bundesamt für Raumentwicklung (2007): Alpentransitbörse, Untersuchung der Praxistauglichkeit. Bern. Transport for London (2005): Central London Congestion Charging – Impact Monitoring. London. Bundesamt für Raumentwicklung (2008): Fair und effizient. Die leistungsabhängige Schwerverkehrsabgabe in der Schweiz. Bern.

The potential effectiveness of monetary instruments is high. However, it depends very heavily on the amount of taxes, tolls and charges. Really effective monetary measures may entail the following problems:

Figure 6:
The increase of fuel costs is a highly effective climate measure, which is politically difficult to achieve.

- The political acceptance starts to break down when an actual change in behaviour becomes mandatory. This was shown very clearly by the sharp rise of fuel prices in the year 2008.
- The higher costs for traffic participants can be passed on to producers and consumers via transport prices (in freight transport). Higher transport costs may trigger a spatial reorganisation of production resulting in shorter routes and therefore easing the load on the environment.
- The capacities of alternative transport modes are currently restricted (rail, public transport). The development requires large investments and is possible only gradually, because planning and construction capacities are also limited.
- Social disparities are heightened. Mobility becomes disproportionately more expensive for low-income earners. This leads to savings in other household expenses (food, housing, education, etc.) or to changes in mobility behaviour (switch to cheaper modes of transport). In densely populated areas the selective use of cars without losing too much comfort will be possible. The measures mainly affect households and areas that are forced to have their own car due to lacking alternatives. Even today, households in sparsely populated regions spend around one-third more for transport than households in densely populated areas (Statistik Austria 2006). Over the medium to long term this could result in site decisions against peripheral regions if it is not possible to create alternative public transport offers that shorten routes by providing more job offerings in the region or to compensate higher mobility costs by transfer payments (e.g. auto commuter tax allowance).

At the spatial level, higher transportation costs have the tendency to favour agglomerations and central areas. The pressure of out-migration increases for peripheral areas. This could also affect some Alpine regions. In peripheral commuting regions with high automobile costs, a reduction (see also CIPRA compact Spatial Planning) may be assessed positively as regards the lowering of greenhouse gas emissions. However, a conflict of spatial policy goals arises: Maintaining rural village structures, the avoidance of out-migration, abandonment of settlements and depopulation versus climate policy goals as long as automobile traffic remains one of the main causes of climate change.

THE FOLLOWING MEASURES ARE PARTICULARLY RELEVANT FROM THE PERSPECTIVE OF THE ALPINE REGION:

a Truck road pricing according to the Swiss model for the entire territory

The “heavy vehicle fee” introduced in 2000 in Switzerland has been proven useful. A first evaluation in 2005 showed a reduction of truck kilometres of 6.5% and a reduction in CO_2 emissions of 6%. Without the heavy vehicle fee, an increase of 23% would have been expected (ARE 2008). There have not been any negative consequences, because the additional costs have been compensated mostly by greater efficiency (better capacity utilisation of vehicles).

b Truck road pricing on highways with premiums to include the external costs of traffic (environment, traffic safety).

Truck traffic bears the costs it causes only in part. The currently effective EU Road Pricing Directive only permits coverage of construction, maintenance and operating costs. However, a differentiation between urban and rural areas and environmental surcharges (up to a maximum of + 25%) are possible for the Alpine region.

c Alpine Transit Exchange

The Alpine Transit Exchange could limit transit traffic by truck and make it more expensive. For short distances between the Alpine foothill areas, less expensive rates would be required in order to avoid raising the costs disproportionately versus long-distance traffic. The ultimate goal is to define a procedure applicable to the entire Alpine region (ARE 2007).

d Increase in vehicle tax (mineral oil tax)

The increase in mineral oil tax is also a very effective instrument that can be implemented throughout the area. However, it is necessary for all countries to act concretely in order to avoid that fuelling tourism. Especially in Austria, Switzerland and Liechtenstein, there is still a lot of scope for raising taxes.

e Parking space management

Parking space management is a proven and well-established instrument for steering destination traffic in urban centres and in the surroundings of tourist attractions.

4.1.2 MONETARY MEASURES THAT PROMOTE TRAFFIC WITH LOW OR NO GREENHOUSE GAS EMISSION

Monetary measures to promote traffic with low or no greenhouse gas emissions include tax reliefs, direct financial assistance in the form of subsidies or indirect financial assistance.

Examples for tax reliefs

As a measure to reduce CO_2 emissions in road traffic in Switzerland, since 2008, a tax relief has been granted on vehicles fuelled by natural gas, liquid gas and bio-gas as well as other fuels from renewable energy sources. Fuels from renewable sources are tax free if they meet the minimum ecological and social requirements.

In Germany, vehicles that drive on purely biofuels are exempt from mineral oil tax. Natural gas vehicles are taxed at much more attractive rates than conventional vehicles. In France, a fuel discount of EUR 1,525 is granted if you buy natural gas vehicles; there is a government bonus of EUR 650 in Italy and in Austria of EUR 500 for each natural gas vehicle. In Liechtenstein owners of natural gas vehicles are exempt from motor vehicle tax.

Examples of financial assistance

In Austria, investments of enterprises that reduce greenhouse gas emissions by switching or replacing their vehicle fleets (e.g. changeover to biofuels, natural gas, introduction of route optimization systems) are promoted within the scope of the klima:aktiv mobil scheme. The development of electrical vehicles is promoted within the framework of the Climate and Energy Fund. The project “VLOTTE” in the Rhine Valley in Vorarlberg/A is the first model region (www.vlotte.at).

Examples for tax differentiation by CO_2 emissions

In France, an environment tax was introduced as of 1 January 2008 with a bonus-malus system (ecopastille) linked to CO_2 emissions for the purchase of a new car. Vehicles with CO_2 emissions of less than 130 g/km receive a bonus, and vehicles with emissions over 160 g/km pay a malus. In Austria, a similar system was introduced on 1 July 2008. In Germany, the vehicle tax was split into a tax on horsepower and a tax on CO_2 emissions as of 1. January 2009.

4.2 DEFINITION OF TECHNICAL STANDARDS AND LIMITS

A very effective means of reducing greenhouse gas emissions from traffic is the definition of technical standards, limits, and bans or obligations using legal instruments:

Table 3:
Selected technical standards, limits and bans.

Avoidance measures	Decision and implementation level				Effects		
	EU	National	Regional	Local	Greenhouse gas reduction	„Side-effects“ [1] positive	negative
Definition of upper limits for average CO_2 emissions of cars and light trucks sold	•				very strong	Reduction of air contaminating emissions Reduction of dependence on oil imports	
Admix obligation for biofuel		•	•		weak [2]	Higher incomes for farmers	Competition to food production, reduction of biodiversity Higher food prices
Speed limits	•	•	•		strong, but only if consistently monitored	Increase in traffic safety, reduction of noise, air contamination	
No driving zones				•	locally strong, overall weak	Increase in environmental quality	

[1] Side effects refer to secondary effects that may be triggered by measures
[2] Using current technologies

Source: Self design.

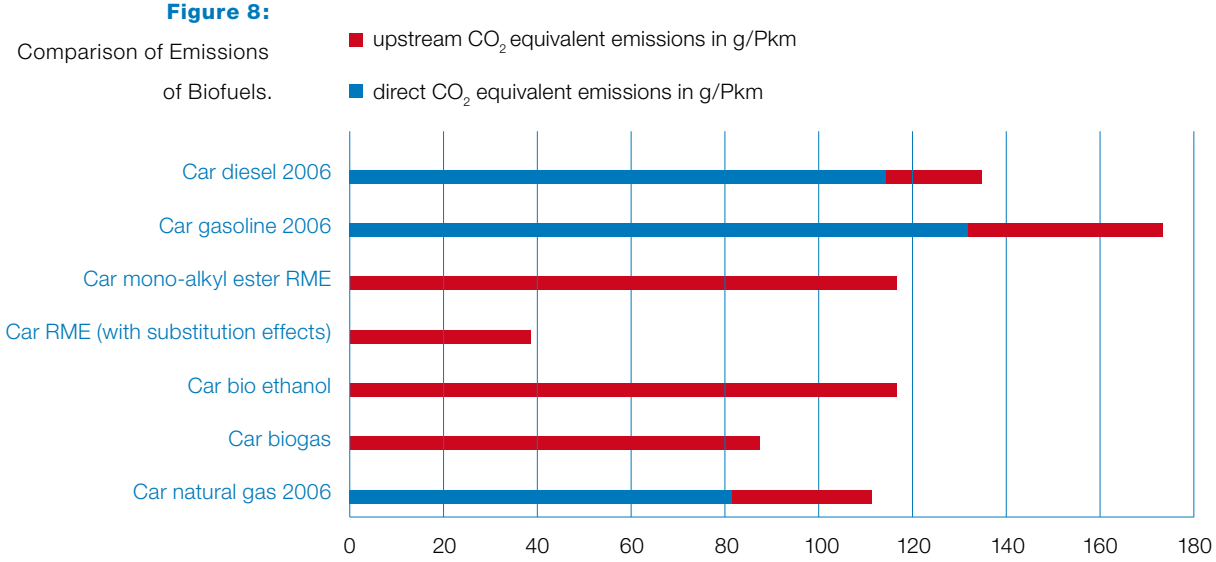
Figure 7:
Renewable energies put to test: in the name of climate protection measures are implemented that could harm the natural balance.

Already in 1999 and 2000, the EU reached agreements with automobile manufacturers under which these agreed to voluntary commit themselves to reduce average CO_2 emissions of automobiles sold by 2008 to 140g/km. This goal was clearly missed (2006: 160g/km). Regulation (EC) No. 443/2009 of the European Parliament and of the Council of 23 April 2009 legally established the upper limit for average CO_2 emissions of vehicle fleets. As of 2020, the target for the consumption of new car vehicle fleets will be 95g CO_2/km. If this limit is exceeded, fines will be imposed for every gram CO_2 per kilometre.

The use of biofuels is highly controversial. The EU plans to increase the share of biofuels to 5.75% by 2010 and to 10% by 2020. Not only the EU has goals to increase biofuel shares. A number of 47 countries that account for 75% of global fuel consumption have similar targets (EEA, 2008).

An investigation of the ecological energy balance of biofuels reveals a very contradictory picture. In Austria, the Umweltbundesamt (Environment Agency Austria) calculated a reduction, depending on the base material, of CO_2 equivalent emissions ranging from 30% (biogas) to 15% (bioethanol, mono-alkyl ester) versus conventional diesel cars if the base material is produced in Austria. However, just to meet the target of a share of 5.75% of biofuel, almost 30% of farming land in Austria would be needed for the respective crops (Boxberger 2005).

Figure 8:
Comparison of Emissions of Biofuels.



Mileage: 1,36 person per km

Source: Umweltbundesamt

The lowest greenhouse gas emissions may be expected of mono-alkyl ester if the by-products glycerol and press cake (protein animal feed) can replace fossil glycerol (used in the pharmaceutical industry) and imports of protein animal feed. This is currently not considered to be competitive.

Extremely problematic are biofuels if forests had to be cleared to create farmland. In the case of the currently most efficient biofuel (sugar can from Brazil), it would take 40 to 120 years to achieve a balanced CO_2 energy balance (GIBBS et al 2008). Contradictory statements are found with regard to laughing gas emissions (300 times more climate effective than CO_2), which depend on the use of fertilizers. In the case of high levels of fertilizer use, the balance could even reverse to negative (CRUTZEN 2007).

Apart from this, there is also the factor of land competition for food production and for other purposes (e.g. wood). If one disregards timber, the main areas of cultivation of biofuels are outside of the Alpine region. However, the Alpine region could be affected by rising animal feed prices.

Generally, the second generation of biofuels (exploitation of the entire plant) is expected to have a much better degree of effectiveness.

4.3 TECHNOLOGICAL DEVELOPMENT

The government is investing enormous amounts of financial assistance into the development of alternative traction systems: Hybrid vehicles, natural gas vehicles, electric vehicles, fuel cell engines and hydrogen fuel engines are being fostered. It is unclear which system will prevail in the future. Almost all have already found niche uses:

- Electro vehicles are used in “car-free” towns as a means of transportation and have traditionally been used as trolley buses for urban transport.
- Natural gas vehicles are used as taxis or in the vehicle fleets of municipal companies and firms.
- The greatest market penetration has been achieved to date by the hybrid motors (fuel motor and electro-motor).
- Prototypes exist for fuel cell cars.

Table 4:
Overview of traction systems.

Traction system	Greenhouse gas reduction
Combustion engine with gasoline/ diesel	Reduction potential: 18%
Gas engines with liquid gas (liquefied petroleum gas, LPG)	Around 15% vs. diesel [1]
Gas engines with natural gas (compressed natural gas, CNG)	Around 15% vs. diesel [1]
Gas engines with biogas	Around 30% vs. diesel [1]
Hybrid systems between combustion engine and electro engine	Up to 30% vs. diesel [1]
Electro vehicles	No reduction if electricity is obtained from coal; up to 97% if electricity is obtained from photovoltaic.
Fuel cell engine • Fuel cell • Hydrogen fuel cell engine	Greenhouse gas reduction only with solar hydrogen production, otherwise worse than conventional automobile.

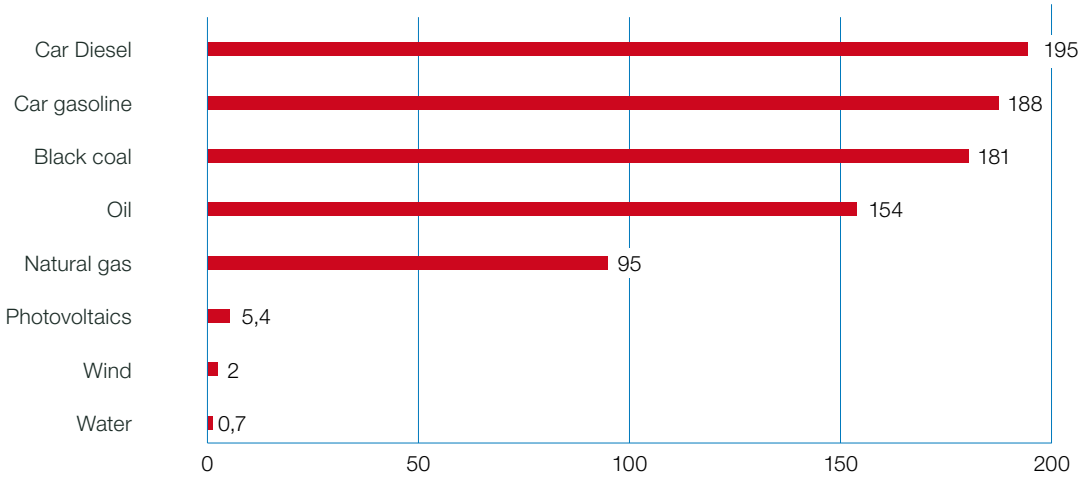
[1] It is assumed that this difference can be maintained by efficiency improvements also versus an improved combustion engine.

Source: Shell Deutschland Oil GmbH (2009): Shell-Pkw-Szenarien bis 2030. Hamburg.

Figure 9:
Electro vehicles are only climate and environmentally friendly if the electricity used is not produced with fossil energy sources or nuclear power plants.

A comparison of traction systems shows that electro motors are especially attractive. Batteries can be used to store electricity and thus create a buffer for wider fluctuations in electricity demand. Moreover, the vehicles operate exhaust-free (emissions occur only at the power plants) and with low noise. Despite progress achieved in battery technology, batteries are still the weak spot of electric vehicles. Furthermore, electro vehicles are only climate and environmentally friendly if the “well-to-wheel” balance (overall balance from “drilling rig to car use”) is positive. This is true only if electricity is not produced with fossil energy sources or from nuclear power plants. Yet, the electricity mix in Europe currently consists to 83% of fossil fuels and nuclear power.

Figure 10:
Well-to-wheel balance of electro vehicles in comparison.



Source: Umweltbundesamt (2008): CO_2-Monitoring 2008. Universität München (2009): Emissionen von Kraftwerken im Vergleich. VCÖ (2009): Potenziale von Elektro-Mobilität. in: VCÖ (Hrsg.): Mobilität mit Zukunft 2/2009.

Without any further technology breakthroughs to create cheaper batteries with greater storage capacities and faster charging times, the pure electric automobile will not establish itself in the mass market in the next 20 years. The automobile scenarios developed by Shell assume a share of electric cars of 2.5% (trend) respectively 10% (technological breakthrough) by 2030.

A stronger trend towards electric engines will increase the pressure to develop the reserve potential available for hydropower plants. This will severely affect the Alpine region.

Figure 11:
The further development of the various transport modes within the eco-transport network helps mitigate climate change.

DEVELOPMENT OF ENVIRONMENTALLY-FRIENDLY TRANSPORT TYPES (PUBLIC TRANSPORT, BICYCLE AND PEDESTRIAN TRAFFIC)

Measures to improve rail transport for passengers and freight, local public transport, bicycle and walking as modes of transport have the aim of reducing travel and mileage by automobile and therefore also greenhouse gas emissions. A generalised assessment of the effects is difficult, because these depend on the starting situation, intensity and interaction of the individual measures.

With the exception of the development of rail and waterway routes for freight traffic, the measures alone have relatively minor effects in comparison to the monetary, technical and legal measures.

This is also because, for example, in urban areas the share of public transport, bicycle and pedestrian traffic is already relatively high and a further increase by improving transport options will only be possible at a higher cost.

The further development of the public transport system will only have its full effect if it is part of a package with supportive monetary, legal and awareness-raising measures.

In the case of the package of measures mentioned, we are referring to the well-known range of improvements for environmentally-friendly transport modes. However, these are necessary in any case to break the rising trend of greenhouse gas emissions caused by traffic. Furthermore, they also have many other positive effects (reduction of air contamination and noise, higher traffic safety, recovery of public space as a living space, increase in value of urban structures).

In the own sphere of influence of the Alpine regions, the key issues are securing and improving regional transport, strengthening environmentally-friendly modes of transport in Alpine towns and the environmentally friendly reorganisation of tourism traffic.

Table 5: Selected packages of measures .

Avoidance measures	Decision and implementation level				Effects		
	EU	National	Regional	Local	Greenhouse gas reduction	„Side-effects“ [1]	
						positive	negative
Further development of passenger transport by rail	•	•			weak to strong [2]	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation
Further development of freight transport by rail and waterways	•	•			strong	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation
Further development of public regional transport		•	•	•	weak to strong [3]	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation
Further development of urban public transport				•	weak to strong [3]	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation
Further development and promotion of bicycle traffic				•	Locally strong Overall weak to strong	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation
Promotion of pedestrian traffic				•	weak	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation
Measures for standing traffic (restriction of parking spaces, etc.)				•	Locally strong Generally weak	Reduction of noise and air contamination, greater traffic safety, etc.	Project-specific impacts due to construction and operation

[1] Side effects refer to secondary effects that may be triggered by measures
[2] As an alternative to air transport
[3] If the existing standard is very low

Source: Umweltbundesamt Deutschland (2003): CO_2-Minderung im Verkehr. Berlin.
Steininger et al. (2007): Klimaschutz, Infrastruktur und Verkehr.
In: AK-Österreich: Informationen zur Umweltpolitik Nr. 175.
self design

4.5 NO FURTHER INCREASE OF CAPACITIES OF ROADWAYS

Although not increasing roadway capacities will not reduce greenhouse gas emissions, it is important to slow or even stop further automobile growth. The roadway network in the Alpine area has been sufficiently enlarged. Numerous studies prove that additional capacities would not increase added economic value at the regional level.

4.6 MOBILITY MANAGEMENT AND BUILDING AWARENESS

The classic instrument of transport policy and transport planning are oriented on the available infrastructure and capacity (frequency, intervals, comfort, etc.) In the past few years, it has become widely recognized that this perspective is not sufficient, but that one should rather primarily address transport demand, mobility needs if a shift in transport behaviour towards transport with low greenhouse gas emissions is to be achieved.

Table 6:
Demand-side measures.

Avoidance measures	Decision and implementation level				Potential effects
	EU	National	Regional	Local	
Driver training (driving schools, truck fleets)		•	•	•	strong
Marketing for low-fuel driving		•	•	•	strong
Consumption indicators in vehicles	•				strong
Reduction of mileage by optimization of routes (trucks)		•			strong
Multi-mode transport information systems		•	•	•	weak to strong [1)]
Target group specific mobility management			•	•	weak to strong [1)]
Target group specific marketing for environmentally-friendly modes of transport		•	•	•	weak to strong [1)]

[1)] Depending on permanent implementation throughout an entire region

Source: Umweltbundesamt Deutschland (2003): CO_2-Minderung im Verkehr. Berlin.
Steininger et al. (2007): Klimaschutz, Infrastruktur und Verkehr.
In: AK-Österreich: Informationen zur Umweltpolitik Nr. 175.
self design

4.7

Figure 12:
Urban sprawl leads to more individual car traffic and more greenhouse gas emissions.

MEASURES OUTSIDE OF THE TRANSPORT SECTOR

Traffic-reducing measures that result in lower greenhouse gas emissions must also be implemented outside of the transport sector.
These include:

- Settlement structures that support traffic avoidance
- Production structures that support traffic avoidance
- Strengthening regional economies

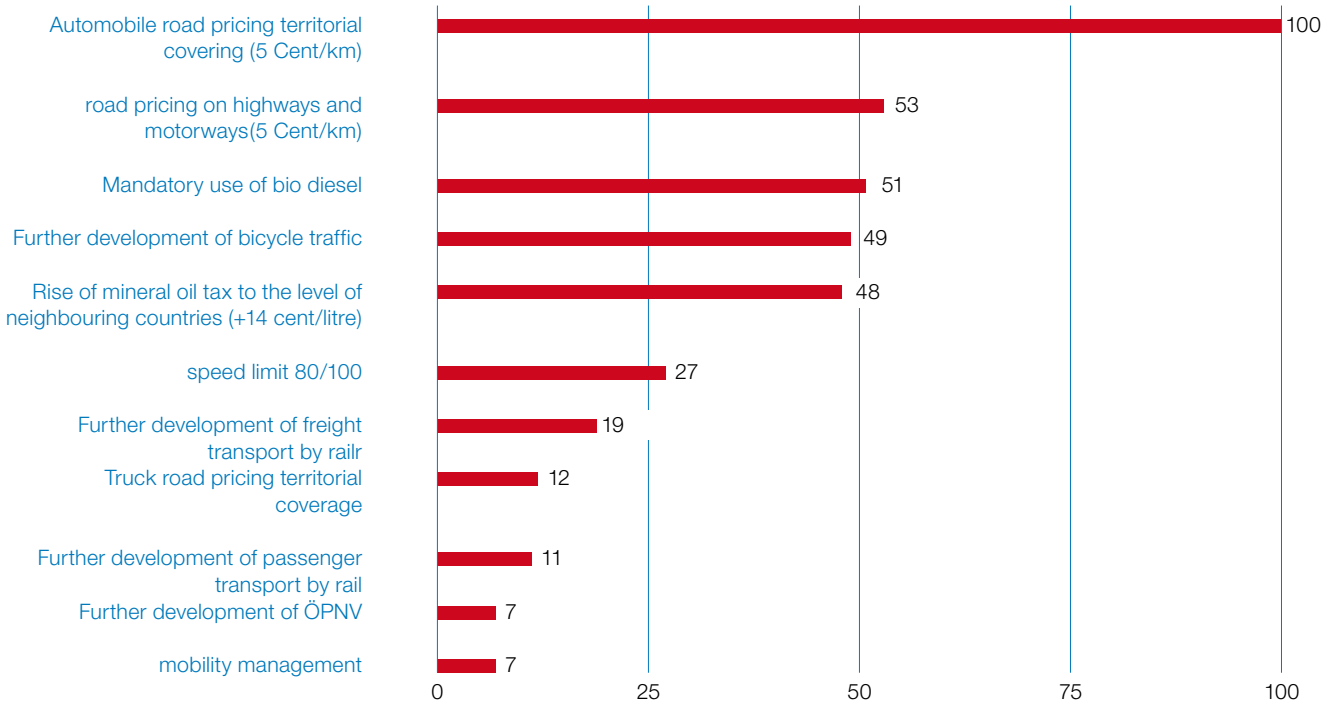
The implementation of these measures requires economic and spatial planning instruments (see also CIPRA compact Spatial Planning).

4.8

COMPARISON OF EFFECTS OF SELECTED MEASURES

The greatest potential for reduction are found in monetary measures, in relation to automobile technology measures, in freight transport measures, and in measures to influence behaviour in passenger traffic. The competence for decisions and implementation for these measures lies in most cases at the European and national level. At the regional level there are numerous influencing options on the choice of transport means in regional and local transport. These measures not only serve to reduce greenhouse gas emissions but also improve air quality, reduce noise disturbance, increase traffic safety and make the quality of public space better. The Alpine regions can act within their own scope of influence as regards these measures.

Figure 13:
Comparison of transport measures on the reduction of greenhouse gas emissions in Austria (the most effective measure has a value of 100).



Source: Steininger et. al. (2007): Klimaschutz, Infrastruktur und Verkehr.
In: AK-Österreich: Information zur Umweltpolitik Nr. 175.

5

CONCLUSIONS

The transport sector is the main reason why the goals for reducing greenhouse gas emissions were not achieved. All forecasts indicate that without comprehensive measures, greenhouse gas emissions caused by traffic will continue to grow. Since mobility not only has a great influence on individual life patterns, but also on economy, spatial structure and many other subsystems of society a change in mobility behaviour, whether voluntary or involuntary, means a drastic cut. For this reason the measures to reduce greenhouse gas emissions have failed to succeed up to now. The range of measures includes monetary instruments, making automobile transport more expensive, technical innovations to vehicle systems, the further development of alternative transport systems and raising awareness to achieve voluntary changes in behaviour.

From the perspective of the Alpine region, those measures are welcomed that are particularly effective, but do not have any negative side effects. These include primarily those measures that can be implemented within one's own sphere of influence in the regions, cities and municipalities.

These are measures that directly address mobility behaviour and that are embedded in overall schemes that also integrate other subsystems of society (economy, health, safety, education, etc.). These measures are cost effective and create a public awareness which is a precondition for achieving acceptance of highly effective measures among the majority of the population. Individually, the cuts in greenhouse gas emissions are not spectacular, but overall they achieve a high degree of effectiveness. A large number of good examples for this already exist in the Alpine area (see Chapter 6).

Secondly, the Alpine region should favour measures that combine a high level of climate effectiveness with positive side-effects (reduce noise and air contamination, higher traffic safety, recovery of public space, health prevention, etc.) These measures include mainly the improvements to vehicles mandated by law (e.g. restriction of CO_2 emissions) that have the effect of reducing greenhouse gas emissions, the further development of public transport and bicycle transport as well as not enlarging the high priority roadway network. The roadway network in the Alpine area has been sufficiently enlarged. Further expansion measures are not only a burden on the climate and environment, but neither would they have any regional economic added value impact – as proven by numerous studies.

In the case of the following measures, potentially negative side-effects should be taken into consideration:

- Monetary measures (taxes, tolls, charges) are highly effective. They can lead to a reduction of automobile mileage by encouraging the switch to other modes of transport, the selection of closer destinations or by keeping people from travelling certain routes. They also have an impact on

medium to long-term spatial organisation because they result in more compact settlement structures. This in turn shortens distances travelled, enables a more economic development of public transport and this way also contributes to the reduction of greenhouse gas emissions. However, a spatial policy conflict of goals arises: The accessibility of peripheral locations is worsened, with the potential consequences being a lack of new settlements as well the out-migration of businesses and inhabitants. The preservation of rural village structures, avoidance of out-migration, depopulation and abandonment of towns contradict climate policy objectives in transport. Monetary measures mostly groups with low household incomes that are forced to travel a lot by car because there are no reasonable alternatives. These are households in peripheral out-commuter regions that are sparsely settled. A number of Alpine regions would be affected by the consequences of effective monetary measures. A possible solution to this conflict of goals could be compensation socially and spatially in the form of an automobile commuter allowance for peripheral regions, in the further development of alternative public transport, in the strengthening of the regional economy but also in support for the social capital of such regions. Additional income from more expensive automobile transport should be used for the development of public transport and regional development of peripheral regions. Those monetary measures should be assessed positively that contribute to a more efficient transportation management. This includes the example of the heavy vehicle tax in Switzerland as illustrated by the impact analysis.

- The promotion of biofuel does not directly concern the Alpine region, because the cultivation areas for biomass are mainly outside of the Alpine production areas. However, an increase in food prices does not have only global consequences (hunger, loss of biodiversity), but could also affect the Alpine dairy farming and meat production due to higher animal feeding prices.

- A dynamic expansion of the share of electric automobiles could heighten the pressure to further develop hydropower plants, as the electric engine would only achieve a better CO_2 energy balance than the combustion motor if the electricity is produced from renewable sources. The Alpine area could be heavily affected by the last unexploited hydropower reserves located in areas requiring high protection.

  Transit traffic is of less relevance for greenhouse gas emissions in the Alpine region itself than “homemade” traffic (share of distance travelled by transit traffic is only around 10% to 15%). The restrictions of Alpine transit traffic (e.g. via an Alpine Transit Exchange) could serve as a strong leverage if the aim is achieved of shifting long distance traffic to rail transport and in this manner reduce greenhouse gas emissions outside of the Alpine region.

GOOD PRACTICE EXAMPLES

A CHAIN OF PEARLS FOR THE ALPS

Alpine Pearls is a network of up to 21 holiday towns that have committed themselves to the principle of soft mobility. These include among other activities:

- Mobility information services before starting the holiday trip, soft mobility arrival to destination, reservation of tickets, seats, and sleeping cars.
- Comfortable and traffic-jam free travel by bus or rail,
- Pick-up service from the railway station including luggage transport,
- Car-free zones in towns, car-free side valleys,
- Alpine Pearls flat rates for soft mobility holidays (bicycle, electro vehicle, town and regional buses, etc.)
- Comprehensive information on soft mobility offers on site
- Offers of typical regional products, food, etc.

Some Alpine Pearls (Arosa, Werfenweng) also offer climate-neutral holidays: Apart from mobility offers that help cut greenhouse gas emissions, the remaining greenhouse gas emissions are compensated by investments in high-quality climate protection projects. The resultant additional costs are borne by the tourism associations of the Pearls.

The figures of the pioneer community Werfenweng in Salzburg prove that the concept of soft mobility does not only benefit the environment, but also the economy: Since the start of the implementation of the scheme in 1997, the number of guests that arrive by rail has quadrupled to 28% and the number of overnight stays has risen by 29%. www.alpine-pearls.com (de/fr/it/sl/en)

Figure 14:
Travelling around Werfenweng with electric bicycles.

Figure 15:
Locations of the Alpine Pearls.

SUSTAINABLE MOBILITY IN THE SOLAR ERA

Figure 16:
Electric «Segways» provide an unusual mobility experience.

In the "European Territorial Cooperation Programme Alpine Space" 15 partners from five Alpine countries have demonstrated and tested in 13 pilot projects what mobility could look like in the solar power era. The applicability, costs, local and global ecological footprint, the ecological and economical effects as well as the transferability were analysed for the solutions developed. This project started in 2009 and runs until 2011. Among other things, the following pilot projects are to be tested (PiP):

- PiP Villard de Lans and Safari Park Peaugrees (France)
  In this project, a solar power supply for electric buses will be set up. In winter, the buses will bring tourists from the parking lots to the ski lifts and in summer from the parking lots to the Safari Park.

- PiP Graz-Biogas for public transport (Austria)
  The bus fleet of the municipal transport company of Graz will be switched from biodiesel to biogas, as biogas has a better performance in the greenhouse gas emissions energy balance.

- PiP Allgäu (Germany)
  In this project, an intelligent supply network for electric mobility is to be developed and tested.

- PiP City Logistics Padua (Italy)

  The city logistic in Padua will test a zero-emissions delivery vehicle that is equipped with a refrigerating unit for perishable goods.

- PiP Alternative engine system for school buses and commuter buses in Litija (Slovenia)
  Alternative CO_2 neutral engines for school buses and commuter buses will be compared in a feasibility study and consequently put into practice. Additionally, a park-and-drive scheme and an information platform for car pools will be set up to reduce automobile commuting traffic.

  www.co2neutralp.net/ (de/fr/it/sl/en)

CLIMATE SPARKS LIGHT THE FIRE

Klima:aktiv is an advisory and financial assistance programme of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management to reduce greenhouse gas emissions that was launched in 2005. Klima:aktiv mobil is one of the programme's modules that consists of several submodules:

- Business and public administration
  Financially assisted measures: Changeover of company vehicle fleets to CO_2 efficient engine systems (e.g. natural gas, biofuel), acquisition of route optimization systems, shifting of transport to rail, use of conveyance belts instead of cars, logistic optimization to cut kilometres driven,

measures to change transport behaviour of employees (e.g. bicycle stands, business travel management), fuel-saving driving courses for drivers

- Cities, municipalities and regions
  Financially assisted measures: Planning, implementation and advertising of climate-friendly transport solutions. These include improvement measures for pedestrians, bicycle riders and public transport, advertising and image campaigns to reduce traffic, establishment of mobility centres, and strengthening the supply of basic service in town centres

- Schools
  Financially assisted measures: Raising awareness among school children, youth groups, parents and teachers, improvement of travel routes to school by foot, bicycle and public transport

- Leisure time and tourism mobility
  Financially assisted measures: Implementation and marketing of climate-friendly transport offers such as car-free travel to destinations, mobility at the holiday destination, mobility during leisure time

- Developers, real estate developers and investors
  Financially assisted measures: Planning of car-free residential housing, development of mobility schemes for new residential and industrial plants, environmentally-friendly construction site management and construction site logistics

The Klima:aktiv programme finances consulting firms that provide expert support to the target groups in the development of measures to reduce greenhouse gas emissions and prepare applications for financial assistance from the national environmental promotion programme. Financial assistance is granted for investments that result in demonstrable and verifiable reductions in CO_2. Many of the projects supported are located in the Alpine regions.

Until July 2009, 592 businesses participated. Per year, around 300,000 tons of CO_2 emissions were cut thanks to the measures implemented.

For further information on the programmes and financially assisted projects: www.klimaaktiv.at (de)

Figure 17:
Whether by bike, electric car or on foot, klima:aktiv promotes a wide range of eco-friendly mobility projects.

HOW DO I GET FROM A TO B WITHOUT A CAR?

The Vorarlberger municipalities Bregenz, Hard, Kennelbach, Lauterach, Wolfurt and Schwarzach have created impulses for environmentally-friendly mobility in the region with the plan-b programme. A critical factor is the inclusion of important target groups such as kindergartens, schools, businesses and also the administrative bodies. Mobility is viewed in the context of living conditions such as health, local basic services and environmental quality. Mobility should also be enjoyable and contribute positively to the quality of life. A large number of concrete projects have been implemented to date:

- Kids on the Bus & children trains for kindergarten children
- Schoolwalker programme & safe routes for our children
- rad plan-b with focus on bicycle riding
- Bicycle storage
- Enterprise mobility management

These activities have created a dense network consisting of municipality representatives, transport firms, chambers of commerce, schools, kindergartens, Gesundheitsvorsorge GmbH and companies that are committed to sustainable mobility.

The mobilization of 2,500 “schoolwalkers”, 600 kindergarten children and around 40 companies with several thousand employees has shown that there are attractive and enjoyable alternatives to the automobile.

www.mobilplanb.at (de)

Figure 18:
Children are our future for eco-friendly mobility.

• DESTINATION - CHANGE YOUR TRANSPORT MEANS!

Parco Naturale Adamello Brenta in Trento/I has around one million visitors in the summer season. Almost two-thirds come by car. For most-frequently visited valleys Val Genova, Val di Tovel, Vallesinella and Malga Ritort bus services have been introduced as an alternative to the automobile. Access by car has been restricted to a limited number of parking spaces for a charge. Apart from the bus transport offered, attractive hiking paths and bicycle rental have been developed. The bus schedules were accorded with the train schedules in the main valley. There is a bus every half hour during the season (June to September). The public relations work aims to motivate visitors to plan their trip without a car from where they start and to use public transport. To this end, bus lines that carry bicycles have also been introduced (Bici-Bus). This measure has reduced car travel to Lago di Tovel by 75%. Car travel to Vallesinella and Malga Ritort was reduced by around 50%. By doing so, greenhouse gas emissions were also cut substantially.

www.cipra.org/competition-cc.alps/PNAB (it)

• BREATHE EASY IN LOGAR VALLEY

The uncontrolled excursion tourism to the Slovenian Nature Park Logartal has placed a heavy strain on the region. Jointly with the tourism association of Solcava, tourism businesses, the municipality of Solcava and the Slovenian Ministry for Environment and Spatial Planning, the local inhabitants founded the firm Logarska dolina GmbH.

Figure 19:
Visitors can enjoy the car free streets.

The objective was to reduce automobile traffic by taking traffic-reducing measures and thus ease the strain on the environment and achieve a new quality for tourism. This aim was achieved in three phases:

1. Phase: Introduction of a toll for motor traffic
2. Phase: Creation of parking spaces within and outside of the valley (planned)
3. Phase: Restriction of traffic and partial closing of the valley for automobile motor traffic

The strain from traffic has already been reduced substantially without lowering the number of visitors.

www.cipra.org/de/alpmedia/good-practice/87 (de/it)

Figure 20:
Free cycle repairs motivate employees to leave their cars at home.

• SOFT MOBILITY: THE WAY TO GO TO WORK

The company STMicroelectronics Grenoble/F (around 2,500 employees) launched a company mobility management plan in 1999 with the goal of reducing automobile traffic created by employees driving to their workplace and during work. To this end, public transport passes were paid 80% by the company and a far-reaching package of measures to promote bicycle riding was started: Apart from providing bicycle stands protected from the weather and showers for employees, they were also offered cost-free bicycle servicing three times a year. Financial support was granted for the acquisition of electric bicycles and a separate storage place was built. At the same time, parking spaces for cars were reduced and trees planted.

These measures helped to raise the share of persons that do not use their own car by 15% to 20% in 1999 to 55% in 2008, and annually cut 1,000 tons of CO_2 emissions.

www.cipra.org/en/cc.alps/competition/company-mobility-plan-pde/ (en/de/it/fr/sl)

• FROM SECONDARY LINE TO PRINCIPAL RAILWAY LINE

The railway line between Trento and Malé in Italy was opened in 1909. In contrast to other secondary railway lines, it was not discontinued but rather enlarged. In a first step, a prolongation to Marilleva in Val di Sole was opened in 2003. It is planned to extend the line further to Pejo. More than two million passengers use the line every year especially commuters and students. The railway line is increasingly being used for tourists that visit the Val di Non and the Val di Sole. In this context, a study is currently in progress that is investigating the option to link it to the Valsugana railway line and thus create a direct connection to Venice.

www.centenario-trentomale.eu (it)

THE ALPINE BUS HAS ROOM FOR EVERYBODY

In 2005, the pilot project Alpine Valley Bus/Bus Alpin was tested in four Swiss mountain regions with poor transport facilities or none at all. In these four regions, a total of six new bus lines were created and two existing lines at risk of being discontinued were strengthened by marketing measures. The new offer was developed and implemented jointly with the regions as part of an overall concept. These include:

- The development of the concept for the offer,
- The set up of public transport systems,
- Securing of financing for the pilot phase,
- Marketing of the offer,
- Media work

Apart from local politicians and transport companies, representatives of the tourism sector were also involved.

Overall, 23,000 persons took advantage of this option in the first two test years. 30% of travellers switched from the automobile, and 100 tons of CO_2 were cut. The public transport offerings are not only beneficial for tourists, but also for the local residents.

Today, not only have the funds been secured to be able to continue offering public transport, but also four further regions were integrated into the project.

www.busalpin.ch (de, it, fr)

TRAVEL FREE OF CHARGE IN GAP AND NOVA GORICA

The city of Gap/F at the eastern border of the Drôme Alps has about 39,000 inhabitants. The city committed itself in 2001 to sustainable urban development in an Environment Charta. Part of the policy was the development of a transport scheme with the objective of achieving improvements for pedestrians, bicycle riders and public transport to reduce automobile traffic. The city of Gap now has 9 bus lines that can be used free of charge. Additionally, an on-call taxi was introduced that can be used for a fee of one euro.

The zero-fee scheme was started in 2005 and has increased the number of people using the buses by around 20%. Based on the wishes of the passengers, the scheme is to be improved further in the future: Shorter intervals, greater punctuality and additional lines for areas not covered up to now.

Apart from zero-fee for public transport, parking fees were abolished in public space and for public parking spaces for clean vehicles (e.g. electric cars, natural gas cars). In 2003, the increase in greenhouse gas emissions from traffic had been expected to be 35%. The measures

taken will probably stabilize the CO_2 energy balance for traffic.

The city of Nova Gorica also introduced a zero-fee scheme for public transport to promote it and reduce automobile traffic. Since 2006, more than 400,000 passengers have taken advantage of this offer.

www.ville-gap.fr (fr)

• OLD-NEW RAILWAY - LINE A SMASHING HIT

In 1991, the Vinschger railway line was closed down by the Italian Railways. In 1999, the route was taken over from the province of South Tyrol and revitalized, modernized and put into operation again. The success has exceeded all expectations. Already one year after the opening (2005), the railway line had 100,000 passengers per month and 50,000 commuters had switched from the auto to trains. This example shows that also in relatively remote and less densely populated areas, attractive public transport is accepted as an alternative to the car.

www.eisenbahn.it (de)

Figure 21:
A success story: the Val Venosta railway.

7

FURTHER INFORMATION

- **A current listing of links, further examples, and compacts on other topics available on www.cipra.org/cc.alps (de/en/fr/it/sl)**

- Alpine Convention (2007): Report on the State of the Alps – Transport and Mobility in the Alps. Innsbruck.
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- VCÖ (2008): Klimaschutz im Verkehr. In: VCÖ (Hrsg.) VCÖ-Schriftenreihe Mobilität mit Zukunft 1/2008. Wien
- VCÖ (2009): Potenziale von Elektro-Mobilität. In: VCÖ (Hrsg.): Mobilität mit Zukunft 2/2009
- Verordnung (EG) Nr. 443/2009 des Europäischen Parlaments und des Rates vom 23.4.2009 zur Festsetzung von Emissionsnormen für neue Personenkraftwagen im Rahmen des Gesamtkonzeptes der Gemeinschaft zur Verringerung der CO_2-Emissionen von Personenkraftwagen und leichten Nutzfahrzeugen
- **www.klimaaktiv.at** (de)
- **www.alpine-pearls.com** (en/de/fr/it/sl)
- **www.co2neutralp.net/** (en/de/fr/it/sl)
- **www.mobilplanb.at** (de)
- **www.cipra.org/competition-cc.alps/almenland** (de)
- **www.ecoinvent.ch** (en)
- **www.cipra.org/competition-cc.alps/PNAB/** (it)
- **www.umweltbundesamt.at/umweltschutz/verkehr/kraftstoffe/biokraftstoffe/oekobilanz** (de)
- **www.fellhorn.de** (de)
- **www.busalpin.ch** (de/fr/it)
- **www.ville-gap.fr** (fr)