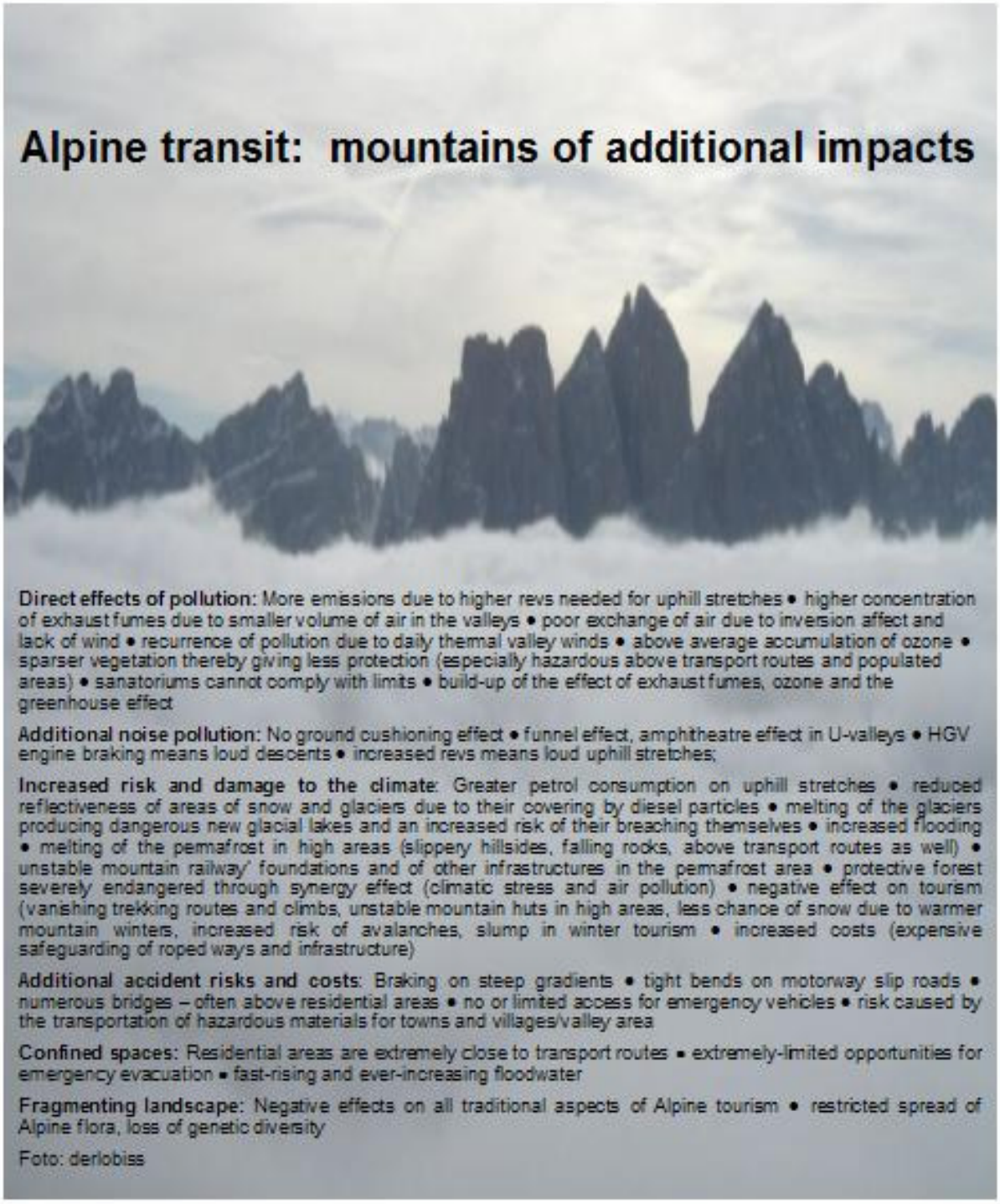
The sensitive Alpine region: challenges for the Eurovignette III

Facts – Figures – Comments

Facts and figures about the Alps

Area:	190 912 km²		
Height:	0 – 4807m		
Countries:	Germany, France, Italy, Liechtenstein, Monaco, Austria, Switzerland and Slovenia.		
Population:	13 600 000		
Population density:	73 people/km² (average Alps total) up to 2750 people/km² (those living in alpine transit valleys[1])		
Tourists	> 100 million/pa		
Number of roads:	14		
Cross-alpine traffic:	9.990.000 HGVs 193.3 million tonnes, of which 105.9 million tonnes was in transit - 2005 (double the1980 figures).[2]		
Division:	France:	77% Road	23% Rail
(Mont Cenis – Brenner)[4]	Switzerland:	35%	64%
	Austria:	77%	23%

A brief summary: What's the problem?



Why is the Alpine Region such a sensitive area?

According to the EU definition[3], sensitive regions are those that are subjected to comparatively more environmental damage: either because they carry more traffic or because the same amount of environmental impact causes more damage than in less-sensitive areas. Both are true for the Alps – why?

a) Cargos with environmental consequences

1) The long uphill stretches of road mean greater petrol consumption, causing more air pollution and CO_2 than in flatter regions. Furthermore, these pollutants accumulate and remain longer due to the special propagation conditions (S. section "air "), thereby increasing their effects. In narrow valleys with frequently changing weather conditions, relatively small traffic volumes can cause pollutant concentrations as high as those found in large cities. Studies have shown that the same volume of traffic in the Alps causes three times more NOx concentration than on the plains. During summer nights, exhaust gases have 6 times more effect than those released during the days[4].

2) There is an increase in vehicle noise when going downhill due to the trucks' brakes. Furthermore, noise can be heard over longer distances (S. "noise ").

3) There is a higher risk of accidents due to the narrow bends and steep stretches.

b) Large-scale damage

1) Small and large landslides are a daily risk in high mountains with steep, rocky slopes. In flat regions they are rare. Whilst high altitude parts of mountains are stabilised by the permafrost, (from approximately 2400m above sea level), thawing, a result of climate change, increases this risk. Furthermore, the diesel soot particles from traffic accelerate the melting of glaciers (S. "climate changes "). These problems are unique to the Alps and not found in other geographical areas in Europe.

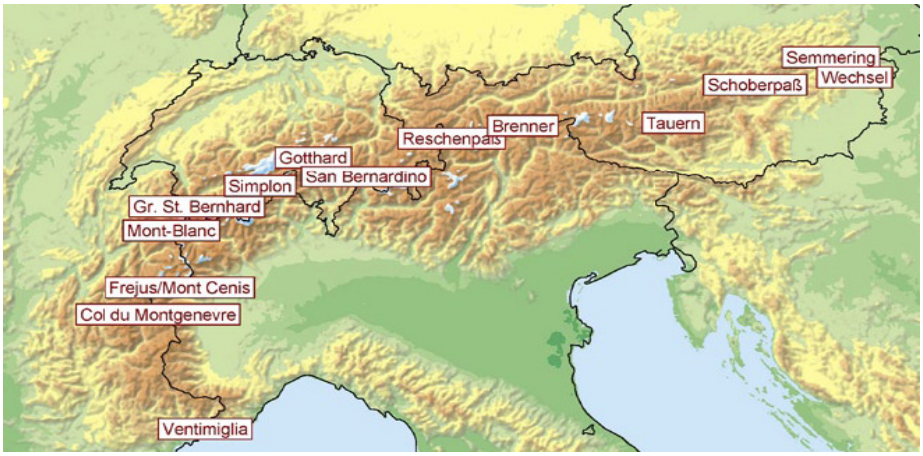
It is not possible to avoid using these areas as only a small part of the Alpine region, some 20%, is suitable for transport and habitation, and only 14% in some regions such as Tyrol. The remainder consists of protected forests, steep rock slopes, rubble, and areas with a risk of landslides.

2) For the above reason, the transportation of goods is concentrated on only 14 suitable routes. These usually follow the valleys very closely and, due to topological constraints, run very close to inhabited areas much of the time. The inhabitants are suffering from direct and high exposure to exhaust gases, with a substantial detrimental effect on human health, particularly in Austria, France, Italy and Switzerland[5]. In the case of a landslides or accidents involving heavy goods vehicles, the cramped locations make evacuation and access very difficult. This would only be exacerbated in the case of a catastrophe or large-scale natural disaster.

Limited space: Population density in several Alpine transit towns[6]

Chambéry:	2754 inhabitants/km²	Kufstein:	2370 inhabitants /km²
Como:	2250 inhabitants /km²	Salzburg:	2288 inhabitants /km²
Innsbruck:	1124 inhabitants /km²		

14 road transit routes along permanent residential areas

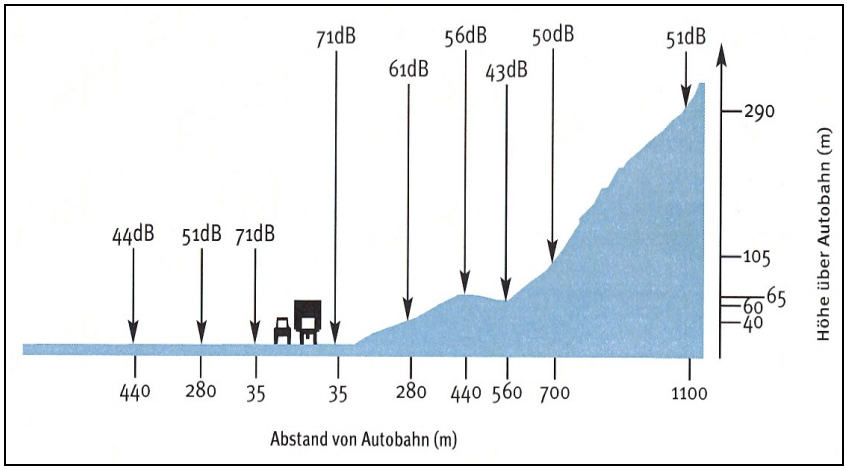


Graphic:BMVIT[7]

3) The concentration of exhaust gases has a greater effect on mountain flora and fauna than at lower altitudes. This damage is particularly dangerous because vegetation normally has a stabilising effect on steep slopes. The short periods when vegetation can grow in the mountains – resulting in very slow growth and thin coverage of the soil – mean that vegetation is much more sensitive and regenerates only slowly. It can take several hundred years for a slope to recover from a landslide.
Nature plays an essential role in the protection of roads and residential areas. This means that a dying mountain forest above Innsbruck is an extreme risk, because it no longer provides flood protection after heavy rainfall, and can no longer protect against avalanches and landslides. In contrast, a dying forest near Hamburg has no safety consequences.

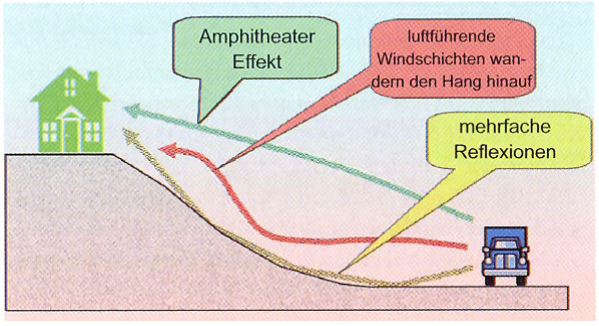
What are the special dispersion conditions in the Alps? Details:

Noise



Comparison of the increase in noise levels in mountain valleys / plains[8]

In the plains, noise decreases randomly, according to the position of objects such as local buildings, and is often absorbed within a few metres. In a u- or a v-shaped valley, noise can spread further, as it is unhindered. The level of noise experienced on a hillside 1km from the road is the same as that heard 250 metres from the same road in a flat area. The noise level at the top of a valley is exactly the same as that heard down in the valley. In some cases the valley slopes function like the sides of an amphitheatre. For those living on such a hillside, having this "amphitheatre effect", the noise levels are as high as if they were living directly next to the road. Therefore the percentage of people suffering from noise pollution is much higher in the Alps than in flat areas.

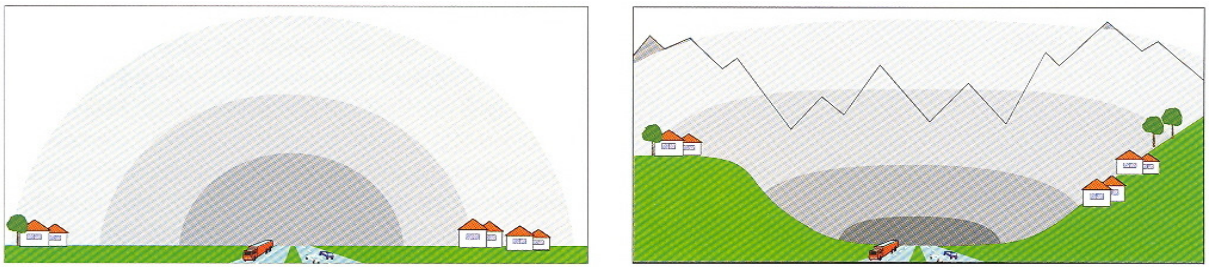


Through being reflected off cliffs, noise is heard at a greater height. The same level of emissions causes significantly increased noise pollution levels higher up.[9]

Air

Whilst there are reasons for the comparatively higher concentration of and intensive effect of exhaust gases, there is also interplay between different mechanisms: the steeper and closer the mountain valleys are, the less aeration (air flow) that is possible. Air pollutants often do not disperse for days and can repeatedly move back and forth through the valley. In large U-valleys, an inversion layer regularly forms, responsible for the increased concentration and impact of pollutants. As a result of the constraints of space, population areas are found at the bottom of valleys, which is also where very high levels of pollutants are found. Children, the elderly and those who spend considerable amounts of time outside are particularly susceptible to polluted air.[10]

Reduced volume of air



In flat countryside, air pollutants can spread unhindered. However, in a valley, the volume of air is reduced by the topography. The grey tones show the increased average concentration[11].

Inversion weather conditions

Innsbruck, inversion weather conditions, the Brenner motorway is in the bottom left hand corner.
(Photo: ALPNAP)

The pollutants enrich themselves under the inversion layer (Graphic: CIPRA, 1994[12])

Air pollutants: Status quo and trends

Despite great progress in vehicle technology, acceptable pollution levels are regularly exceeded throughout the entire Alpine region. This is why the 2005 Alpine status report demanded additional technical measures.

Nitrogen dioxide (NO_2)
NO_2 concentration has remained constant, despite the continued increase in the volume of traffic - thus technical progress made over the last decade has curbed emissions. However, it is likely that EU limits will not be met after 2010 without increased measures.

Ozone
In some parts of the Alps, EU limits (to be achieved by 2010) in place for the protection of human health and vegetation, have been exceeded. Over the last decade, there has been an increase in long-term ozone and it is unlikely that these 2010 goals will be met.

PM (particulate matter)
High PM10 levels (above the short time limits - daily average) are found in most large Alpine valleys, basins and in many cities, particularly in areas alongside roads. The main sources are traffic and wood burning stoves but so far, no trend can be determined. [13]

What are the consequences for the "Eurovignette III"?

1. In order to reduce the Alpine-specific environmental problems and to implement the costs fairly, the special current guidelines arrangements already in force must receive total support and be improved still further.

2. Accident costs (not covered by insurance) must be taken into consideration when costs are evaluated. Revenue should be used to finance more ambulance services and also measures to reduce air and noise pollution.

3. The fixed upper limit and low average values in annex III could be negative in determining the maximum permitted fees, because that would be a distortion of the actual costs in the Alpine region. It will be more beneficial if the fees are calculated according to scientific methods (see method manual).

4. The Alps have been wrongly classified as a rural area because the classification process considered only the population density of the total area. Future guidelines should be based on the definition "permanent residential area", thus correcting the distortion.

What role does climate change play?

The Alpine glaciers have been decreasing in size for over 150 years. Until 1970, this reduction was within the normal range, but since about 1980, the decrease has been 20-30%, a substantial acceleration over the last 30 years. A 2/3 loss of volume has been observed since 1850.[14]

In the Alps, climate change is already a concrete fact. As in the Polar regions, the effects of climate change are more evident in the mountainous areas. The average temperature in the Alps is already more than 2°C above average, three times more than the average European increase. 1994, 2000, 2002 and 2003 were the warmest Alpine years in the last 500. The OECD predicts that three-quarters of all Alpine glaciers will have disappeared by 2050[15]
For weeks in the summer of 2003, the freezing point was above 4000m, and has been many times again since. [16] . We are witnessing the fastest glacier decrease the world has ever seen.

The possible consequences of this are as fatal for the traffic network as for the residential areas, because transportation routes are also affected. Dangerous natural phenomena do not distinguish between residents and those passing through: they threaten all equally.

The contribution of traffic to climate change in the Alps

Traffic has a greater effect on climate change in the Alpine region than in other regions in Europe. The risks and costs already seen are substantial. Traffic is directly responsible for more than 30% of EU CO_2 emissions. Furthermore, not only do exhaust gases contain CO_2, they also weaken the ozone layer at the same time, allowing more intensive UV rays which increase the temperature.

In the Alps, two special features mean that traffic increases global warming. CO_2 emissions are higher in the mountains because significantly more fuel is needed for the long ascents. A second effect: soot and fine particles accumulate on the glaciers and darken the surfaces. The darker the area is, the more the sun heats up the ice. A white surface (Albedo) is able to completely reflect back the sunlight.[17]

An additional effect of traffic: soot and other fine particles weaken the glacial snow's reflective properties. Zugspitze/Germany photo: GÖF

What are the risks for residential areas and traffic routes?

Melting glaciers - new glacial lakes

Rising temperatures increase the potential for danger in the Alps. The rapid melting of glaciers leads to large areas of debris, including loose rock which can cause landslides endangering valleys, residential areas and traffic routes after heavy rain (landslides). There are also justified concerns regarding the formation of glacial lakes, which occur behind ice dams and contain debris and rubble. They can rise quickly, causing flash floods.

2002 The Trift glacial lake

2006 The Trift glacial lake (photos: GÖF)

Thawing areas of permafrost

Permafrost is a 20 to a 100-metre-thick layer of frozen ground found at high altitude (above 2,400 metres) in mountainous regions and normally remains frozen throughout the year. Permafrost provides ground stability as the ice "cements" together rock, debris, stones and earth. Over the last 100 years, the permafrost area has retreated by about 150-200 metres. If the ground ice thaws, mountain-slopes can move. They often glide slowly into a valley but there can be sudden landslides and boulder and mud avalanches.

Destabilised forest ecosystems

More frequent weather extremes destabilise the protective forests above residential areas and infrastructures causing new damage and also increasing that which already exists. Air pollution causes significant damage to trees and forest ecological systems, particularly those in the north and south and along transport routes. Additionally, forests now have to face the effects of climate change: e.g. weather extremes such as storms and increased insect numbers.

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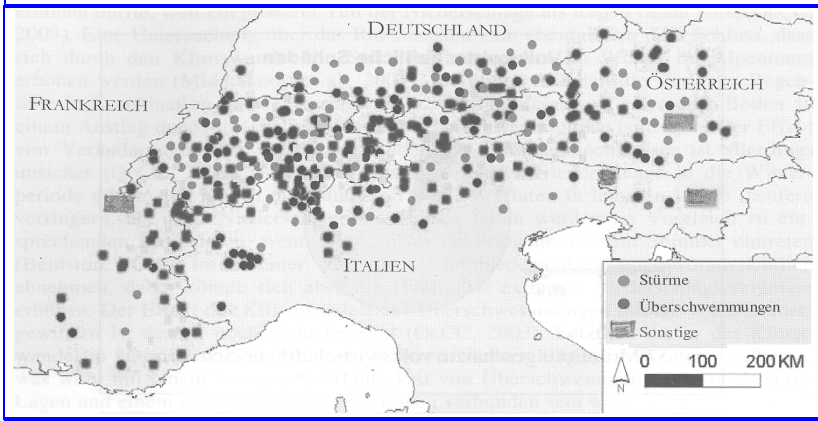
What are the consequences for the “Eurovignette III” ?

1. The European Commission exempted regional climate effects from its Eurovignette III proposal, arguing that climate change would have only a global effect. This should be corrected and the costs of climate change should be integrated into the Eurovignette III.
2. It can be argued that there are more suitable instruments for climate protection. However, the basis for both lasting and effective climate protection is a mixture of pricing means, taking into account not only fuel consumption, but also the distance driven and containing a special arrangement for those living locally. In any case, the Eurovignette III is a valuable method.
3. Fixed upper limits for costs are not meaningful because of large regional differences. Climate costs are best established using the member countries' method manual.
4. It should be allowed to use income from Eurovignette fees for climate prevention/protection measures

Effects of the last few years



Balance of Munich-Re-Insurance

Between 1982 and 2005, natural disasters and damage in the Alps caused economic loss valued at 57 billion Euros[18]

Examples

New glacial lakes • During the summer of 2002 in the Monte Rosa Massif, a glacial lake formed and threatened the village of Macugnaga for several weeks. • Since 2003 a glacial lake has developed under the Trift Glacier in the Swiss canton of Berne. It is expected that it will overflow soon and the subsequent flood could reach the nearby village. • In the summer of 2006, a glacial lake overflowed in Muren in the Vadret l'Alp Ota, causing the death of a tourist. • It has been known for sometime that the water from the melting of the pit glaciers threatens the Swiss village of Saas Baalen. •

Permafrost •Various mountain huts have had to be abandoned because of unstable foundations, structural problems and the danger of falling rocks. • Communication routes and walking paths in high areas have disappeared. The tourist season has become much shorter in some areas[19].

A 'catching' dam above Pontresina/Engadin; its construction became necessary when the permafrost area above the city began to melt. Cost: 5 million euros. (photo:GÖF)

Werthenstein/Switzerland 2003 (photo: amtluzern)

eroded highway leading to the Brenner

Strong Signals by the Alpine Convention – What does this have to do with EU transport policy?

The EU has said that it wants to improve protection for the Alps. The most important signal is its Alpine convention: an agreement for the protection of and a lasting environmentally-fair development in the Alpine region. It consists of the framework convention and 8 specialised protocols, including traffic protocols.

The Alpine convention is a binding international agreement in accordance with the Vienna Convention on the Law of Treaties, signed by the eight Alpine states and the EU. The EU will ratify the traffic protocols in the forthcoming months. Six Alpine states have already ratified them, and at regional and municipal level, a number of feasible trans-national initiatives and networks has been in place for years. For local participants and many scientists, the Alpine convention is a milestone for lasting development. Clear legal guidelines are a characteristic of the traffic protocols, but above all, they contain references to financial aid and thus mean a win-win situation for everyone.

The individual regulations of the traffic protocols in the Alpine convention are also relevant for the Eurovignette III:

Art. 1, Goals: formulates the obligation of a traffic policy, which "reduces loads and risks from internal and cross-Alpine traffic, so that it is tolerable for humans, animals, plants and also their habitats, through, among other things, the increased displacement of goods traffic, in particular onto the rail network, and especially by the creation of suitable infrastructures and incentives conforming to market trends" (….)

Art. 2, Definitions, "polluter pays principle": the costs of promoting other transport methods which avoid or use Alpine roads less, thereby decreasing environmental impact and redevelopment of the environment and its subsequent effects; requires that polluters, as far as possible, bear the "entire cost of the effect of traffic on environment and health."

Art.11 Traffic, prescribes: "The contracting parties forgo the building of new high-volume roads for Alpine traffic." There will be a significant restriction on the construction of internal Alpine roads; these may be built only if it can be proved that the objectives can be demonstrably kept (UVP) and the alternatives (improved use of existing capacities, infrastructure development) have been thoroughly examined.

Art.14 Cost transparency: the conversion of the "polluter pays principle" must be supported by the development and application of a calculation system to determine all the costs with the goal of introducing fee systems which gradually become traffic specific and cover the true costs.[20]

What are the consequences for the "Eurovignette III"?

1. With the formulation of the goals in Article 1, the Alpine convention is progressing rapidly, which is appropriate given the serious consequences of non-action. The Eurovignette III will be fair, if it aims for the greatest possible commitment: the obligatory introduction of HGV fees on all roads and an appropriate level of minimum charges.

2. Further blocking or watering-down of effective regulations, for example of the fees to be taken into account, would be not compatible with the objectives of the Alpine convention (Art.1).

3. The restriction of including only three types of external costs, as suggested by the Commission, and fixed upper limits, contradict the Alpine convention because they explicitly forbid making polluters have to bear the complete costs. Some Parliamentary amendments suggest computing

the external costs according to the methods of the manual - thus without artificial upper limits. In addition, there are proposals, which include all the relevant cost categories. These proposals correspond fully with the Alpine convention (Art. 2 and 14)

4. Caution is required for the use of revenues! Funds marked for road construction directly contradict the convention and cannot even be voted upon (see art. 11). The same is true for the appropriation of the general infrastructure fees and external cost fees (as far the area of application of the Alpine convention is concerned).

A microphone demonstrating the "Amphitheatre effect "on the eastern side of the Wipptals (at Steinach/Austria). In the background, a bridge of the Brenner motorway is recognisable. The EU project ALPNAP is one of many initiatives to help people learn more about and act appropriately in the Alpine Region[21].

Sources:

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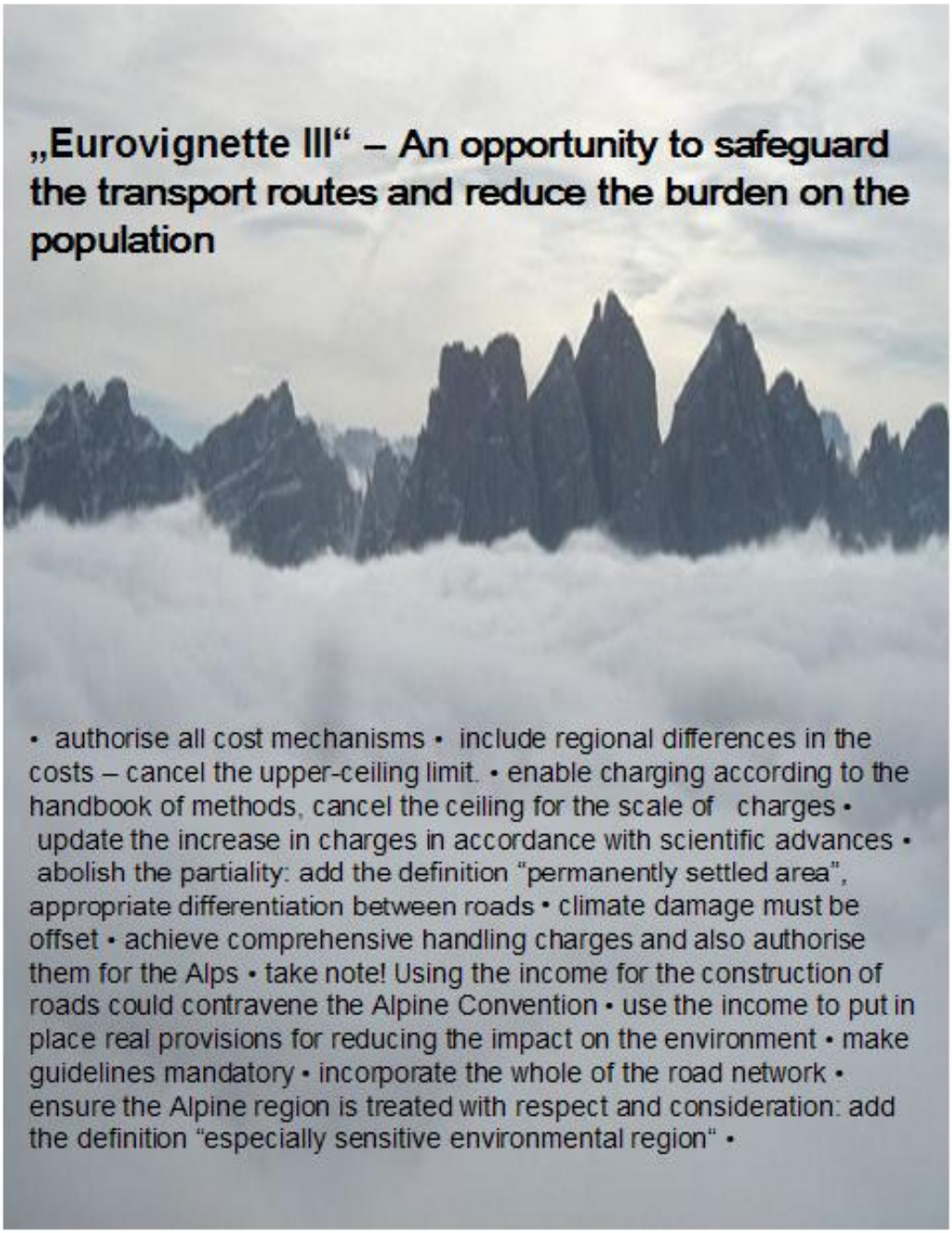
What should be done?



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