Interactions transport / land use

(Verkehr und Raumordnung)

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Summary

S1 Sustainability in transport and regional planning

Current production methods and style of living in our highly developed societies - with complex, distributed working structures - are far from being sustainable.

The entire deployment of resources (economic, ecological, social) is linked with the provision and the return (to nature by so-called ‘disposal’) of goods and services. Provision and return can be allocated entirely to production and transport processes. This leads to the first conflict of objectives. If one sets an upper limit for the deployment of resources then the question arises as to what is the proportion conceived to production and what is conceived to transport. As more resources are deployed for transport, so fewer resources remain for production. More of the one means less of the other.

We know that we will have to lower energy deployment by a factor of between four and ten. 30% of energy production, and as much as 60% of fossil energy, are consumed by transport. In other areas the relationship is hardly different - transport uses approximately 30% of developed space. A sustainable society without a sustainable transport system is hardly feasible.

Transport is a question of distribution of people, goods, services and activities, or in a word - regional planning. A sustainable transport system can hardly be implemented without sustainable regional planning. Regional planning, in turn, is partly the result of transport provision. This means that without considering the interaction between transport systems and regional planning, we cannot find ways to a more sustainable transport system.

A sustainable transport system is characterised by a number of different qualities. The question as to whether a transport system becomes more sustainable may be evaluated, in a simplified way, by means of three indicators:

- Fewer motorised trips
- Shorter distances of motorised trips
- Reduced deployment of resources for motorised trips – generally true for public transport

All regional planning favouring one of these processes will be more sustainable and will represent a step towards a more sustainable transport system.

But what is sustainable regional planning?
S2 Criteria for sustainable regional planning

Sustainable regional planning can also be described by means of a number of indicators. In this case, mainly issues from the perspective of a sustainable transport system are considered. Sustainable regional planning from the transport perspective is concerned with quantitative and qualitative aspects. The relevant literature frequently mentions three criteria:

- The ‘Density’ of activities in a given space. Thesis: the more densely that activities occur, the shorter and more bundled are the trips.
- The ‘Mix’ of activities in a given region. Thesis: if settlements are better mixed with regard to function (inhabitants, work places), economy (industry branches) and social groups, so the trips will be shorter.
- The regional layout of dense mixed units (‘Poly-centrality’). Thesis: poly-central distribution of sustainable core settlements leads to less traffic.

This will be illustrated below.

Sustainability criterion ‘Density’

‘Density’ actually reduces traffic across both larger and smaller regions:

- The inhabitants of urban areas consume fewer transport services than those in rural areas (Table 1). This perspective affects the more sustainable regional planning of urban settlements. This raises the question of the rule of peripheral areas within the spatial organisation of the country.

<table>
<thead>
<tr>
<th>Deviation of Transport Consumption per person in %</th>
<th>Car</th>
<th>Public Transport</th>
<th>non-motorised</th>
</tr>
</thead>
<tbody>
<tr>
<td>City vs. Country</td>
<td>–32%</td>
<td>72%</td>
<td>9%</td>
</tr>
<tr>
<td>Town vs. Country</td>
<td>–9%</td>
<td>34%</td>
<td>8%</td>
</tr>
<tr>
<td>City vs. Town</td>
<td>–25%</td>
<td>14%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table S-1: Differences in mobility behaviour (per person by regional category)¹

- But urban regions still generate too much motorised traffic. Inhabitants of inner cities consume fewer transport services than those in areas peripheral to conurbations. This firstly raises the question of the situation in the ‘peripheral’ areas of conurbations: conurbation peripheries are as equally thinly inhabited as many ‘rural’ areas. However, several studies also demonstrate that from the perspective of mobility behaviour ‘dense’ does not always mean the same: differently structured urban areas show largely different mobility behaviour (solely residential sectors, old urbanised quarters, newly urbanised quarters, etc.). This indicates that qualita-

¹ Despite the fact that lifestyles and ways of life are almost identical in town and country, the question remains whether, and to what extent, differences in the socio-economic structure of the three aggregates could be the reason for differences in mobility behaviour.
tive elements such as town planning are of major importance for a more sustainable transport system too.

Apparently we are facing a ‘two-fold periphery problem’: rural as well as urban peripheries create excessive traffic, in particular with individual motorised vehicles.

The question whether there is an ‘ideal density’ has to remain open, although there are upper and lower limits.

The upper limit of density is determined by the absorption capacity of the ecological system (air and noise pollution, consumption of land, etc.). Today the largest Swiss conurbations are already close to this upper limit. Most recent developments such as the decrease of specific emissions from motor vehicles, efforts to reduce noise pollution, and to make traffic safer (‘vision zero’), are capable of raising this upper limit significantly. In the near future there may be an opportunity to rehabilitate conurbations to a large extent. This could remove the obstacles to increased population density over large areas.

However, there is also a minimum density, albeit depending on circumstances. This is the density required for the economically and ecologically viable deployment of public transport means (e.g. 15-minute frequency to the nearest centre). This would require a minimum utilisation of soil of 0.3 to 0.5.

Sustainability criterion ‘Mix’

Increased density is useless if functions (living, work) are separated from each other. This requires a certain utilisation mix within a given area. This also applies both to large and small areas.

Mixed settlement types do not necessarily need to provide a particular degree of self-sufficiency, but rather the ‘subsidiarity’ of factor markets and commodity markets enabling short cycles of people and goods. Longer cycles of people and goods should only become necessary in lack of a local supply.

The principle of utilisation mix raises the question of the size of densely populated regions. They have to be large enough to create innovative environments and allow competition in local factor markets and commodity markets. The larger such units are, the better these conditions are met.

This criterion also favours larger regional units as a more sustainable form of regional planning. Today’s figures show that conurbation sizes of 100,000 to 500,000 inhabitants generate the least traffic volumes per person.

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2 In urban areas the quality of services, in particular for commuters, shoppers and business travellers are below average, while leisure transport performances are above average. This indicates a structural problem in conurbations (escapism).

3 For public transport a frequency of 15-minute intervals is required to achieve an availability level roughly comparable with the availability of private transport.
Sustainability criterion ‘Poly-centrality’

Sustainable regions tend to be large, densely populated and mixed. If one assumes an optimum size in the range mentioned above, then an urban system comprising centres of this size would be ideal over larger areas. However, research indicates that a poly-central structure within conurbations can be beneficial in terms of transport in comparison with a mono-central structure.

Proposals for more sustainable regional planning

Table S-2 summarises the proposals that result from these criteria for more sustainable regional planning:

<table>
<thead>
<tr>
<th>Sustainability Criterion</th>
<th>Details</th>
<th>Proposals for large areas</th>
<th>Proposals for small areas</th>
</tr>
</thead>
</table>
| ‘High Density’           | Per unit area enable more:  
• activities  
• utilisation  
• area usage | • Strengthening of urban areas  
• Finding new relationship between town and country | • Stopping conurbation spread  
• Stopping growth in conurbation periphery or allowing to thin out  
• Internal development of inner city and first conurbation belt |
| ‘Activity Mix’           | Enable activity mix with:  
• goods and people cycles as short as possible  
• spatial subsidiarity of economic interaction (‘nearer’ instead of ‘further’)  
• ‘minimum degree of self-sufficiency’ | Request for optimum mix must not deter innovation and competition, therefore relatively large urban areas | • More living and trade in inner city  
• More work places for local inhabitants with location advantages in conurbation periphery |
| ‘Poly-centrality’        | Optimum size of areas with as much ‘self-sufficiency’ as possible and with optimum spread over a larger region | Town system of larger urban areas | Poly-central instead of mono-central agglomeration |

Table S-2:  
Coarse description of criteria for sustainable regional planning from the transport perspective

A new relationship between town and country

From this perspective, the relationship between town and country can be seen in a new light. At least implicitly, it has been demanded that rural inhabitants should be given the opportunity to have an urban style of life, or at least fast access to it - medium-sized and large centres should be accessible within certain time limits.
From the perspective of sustainability, the rural areas are given a somewhat different but not inferior position within the region (s. Table S-3).

<table>
<thead>
<tr>
<th>Objectives of a regional planning policy for the rural areas</th>
<th>Current interpretation</th>
<th>Interpretation from the perspective of sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime objective for all subsequent partial aims</td>
<td>Same living conditions in urban and rural areas. Countryside as an extension to urban living conditions.</td>
<td>Equal living conditions in rural and urban areas. Countryside as independent living area with special qualities.</td>
</tr>
<tr>
<td>Welfare</td>
<td>Levelling of monetary discrepancies (income). Availability of consumer goods and services as in city, if not locally, then through fast access to city.</td>
<td>Levelling of welfare discrepancies. Not same availability of consumer goods any longer, but same level of welfare opportunities, also with regard to the quality of life in the countryside.</td>
</tr>
<tr>
<td>Development: work places</td>
<td>Creation of as many work places as possible</td>
<td>No more active settlement policy. Only creation of work places with location advantages (tourism, etc., and possibly jobs based on ICT4)</td>
</tr>
<tr>
<td>Development: inhabitants</td>
<td>Settlement of as many inhabitants as possible</td>
<td>No more active settlement policy. Location for inhabitants preferring a rural lifestyle.</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Links as fast as possible to medium-sized and large centres, accessibility targets</td>
<td>Renunciation of links to centres as fast as possible.</td>
</tr>
<tr>
<td>‘Service public’ for public transport</td>
<td>To be ensured</td>
<td>To be ensured</td>
</tr>
<tr>
<td>‘Service public’ for services, schools, etc.</td>
<td>To be secured by increasing the number of inhabitants and work places</td>
<td>To be explicitly secured and warranted, possibly also by transfer payments</td>
</tr>
<tr>
<td>Protection of landscape and countryside</td>
<td>Reducing the conflict between road construction and settlement expansion on the one hand and protection of the countryside on the other hand by means of planning</td>
<td>Rigorous preservation or recreation of quality, as areas close to nature for peace and recreation. Ensuring and increasing quality of life as a welfare element for inhabitants.</td>
</tr>
</tbody>
</table>

Table S-3: Rural areas in today’s and future regional planning focusing on sustainability

Redefining the role of rural areas is not intended to cause people to leave, but to cause an exchange of inhabitants in search of an urban or, respectively, a rural lifestyle.

Rehabilitation and strengthening of conurbations

The equivalent to the countryside as a ‘new living environment’ is the ‘rehabilitated conurbation’. Their environmental and transport-related rehabilitation is a condition for the intended internal development of conurbations. Over the next 10 to 20 years there will be real chances to recre-

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4 ICT: Information and Communication Technology
ate the inner cities as attractive living environments. This will require solutions as fundamental as for rural areas:

- No further expansion of conurbations, no development of rural settlements in conurbations
- In connection with that: renunciation of faster links between adjacent rural communities to the inner city
- Instead, significant development of public transport links within existing conurbations, and in particular the building of tangential transport
- Rigorous protection of gaps not built over in conurbation peripheries
- Internal development: further increased density of the inner city and creation of, or further increased, density of sub-centres in first conurbation belt with well-developed public transport
- Consequent decrease of noise and air pollution, and improvements to road safety

S3 Trends and impact chains between transport and regional planning

With regard to regional planning, some long-term trends with importance for a more sustainable transport system have developed:

- The ‘thinning-out’ of inhabitants and work places at a rate of approximately 1 to 1.5% per year in relation to the gross living area of residential buildings. This also results in thinning in relation to the settlement area. This results in an expansion of the settlement area per person or work place, and in general causes a consequent countrywide decrease of density.
- Apparently there is a general trend for inhabitants and work places to concentrate in urban areas (the population in urban areas increases). However, this takes place only because more and more rural communities are integrated into conurbations with consequently increasing populations, but the (over-proportional) settlement areas of new conurbation communities are also included into these conurbations. The conurbation process therefore causes the average density in conurbations to decrease.
- Conurbations grow at their borders.
- A functional (inhabitants vs. work places), economic (branches) and social fragmentation (family status, income)
- The creation of metropolitan areas
- Behind these trends are the settlement decisions of households and industries, which are, in part, strongly influenced by the transport system.

Together, these trends result in a less sustainable transport system.

S4 Status and summary of current regional planning and transport policies

Regional planning and transport policies are very close linked. Both use space to a large degree, and both influence the type, the volume, and the location of usage.

An analysis of constitutional principles already allows for conclusions about the importance and the opportunities of a co-ordinated regional planning and transport policy. As regional planning, in accordance with the Constitution of Switzerland, is the responsibility of the cantons, the Fed-
eral Government has very limited instruments for regional planning and for controlling transport. Therefore, transport-related regional planning takes place mainly on a small intra-regional level.

Transport, on the other hand, plays a much more important role at the federal level. Here the conditions are favourable for a region-orientated transport policy, in particular with regard to the larger picture.

These different scenarios call for a co-ordinating effort, or common objectives, for the Federal Government and the cantons.

A first initiative for a common countrywide concept was undertaken within the framework of the ‘General Transport Concept for Switzerland (Gesamtverkehrskonzeption Schweiz – GVK-CH) based on the modified regional planning guideline CK73.

The failure of the first Regional Planning Act resulted in the lack of direct obligations for regional planning at a federal level, or these obligations were transferred to the cantonal planning authorities: the Federal Government limited itself to the preparation of concepts and factual plans. During the first generation of planning guidelines the linking of regional planning and transport policies was only moderately successful.

Co-ordination was shifted closer to large projects such as NHT or Rail 2000 and therefore to the regional planning level.

Within the framework of the second generation of guidelines, currently being prepared by the cantons, these two policy areas are to be linked more closely. Today the Federal Government, as well as the cantons, is better prepared for this as appropriate foundations have been worked on over the years.

A critical evaluation indicated that neither the regional planning policy, nor the transport policy, have exhausted their common opportunities. The transport policy could only be employed with limited use for regional planning objectives. The transport system is understood as a ‘necessary infrastructure’. One exception is its deployment as a balancing policy between areas.

However, the transport policy also does not fully exploit the instruments of regional planning in order to strengthen its objectives.

A review of the relevant EU documents reveals that this is not a situation applicable to Switzerland alone. Here, the promotion of infrastructure development for strengthening the cohesion between member states also receives high priority.

The ‘Principles of Regional Planning for Switzerland’ meet, in all major points, the requirements of sustainable regional planning – with the exception of just one point it would seem: the issue of ‘strengthening the countryside’ requires a very differentiated perspective.

However, practical implementation of these ‘Principles of Regional Planning’ is still in its infancy. A lot depends on the practical implementation. Meanwhile, there is much talk about ‘strengthening the rural areas’ and of ‘improved networking with urban areas’. With attempts to be more precise, such phrases now seem to be questionable, as they have been understood up to now as descriptions of a rather haphazard settlement and job creation policy.
S5 The results of NFP41 in the light of sustainable regional planning

The research reports of NFP41 should be seen in this light. An analysis of the results and the suggestions from all studies with regard to their regional planning implications provides the following picture (s. Table S-4):

<table>
<thead>
<tr>
<th>Impact group</th>
<th>Issues (key words)</th>
<th>Effects</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framework conditions</td>
<td>Pricing system, internalisation of external costs, new finance regulations, deregulation</td>
<td>Positive, clear effects</td>
<td>Implementation in part very important for regional effects: road pricing (can have counter-productive effects), financing modus</td>
</tr>
<tr>
<td>Goods transport</td>
<td>Promotion of combined transport</td>
<td>Marginal, locally very selective effects, mainly on employment</td>
<td></td>
</tr>
<tr>
<td>Influencing preferences</td>
<td>Car-free lifestyle, new tourism behaviour</td>
<td>Special aspects, isolated effects only</td>
<td>Effects may possibly be very much delayed</td>
</tr>
<tr>
<td>Optimised overall solutions for transport requirements</td>
<td>Mobility management, Mobility chains</td>
<td>Positive, effects mainly in conurbations</td>
<td>No solution to fragmentation problem, possible growth of conurbations (public transport dilemma, see below)</td>
</tr>
<tr>
<td>Telematics</td>
<td>Telematics in industries and in transport</td>
<td>Positive and negative effects possible, overall assessment more negative</td>
<td>Positive effects through adequate selection of measures</td>
</tr>
<tr>
<td>Promotion of non-motorised travel</td>
<td>Pedestrian and bike travel, design of urban areas</td>
<td>Positive, but limited effects</td>
<td>Especially efficient in connection with mobility chains</td>
</tr>
<tr>
<td>Promotion of public transport</td>
<td>Improvements to rail transport (technologies, services for border-crossing transport), Swissmetro</td>
<td>Positive</td>
<td>Public transport dilemma (public transport in conurbation periphery also increases), some uncertainties with Swissmetro/Eurometro</td>
</tr>
<tr>
<td>Basic research</td>
<td>Several projects</td>
<td>Effects only detectable after implementation</td>
<td></td>
</tr>
</tbody>
</table>

Table S-4: Summarising evaluation of the results of research work from the perspective of sustainable regional planning

It can also be claimed in general that, with very few exceptions, the concepts for a more sustainable transport system also contribute to more sustainable regional planning.

There are few different evaluations from the perspective of the ‘Principles of Regional Planning Policy for Switzerland’ and the sustainability criteria discussed here.
S6 Conclusions

If one examined the challenges provided by a more sustainable transport system for the Regional Planning Policy, and by more sustainable regional planning for the Transport Policy, then the following can be stated from the perspective of this study and the results of NFP41:

a) Challenges for the Regional Planning Policy:

- The Regional Planning Policy must improve co-ordination to guide development initiatives to suitable areas, and develop criteria based on sustainability objectives for the design and funding of transport measures relevant for large areas.
- With regard to small areas, the Regional Planning Policy must establish standards and criteria so that regional planning can base the development of utilisation of soil on a more sustainable response to the growing demand for public transport (e.g. the dependence of new zones on public transport supply standards); the future deployment of telematics in particular must be based on clear criteria.
- The co-ordinating roles of federal/cantonal authorities, and cantonal authorities and communities, needs to be strengthened.

b) Challenges for the Transport Policy:

- With regard to large areas, the design and funding of measures for transport must be determined increasingly in accordance with efforts for more sustainable regional planning (e.g. funding contributions for new public transport services to be based on a policy for more sustainable regional planning).
- With regard to small areas, criteria and standards have to be developed for how the design and funding of public transport services can be made increasingly dependent on a more sustainable settlement structure (funding contributions in relation to area usage).
- With regard to the authorities: concepts and factual plans need to be re-evaluated; projects and programmes need to be evaluated earlier with regard to their regional feasibility, and this also requires the development of a suitable instrument from the perspective of sustainable regional planning.