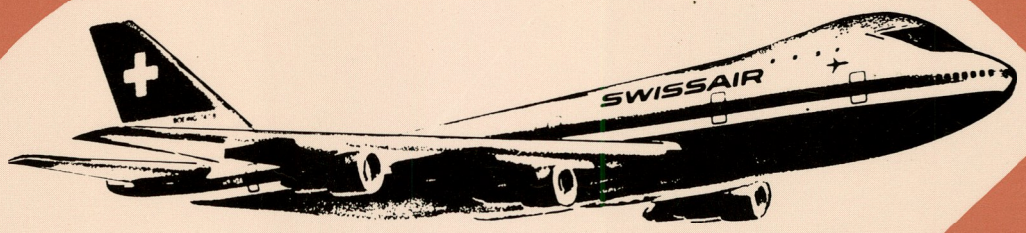
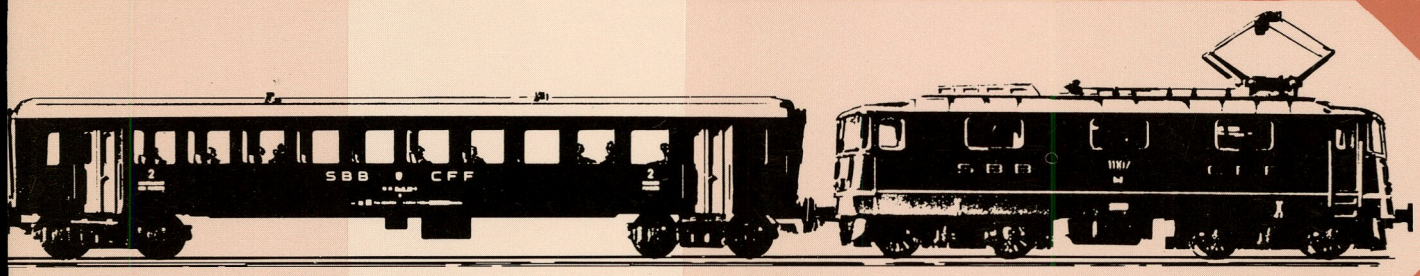
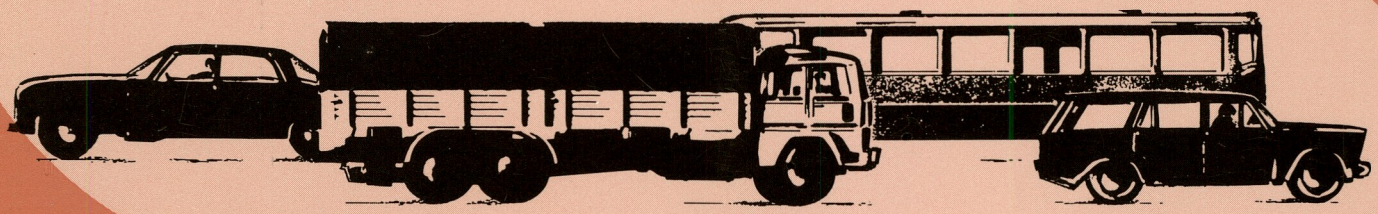
SICT

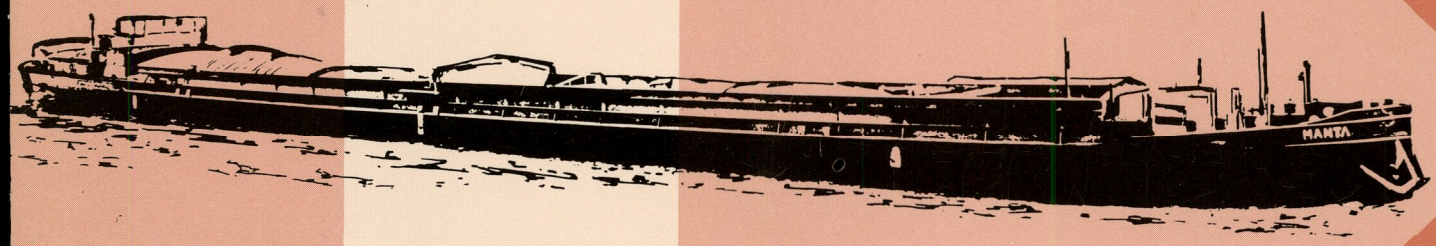
SWISS INTEGRAL CONCEPT OF TRANSPORT

SUMMARY









SICT

SWISS INTEGRAL CONCEPT OF TRANSPORT

SUMMARY OF THE FINAL REPORT

of the Federal Commission for a
Swiss Integral Concept of Transport

Berne, December 1977 / April 1979

Publisher: Federal Department of Transport, Communications and Energy

Prepared by the staff of the Federal Commission for a Swiss Integral Concept of Transport

Secretariat: Effingerstrasse 14, CH-3003 Berne

Available from the Federal Stationery Office, Berne
(Eidg. Drucksachen- und Materialzentrale/Office central fédéral des imprimés et du matériel, CH-3000 Berne)

C O N T E N T S

1. INTRODUCTION

At the end of the 1960's it became increasingly clear in Switzerland, as elsewhere, that the State's existing legal, financial and organizational means could no longer cope with the strongly growing transport needs and the new major projects for rail, road, shipping and air transport. The State's available resources were also incapable of dealing with the massive expenditure, demands on regional planning and environment protection and the social consequences of transport arising from these projects under discussion. Possibilities for state intervention in the individual transport systems, which have been elaborated in varying ways during the last 130 years according to prevailing circumstances, are not sufficient. The conflicts in objectives which arose made it imperative to work out a global method of overcoming the problem.

For this reason the Swiss government (Federal Council) set up a Commission of Experts to establish a national integral concept of transport in January 1972, and charged it with the task of providing political authorities with a series of alternative proposals on how the private and public transport sectors can be adapted to social and economic development. In this the following goals should be strived for:

- Promotion of the general welfare of the nation
- Satisfaction of transport needs
- A guarantee of the greatest possible mobility and free choice in means of transport
- Orderly competition without malinvestment
- Consideration for regional planning and protection of the environment
- Coordination of overall expenditure
- Settlement of contradictory demands
- The possibility of implementation in stages.

The 62 representatives from science, the economy, transport carriers, transport users, politics and the administration were under the chairmanship of National Councillor, Dr. Alois Hürlimann. This "transport parliament" had the support of an interdisciplinary staff of specialists under Professor Carl Hidber for carrying out basic preparations. Numerous special studies were commissioned from private research bureaux and university institutes 1). A seven member stee-

ring committee from the Commission supervised the goal-oriented organization and the execution of the necessarily extensive studies, and then passed on the interim results to the whole Commission for discussion. Special sub-committees were formed for dealing with particularly important problems of transport policy.

The SICT Commission unanimously agreed to the recommendations in December 1977 thereby obtaining a political consensus embracing all major interested parties in transport. The full final report was handed over to the Federal Government in April 1978. This report of approx. 400 pages including 42 appendices is available in German and French 2). As well as providing an overall view of the compartmentalized transport policy pursued until now, the report also contains a systematic description of all stages in the Commission's work.

This summary contains a brief outline of how the Commission went about its task and the third part of the final report (chapters 10 and 11) in full. The third part contains the main results and conclusions as well as the transport policy recommendations of the Commission to the government in the form of 40 theses. (See the following chapters 3 and 4).

Note concerning the english translation

A particular term used throughout this summary has to be commented on. In Swiss political terminology, the expression "Bund", "Confédération", "Confederazione" designate the legislative, executive and judiciary powers of central government over the whole of the country. "Cantons" on the other hand are the member states with a certain sovereignty and the corresponding powers over their territory. The Swiss political system should consequently be termed 'Swiss Federation', and the central powers 'federal government'. The term 'confederation' does not fully represent these functions. However, it is so widely used in this country that any other expression might lead to misunderstanding. It has, therefore, been decided to put the term 'Confederation' where federal government embracing the three powers is meant.

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1) 100 expert reports from external research contracts and 30 working documents of the SICT staff on special problems were prepared for the Commission

2) Available from the Federal Stationery Office (Eidg. Drucksachen- und Materialzentrale/ Office central fédéral des imprimés et du matériel, 3000 Berne), price SFr. 35.-

2. METHODOLOGY

The Commission was anxious to tackle the complex transport problems using modern scientific methods and in this way ensure as comprehensive an approach as possible. Instead of handling individual questions in a pragmatic manner, a procedure by systems analysis was chosen. The categorization of problems on the basis of this method is shown in the following figure 1. The individual stages of the procedure are described briefly below:

2.1 Delineating the system

The main concern within the Commission's task was the national transport system. Here, in accordance with prevailing circumstances in Switzerland, road and rail transport were in the forefront. Inland shipping, air transport and pipelines for liquid fuels were,however, included in the studies. For political and practical reasons local transport was excluded. Intra-regional transport which also includes a considerable portion of the so-called suburban and agglomeration transport was only dealt with generally and in particular in its relationship to supra-regional transport. Concrete solutions to transport problems within the regions must therefore be worked out at the cantonal level; the SICT providing substantial documentation for the purpose.

The following Figure 2 gives a comprehensive view of the limits established for the Commission's area of activity.

FIGURE 1 CATEGORIZATION OF PROBLEMS IN THE TRANSPORT SECTOR BY SYSTEMS ANALYSIS

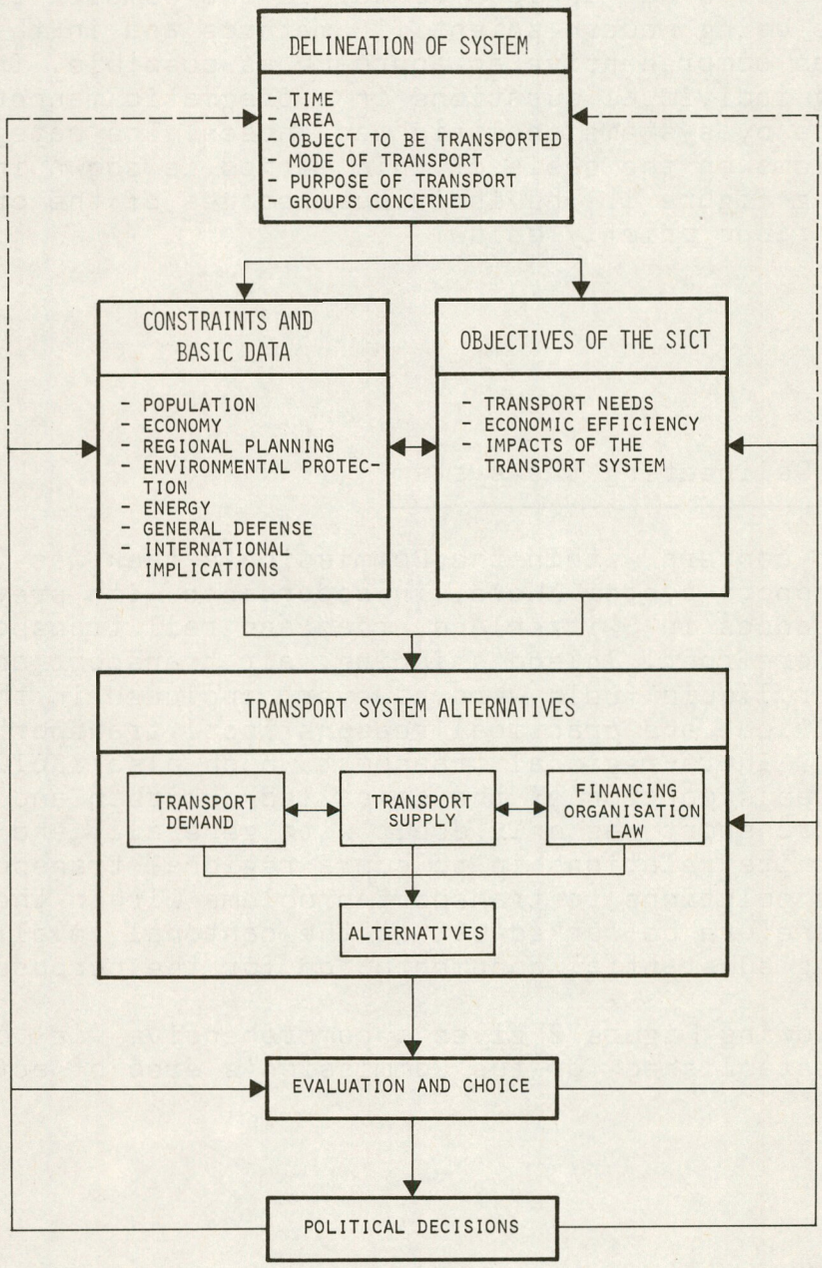


FIGURE 2 SYSTEM DELINEATION OF THE SICT

CRITERION	FULLY TREATED BY THE SICT	STUDIED ONLY BY WAY OF EXAMPLES	NOT DEALT WITH BY THE SICT
TIME	Medium term Long term		Short term
EXTENT	International, National Inter-regional	Regional	Local
OBJECT TO BE TRANSPORTED	Passenger, Goods		Information
TRANSPORT PURPOSE Passenger transport Goods transport	Commuter traffic Weekend traffic Tourism, Business, Visiting traffic For production For consumption	Short distance Recreation transport	
CARRIER OF TRANSPORT	Road, Rail, Water, Air, Pipelines		
THOSE INVOLVED IN THE TRANSPORT	Directly involved, indirectly involved (affected and benefitted)		

2.2 Constraints and basic data

Because it was a planning task within a limited political sphere, the SICT Commission had to take into account a series of constraints and basic data which cannot and should not be influenced directly by the SICT. Such exterior constraints imposed upon the transport system especially worth noting are:

- Trends in demographic development: Outstanding characteristics are the modest projected growth of the Swiss population from 6.4 million in 1974 to 6.6 million in 2000, the relative increase in the number of people in the upper age groups, the continued drop in the average size of families and the decrease from 49 to 46 % in the gainful employment ratio.

- Trends in economic development: Decisive factors of influence are the changes in employment structure as well as the marked slowing of the annual growth of the gross national product (GNP) from 4.5 % in the last 25 years to 2 %.

- Development of public expenditure: It is assumed that public transport expenditure will rise in proportion to the gross national product. Because total public expenditure, however, should rise faster than the GNP the relative share of transport expenditure within total public expenditure will go down by about one third by the year 2000.

- Regional planning objectives: Corresponding to the overriding regional planning objectives the future transport system should be conceived in such a way as to consolidate the existing decentralized settlement structure in Switzerland. This means that population distribution should not change significantly.

- Environment protection requirements and energy consumption: In accordance with all other political efforts regarding environment protection it was established that, in spite of further transport growth, total impact on the environment caused by transport should not exceed the levels of 1970. Where such excess loads already exist today, they should be reduced to within acceptable tolerance levels.

  Because of the heavy dependence on imported energy (oil), corresponding forecasts on future energy supply for transport are very difficult. For this reason the Commission laid out two different scenarios which both assume (although in varying degrees) a rise in future energy prices.

- A further series of constraints on the future shape of the transport system are based on the needs of the federalistic nature of the Swiss state and the factors arising from the strongly international orientation of the country.

2.3 System of objectives of the SICT

Deriving from the Commission's mandate from the government on one hand and the constraints and basic factors on the other, a systematic, hierarchical system of objectives and indicators was developed which embraces more than 200 aspects of the objectives. This system of objectives forms the basis for dealing with individual problems and for the consolidation and evaluation of the various global transport concepts that have to be worked out.

In building up the system of objectives, the Commission assumed from the overall aim that the transport system has to perform a service function within the context of the state, society and the economy, and on that this basis it should make "the greatest possible contribution towards improving the quality of life". This overall objective can be divided into three main groups of objectives:

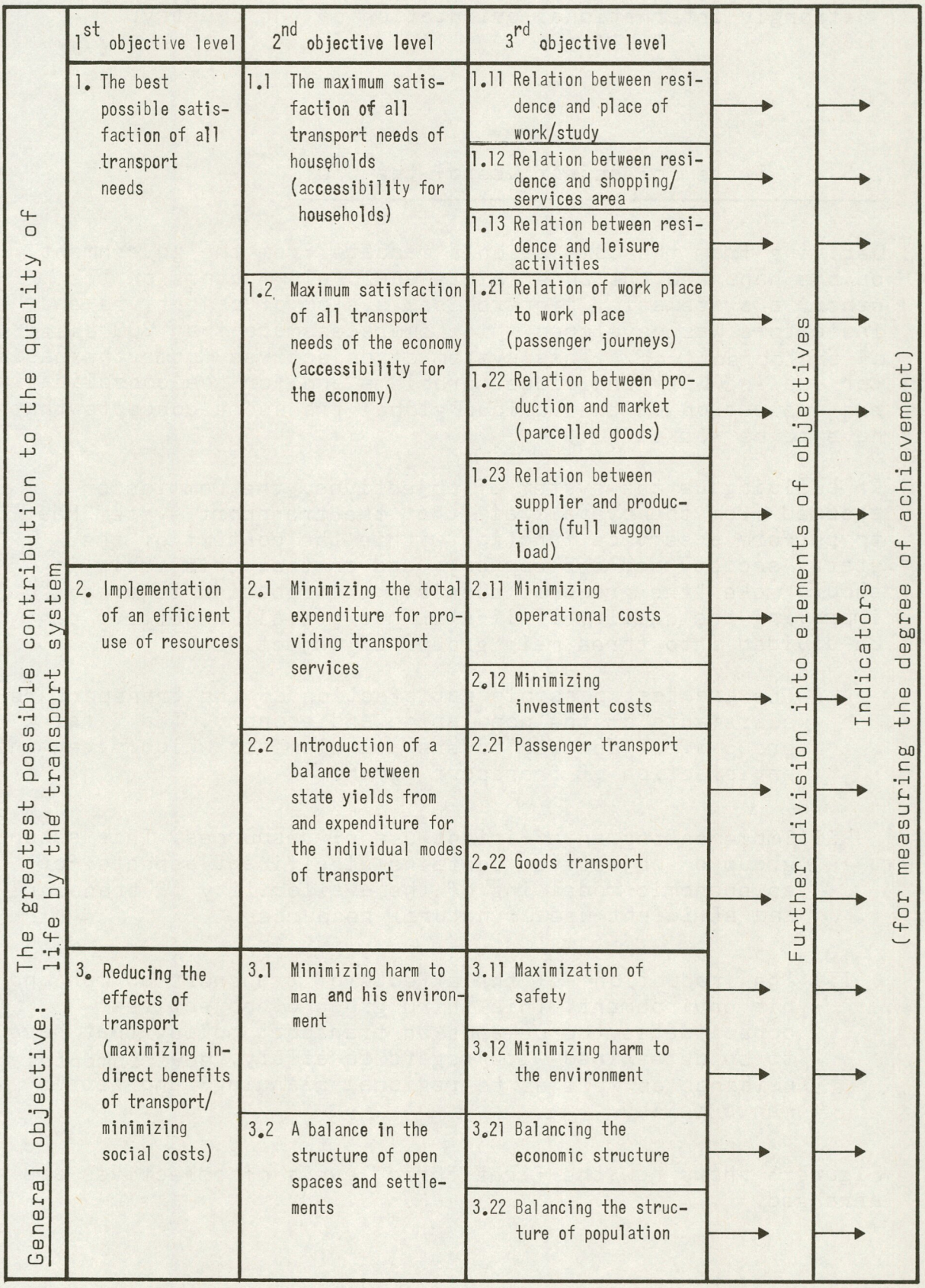
I The greatest possible satisfaction of the transport requirements of the population and economy. The first group of objectives covers all elements which determine satisfaction of transport demand.

II Implementing an efficient use of resources. This second group of objectives contains significant aspects for an economic modelling of the availability of transport and efficient use of natural resources.

III The reduction of the effects of transport on man and his environment. This third group of objectives consolidates the demands on transport policy that have to be determined with regard to safety, environmental nuisance as well as to regional planning- and settlements policy.

Figure 3 shows how the first three levels of objectives are arranged.

Figure 3 System of objectives of SICT



Establishing the priorities (or the weightings) which are to be attributed to the individual elements of objectives was an especially important task. The necessary foundations for doing this were created by repeated polls among all the Commission members and by representative polls of the population. The results of these studies show clearly that in the future re-organization of the transport system absolute priority must be given to economic efficiency and to protection of the environment.

The main results of the main objective's priorities are set out in Figure 4.

2.4 Establishing the transport alternative systems

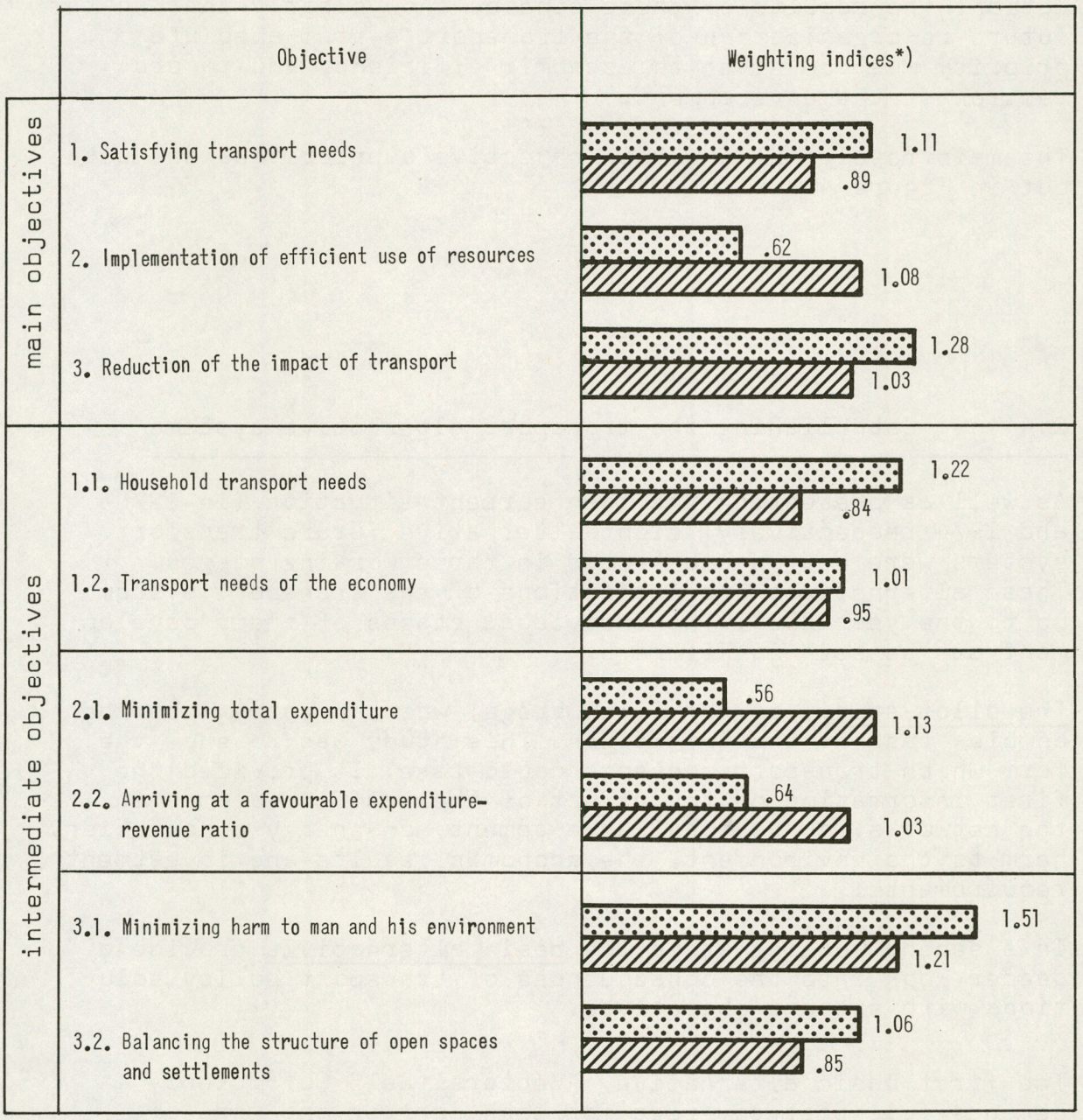
As well as presenting the then current situation (in 1970 and 1974 respectively) eight alternative future transport systems were set up and tested in three working stages. These alternatives are projections of the transport system up to the year 2000. The individual stages of their development can be seen in Figure 5.

The pilot study, as the first stage, was the entry into the complex task of the Commission. This study was to show the form which transport concepts could take. It provided the first information on the effect of the traffic volumes in the networks, on regional development, on energy consumption, harm to the environment, the economic results and investment requirements.

In a second working stage the basic alternatives provide a deeper look into the consequences of transport policy solutions with extreme objectives.

The first basic alternative, "Sectoral Self-Sufficiency", demands full cost coverage for each carrier and mode of transport. In the second basic alternative, "Global Self-Sufficiency", certain types of transport and carrier may be subsidized, but the transport system as a whole must run at a profit. The third basic alternative "Regional Promotion", is intended above all to support the objectives of regional planning. The fourth basic alternative "Protection of the Environment" attempts to achieve a reduction of all types of harm to the environment.

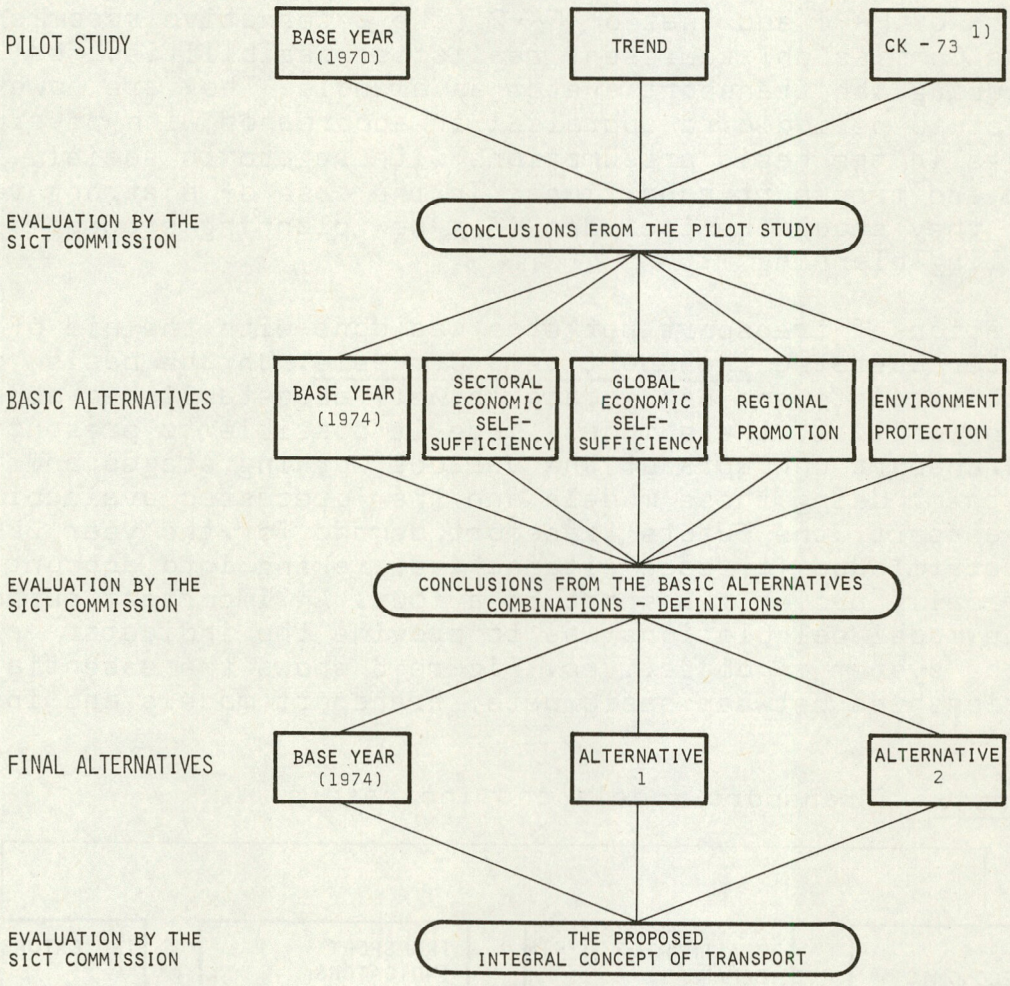
Figure 4 Comparison of priority ratings for the highest level of objectives



*) Level weighting = Standardized weight (relative weight multiplied by the number of elements per level). This representation makes it possible to arrive at a cross comparison

Opinion poll
Census among the Commission members 1977

FIGURE 5 STEPS IN ESTABLISHING THE SICT

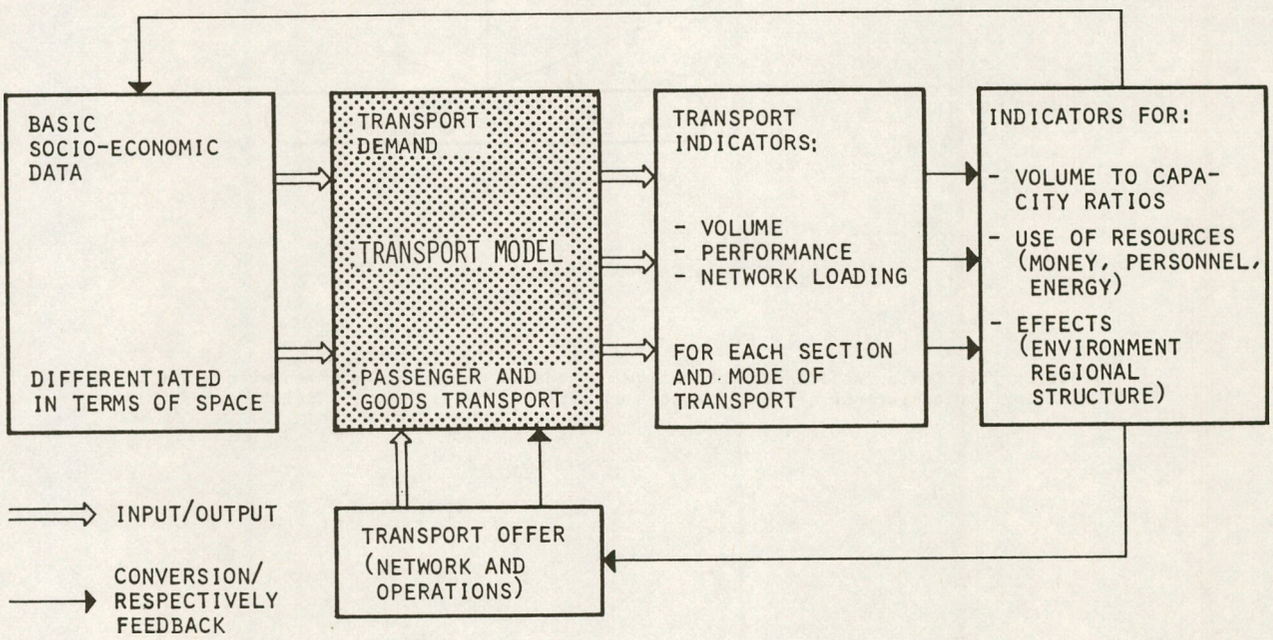


1) Alternative taking as its main objective regional development recommendations set up by the regular conference of the directors of offices in all Federal Ministries.

Both Final Alternatives (FA), as the third working stage, are the result of the previous studies and represent carefully evaluated transport systems which pay full attention to all the important groups of objectives. In the following chapter 3 both these final alternatives, FA-1 and FA-2, will be described in more detail and proposals deduced from them for realizing the integral concept of transport. The "established transport networks" mentioned in that chapter should not be interpreted as definitive transport plans in the form of a construction scheme. It is true that both the network of FA-1 and that of FA-2 (the alternative recommended by the Commission) represent realistic possibilities for developing the transport system as a whole. They are however subject to periodic re-appraisal in accordance with possible changes in the basic presumptions with regard to social, economic and transport conditions. In the case of a strong variation they should be included in a new planning process ("rolling planning").

Simulation of transport patterns was done with the aid of computer operated transport demand models. On the basis of the constraints and basic data as well as established objective priorities, these models made it possible to present the transport concepts of the various working stages and to vary them. Using these models and the forecasted availability in transport, the future transport demand for the year 2000 was determinded for each alternative, taking into account empirically proven transport behaviour. An important purpose of the model calculations was to provide the indicator values for the system of objectives. Figure 6 shows the essential relationships between basic data, transport models and indicators.

Figure 6 Transport models and indicators

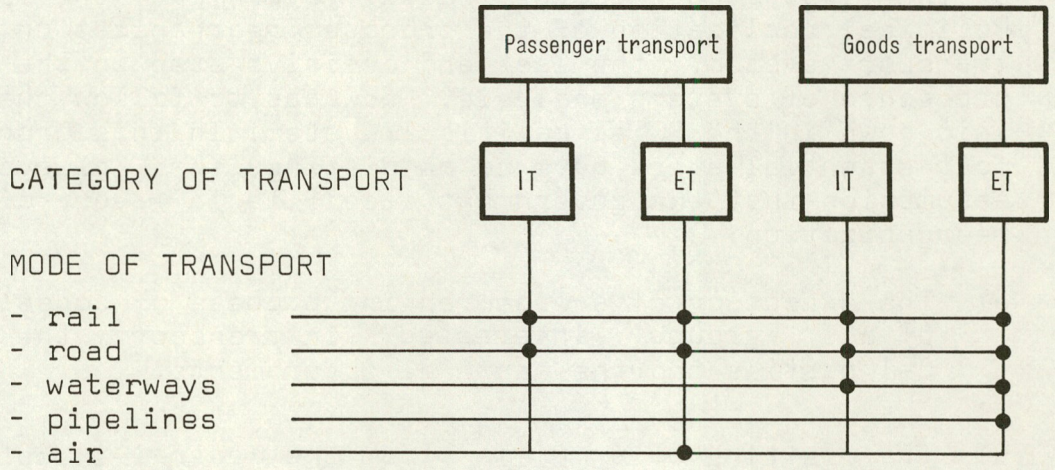


Previous transport planning had mainly used such models for agglomeration transport, so to comply with the tasks of the SICT, models had to be specially developed which were relevant on a national level. In the given framework of time and financial means it was not possible to develop fundamentally new simulation procedures. Therefore, the well-known four step model based on the gravity approach was chosen, a model which has already proved itself in practice. This means that the transport process is split up into four sequential steps:

- traffic generation (estimation of the number of journeys origination and terminating in each zone)
- traffic distribution (assignment of journey origins to the various possible destinations yielding spatial distribution of journeys)
- model split (determining the likelihood of using each of the various transport modes)
- route assignment (selcting the particular route likely to be used).

Each of these steps is represented by a special sub-model.

Separate models were first worked out for passenger and goods transport as well as for transport within Switzerland and external traffic. The six models were then united in an integrated overall model. The following diagram elucidates the individual areas dealt with in the models.



IT = Internal transport (transport within Switzerland)

ET = External transport (transport links with foreign countries)

2.5 Evaluation of the alternatives

The commission did not just have the job of drawing up different transport concepts. It also had to compare and evaluate all these alternatives. This process of evaluation took place on the basis of the system of objectives and using the method of value-analysis. A so-called partial value was determined using priority ratings on one hand and, on the other hand, an evaluation, with the help of the indicators, of how well the objectives have been fullfilled; by combining all partial economic values it is possible to determine the total economic value of an alternative. The main computed results of this process of evaluation for both final alternatives as well as a short commentary can be read in chapter 3.7.

The advantage of the method of value-analysis is that, in contrast to the customary cost/benefit analysis, non-monetary qualitative aspects can be expressed in rating points and in so may be compared with each other in a quantified form. Objective and subjective elements of the process of evaluation are clearly separated and explicitly defined.

2.6 The political decision

The SICT Commission completed its work with the handing over of the final report to the Federal government, the mandator. Political realization of the proposed reorganization of the transport system, the last and decisive step in the chosen procedure of systems analysis, now has to follow the procedures laid down in the Swiss political system. In this process four essential steps have to be distinguished, always on the assumption that the government itself is in favour of such a reorganization:

a) The execution of a wide-ranging process of consultation of all groups interested in transport, the political parties and the cantonal governments.

b) The drafting of a bill from the Federal executive to Parliament, taking into account the results of the process of consultation, containing suggestions for the necessary adaptation of transport law on the constitutional and legislative level.

c) The parliamentary debates, in both chambers, on the government proposals.

d) The approval of the constitutional changes (compulsory referendum) and possibly of changes in the law (optional referendum) by the federal electorate.

This whole process will take at least three years. Only after a positive outcome from the referenda is the way open for realization of the Commission's proposals, because few of the measures can be introduced in the short term by government decree.

3. CONCLUSIONS FROM THE COMMISSION'S WORK

The following conclusions are founded on basic factors which have a considerable influence on the transport system. Particularly noteworthy are:

- Population growth: The rate of increase in the Swiss population is going to show a sharp decline. The population should grow from 6.4 million inhabitants in 1974 to only 6.6 million in the year 2000. It is also presumed that the way in which the population is distributed will not change much either. As a result of the decrease in the foreign population and the drop in the birth rate, the working population will diminish from 49 to 46 % of the total. So the number of jobs will only rise slowly, going from 2,94 million in 1974 to 3.06 million in 2000.

- Economic development: The growth potential of the Swiss economy is also being looked at more conservatively than before. The average annual rate of increase in the gross national product during the period 1974-2000 will probably reach 2%, which is less than half what it was between 1950 and 1974.

3.1 The development of supply and demand

Given these basic factors, demand for transport will increase far more slowly than before 1974. This general tendency will affect both passenger and goods traffic, but in differing degrees.

According to model calculations, passenger traffic, which is less influenced by the current recession, will grow somewhat more strongly than goods traffic. The following forecasts of how demand will develop should be regarded as average values within a wider range of economic swings.

Framework of the two Final Alternatives

In the first Final Alternative (FA-1) expansion of the transport system is dictated by a limitation on available financial and natural resources. The national highway and mainroad network will be completed, with a few exceptions, as already planned. For reasons of capacity and competitiveness the existing rail network will be supplemented by attractive new main axes between Lausanne and Winterthur and Basle and Olten.

In the second Final Alternative (FA-2), the transport system is geared to a moderate growth and optimum impacts. FA-2 calls for the completion of the slightly modified national highway and mainroad network and, in addition, for the linking of the more isolated regions to the network. New main railway axes would be built between Lakes Geneva and Constance and between Basle and Olten, presenting an attractive alternative to the national highway network. In this way overloading effects could be avoided by sensible expansion of the infrastructure and the public passenger transport system would be given added user potential. An extension of the Rhine shipping system is planned from Basle-Rheinfelden up to the confluence of the River Aare at Klingnau. This is with a view to reducing the traffic burden on the Basle region.

The transport networks of both alternatives after re-adjustment according to network loading ratios are shown in figures 24 and 25. Capacity performance of the transport system is influenced by the infrastructure but also by other measures. This is why a regular interval schedule is foreseen on the mainlines of the rail network which will enable branch lines to be better integrated within the network as a whole.

The two alternatives use different hypotheses with regard to the level of individual prices charged by the various modes of transport. FA-1 reckons with a sharp rise in the price of oil imported from abroad, with a resulting increase in the cost of road transport. FA-2 on the other hand assumes that fuel prices will merely keep pace with other consumer costs. However, this also means a significant deviation from developments as seen up until now. These price relationships set down for passenger and goods traffic are not specific to each alternative but present hypotheses issuing from energy scenarios laid down by the Commission.

There are certain indirect measures which have an influence on what is offered in the Final Alternatives. These include the elimination of the 'distortions of competition' and 'burdens alien to the enterprise' as well as the determination of the 'public service performances' of the transport system.

Supply and demand in road transport

Taking into account the future road network, the assumed price relationships and with special regard to the influence of rail transport, the total demand in road transport (passenger and goods) should increase by 50 to 70 % (expressed in pass./tonne kms) between now and the year 2000. This means that the development would be at the same pace as economic development at most, though possibly below this level. This represents a desirable swing away from the trend up to the present time. But the precondition for this is that the Swiss transport system would be modified according to one of the final alternatives.

Demand for road transport	Base year 1974	FA-1	FA-2
1000m. Pkm/yr	51,7	79,6	87,2
1000m. tkm/yr	7,3	9,9	10,9
Total (Pkm + tkm)	59,0	89,5	98,1
Index	100	152	166

These prognoses produce varying volume to capacity ratios on the national highway and mainroad network 1). Certain routes can be expected to be overloaded while others will have reserve capacity. Above all, the Berne-Zurich-Basle triangle has traffic volumes on certain routes which exceed capacity considerably. Particularly critical spots are the points where the N1 and N2 motorways meet (in the Olten area) and where the N1 and N3 join (near Baden). At these intersections the present four lane highways are not sufficient to take the expected traffic volume.

On the other hand, changes should be made in the long-term national highway construction programme 2) because certain stretches would be underused. For optimum use of the existing and future transport network the stretch of the N1 motorway from Yverdon to Kerzers will not be necessary around 2000, so long as the N5 motorway along Lake Neuchâtel is made into four lanes.

From the traffic volume point of view a conversion to four lanes should not be necessary on the following stretches:

1) Determining traffic: - on the Plateau: average weekday traffic (The Plateau is the plain area between the Alpine and the Jura chain of mountains.)
- in mountain regions: average Sunday traffic (June Sunday)

2) Swiss National Highways, Third Long-Term Construction Programme, Variant 1976.917 (ASF)

- Gotthard and Axenstrasse tunnel (N2 and N4 respectively) assuming that part of the north-south through traffic will use the San Bernardino route.

- Riddes-Brig (N9) because the existing cantonal road can take over part of the future traffic.

This does not mean that a scaled-down expansion of the national highway network will cover transport demand permanently. In extreme situations, eg. summer holiday traffic, overloading has to be reckoned with already, even within the planning period. This is because the bases of the model calculations were average weekday and weekend traffic conditions. Close obervation of how traffic develops, with an updating of the planning groundwork as demanded by the Commission, will enable any necessary extension to be initiated in good time.

The building of a main road through the Simmen Valley with the Rawil Tunnel as a link between the Bernese Oberland and the Rhone Valley is justified according to the model calculations. This applies especially to weekend traffic demands. But results from FA-1 show that the absence of this link would not lead to congestion on the N9 or N12 motorway. The conversion of the Berne-Lötschberg-Simplon (BLS) line to a fully double track line is under way in order to relieve excess pressure of goods through-traffic on the St. Gotthard line. Competition between the BLS railway link (roll-on/roll-off service for cars) and the N6 motorway link through the Alps will no longer be relevant when a large portion of railway capacity will be utilized for goods through-traffic. The construction of a direct road link between the Bernese Oberland and Canton Valais in accordance with the National Highway Programme would significantly improve accessibility insofar as it would shorten the road link between the German-speaking Plateau and Central Valais by 50 kilometers.

The expected volume of traffic does not justify a direct road link between Canton Glarus and the Upper Rhine Valley during the next 20-30 years. Such a link would make sense as a means of promoting regional development so long as Glarus and the Upper Rhine are keen to step up development within the framework of their regional planning,and as long as transport planning is part of a comprehensive package of measures. In the context of the SICT it was not possible to examine the relationship between the cost of such a link and its effects on regional development.

The model calculations show that there is a need for a winter-proof road link between Prättigau and the Lower Engadine Valley (South Eastern Switzerland). Traffic volume here is 2-3 times higher than on the direct link between Glarus and the Upper Rhine Valley. This connection should also be regarded positively

Figure 24

TRANSPORT NETWORK

FA-1

LEGEND :

normal gauge	narrow gauge
railway line 2 and more track	
railway line 1 track	
New Main Rail Axis (NMRA) new construction or adaption for high performance	
motorway 4 and more lane	
main highway (2 lane)	
important trunk road	
waterway (Rhine)	
airport	
pipeline	
refinery	
shunting yard (capacity ≥2000 waggons per day)	

1:1 000 000

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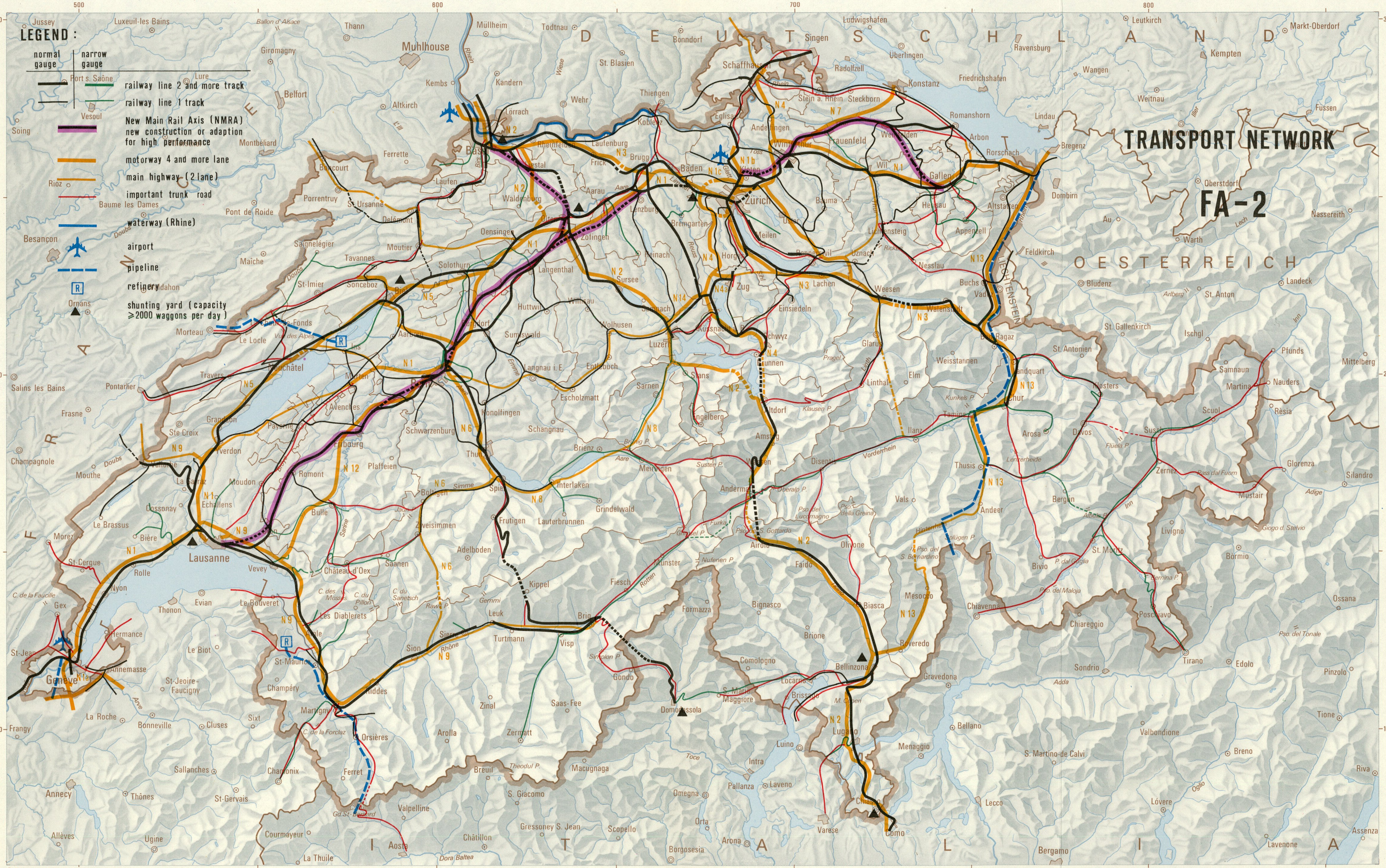
Figure 25



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as serving to improve transport accessibility to the most isolated parts of Switzerland. Instead of a road tunnel, a new roll-on/roll-off rail route might be considered. However, the choice between these two solutions needs further detailed study.

Further suggestions on the shape of the main road network were examined in the final alternatives, in particular the suggestions for an improved east-west link from Toggenburg via Zug, Lucerne and the Entlebuch Valley to Berne and for a Trans-Jura two lane highway from Boncourt via Moutier to Oensingen and Biel respectively.

Pedestrians and cyclists also count as private transport. Their regional and inter-regional traffic relations should be taken into consideration above all during the construction of new facilities. An extensive separation of pedestrians and cyclists from motorised traffic should be sought, and walking routes and the network of cycle ways should not be cut by traffic routes. An improvement of the network for slow traffic will enhance the quality of road traffic in general.

Supply and demand in rail traffic

Public transport and in particular rail transport makes up another important element in the transport system set out in both final alternatives. Rail traffic should improve that which it has to offer in those areas particularly suited to its services. However, bearing in mind general defence requirements, it should reduce its services in thinly populated areas where bus services would meet requirements more adequately. Results from the models show that demand for public transport both by passengers and goods should increase overall by between 80 and 100 %. This increase is greater than the real economic growth of around 70 % in terms of real value. The varying degrees of development for goods traffic in the two alternatives is due to the different projections of transport prices.

Both final alternatives point to the possibility of a reverse in the presently decreasing trends for public transport so long as the proposed measures are taken and the constraints and assumed basic data correspond closely enough to actual developments. It was not possible to determine exactly how the future market will react to the assumed tariffs and prices.

Demand for rail transport	Base year 1974	FA-1	FA-2
1000m. Pkm/yr	9,7	19,9	19,8
1000m. tkm/yr	7,4	13,8	10,6
Total (Pkm + tkm)	17,1	33,7	30,4
Index	100	197	178

The model calculations show that the increase in road traffic can be slowed down by raising the service offered by rail transport through the provision of a new Mail Rail Axis (MRA) and an attractive timetable. This basic improvement in the competitive position of the railways represents an effective long term alternative to the otherwise unavoidable need for expanding the heavily loaded road network of the Plateau. What is even more important is that unless rail capacity is increased, traffic suitable for rail transport will have to be diverted to the roads. Thanks to the conversion of the BLS line between Frutigen and Brig from single line to double track, the capacities of the Gotthard and Lötschberg/Simplon routes will just be sufficient to the year 2000. The improvement to the Lötschberg-Simplon route only makes sense, however, if the northern linking route Basle-Olten-Berne is improved (with the Hauenstein tunnel and additional double track between Olten and Berne) and if more installations are provided in the south. This would mean the completion of the first step in the new Main Rail Axis. The necessity of building a new line crossing the Alps shortly after the year 2000 and its economical feasibility have to be examined in due course in the light of the actual development of demand.

An important result of the calculations on capacity is that the MRA concept does not demand a completely new track. The Geneva-Lausanne route which is being modernized at the moment has sufficient capacity, which means that no extra line need to be built for the MRA. A new line would improve travelling time by a mere 6 minutes. For the same reason there is no need for a separate MRA route between Lenzburg and Zurich. The existing well-built stretch, with the Heitersberg tunnel and the double track via Brugg and Baden are sufficient for east-west traffic. A continuation of the MRA through St Gallen is not justified by demand until 2000, which is important in cost terms (no need for a St Gallen-Altstetten tunnel).

In order to link future air transport to the surface transport system with maximum effect, Geneva's Cointrin international airport should be connected directly with the MRA in the same way as Zurich-Kloten. For the time being traffic conditions

do not merit taking the same step at Basle-Mulhouse airport but developments should be followed. In the planning of traffic infrastructure, coordination of road and rail carriers is of prime importance. Combined road and rail (piggyback) transport for transit goods traffic deserves especial promotion for environment protection and for easing the burden and certain main routes of the road network. This necessitates, among other things, the enlargement of tunnels on the Gotthard line and the setting up of adequate loading installations in Basle and in Canton Ticino. The opening of the Gotthard road tunnel should coincide with the setting up of an attractive road-rail "piggy-back service".

Along with the improvement in what the main railway lines have to offer, both final alternatives make an effort towards a re-structuring of poorly used lines. This does not lead to an inferior timetable but to a change towards public road transport, which often means more effective connections and service. The model calculations have shown that the proposed number of such conversions is tolerable but the results did not enable any definitive conclusions to be made about the lines concerned. Each individual case has to be resolved with additional studies which might also take into consideration partial conversions, like the elimination of passenger traffic but the retention of rail transport for goods. Before any bigger investments are made, the question of total or partial closure of uneconomical lines should be carefully examined. At the same time general defence aspects should be taken into consideration.

Supply and demand in air traffic

The emphasis in air transport in Switzerland is principally on international communications, with passenger traffic as the dominating factor. The huge upsurge in this form of transport in the last decade should be replaced in the future by a less hectic development. From the models (which also take into account the impact of an European high-speed rail network on air traffic) and from additional investigations it has been established that up to the year 2000 there will be an increase of between 130 % - 170 %. This means that of all the carriers, air transport shows the greatest growth.

Demand for air transport	m. pers/yr	index
Base year 1974	10,6	100
FA-1	28,7	271
FA-2	24,3	230

Nevertheless,a corresponding expansion at Zurich-Kloten, Geneva-Cointrin and Basle-Mulhouse during the planning period should take care of this development. When the present-day international airports will reach their capacity limits and whether and how this moment can be put off by technical, operational and organisational measures, remain open questions.

Reliable forecasts on the future development of private and business air traffic (non-commercial air traffic) do not exist and comparisons with developments abroad can hardly be conclusive because of the difference in meteorological and topographical conditions. It is recommended, however, that the present infrastructure of regional airports and landing fields should be retained in order to allow for a modest growth,not least in the interest of tourism.

Supply and demand in inland shipping

The importance of waterways for the transport of goods is widely underestimated. Considerable tonnage, which would otherwise be an additional on the road and rail networks, is transported on the Swiss lakes. In the SICT it is the Rhine which has the most significance as a waterway. The transfer of goods traffic from the Rhine to road and rail transport takes place today exclusively in the Basle region. According to the model calculations Rhine harbour traffic demand could increase by some 70 % within the planning period. Apart from the competitive transport prices this is due to a considerable improvement in the European waterway system. The Rhine-Main-Danube canal with its connection to the Black Sea will be completed by the 1980's. The Rhine-Rhone canal too (with the port of Bourogne only 10 km over the border), will probably come into operation at the end of the 1980's. The estimated development in demand is however a representation of what the maximum figure is likely to be, but large downward fluctuations are clearly possible.

Demand for water transport (Rhine)	m.tonnes/yr	index
Base year 1974	9,3	100
FA-1	15,6	168
FA-2	15,9	171

Notwithstanding that the forcasted demand will exceed existing capacity in the Basle Rhine harbours, a very dense lorry traffic is to be expected to and from the harbours. This leads to an above average burden for the Basle area. This situation will not be improved much by the expansion of the rail infrastructure between Basle and Olten. A noticeable easing and diversion of this heavy traffic can be obtained by extending Rhine shipping to Klingnau, a necessity which seems proven by the calculations that have been carried out. This extension would cause a large expansion of infrastructures for the three transport modes, water, rail and road,in the Klingnau region,but it is not yet certain how large an expansion would be necessary. Extending the navigable waterways via the river Aare to Lake Neuchâtel is not necessary before the end of the planning period.

Supply and demand in pipelines

Important elements in the goods traffic infrastructure are the four pipelines built and brought into service in the recent past (1963 - 72). The available capacity which can still be enlarged somewhat should be fully utilized by the end of the planning period (year 2000). This represents an increase in tonnage of over 50 %.

Demand for pipe-line traffic 1)	m.tonnes/yr	index
Base year 1974	13,1	100
FA-1 and FA-2	20,1	153

1) Import and transit

So far there are no plans for any significant expansion of this mode of transport. The principle of making the best possible use of the existing infrastructure should thus be fulfilled. By renouncing expansion for the time being it is also possible to avoid additional competition for rail and waterways.

3.2 Support for the regional planning objectives

The SICT's objectives in regional planning are ambitious. In order to obtain a consolidation of the existing decentralized structures of population distribution the present demographic and economic process of rural depopulation and urban concentration has to be halted or even put into reverse. In addition, problems are arising which have an increasing influence on the quality of life not only for people in the depopulating mountain regions but also in the densely populated agglomerations.

The regional planning goals cannot be achieved solely by changes in the transport system. Of the same importance are comprehensive efforts in other areas and on all levels of the public sector. The basic demand from a regional planning point of view is that future transport policy measures should be coordinated as closely as possible with comprehensive concepts of development. It is true that isolated intervention in the transport sector can, in certain circumstances, induce economic growth in underprivileged areas. This can also be counter-productive, however, if small-scale agglomeration and depopulation processes produce disparity of development within a region. In order to avoid such undesirable effects accompanying measures are indispensible.

This need for a comprehensive development strategy must be taken into consideration in all the following recommendations. The expediency from the regional planning point of view of certain of the SICT suggestions has to be studied more closely during the execution phase.

Maintaining and improving the quality of inter-regional transport links

Between the two final alternatives there are only slight differences in the development of inter-regional accessibility. Both alternatives guarantee the maintainance of the present day quality of transport network. Nevertheless FA-2 does indicate a few additions to the transport infrastructure which are interesting for the regional promotion.

In private transport, development in both alternatives corresponds to a great extent with regional planning requirements. Thus there will be an above average improvement in accessibility to wide areas within the mountain regions. The additional extensions to the road network foreseen in FA-2 strengthen this tendency.

On the other hand, improvements to public transport only partially satisfy regional planning demands. The New Main Rail Axes proposed in both alternatives guarantee equal quality for road and rail connections between the large cities. They also improve links between the central Plateau and the large city regions, as well as the accessibility of important tourist centres. Inspite of this, however, the improvements to public transport lag behind those to private transport. Neither the disadvantages for those forced to use public transport nor the lack of connections between the mountain regions and the public transport network can be overcome solely by the planned extensions to the infrastructure, or by operational improvements. Parallel measures adapted to the need of each region and population group are also necessary.

Special measures in poorly developed regions

The improvement of the major infrastructure primarily ensures transport links between regions and goes some way towards reducing the current disparities in the development of the various regions. This, however, will only cover part of the transport requirements for regional populations. Especially in the poorly developed problem regions in the mountains is the main emphasis for regional promotion through transport on the level of intra-regional transport. Decisive factors here are the commuter routes to places of work concentrated in the main valleys, the accessibility of regional centres with regard to shopping and educational needs and the guaranteed shipment of goods by road or rail.

Because this accessibility to the regional centres plays such a key role on a planning and socio-political level, relatively strict criteria were laid down in this respect in both final alternatives. This means that even in the mountain regions transport conditions will be regarded only as fully satisfactory if more than 75 % of the population are able to reach an intermediate regional centre within 60 minutes, and a small provincial centre within 30 minutes. Whereas this condition may be fulfilled by private transport in more than 3/4 of all mountain regions, public transport is unable to do so within the limits of acceptable cost. Even with a 50 % increase in the above mentioned time limitations to 90 and 45 minutes respectively (justified because of walking distance to station or bus stop, time for waiting and changing) the accessibility requirements cannot be met by public transport. This fact calls for special attention to be given to improvement of public regional transport and to the reduction of disadvantages to underprivileged regions during the implementation of development plans. These requisites should be met by the following transport policy measures:

- Additional grants to the Cantons for the improvement and running of regional transport. Apart from the usual grants distributed according to the transport hierarchy, extra Federal grants also should be made to ease the more glaring insufficiencies in the provision of basic transport facilities for less developed regions.

- Within the framework of approximating tariffs in public transport the Federal authorities should reduce fares for communities with long routes to work or school as well as for low income groups.

These measures should provide compensation for insufficiencies in the access to the transport system. Inhabitants of mountain areas should not have to pay more for their transport needs than those who live on the Plateau with a more dense transport network and wider choice.

Special measures for transport in the agglomerations

Problems of town planning and particularly of environmental pollution also exist in agglomerations. Therefore public authorities must set out transport policy guidelines and measures which will promote the desirable development in these areas.

In the large agglomerations one can note a main trend in which transport contributes towards phisically separate social strata within communities. The exodus from agglomeration centres and the development of so called "dormitory towns" (high commuter quota and below average density of work places) cause new streams in agglomeration traffic with peaks in the morning and evening.

The greater distances between places of residence and work caused by the way in which communities have developed have created a new type of traffic which is linked with an often necessary considerable expenditure of time and money. Inhabitants of badly served suburbs are especially affected. The lack of public transport is a particularly important factor for lower income groups who have been forced out to the relatively distant suburbs with lower rents.

The main problems with regard to private transport are parking space and environmental impact. For public transport the problem is the discrepancy between the capacity volume needed during rush hours and the slack demand at other times.

Because road or rail public transport takes up less space and has less impact on the environment than private transport, as well as having a greater capacity for mass conveyance, it deserves priority in the agglomerations.

Basically, the Cantons and Communes are responsible for organizing public transport in the agglomerations. For this they are able to use funds which they receive from the Confederation[1] in the context of the balancing of financial burdens. Special federal funds are to be used for combatting undesirable effects on the environment.

3.3 Energy consumption and environmental protection

Energy consumption

At present, energy consumption in the transport sector accounts for about one quarter of the total final energy consumption. Energy consumed for transport needs is made up of about 95 % oil products and 5 % electrical energy. Although possible savings with regard to total consumption cannot be spectacular, the transport system must make a contribution towards a sensible and economical use of energy.

Because future trends in energy prices depend upon many uncertain and unpredictable factors the final alternatives are based on two different projections:

- In FA-1 it is assumed that future oil import prices will rise 4 % more than the prices of other forms of energy and production factors. This represents a 2 % annual rise in consumer prices for fuel and diverges strongly from the trend up until now.

- In FA-2 however, the energy prices are presumed to keep pace exactly with those for other consumer goods and production factors.

Both alternatives are able to keep within the constraint fixed by the Commission whereby energy consumption for

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1) Cf. the note on the term 'Confederation' at the end of chapter 1.

transport increases at a lower rate than economic growth. This enables a remarkable contribution to be made towards achievement of the objective of an economic use of resources.

Energy consumption according to mode of transport	FA - 1		FA - 2	
	TJ/yr	Index 1)	TJ/yr	Index 1)
Private transport	151'000	118	183'000	143
Public transport	9'900	155	11'100	173
T o t a l	160'900	120	194'100	144

1) Index 1974 base yr = 100

TJ = 10^{12} joules

Calculations indicate that transport energy consumption should rise by between 20 - 45 percent up to the year 2000 while in the same timespan gross national product will rise by about 70 percent. This slower growth rate in energy consumption is partly due to the emphasis on public transport promotion and partly to improved efficiency in engines for road transport. Electrical energy consumed by the railways is not only less harmful to the environment but is also essentially a home product. It does not follow from this that all poorly used lines should be maintained because in these cases energy consumption per unit of performance is relatively high. The most important preconditions for an economical use of energy are a balanced utilization of all carriers of transport and a corresponding coordination of operations among all the different modes of transport. On the road network, too, intolerable bottlenecks with chronic traffic jams should be eliminated because they have particularly unfavourable effects on energy consumption.

Air pollution

According to the model calculations air pollution will not increase in spite of the growth in transport. Thus one important constraint concerning the protection of the environment has been met. Both alternatives provide for a fifty percent reduction in toxic exhaust substances compared with 1970. The most effective measure for combatting air pollution caused by transport is tackling the nuisance at source, particularly with motor vehicle and aircraft engines. However, the increased attractivness of public transport is also of great importance because in highly urbanized areas it will permit a transfer to transport with less or even no emission. Both final alternatives study the effect of these measures on individual pollutants. Compared with 1970, it is possible to obtain a significant overall reduction in harmful exhausts in spite of an increase in traffic, as is shown in the table below.

Toxic exhaust from road traffic	FA - 1		FA - 2	
	1000 t/y	Index 1)	1000 t/y	Index 1)
Carbon monoxide	190	40	210	44
Hydrocarbons	15	39	17	45
Nitrogen oxide	45	63	50	70
Sulphur dioxide 2)	4,6	118	5,3	136
Lead	0	0	0	0

1) Index 1970 = 100
2) Excluding stationary sources

In conclusion therefore, it is possible to reckon that the proposed measures will make an effective contribution to the long term improvement of the environment in accordance with Federal government policy aims. It will be even possible to go beyond the minimum requirements laid down by the Commission which does not allow any increase in pollution compared to the present day situation. These measures, however, will only become fully effective after a certain period of delay. The reason for this is that the stricter specifications will only apply to new vehicles and it will take several years before all vehicles have been replaced. During this time a temporary increase in exhaust levels cannot be avoided in spite of a gradual reduction in limits.

Noise pollution

The expected developments in traffic make effective protection of the population from noise a particularly urgent problem. Because a large part of the traffic increase will be concentrated on the main highways, built up areas will be relieved of additional noise. In spite of this, however, more attention must be given in the future to ensuring that there is a sufficient buffer zone or, that other noise protection measures are taken in the vicinity of motorways and trunk roads.

The most effective measures for combatting noise are legal regulations on specific maximum noise levels at source which are technically and economically feasible. The aim of the Federal Council is a reduction of the noise at source of between 6 - 10 dB (A) according to the type of vehicle. This is expected to produce an effective overall reduction of 3 - 6 dB (A), taking into account the average driving behaviour. Adherence to these regulations should be strictly controlled. Alongside these regulations education plays an important role too, because a sensible manner of driving not only reduces noise levels but also contributes to a reduction in pollution and less energy consumption. In addition, local measures may be necessary in individual cases, with the financing being met by either the Confederation or the Cantons, according to their respective responsibilities.

Increased noise on the New Main Rail Axes (MRA) is also avoidable by introducing suitable measures which have already been tested on the rolling stock. Nuisance from air traffic is especially great around the national airports. The introduction of noise certificates as a precondition for allowing aircraft to use the airport and the creation of noise zones in the areas around airports should ensure that the effects of noise on the population do not exceed tolerable limits. Here too, the constraint of less noise in spite of more traffic must be respected.

Protection of scenery, nature and water

As a result of increasing consciousness about the environment there is less and less toleration of encroachment by transport into rural and protected nature zones in general. The protection of such areas is a justified aspiration which should be given more consideration in any plans which extend the transport infrastructure.

In both final alternatives, about 40 percent (230-260 kms) of the proposed major road arteries pass through areas which are classified as "highly sensitive and valuable". This is hardly surprising since this extension of the network represents the completion of the National Highway Programme and therefore concerns the linking axes in the mountain regions and other critical areas which have been deferred until now. On one hand the desire for protecting nature must be met with suitable and financially acceptable measures. On the other hand the need for adequate transport in mountain regions requiring development cannot be rejected every time by an extreme form of "protection of heritage".

Happily the New Main Rail Axes suggested in both final alternatives do not cause any significant damage to nature or the countryside, mainly because large sections run through tunnels. The soundness of these transport proposals is confirmed by the fact that an extension of the existing motorway network in the Plateau can be avoided almost completely.

The extension of navigation on the Rhine up to Klingnau also creates environment protection problems. In order to solve those detailed studies must be made of the way in which land will be used and the possible mapping out of new protected zones along this waterway.

3.4 Transport safety

Measures for improving transport safety mainly concern road transport because by far and away the greatest number of accidents occur with this form of transport. An increase in traffic volume brings with it a corresponding rise in accident risk. This can only be countered by lowering the specific danger per passenger/kilometer or tonne/kilometer in the same proportion as the rise in traffic volume.

The objective of keeping traffic accidents at their present day level requires a lowering of the present accident rate by 35 - 40 %, that is from 2.3 to between 1.5 and 1.4 accidents per million vehicle/km. In view of the results obtained in recent years from compulsory wearing of seatbelts and from speed restrictions on the motorways and trunk roads, this seems possible. However, only a resolute long term policy and great determination will make it possible to fulfil this apparently easy, but in reality very difficult aim.

The National Highways contribute greatly toward road safety. This is because for the most part they are dual carriage ways. Roads of this type are 3 - 5 times safer than traditional two-lane roads with regard to the number of accidents and 5 - 10 times safer in terms of accident victims. With the completion of the National Highway network and the transfer of traffic on to the motorways and main highways, a further beneficial effect on accident statistics can be expected.

In spite of the completion of the National Highway network, however, 60 - 65 % of total traffic volume is still on the remaining roads. This means that because of their high accident rate 85 - 90 % of all accidents will continue to occur on this type of road. Therefore the greatest efforts should be dedicated to raising the safety on the traditional category of roads. On the basis of these facts a scheme should be worked out containing the main points set out in the diagram below 1):

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1) SICT Mandate no. 124

Road categories		Measures		
		Maintenance	Improvements	Operation & Organization
High performance roads		XXX	-	-
Main and secondary roads	outside built up areas	X	XXX	X
	within built up areas	-	X	XXX

XXX = of great importance

X = of less importance

On high performance roads the main consideration should be maintenance, especially of the road surface. On main and secondary roads outside built-up areas the emphasis should be on the improvement of unsatisfactory facilities. If necessary, additional operational and organisational measures may also be considered. In built-up areas safety can be improved partly by arranging detours of city centres or even by-passing the whole city. But there are limits to the amount of road building that can be done without changing the whole face of localities. Significant improvements can be achieved, however, with operational and organizational measures such as speed limits, pedestrian overpasses, clarification of precedence rights, and through better traffic instruction.

Although less than one percent of all traffic accidents happen on the railways, in order to prevent a rise in the number of accidents, improvements of an operational and constructional nature should be carried out (automation of shunting yards, the removal of all level crossings etc.). It is particularly important that the traffic on the New Main Rail Axes should not register any higher accident rate than on the rest of the rail network.

By transfering passenger traffic from road to rail a notable rise in the safety of the transport system as a whole can be achieved with both final alternatives.

3.5 The hierarchy of state duties in transport

Many of the difficulties in state transport policy can only be overcome if the boundaries of jurisdiction and financial responsibilities of the Confederation[1] and Cantons, which vary from one mode of transport to another, can be elucidated for inspection and systematically re-organized. An effort should be made to delegate as many national transport duties as possible to the Confederation and let the Cantons take care of regional and local problems. The division of duties between Cantons and Communes is strictly a cantonal matter. This re-arrangement of duties between the Confederation and the Cantons will permit a better overall view of the financial consequences of any political decisions, a more economical use of resources and more autonomy for the Cantons.

National transport duties incumbent on the Confederation are:

- Long distance transport, national and international
- Ensuring inter-regional communications linking the distinctive areas of the country together
- Linking capitals of the Cantons with the public and private national transport network
- Removing marked discrepancies in the provision of basic transport facilities to the Cantons.

In defining state duties a distinction has to be drawn between infrastructure and operation.

According to their main functions the road and rail networks, the waterways, airports and pipelines have to be re-allocated into those networks of national and of cantonal (regional) importance. The Confederation should be responsible for the planning, building, maintaining and financing of national networks. Responsibility for the cantonal networks would lie with the Cantons (network hierarchy).

Division of responsibilities for the operation of the public transport system cannot be made exactly along the same lines as for the networks. This is because the Confederation, like the Cantons, should be able to demand public services to be carried out not only within its own network but also within the other networks (operational hierarchy). In this context, particularly important is the standardization of tariffs which aims at adjusting the higher rates for public transport in the mountains of otherwise geographically handicapped regions to the lower rates in the Plateau. The Confederation

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1) Cf. the note on the term 'Confederation' at the end of chapter 1.

should continue to finance this approximate adjustment as a compensation for one of the redefinded public services.

The new division of responsibilities will produce a considerable transfer of financial burdens between Confederation and the Cantons. However, studies carried out reveal that neither the total contribution of the Confederation nor the contributions of the Cantons will be very much altered overall. However, for individual Cantons there could be considerable increases or decreases in costs for their own networks. These transfers will have to be compensated for an effective balancing of financial burdens. The Cantons have to be provided with a share of Federal income from transport (e.g. petrol tax, heavy traffic tax, consumer tax for public transport) in advance. This will put them in a position to carry out their ascribed transport duties according to their own priorities. This includes the provision of basic transport facilities within their area, the promotion of intra-regional public transport and the extension of roads which supplement the national network.

The general studies of the Commission on the hierarchical division of the transport system and its financial consequences must be examined in detail in direct cooperation with each individual Canton. These additional clarifications should ensure that in transport duties no Canton will be essentially worse off than before and that through compensation all Cantons will receive equivalent treatment.

The hierarchical division of transport tasks has to be given a legal basis by amending the Constitution and changing the law. The new order in public transport duties cannot be introduced in one short term step, but has to be brought into action gradually over time. In addition, there must be continuous adaptation to changing conditions.

3.6 Principles and results of transport economy

Basic economic principles

The Commission suggests that the basic economic principles should be:

> "The transport system as a whole, after compensation for the provision of public services, demanded by public authorities, must achieve economic self-sufficiency in the long term."

To this end normal market conditions should apply as far as possible to transport. Distortions of competition of the individual carriers should be corrected. Basically, those who use transport should be obliged to cover all the costs they incur except when particular factors other than transport establish the objectives overriding.

Direct state influence should limit itself essentially to infrastructure. The only exception should be operations fulfilled in higher level interests. These public services should be precisely defined and subsidized by public authorities. There will be no privileged treatment among carriers in that section of the transport system which operates commercially.

This basic economic principle will be set out in more detail below. In doing so a distinction will be made between "Infrastructure" (routes of communication) and "Operations" (which can be divided into commercial services and public services.

Transport infrastructure

Public authorities should decide on planning, construction and financing of the transport infrastructure because of the public interest in investments. In order to guarantee equal treatment for all modes of transport, this applies to all routes, in particular to the national rail network.

Thus the state will have to judge the appropriateness and the priorities for extending the networks. With a view to optimum use of the resources the following factors should be taken into consideration:

- Balance in the whole system (particularly with reference to alternative modes of transport),

- Full use of existing infrastructure,

- The measurable costs and benefits as well as the non-measurable effects

- The advantages and disadvantages of alternative possibilities.

In the same way that system analysis has been used for working out the final alternatives, each expansion project has to be evaluated for its economic efficiency, for its direct or indirect effects and for the extent to which it satisfies transport needs. Preference should be given to those solutions and/or times for implementation which contribute most to the achievement of the primary objectives of transport policy.

In order to ensure equal treatment for the infrastructures of all modes of transport, the state should carry the financial responsibility for rail, road, water and air transport infrastructure 1). In return it can demand user fees (from private and commercial users) which vary according to the extent of use. The utilization principle serves as the basis because the principle of causality has shown itself to be less practical 2).

The choice of pricing method is closely related to the aim of optimum use of resources. A system of tariffs according to the so-called marginal cost principle, which is often suggested, at present meets insurmountable difficulties when applied. It only leads to an optimum use of the infrastructure if the marginal costs principle is used in all sectors of the economy, which is not the case. The Commission therefore suggests that fees for using the infrastructure should be fixed with the long term aim of totally covering infrastructure costs. Where the market allows it, the fees should also include the costs of future improvements to the infrastructure. If such fixing of fees leads to a short-term disproportional use within an infrastructure certain fees can be temporarily reduced. The me-

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1) The principle applies primarily to the national network for which the Confederation is responsible. Within the framework of the federal system each Canton is free to decide whether it will introduce a similar rule or not.

2) The following example demonstrates the difference between the two principles: Supposing a railway tunnel has to be enlarged for piggyback transport of lorries; the utilization pricing principle suggests dividing the cost of the tunnel improvement between all users (passengers and goods) according to the extent of using the tunnel (e.g. measured by travel time); the causality pricing principle postulates that only lorries transported by piggyback should pay for the additional tunnel costs.

thod long term coverage of costs harmonizes the conditions of competition between the different modes of transport and tends to minimize total costs.

The final alternatives reckon with the following new investments for infrastructure.

Net investments 1974-2000 (in 1000m francs at 1974 prices)	FA - 1	FA - 2
Rail	10,1	11,3
Road	51,9	54,4
Air	1,7	1,7
Water	0,1	0,5
Total	63,8	67,9

Operational output

Commercial services of the transport system

As far as possible, market conditions will be created which bestow the greatest possible freedom on the individual and, within the limits of public interest, upon transport operators. Restrictions on competition will only be permitted in certain special cases.

Existing distortions in competition in favour of one or other mode of transport should be eliminated. Seen from the present time, the following measures should be taken:

- Heavy road traffic, which does not cover the infrastructure costs which it causes, should be charged with a special tax per vehicle kilometre leading to complete coverage of costs attributed to it in the National Highway Account 1). This heavy vehicles tax represents a part of the road user fees.

- The covering of the deficit in public goods transport should be gradually reduced and finally stopped in order that the principle of long term coverage of costs is achieved in this area too.

- Observance of working and resting regulations as well as maximum permitted weight should be more effectively controlled for commercial road transport.

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1) Compte routier suisse/Schweizerische Strassenrechnung, published annually by the Federal Statistical Office

- Regulations for working and social conditions in private and public transport should be gradually harmonized. In doing so the specific characteristics of these forms of transport should be taken into account.

- Burdens not relating to and advantages not stemming from entrepreneurial efforts should be eliminated whenever possible. Where it is impossible or very difficult to eliminate them they should be written off against each other. Any possible surplus should be put towards the compensation for public services.

External costs and benefits can also lead to distortion in competition because they do not affect pricing policies of the transport companies. Therefore, all external costs and benefits, which can be calculated and charged to those who cause them, should be internalized. In the foreground here, are environment protection costs. These can be reduced by legal technical regulations limiting vehicle emissions. Further reduction of nuisance can be done through passive measures along communication routes, the cost of which should be imposed proportionally on the users.

Public transport must not only operate cheaply but should also operate according to demand. In line with the basic economic concept public transport has to be given maximum freedom of enterprise. Public authorities should refrain from all interventions in the commercial services of public transport. Basic obligations traditionally imposed on all public transport enterprises should be relaxed in order to allow these enterprises to use all instruments of competition such as price, quality and innovation.

Public services of transport operators

Public services can be defined as those which the commercial transport market would not render without compensation, which are needed in higher public interest and are specifically demanded by public authorities. Because of the hitherto unsatisfactory regulations and as a direct consequence of the aims of the SICT, which state that the transport system also has to fulfill goals outside the transport field, the Commission elaborated a new definition which postulated that:

- Public services can be provided by all modes of transport

- Political obligations and compensations should correspond

- Public services should be adapted periodically to new conditions.

This new definition states:

"Public services arise where a transport concern is under duty to carry out certain legally defined obligations which have economic, regional planning, environmental or energy policy, social or cultural, objectives. They may also take into account possible emergency situations or general defence requirements. They are services which no concern running on normal commercial lines could render without compensation."

Provision of public services can be at three levels:

- transport infrastructure
- availability of services (timetable)
- prices (tariffs).

Public services in the form of selective contributions to the infrastructure arise above all in the promotion of poorly developed regions, for combatting pollution in agglomerations and for reasons of general defence. In the first two cases it is up to the Canton to undertake the investments, with the Confederation providing contributions from the traffic funds. Investments for general defence purposes are met entirely by the general federal budget.

Measures on the level of availability of services and prices should be studied together. This is because costs arising from the provision of services are counteracted by the income from tariffs. The following types of transport have to be distinguished:

- short distance passenger traffic
- long distance passenger traffic
- goods traffic in wagon loads
- parcels and small freight traffic.

The Commission feels that (intra-regional) short distance passenger traffic is the prime field for the provision of public services. This is because, on one hand, the costs for short distance public transport are relatively high while on the other hand services, especially out of rush hour times, are not fully used and for social reasons the tariffs are reduced in the general public interest.

It is considered the task of the Cantons and regions to commission public services in short distance public passenger transport. Within the framework of the financial balancing system the Cantons have the means at their disposal.

The adjustment of tariffs in order to bring the high tariffs of so called concessioned (or 'private') transport concerns closer to those of the Federal Railways is considered appropriate and essential for the future. It should continue to be the financial burden of the Confederation. However, methods and criteria for calculation still have to be re-examined and made to conform better to their objective.

In public long distance passenger transport as well as in wagon-load traffic on all carriers public services no longer operate. In a referendum on the 4th of December 1977 the voters agreed to abolish the obligations of public transport to carry and to publish tariffs for parcels and small freight traffic. The way is now open for a reorganization along commercial lines. Because the railway personnel and facilities engaged in parcels and small freight traffic can only be phased out in the medium term there should be a transition period until 1985. After that subsidies for small freight traffic (in the form of compensation for the provision of public services) will be cancelled.

For normal cases the Commission has suggested the following procedure for negotiating the provision of public services and their compensation between the political authorities and transport concerns:

- Within the framework of a long term planning period, the political authorities work out as concrete a programme as possible for the public services which have to be demanded in the next timetable period.

- The transport companies produce a set of corresponding proposals for public services and establish budgets of costs and receipts.

- The political authorities clarify these offers and then commission the companies with their execution.

- The compensation figure is established in advance, taking into consideration the offered services, the tariff level and the costs and receipts arising from them.

- The transport companies are responsible for providing the most economic services possible.

- At the end of each financial year the results are checked back with a view to correcting any variations in costs and receipts which are beyond the control of the transport companies.

- For each timetable period (2 years) the provision of services will be reassessed in the light of experience and the procedure set out above will be repeated.

On the basis of first estimates, which cannot anticipate the political process of negotiating the public services, the probable future compensation figure can be reckoned at 400-600 million francs per year (1874 prices).

This ruling on public services and their compensation, together with the realisation of other suggestions of the SICT includes the abolition of the deficit guarantee for the Federal Railways and the postal bus services.

A transitional arrangement is necessary because the introduction of the suggested global regulation will take some time. This solution includes doing away with the need for authorization of tariffs for long distance passenger traffic and for wagon-load traffic. Further, the system of compensation for the Federal Railways has to conform to the system set out above. With regard to concessioned transport companies it has to be examined whether compensation should be modified by a short term change in the law relating to railways.

Federal instruments for financing the transport system

The financial needs of the transport sector can be devided into four groups:

- Infrastructure investments (non-recurrent payments)
- Current infrastructure expenses (annual)
- Running costs for commercial services (annual)
- Running costs for services in the public interest (annual)

Another important element is the compensation paid by the Confederation to the Cantons which should make sure that the Cantons are able to carry out the tasks which fall upon them under the new transport hierarchy ('balancing of financial burdens').

Public authorities are unaffected by the costs of the commercial services. Here it can be assumed that the transport users will carry all the costs in the long term. For the other three cost groups however, the public authorities are responsible. The services in the public interest demanded by the Confederation have a special character. Because they are demanded by overriding interests (regional policy, general defence etc.) they are not financed from transport system resources but from the general budget. They have to be charged to the relevant Federal Department (ministry). On the other hand the Cantons are presented with a new task of compensating for public services demanded by them, an expense which forms an integral part of the balancing of financial burdens.

The Commission has proposed the setting up of two funds as the financing instruments of the Confederation for covering:

- current annual infrastructure expenses
- balancing of financial burdens of the Cantons (annual) and
- for providing the resources for infrastructure investment.

These funds would take the form of a:

- fund for private transport and a
- fund for public transport.

Both funds are to be filled with resources earmarked for the purpose. The most important source for the private transport fund are revenues from road users, (3/5 of fuel import taxes, import surtax on fuel and heavy vehicles performance tax). For the public transport fund a financing via more general sources seems justified. On the one hand public transport has to ensure services under all conditions (extreme weather conditions, oil crises etc.) and on the other hand its services are available for all transport users even when they do not normally take advantage of them. In addition the use of public transport does not entail any pre-payment as in private transport (purchase of vehicle). Therefore it is justifiable to stock this fund with revenues from the turnover tax (now in effect) or a possible future value added tax, at a maximum level of 20 percent of the basic tax rate. The fund also receives the fees from railways for using the national infrastructure.

Both funds are basically earmarked for the relevant type of transport. They should, however, balance each other out so that the stated objectives of both modes of transport are reached in the long term.

The creation of these two funds, each with its own source of finance, contradicts one of the not always uncontested basic principles of public finance policy. It takes into account however, the fundamental recognition in the transport sector that the maintainance and improvement of an effective global system requires large investments which have to be sustained over a long period if one does not want to doubt their effectiveness from the very beginning. It is only possible to provide coordinated infrastructure for both private and public transport within an acceptable time and to allow for continuous adaptation to developments, if financing is based on a specified income independent of the current state of the federal finances. Most Cantons found such solutions for their transport duties a long time ago. For the Confederation, the National Highway account is a step in the same direction

which is proving beneficial for the rest of the federal finances in this time of crisis.

The seperate financing of the national motorways and federal contributions to those main roads entitled to subsidies is maintained in principle in the SICT,with the addition of all the road network that is totally or partially the responsibility of the Confederation. The system has the great disadvantage, however, in that it is funded from only one source, the normal and special important duties on fuel. This means that it is totally dependent on how much fuel is consumed in this country, a factor which can be considerably influenced by manipulation of supplies from oil producing countries, by the effects of political or military conflicts, by prohibitive price rises etc. What is more,the yield for this special financing is not inflation-proof because it is based on a weight tax which does not keep pace with price developments. Any adjustments require special decisions which cannot be taken freely because they have to take into account market conditions if they do not want to run the risk of being counter-productive. All in all,it is a vulnerable system of financing especially because crude oil reserves are limited and signs of exhaustion with all their possible consequences could appear towards the end of the planning period.

These facts alone but also concrete finance requirements led to the proposal of creating the above mentioned special differentiated financing of public transport with a specific surcharge on the current federal consumer tax. Out of consideration for the general federal budget this would be limited to 20 percent of the basic rate. A fund built up in this way would have a much broader and assured basis with the yield automatically going up with any increase in prices. This form of general transport tax is justified by the great investment sums which are necessary to make public transport more attractive and which at the same time provide a guarantee of a minimum mobility for everyone in exceptional situations. It does not contradict the principle that the transport system must be self-sufficient but confirms this principle by making sure of contributions from those directly and indirectly interested.

Because of their long term purposes and because of all the uncertainties, it is difficult to say which of the two funds will be the best provided in the long run. It can be taken as highly likely that both funds will experience considerable fluctuations with which each fund will have to deal itself and which will necessitate a build-up of sufficient reserves. It would be disturbing, however, if one fund was constantly in deficit and could no longer fulfill its obligations under the established transport policy, while the other fund was receiving more means than were demanded by its normal or even

declining duties. In this event the Commission foresees a balancing out by means of "communicating channels" which would make sure global transport policy aims were achieved even in such extreme situations without the need to raise interest carrying loans from general federal resources. Thus the suggested financing system offers a long term and simultaneous guarantee for the interest of public and private transport as well as those of federal financial policy.

The Commission did not concern itself further with the legal nature and concrete organization of the two funds because these details have to be worked out in a broader context. On the one hand the Commission rejects the idea of complete legal autonomy for the funds because the political importance and the large sums involved in infrastructure investments require a strict supervision by the federal legislative. On the other hand, however, the funds must protect the continuity of investments that have been decided and the due completion of construction work that has been begun against the fluctuations and uncertainties that affect the federal budget. It is possible to contemplate an intermediate solution sui generis conceived along the same lines as the so called "extraordinary accounts" of the Cantons and Communes.

3.7 Global evaluation

The preceding chapters have presented the essential elements for a qualitative evaluation of the two final alternatives. Apart from the suggested transport network, political priorities have also to be taken into account.

The Commission consciously avoided presenting two strongly contrasting alternatives. Rather than that, the two alternatives consist of suggestions for optimization in the long term and are suggestions which seem politically feasible within the limits of foreseeable social and economic developments.

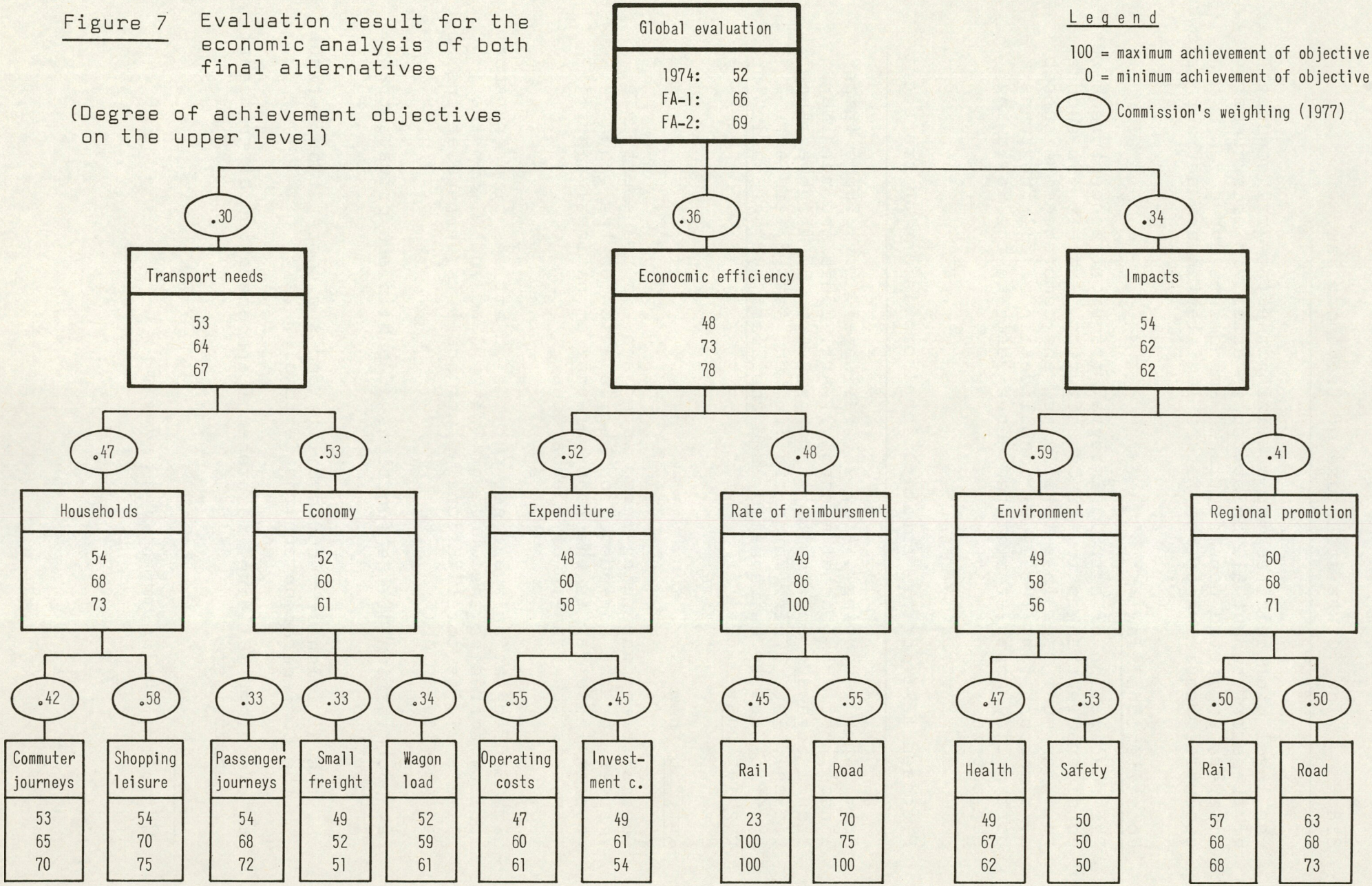
Both FA-1 and FA-2 enable a significant improvement of the transport system to be carried out in the light of all important objectives. A point-by-point comparison of the two alternatives shows that FA-2 attains higher degrees of achievement for most of the objectives and therefore gives a better overall result. The results of the value-analysis for the four upper levels of the system of objectives can be seen in the diagram on the next page (cf. chapter 2.3., figure 3).

The clearest points in favour of FA-2 relate to economy and satisfaction of transport needs. Evaluation of the direct and indirect effects of the two transport concepts, however, gives a very uneven picture. In FA-2,advantages from the regional planning point of view have to be weighed against the disadvantage of a slightly heavier impact on the environment. In the latter case the assumed price rises for energy and the consequent shift to public transport work to the advantage of FA-1. However, it must be remembered that oil prices are determined abroad and contain an enormous factor of uncertainty. Therefore the inferior result for FA-2 in this area is not specific to one alternative, because a corresponding rise in energy prices could have similarly favourable consequences for the environment in FA-2. In addition,it should be pointed out that FA-2 completely fulfils all the constraints that have been laid down with regard to the environment and would provide a considerable improvement over the situation today.

On the grounds of this overall evaluation both final alternatives can be regarded as valid ways to a balanced transport system, but nevertheless FA-2 is the preferable alternative.

Figure 7 Evaluation result for the economic analysis of both final alternatives

(Degree of achievement objectives on the upper level)



3.8 The future structure of transport law

The legal prerequisites for realizing the integral concept of transport cannot all be stated in detail in this summary. However, suggested constitutional amendments and a few essential requirements for future legislation are set out below.[1)]

Constitutional law

The realization of a truly integral transport concept requires considerable changes to the Constitution. A draft for such a revision must contain a totally new and comprehensive concept of transport law. The legal consolidation of all the transport policy postulates stated above leads to the following suggestions:

Proposed text for new constitutional provisions on transport

Art. 24ter (shipping), Art. 26 (railways), Art. 26bis (pipelines), Art. 36 (postal monopoly), Art. 36bis and ter (National highways and their financing), Art. 37 (highway supervision), Art. 37bis (motor traffic) and Art. 37ter (air traffic) are to be repealed and replaced by the following regulations:

Art. 36 (new)

[1] Legislation concerning land, water and air transport is a matter for the Confederation. Legislation on the road system in so far as the roads are not of national significance is the concern of the Cantons.

[2] The Confederation shall set out the objectives of a transport policy embracing the whole of Switzerland and within the limits of its constitutional power shall issue regulations in particular on:

a. coordination of the functions of public and private transport;

b. the division of responsibility and the cooperation between the Confederation and the Cantons;

c. planning, building, maintenance and operation of transport facilities;

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1) Cf. the note on the term 'Confederation' at the end of chapter 1.

d. the safety of those using transport;

e. financing transport.

[3]These regulations take into account transport needs, efficient use of resources and the impact of transport on man and environment.

[4]As an exception to the principle of free trade and industry the Confederation has the monopoly in commercial passenger transport, post and telecommunications, railways, air traffic and pipelines. As long as it is in the general interest of the country and if other measures fail, transport legislation can also deviate from the principle of free trade and industry also in other cases.

Art. 36bis (new)

[1]The free choice of means of transport is guaranteed.

[2]The public roads are open to everyone within the limits of the purpose for which they were conceived. The right is reserved to levy user taxes for excessive use or to cover the infrastructure costs.

[3]Personal privacy in the field of posts and telecommunications is guaranteed.

Art. 36ter (new)

[1]The Confederation shall take care of planning, building and maintaining the infrastructure of the nationally important transport network. Operations shall be the responsibility of transport enterprises or the Cantons.

[2]The Confederation shall be responsible for running the Swiss post and telecommunication system as well as the Federal Railways. They shall be run on a commercial basis and be largely autonomous.

[3]The Confederation shall promote the construction, maintenance and operation of facilities for public transport on the regional level, regional cooperation amongst the different

carriers of public transport as well as the improvement of roads which supplement the national road network. It shall also allocate funds to the Cantons for balancing the financial burdens of the transport sector.

[4]The Cantons have to be brought into the planning of the national transport network.

Art. 37 (new)

[1]Transport shall be so structured as to cover its own costs after taking account of compensation for special services demanded by the Confederation, Cantons or Communes.

[2]With the exception of compensation for special services the transport related expenses incurred by the Confederation for transport and for balancing the financial burdens among the Cantons shall be financed by earmarked taxes, namely:

a. For public transport: The net yield from a surcharge on the turnover tax not exceeding a fifth of the basic rate, as well as the net yield from fees paid by transport enterprises for the use of infrastructure in the national transport network.

b. For private transport: Three fifths of the net yield from duty on motor fuels, the net yield from special surcharges on fuel duty and the Confederations's share of fees for the use of roads in the national network.

[3]The net yields from earmarked taxes will be put into one or the other fund according to their purpose; the funds sould be harmonized in such a way that in the long term the established objectives of both the public and private transport sectors can be attained.

[4]Should the deposits in the individual funds temporarily not cover expenditure the Confederation can grant interest-bearing bridging loans.

Reflections on the constitutional texts

These suggestions for re-shaping the constitutional aspects of transport law form the decisive result of the Commission's work. The essential characteristic of these texts is that they incorporate all the previously scattered regulations for the various modes of transport into one comprehensive

regulation. The Commission is of the opinion that the four new constitutional articles should be presented to the people and the Cantons in the form of a single project. In this way it is possible to preserve the principle of the unity of the subject-matter.

Article 36 of the constitutional draft defines the limits of the Confederation's legislative authority. The following three articles clarify three important areas: namely the area of personal freedom (art. 36bis), the direct functions of the Confederation with regard to transport (art. 36ter) and the financing of the transport system (art. 37).

This will do away with the compartmentalized view of the transport system by bringing together all the Confederation's legal authority in one general regulation (art. 36, para. 1). For the first time it will be expressly emphasized that legislation should be directed towards the goals of the comprehensive transport policy (art. 36, paras. 2 and 3).

Within the framework of general legislative competence the traditional monopolies of the Confederation are confirmed as an exception to the rule of freedom of trade and industry. The monopoly on commercial passenger transport service which until now stemmed from the postal regulations receives a special mention (art. 36, para. 4). At the same time the legislature is given the power, within certain limits, to restrict the freedom of trade and industry in certain other cases.

In art. 36bis, para. 1, the previously unwritten right to a free choice in means of transport within the limits of their availability is guaranteed for the first time. This derives from the freedom of the individual in particular the right of mobility. This is why this article takes its place alongside transport monopolies which concern commercial activities. In this context the relevant law on free access to public roads is generalized in art. 36bis, para. 2. The same paragraph provides for the first time and in general form for the introduction by legislation of fees (tolls) for the use of roads. By definition these taxes are governed by the limiting principle of covering costs. With this constitutional foundation and given the results of the National Highway Account by vehicle categories a heavy vehicle tax can in future be envisaged. The same constitutional regulation would make it possible, among other things, to introduce special taxes for using the national highways (for example general taxes linked to vehicle performance, system of windscreen

sticker licences for motorways etc. 1). Paragraph 3 of art. 36bis concerning post and telegraph secrecy has been taken over in an adapted form from the previous postal article.

Art. 36ter, para. 1, establishes the new hierarchical structure of the transport netowrk in which the Confederation is responsible for the transport infrastructure of national importance. The Cantons however, retain the right of codetermination (para. 4). The additional principle according to which the transport enterprises or the cantons are responsible for operations (obviously taking account of the transport monopolies of the Confederation art. 36, para. 4) is alleviated by the constitutional duty of the Confederation to operate the SBB (Federal Railways) and PTT (Post and Telecommunications) (art. 36ter, para. 2).

The federal duties laid down in art. 36ter, para. 3, with regard to promoting regional public transport, cooperation between the various modes of public transport and the improvement of supplementary road networks can be considered as individual measures with a view to a functional division of duties and a comprehensive balancing of financial burdens, in favour of the Cantons.

Any deviations from normal state budgetary principles require a special foundation in constitutional law. This why art. 37 sets out the principles of transport being self-financing (para. 1) and the specific financing of the transport expenditure of the Confederation with earmarked revenue (para. 2). The sources of finance for public transport (para. 2 a) represent new law; however, the surchargedon the turnover tax should be adapted to the value added tax system if it is brought into effect. Para. 2b which refers to the tax on fuel for private transport corresponds closely to existing legislation on financing roads. The new fees for use of the roads are in accordance with the reservation expressed in art. 36 bis, para. 2, the text guarantees the Cantons a share corresponding to their road network. Art. 37, para. 3, lays down the principle that the earmarked taxes are to be administered through special funds but leaves the decision on what legal form these funds are to take up to normal legislation. The possibility of advance sums being granted to the transport funds from the general federal budget (art. 37, para. 4) can be regarded as a provisional measure subject to the basic principle of self-financing as laid down in art. 37, para. 1.

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1) The Commission has rejected such taxes for the immediate future because the proposed heavy vehicle tax will re-establish coverage of all costs on the highway account. Furthermore, the different tax systems that have been discussed present undeniable disadvantages for this country and there is no agreement on their cost effectiveness and possible unfavourable side effects. A later legislative introduction of additional charges would have to be preceeded by further investigations.

Finally it should be mentioned that in order to conform with the new grouping of the articles relating to transport some references in other parts of the Federal Constitution have to be adapted (eg. art. 41ter, para. 4a and art. 42).

Further Legislation

The suggested constitutional texts intentionally leave a lot of room for manoeuvre on the legal level, for transport policy. This allows for better incorporation of medium and long term developments.

The best way to harmonize transport law in the shortest time possible in accordance with the objectives of the SICT, is to elaborate a "general transport law". This law should settle all matters which are of general significance for the relationship between the State on the one side and the various modes of transport and transport users on the other side. This general law should also settle the relationship between the various modes of transport themselves. Of special importance is the establishment of the transport hierarchy together with the balancing of financial burdens and of the transport funds.

In addition a special law on public transport should be drawn up. This law should set down the fundamental duties of the public transport enterprises and it should also make clear the limits on the commercial freedom and responsibilities of the public authorities and these transport enterprises. At the same time compensation of public service performances including approximation of tariffs have to be redefined. In particular new principles must be fixed for calculating compensation and for the decision making process.

3.9 Organization of the Federal Administration in the transport field

In order to facilitate a coordinated transport policy Federal duties in execution, administration and supervision of transport matters should be put in the charge of one single ministry, namely the present Department of Transport, Communications and Energy. For this purpose the Federal Office of Highways and Rivers and the Division for road traffic in the Federal Office of Police should be integrated into the Ministry of Transport and Energy 1). Within this ministry, transport tasks would be divided among special offices for: public transport on land and water, road construction, private road traffic, private shipping and air transport.

Planning and coordination duties will be in the hands of a special staff, directly responsible to the minister. This staff will ensure the continued use of the extensive scientific documentation, the data banks and transport models of the SICT. This staff also has the duty, in cooperation with interested offices, of working out in detail the principles formulated by the Commission, on transport hierarchy, transport funds, compensation for public services, etc. The staff also has to draw up the proposed constitutional and legal texts necessary to realize the Commission's recommendations. Such a staff would also be a suitable organ for examining infrastructure projects on the national level for their feasibility and whether they conform to given objectives. For this reason planning documentation should be updated periodically and the effects of transport policy measures continuously analysed.

It is essential that important policy questions in the fields of legislation, planning and finance should be studied taking into account as many interests as possible. For this purpose the Transport and Energy Ministry should set up a consultative council of about 15 members drawn from the transport economy, transport users, the scientific world and the national regions. This council has the job of deciding whether all important decrees and measures (relating to extension of the transport infrastructure, service duties of public transport, infrastructure cost calculations, the use of income from the transport funds) conform with the objectives of comprehensive transport policy. A further duty of the council would be to propose modifications of these objectives in the light of new developments. This consultative organ for all transport could replace various other federal commissions.

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1) The question of how the division for waterway control and dam construction will be organized remains open.

4. FINAL RECOMMENDATIONS

On the basis of its thorough examination of the problems involved in transport planning and transport policy the Commission unanimously recommends the Federal Council (Federal cabinet) to adopt and set in operation the SICT as set out in chapter three of this report. In doing so the following forty main theses should be taken into consideration[1]:

Choice of final alternatives

1. The SICT is based on a multi-level system of objectives which was worked out by the Commission from the mandate by the Federal Council dated 19th of January 1972. The three main objectives (satisfaction of transport needs, efficient use of resources and consideration for the direct and indirect impacts) serve as the yardsticks for evaluating the final alternatives. Given the high quality already attained in the Swiss transport system the main emphasis is on an optimum use of resources and improvement of the impacts of transport.

2. The Commission suggests that the Federal Council should give preference to Final Alternative 2. This alternative provides for the adaptation of the road network and motorway construction scheme to the changed economic, social and ecological conditions. On the other hand, this alternative calls for an improvement and concentration in the services offered by the railways for traffic suited to rail transport. This includes the construction of new main rail axes between Lakes Geneva and Constance and between Basle and the southern foothills of the Jura which would be capable of competing with road passenger transport.

3. The basic objectives set out in the SICT and the measures necessary to achieve them should be checked regularly in order to see whether they conform with developments in society, the economy and the environment.

   Care should also be taken to assess the effective results of measures against the objectives within the SICT.

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1) Cf. the note on the term 'Confederation' at the end of chapter 1.

Current work which has not been finished because of its complexity must be continued. In particular more scientific data is needed on the problem of external costs and benefits in order to determine their overall effect and to eliminate any possible distortions in competition.

Structure of the transport system

4. Responsibility for the transport networks and the types of transport should be functionally divided between the Confederation and Cantons in accordance with major interests involved and the federal structure of the country(transport hierarchy). As a result of this there will be a distinction between national and regional transport networks and duties. It is the Confederation's duty to coordinate the links between the two networks.

5. National duties in the framework of the new transport hierarchy include:

   - providing for national and international long distance transport
   - guaranteeing communications between regions
   - connecting capitals of the Cantons with the national networks of public and private transport
   - elimination of striking discrepancies in the provision of basic transport facilities within Cantons.

   Sovereign rights on planning, construction, maintainance and financing of a transport infrastructure do not necessarily have to coincide with its ownership or operation.

6. The Confederation makes sure, by means of a special balancing of financial burdens, that no Canton is more heavily charged for additional tasks it receives under the new transport hierarchy than before. This also applies to the transitional phase. The adjustment of charges has to be adapted to future development of transport and its yields as well as to public finance.

7. Within the context of the jurisdiction given to them and the levels in the hierarchy, the Confederation or Cantons decide autonomously on how the available financial means are to be applied in setting up the infrastructure and influencing what the different modes of transport have to offer in terms of service. Co-ordination among the Cantons has to be assured.

8. The division of transport policy/responsibilites between the Cantons and Communes is not a matter for the Confederation. Each Canton settles this matter independently or in co-ordination with neigbouring Cantons.

Coordination of planning, construction and maintenance of the transport infrastructure

9. In their own areas of responsibility the Confederation and Cantons plan the various transport networks as a coordinated integral system and set priorities for implementation.

10. Before any large investments are made they have to be justified in relation to transport policy objectives. Both the measurable and non-measurable overall economic costs and corresponding benefits are to be taken into consideration during this process.

11. Over and above this, each national infrastructure project has to be tested for suitability by comparative studies (in particular the utilization of existing infrastructures and other possible solutions). Preference should always be given to that alternative or completion date which reaches the highest degree of achievement of SICT objectives.

Compensation for the performance of public services

12. It is essential to formulate a new and comprehensive regulation in order to define and compensate the performance of public services. These services, which could not be contemplated in commercial terms without some form of compensation, are imposed in the public interest in order to fulfill policy goals in the cultural, social, environmental, energy, economic or security fields.

    Contrary to previous practice, all public services will only be recognized as such in the future if they have been demanded by the responsible political authorities (Confederation, Cantons and Communes) and have been negotiated in advance with the transport enterprises with regard to volume, conditions and amount of compensation.

13. Public services should be examined periodically by the responsible political authorities of the Confederation, Cantons or Communes to determine whether they are still necessary and sufficient and whether they are being carried out by the suitable mode of transport.

14. Public services of general interest demanded by the Confederation should be financed from the general budget. They are to be charged to those departments (ministries) with which they are associated.

15. The Confederation recognizes the adjustment of tariffs as a task in the public interest that it has to finance itself in order to maintain a structure of communities which is as decentralized as possible. Methods and criteria for determining the desired level of tariffs have to be studied and formulated in accordance with objectives.

16. Additional public services might become necessary in poorly developed regions and in agglomerations, in the first place to ease marked deficiencies in the provision of basic transport facilities and in the second place to reduce excessive impacts on the evironment caused by transport.

The Cantons should define these special public services and finance them. The Confederation grants earmarked contributions for the purpose from the transport funds.

Competition in transport

17. The existing state monopolies on commercial passenger transport, post and telecommunications, railways and air transport as well as pipelines should be maintained. Private transport(goods and passenger) should also continue to be limited only by legal regulations in order to guarantee the widest possible choice in means of transport.

    Deviations from this general principle are acceptable if they are of national interest and if other measures fail. As far as possible, goods traffic in transit should be carried by rail (combined transport).

18. Where there is competition between road and rail (particularly with goods transport) all distortions should be eliminated. The following measures should be foreseen:

    - Heavy road transport, which does not cover the infrastructure costs it causes, will receive a new special tax linked to work performance. This will allow a full coverage of costs in relation to National Highway Account (total capital account).

    - The deficit covering of public goods transport is to be reduced gradually and eventually abolished.

    - More effective controls should be imposed to make sure that regulations on working hours, rest times and maximum loads for goods transport by road are respected.

    - Taking into account the specific characteristics of each form of transport, the legal regulations on working and social conditions for public and private goods transport should be harmonized.

    - Proven burdens not related to and advantages not stemming from entrepreneurial efforts should be phased out wherever

possible and written off against each other. Any possible surpluses should be used for compensating services in the public interest.

- Account should be taken of those external costs and benefits distorting competition which can be calculated and ascribed to those who cause them.

19. The differing regulations for financing road and rail infrastructure costs should be eliminated, at least within the transport network at national level. This is why the Confederation should take over the financing of infrastructure costs for the national rail network in the same way as it has done for the national highway network.

Financing the transport system

20. Transport system users should in principle cover the costs they cause. The only permissible exceptions to this principle are when the transport system has to perform public services for overriding interests or as a result of international treaties.

21. In order to finance the transport infrastructure and its other obligations arising from transport policy the Confederation should create two funds, the first for public transport and a second fund for private transport. The funds should balance each other out in such a way that over the long term the stated objectives of both the public and private sectors can be achieved.

    When the deposits in the individual funds do not cover expenditure the Confederation may grant interest-bearing bridging loans.

22. The fund for public transport is for covering infrastructure costs in this sector and for maintaining an adequate service. It is supplied by a earmarked surcharge of at maximum 20 % of the turnover tax rate and through the user taxes from railways on the national infrastructure. The idea of the consumer tax is that it takes the form of a general transport tax which ensures that everyone, including those who never or only occasionally use public transport, make an equitable contribution towards the

maintainance of an adequate public transport service and towards a corresponding balancing of burdens for the Cantons.

23. The fund for private transport is for covering the costs of the infrastructure for road traffic for which the Confederation is responsible. This particularly includes expenditure for building and maintaining the national road network and the sums paid out to the Cantons for balancing the financial burdens of their road costs.

    The private traffic fund is supplied by three fifths of the net yield from tax on motor fuels, from the net yield of the special surcharge on fuel as well as by the Confederation's share of user taxes from roads in the national network.

24. In the medium- to long-term, infrastructure costs (including interest on building loans) should be covered by users. Costs for newly planned infrastructure projects should also be taken into account as far as market conditions allow. Taxes for using the infrastructure can be temporarily lowered in order to pursue transport policy objectives, for example in order to achieve a balanced use of the available infrastructure.

The task of the Swiss Federal Railways

25. The tasks of the Federal Railways should be reformulated in such a way as to give all sections of the network the greatest possible commercial freedom. In particular,the railways should be solely responsible for deciding on the offer of services and prices in long distance passenger transport, wagon load and small freight transport. The federal parliament has the duty of laying down the medium-term basic principles of what services the Federal Railways should provide. Within the framework of this basic outline of duties the Federal Railways have to define their commercial objectives and make a periodic account of how they have fulfilled these objectives. As soon as the Federal Railways are able to be run as projected in the SICT,all deficits that will occur should be carried forward and amortized within a reasonable period.

26. Responsibility for deciding on new rail lines or other installations of national importance should be transferred to the federal parliament, with the Federal Railways reserving the right to make suggestions and give their advice.

27. The Federal Railways should be given authority to reduce services which to not pay, to replace them with other means of transport or to close them down altogether if their losses are not covered by public authorities.

The tasks of other public transport enterprises

28. The historically interpreted division of the Confederation's authority in postal and communication matters, into a monopoly for the transfer of information and small packages on one hand and a monopoly for passenger transport on the other, should be given a basis in constitutional law in future. The second monopoly applies to the regular commercial transport of passengers in general and so goes beyond the postal sector.

29. The PTT should keep a separate account for its passenger service in order to facilitate the links with other public transport services.

30. Where they are fulfilling analogous tasks the concessionary transport enterprises should be treated in the same way as the Federal Railways and the PTT, with regard to infrastructure investments and service duties, etc.

    In order to improve regional public transport and in order to make it more economic an effort should be made to concentrate the regional transport enterprises concerned into regional units.

New federal transport law

31. There should be a partial revision of the Federal Constitution to consolidate the diverse powers of legislation for the individual modes of transport which, until now, have been scattered through the Constitution.

32. The new constitutional text should in particular provide for:

- coordination of the interests of public and private transport within the comprehensive transport policy
- division of duties between the Confederation and the Cantons
- the principle that transport has to cover its own costs
- the possibility of imposing special regulations on long distance transport of goods by road where this is in the national interest and in the absence of alternative measures
- the authority to levy earmarked taxes for both public and private transport
- the administration of the specific taxes through two funds for private and public transport respectively, with provision for the two funds balancing each other.

33. The Commission recommends that the Federal Council should base the partial revision of the Constitution on the suggested texts for articles 36, 36bis, 36ter and 37 in chapter 3.8. of this summary.

34. After adoption of the suggested constitutional revision by the federal electorate and the Cantons a general transport law should be promulgated which sets out the objectives of the comprehensive transport policy, defines the national transport network, establishes coordinated transport planning and regulates details about financing and balancing of burdens.

35. Simultaneously, rules for compensation for provision of public services by the Federal Railways, the PTT passenger buses and the transport enterprises with concessions,

including adjustment of tariffs, should be revised. In addition, the basic obligations of public transport (obligations to operate, to transport, to publish timetables and fares) should be reduced in order to promote greater freedom and self-responsibility for the enterprises.

Reorganization of the Federal Administration

36. All offices in the Federal Administration, which entail duties connected with a coordinated Swiss transport policy, should be concentrated in the Department of Transport, Communications and Energy.

37. The execution of duties relating to public transport on land and on water, road construction, private road traffic, air transport, private shipping and the pipelines should be designated to special offices within the Federal Department of Transport, Communications and Energy.

38. A special staff should be set up for working out general bases of transport planning and policy as well as for coordination between the different carriers of transport. This staff should be directly responsible to the Minister for the introductory and consolidation phase of the new comprehensive transport policy.

39. The Ministry of Transport and Energy should establish a consultative commission made up of representatives from transport, transport user organizations, national regions and science. This commission would have the task of examining all important questions of transport policy and striving for solutions which best serve the interests of all concerned, within the framework of general transport policy objectives.

40. The transition from today's sectional organisation to integration should be carefully planned and carried out

in systematic steps in order not to jeopardize current duties and to avoid cases of hardship.

Lucerne the 21st of December 1977

In the name of the
Commission for a Swiss
Integral Concept of Transport
The President:

Dr. Alois Hürlimann
National Councillor

Present and forecasted traffic volumes

Appendix 1

Passenger transport		Unit	Base year (1974)	%	FA-1	%	FA-2	%
Passengers	public transport (road and rail)	1000 m. per year	0.936	26	1.400	28	1.320	26
	private transport		2.653	74	3.680	72	3.750	74
	TOTAL		3.589	100	5.080	100	5.070	100
	Index	Index	100		142		141	
Pass. kms	public transport (rail and road)	1000 m per year	11.2	18	22.6	22	22.0	20
	private transport		51.7	82	79.6	78	87.2	80
	TOTAL		62.9	100	102.2	100	109.2	100
	Index	Index	100		162		174	
Goods transport								
Tonnes	rail	million	50.4	13	77.3	17	59.4	13
	road	per year	312.3	82	373.1	78	383.9	81
	lakes		5.5	2	6.0	1	6.8	1
	piggyback		-		0.9	0	3.0	1
	pipelines		13.1	3	20.1	4	20.1	4
	TOTAL		381.3	100	477.4	100	473.2	100
		Index	100		125		124	
	Rhine navigation	million per year	9.3	2	15.6	3	15.9	3
Tonne kms	rail	1000 m.	7.47	47	13.79	53	10.62	43
	road	per year	7.30	45	9.93	39	10.87	44
	lakes		0.15	1	0.19	1	0.64	3
	piggyback		-		0.28	1	0.95	4
	pipelines		1.10	7	1.60	6	1.60	6
	TOTAL		16.02	100	25.79	100	24.68	100
		Index	100		161		154	

Estimated yearly cost of the Swiss transport system

Appendix 2

(at 1974 prices in million francs)

	Base year	FA-1	FA-2
Gross national product	146'500	250'700	
Index	100	171	
Income per capita (Francs)	19'200	30'400	
Yearly infrastructure costs			
Public transport (rail and road)	815 - 850	1'390 - 1'690	1'470 - 1'790
Private transport (road)	2'540 - 2'680	3'660 - 4'630	3'880 - 4'920
Navigation (Rhine)	40 - 50	60 - 70	100 - 110
Air	150 - 160	320 - 340	320 - 340
Pipeline	20	20 - 30	20 - 30
Total	3'560 - 3'760	5'450 - 6'760	5'790 - 7'190
Index	100	150 - 183	159 - 195
Total yearly costs			
Public transport (rail and road)	2'930 - 3'130	3'560 - 4'080	3'740 - 4'310
Private transport	24'180 - 25'420	34'860 - 41'170	33'940 - 40'120
Navigation	80 - 90	130 - 140	170 - 200
Air [1]	150 - 160	320 - 340	320 - 340
Pipelines	30	30 - 40	30 - 40
Total	27'370 - 28'830	38'900 - 45'770	38'200 - 45'010
Index	100	138 - 163	136 - 160

1) not including airline operating costs

56 838