INNOVATIVE GOVERNMENTAL APPROACHES TO SUPPORT AND PROMOTE INTERMODAL TRANSPORT ON TRANSALPINE CORRIDORS THROUGH SWITZERLAND

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ABSTRACT

The European transport policy as well as national transport policies aim at increasing the market share of more environmentally friendly transport modes (rail, inland waterway, and short sea shipping integrated into intermodal transport alternatives). Road transport has still the biggest mode share and despite the fact that forecasts show that short sea shipping will grow slightly faster than road transport in the mid- and long-term view, it still is a dominant mode of transport for intra-European freight transport.

One of the main reasons for this development is intermodal logistics inability to adequately meet the customer requirements in the new logistic environment that emerged during the 1990s. Road transport is often considered to be more flexible, cost effective, transparent, efficient and providing higher service quality than intermodal transport alternatives. Organisational, technical, financial, economical, infrastructural and logistical barriers hinder today a wide breakthrough of intermodal logistics.

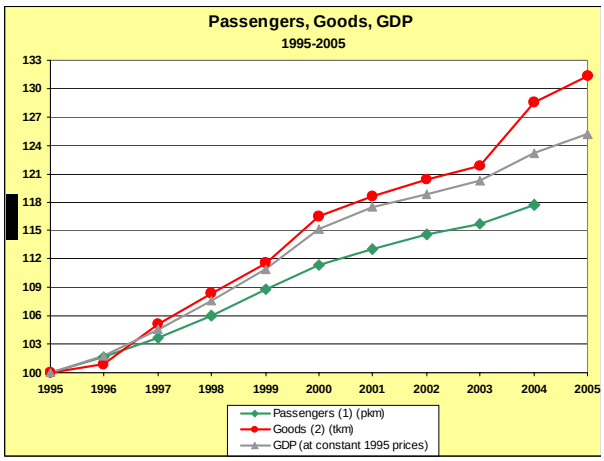
The paper gives a general overview on policies and measures to support and promote intermodal transport in Europe and explains in more detail the Swiss approach to support and promote intermodal transport on the transalpine freight corridor through Switzerland. Besides the concrete measures also the experiences and effects of the Swiss approach are shown.

The paper is based mainly on the work of the PIARC Technical Committee “2.4 Freight Transport and Intermodality” which is presented in the report “Measures promoting alternatives to the road and intermodal terminals” and intermodal concepts, research and evaluation projects carried out in Switzerland. Also interim results of the running European PROMIT project (Promoting Innovative Intermodal Freight Transport) have been taken into account. The paper focuses on governmental measures addressing non-accompanied intermodal transport.

1. FREIGHT DEVELOPMENT IN EUROPE AND NEED FOR ACTION

1.1. Freight development in Europe

Freight transport increased in the last decades on global, international and national level (Fig. 1). In Europe, since mid of the nineties, freight transport (in tkm, 2.8%/year) is growing faster than passenger transport (pkm, 1.9%/year) and also faster than the economy (GDP, 2.3%/year). The main reasons behind are the globalisation, the spatial division of labour and the individualization of demand. Looking at this trends one could speak of a negative decoupling between the economic and freight transport development which is not in line with a sustainable development.



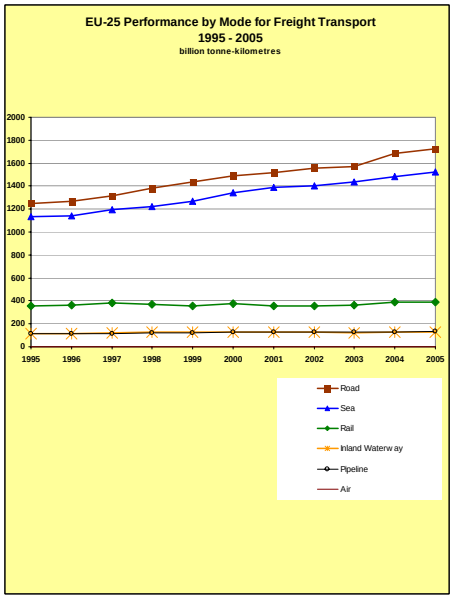


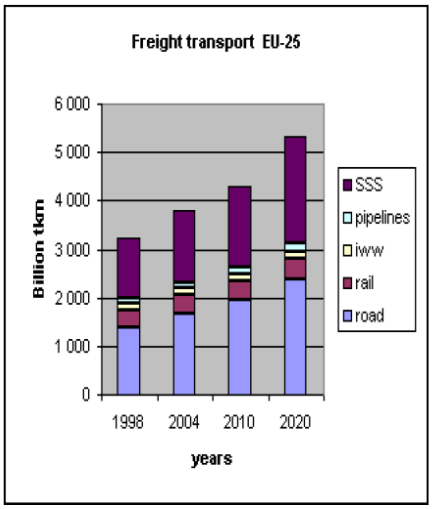
Figure 1: The development of freight transport in EU-25 1995-2005 (Eurostat 2006, (1))

Freight transport within EU-25 in 2005 is estimated to about 4.2 billion tonne kilometres (Fig. 1). The share of road transport is 44%, maritime transport 39%, inland waterways 3%, rail 10% and air and pipelines 4%.

Intermodal transport has still a low share in short sea shipping, inland waterway and rail transport. Considering all intermodal transport chains it is estimated that today in Europe (2):

- 10 to 15% of transported volumes are intermodal transport
- 5 to 8% of continental transport volumes are intermodal transport
- 75 to 80% of intercontinental transport volumes are intermodal transport.

Total freight is expected to increase 50% until 2020 (Fig. 2, (3)). Short Sea Shipping (+59%) and road transport (+55%) are expected to continue to increase more than inland waterway (+28%) and rail (+19%)



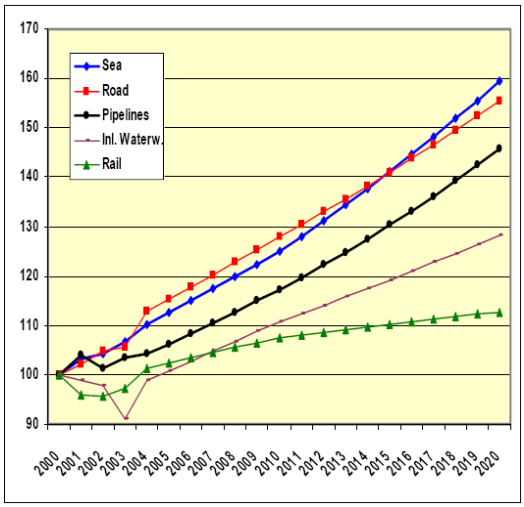


Figure 2: Expected Growth in Freight Transport 2000-2020 (Source: European Commission 2006, 2000=100, (3))

Overall freight transport is gaining importance relating to capacity use of the transport network (congestion, accessibility, etc.), relating to negative impacts on the environment (pollution, use of space, energy consumption etc.) and relating to society (traffic accidents, supply of goods etc.).

1.2. Need for encouraging intermodal transport

The need for encouraging intermodal transport has been identified within the PIARC technical committee “Freight Transport and Intermodality” (2):

- The productivity of road transport is declining as a result of congestion, improved enforcement of regulation and social standards (training, driving and resting times) and is leading to higher costs and loss of competitiveness of road transport. Road transport capacity will not increase in tact with growth because of the costs of new infrastructure and local objections to new roads and road extensions. New capacity is also taken by the growth in private passenger transport.

- Environmental problems (noise, pollution, area space use, etc.) are increasing, especially in sensitive mountainous regions, coastal regions and urban areas. Concerns about climate change are increasing. Road truck transport is heavily dependent on fossil fuel. High fuel prices and price instabilities have to be faced.

- Economic growth involves increased traffic flows, and to cope with this the different transport modes need to combine their services to create an efficient and sustainable transport system. Intermodality is seen as one possible approach with a high potential to make freight transport more sustainable and ensure economic development. Intermodality is needed so that better use can be made of alternative modes that have accessible spare capacity. Making better use of available resources is not an expensive solution and reduces the stress on over-used road networks.

1.3. Definition of intermodal transport

Intermodality or intermodal transport is defined as “The movement of goods in one and the same loading unit or vehicle which uses successively two ore more modes of transport without handling of the goods themselves in changing modes.” (UNECE 2001 (4)).

As modes of an intermodal transport chain rail, barge (inland waterway), ship (short sea shipping and deep sea shipping) and road, which is used usually for the pre- and endhaulage from and to terminals, are considered.

Combined transport is a segment of intermodal transport and is defined as ”Intermodal transport where the major part of the journey is by rail, inland waterways or sea and any initial and/or final legs carried out by road as short as possible” (UNECE 2001 (4)). Often this term is used as a synonyme to intermodal transport.

The most common intermodal chains are shown in figure 3 (TRILOG 1999, (5)). The main haul is either done by rail, inland shipping or short sea shipping transport. As loading units in intermodal transport chains containers, swap bodies and semi trailers are transported. This kind of intermodal transport is non-accompanied.

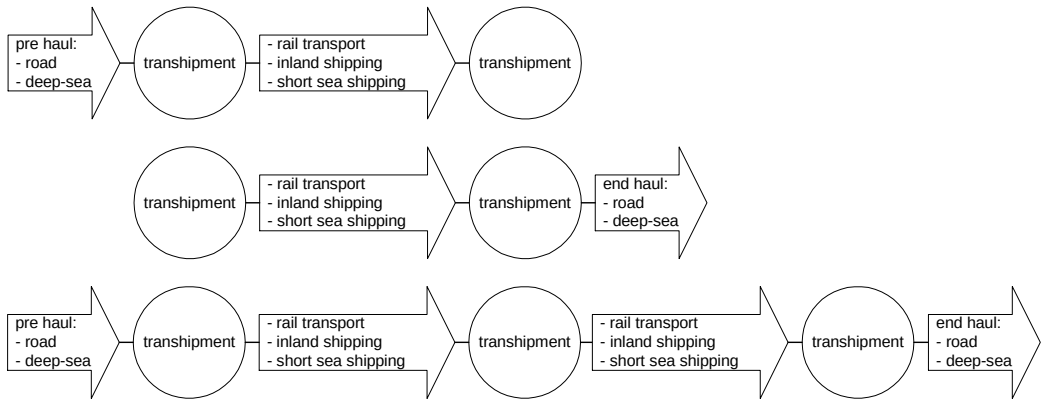


Figure 3: Intermodal transport chains (5)

Looking at Rolling Motorways also tractors with semitrailers can become loading units. This kind of intermodal transport is accompanied if the driver stays together with the vehicle on the main haul. This paper focuses on non-accompanied intermodal transport.

1.4. Barriers related to intermodal transport

Although intermodal transport is growing, its share is still relatively low and the big breakthrough of intermodal transport has still to come. The main reason for this development is the inability of intermodal transport adequately to meet customer requirements in the new logistics environment. Road transport is often considered to be more flexible, accessible, cost effective, transparent, efficient and to provide a higher quality service. The main barriers and key problems that hinder a breakthrough of intermodal transport are the following (PIARC TC 2.4 2007 (2), PROMIT 2007 (7)):

- **Organisational barriers**, i.e. too many partners involved, lacking cooperation between involved actors, unclear responsibility and liability, etc.
- **Technical barriers**, i.e. missing integration of information technologies, no door-to-door tracking and tracing, friction at transfer points, lack of standardisation (e.g. semi-trailers, certain loading units, message exchange), etc.
- **Infrastructural barriers**, i.e. unsuitable infrastructure at terminals, different rail gauges, capacity restraints at terminals and their access roads, different rail track equipment, lack of standardisation at terminals, etc.
- **Operational, logistical and service-related barriers**, i.e. lacking transparency in the transport chain, missing flexibility for short-term orders, priority for rail passenger transport in the European railway network, missing intermodal services, missing information about available services, missing awareness of possibilities of intermodal transport, problems integrating intermodal transport in logistics chains of companies, missing integration of short sea shipping, railway and barge in intermodal transport etc.
- **Political barriers**, i.e. no harmonised framework conditions for pre- and end-haulage, terminal funding, etc.
- **Financial and economic barriers**, i.e. high investment costs for intermodal equipment, intermodal terminals, high pre- and end-haulage costs, cost-intensive storing capacity, etc.

The barriers in the intermodal chain are localised and a rough assessment of their importance is indicated in the following table (PIARC TC 2.4 2007, (2)).

Problem areas	Intermodal chain	Main haul	Terminal	Pre- and end-haulage
Organisational barriers	**XXX**	**XX**	**XX**	**XX**
Technical barriers	**XX**	**X**	**XX**	
Infrastructural barriers		**XXX**	**XXX**	**XX**
Operational, logistical and service related barriers	**XXX**	**XX**	**XX**	**XX**
Financial and economic barriers		**XX**	**XX**	**XXX**
Political barriers (framework conditions)	**XX**	**X**	**XX**	**XX**

XXX = very high importance, XX = high importance, X = low importance.

Table 1: Importance of problems in intermodal transport (3)

These barriers and problems have a negative impact on the efficiency and quality of intermodal transport chains and decrease its attraction to the user. There is a need to overcome and reduce these barriers. Besides measures initiated by the market parties governmental measures can contribute substantially to improve the situation of intermodal transport.

2. ACTIVITIES TO SUPPORT AND PROMOTE INTERMODAL TRANSPORT ON EUROPEAN LEVEL

Intermodal plays an important role in European transport policy (European Commission 2001 (6), 2006 (3)) although the approach was extended to co-modality in 2006 which includes the promotion of optimal use and integration of modes.

Intermodal transport is on European level promoted and supported by research and demonstration programmes, actions programmes, implementation projects, development and funding of the Trans-European Transport Network (TEN) and standardisation (www.ec.europa.eu/ten/transport and PIARC 2007 (2)).

2.1. Research and Demonstration programmes

Research and demonstration framework programmes (4th, 5th, 6th and 7th FP, www.cordis.europa.eu) include Integrated Projects (e.g. IDIOMA, CESAR, SPIN, INTERMODA, EUTP/ITIP, INHOTRA, IQ, BRAVO) and coordinated and supporting Actions such as PROMIT (Promoting Innovative Intermodal Freight Transport (7)).

2.2. Action Programmes

Action programmes include PACT (Pilot Actions on Combined Transport, 1997-2002), Marco Polo I (2003 to 2006) and Marco Polo II (2007-2013). The programmes supported and support actions in freight transport, logistics and other relevant markets. These actions have to contribute to maintaining the distribution of freight between the various modes of transport at 1998 levels by helping to shift the expected aggregate increase in international road freight traffic to short-sea shipping, rail and inland waterways or to a combination of modes of transport in which road journeys are as short as possible. Marco Polo II includes new actions, such as motorways of the sea and traffic avoidance measures. It defines six

actions: (a) Modal Shift Action, (b) Catalyst Action, (c) Common Learning Action, (d) Motorways of the Sea Action, (e) Rail Synergy Action, (f) Traffic Avoidance Action.

The action programme NAIADES (Navigation and Inland Waterway Action and Development in Europe) started in 2006 focuses on five strategic inter-dependent areas as markets, fleet, jobs and skills, image and infrastructure. To overcome the barriers in these fields organisational and legislative proposals will be carried out. Policy, educational and promotion measures will be developed and implemented. This includes the application of information and communication technologies. The time frame for the implementation of the plan is the period 2006-2013.

The ex post evaluation of the PACT programme (AEA 2000, (8)) has shown a significant modal shift from road to intermodal transport with, at the same time, a relatively small budget for supporting measures. Between 1996 and 1998 a modal shift of 6.5 billion tonnes-kilometres could be reached and related decreases in emissions and energy consumption.

Figure 4: Intermodal transport solutions

For the Marco Polo II programme (2007-2013) supporting intermodal transport, a modal shift of 144.1 billion tonnes-kilometres with European Union subsidies of 820 Mio Euros is expected (ECORYS 2004, (9)). The most promising parts of the programme are the modal shift action and the motorway of the sea action. The analysis results in Marco Polo II having a positive impact on reducing externalities of 4.98 billion Euros. Effectiveness ratios of 176 tonnes-kilometres shift per Euro subsidy and 6.07 Euro external benefits per Euro are aimed at.

2.3. Supporting projects

Supporting projects as the Freight Integrator Action Plan (2003, 10)) and Integrated Services in the Intermodal Chain (2005, 11) include measures as improving intermodal liability and documentation, harmonising technical equipment, improving quality of intermodal terminals, certification and training and promotion of intermodal transport.

The supporting measures proposed in ISIC (Integrated Services in Intermodal Chains) will lead to a major modal shift and reduction of external costs. It is expected that 6351 million tonnes-kilometres can be moved from road to intermodal transport. Some of the actions achieve benefit/cost ratios between 2 and 8.

2.4. Trans European Network

The trans-European transport network (TEN) comprises infrastructure (roads, railways, waterways, ports, airports, navigation aids, intermodal freight terminals and product

pipelines) and the services necessary for its operation (see www.ec.europa.eu/ten/transport). The priority measures are:

- completion of the connections needed to facilitate transport;
- optimal efficiency of the existing infrastructure;
- achievement of the interoperability of network components;
- integration of the environmental dimension in the network.

The European Commission can – based on conditions – co-fund feasibility studies (up to 50%) and the realisation of infrastructure projects (up to 20%). At least 55% of funds for TEN-Ts will be given to railway projects and not more than 25% to roads.

2.5. Standardisation

Against the background of internationalisation and globalisation of markets and the growing increase and interdependency of goods flows, standardisation in the field of freight transport is an important issue. Intermodal transport is mostly international or European, seldom national transport alone. It is therefore obvious that standardisation should be established at international (ISO) and European level (CEN) and only exceptionally at national level. Standards are consensus agreements between national delegations representing all the economic stakeholders concerned - suppliers, users, government regulators and other interest groups, e.g. consumers (ISIC 2005, 11). They agree on the specifications and criteria to be applied consistently in the classification of materials, in the manufacture and supply of products, in testing and analysis, in terminology and in the provision of services (based on www.iso.org and www.cen.be).

Interoperability is only one - but important - reason for standardisation. Other important reasons are the improving of service quality and a common understanding of language and definitions. Compared to regulations, standards cannot be forced to fulfilment, but the client or user of intermodal transport can claim the fulfilment of certain standards. Standardisation can generally be used as an instrument for improving efficiency and quality of intermodal transport chains, for instance coupled with benchmarking systems. In relation to intermodal transport, standards aim at (11):

- Common understanding on language and definitions related to intermodal transport.
- Interoperability relating to intermodal transport infrastructure, equipment and services.
- Liberalisation of procurement of services and products in the intermodal transport sector.
- Improving collaboration and exchange of goods in intermodal transport units.
- Improving service quality over the entire intermodal chain.

Today, international and European efforts for the establishment of standards for freight transport are concentrated mainly on services, transport telematics, security and the adaptation of existing standards to new developments. The standardisation of integrated intermodal transport systems and interfaces is likely to gain importance too.

Further standardisation needs in intermodal transport cover IT solutions, security, loading units, equipment, services and the planning and design of infrastructure. For example, there are already standards for intermodal terminals in Austria, and Switzerland, too, is currently developing such standards.

The role of government is not to produce standards, but financially to support the development of standards designed to overcome interoperability problems for the benefit of society. This could be done at the level of International Communities (like the European Union) and/or also at national level. Standardisation will reduce technical, operational and organisational barriers and contribute to a higher quality and efficiency of intermodal transport.

2.6. The PROMIT Project

PROMIT is the European Coordination Action (CA) for intermodal freight transport (www. promit-project.net (7)).

PROMIT is initiating, facilitating and supporting the coordination and cooperation of national and European initiatives, projects, promotion centres, technology providers, research institutes and user groups related to this more complex transport form. The strategic PROMIT objective is to contribute to a faster improvement and implementation of intermodal transport technologies and procedures and to help promoting intermodal logistics and mode shift by creating awareness on innovations, best practices and intermodal transport opportunities for potential users as well as for politicians and for the research community.

PROMIT fosters the development of intermodal logistics through the promotion of successful logistics approaches to intermodal transport solutions. PROMIT does not start new research activities but collate, co-ordinate and disseminate what already exists and is emerging in terms of research and industrial initiatives. Best practices of recent and ongoing projects, technologies and concepts are presented to a large forum of international transport experts, including various user groups and researchers. Information about innovations and new technologies will be widely spread by:

- Dissemination activities like this Best Practice Handbook delivering facts and figures about the potential of intermodal logistics,
- Intermodal Innovation Days (conferences),
- Clustering workshops bringing together experts (users and researchers) and
- Dedicated promotion activities to be worked out in the project.

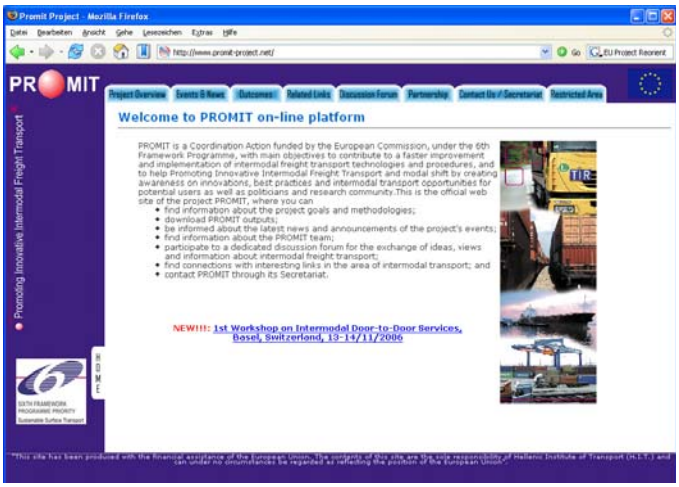


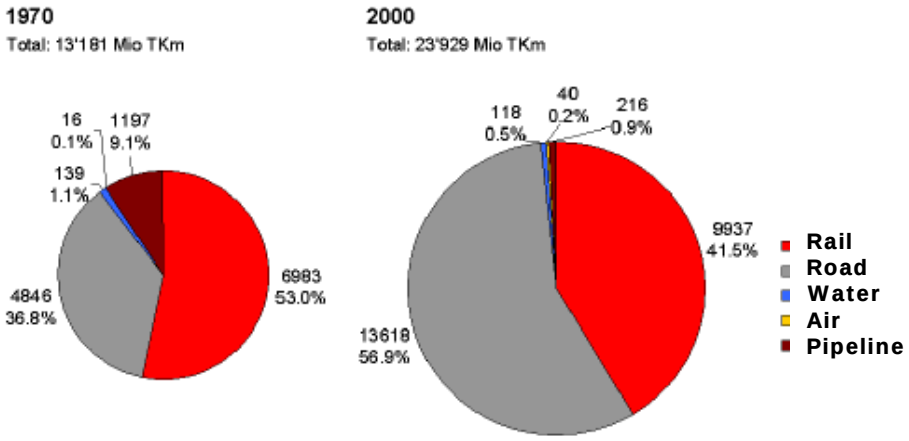
Figure 5: PROMIT homepage www.promit-project.net

The activities and results of the PROMIT project can be seen on the project website.

3. FREIGHT DEVELOPMENT IN SWITZERLAND AND KEY PROBLEMS

3.1. Freight development in Switzerland

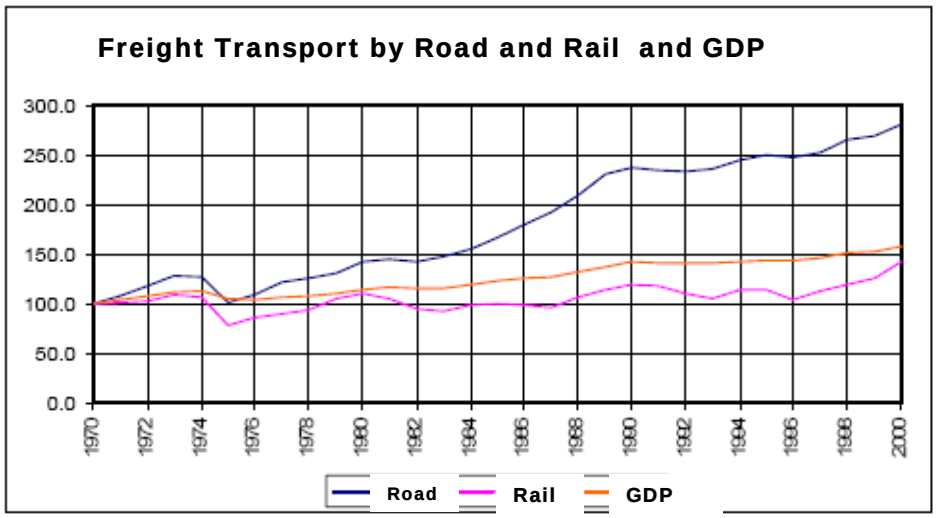
Between 1970 and 2000 the freight activity (tkm) increased by 73% (Fig. 6, (12)). Road freight transport increased by 180% (nearly a factor 3!) Rail freight increased only by 42%. Therefore the rail share decreased from 53% to 42%



Source: Swiss Federal Office of Statistics

Figure 6: Development of freight transport in Switzerland (Source: BFS)

Between 1970 and 2000 the road freight growth rate (3.5%/year) was much higher than the growth rate of GDP (1.5%/year) and rail (1.2%/year) (Fig. 8). Since the middle of the ninetees road and rail freight growth is significantly higher than the GDP growth. This development was caused by structural changes in the economy (European and global integration, spatial division of production etc.) leading to smaller consignment sizes, higher delivery intervals and longer distances.



Quelle: Bundesamt für Statistik, Neuenburg

Figure 8: Development of road and rail freight and GDP (Source: BFS)

Also intermodal transport increased in the last years (Fig. 8). Between 1983 and 2005 intermodal transport grew from approx. 4 mln. tons up to approx. 16 mln. tons by 300%. Especially transit and import/export transport increased.

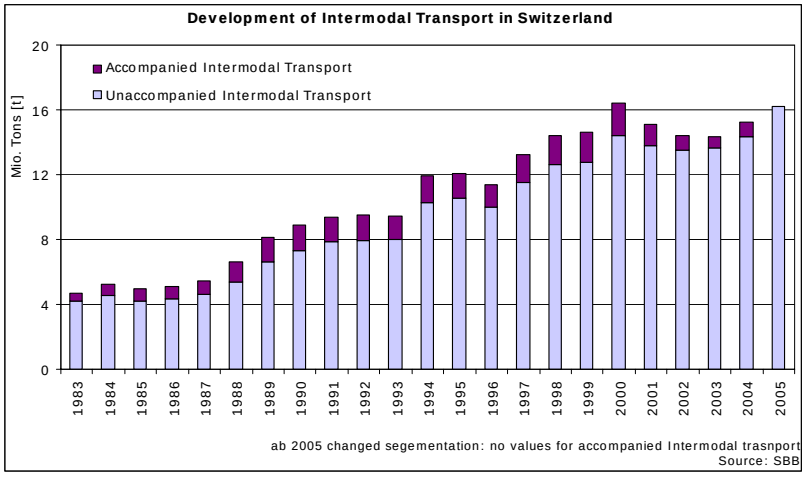


Figure 8: Development of intermodal transport in Switzerland (Source: SBB)

3.2. Freight development on transalpine corridors

When we take a closer look at the development of the freight transport on transalpine corridor through Switzerland we can state the following (Fig. 9):

- Between 1980 and 2005 the freight volume increased from 50.7 mln t to 106.3 mln t (+110%).
- The rail share over the whole alpine range was in 2005 37%; 23% in France and Austria, 65% in Switzerland.

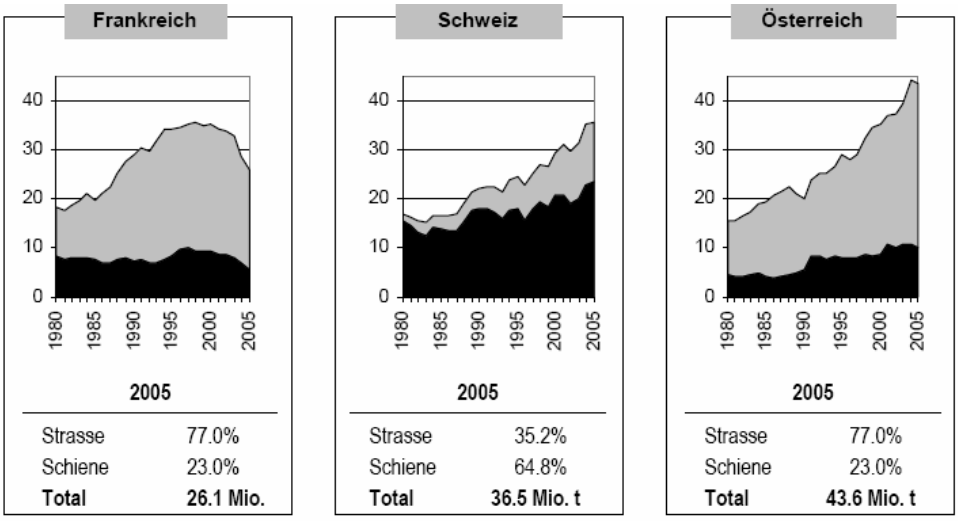


Figure 9: Transalpine Freight Transport through Austria, France and Switzerland 1980 to 2005 (Source: BAV)

Since the Gotthard road tunnel opened in 1981 the road freight transport increased significantly (Fig. 9, 10). Compared to France and Austria Switzerland has still a high share of rail transport (incl. intermodal). Since approx. 2001 the share of intermodal transport is higher than the share of railway transport. The reasons for the shrinking wagon load traffic have been analysed in evaluation studies (Progtrans and Ecoplan 2006 (13), (14), (15)). Main reasons for the rail freight decrease are to be found in increased containerisation, reduction of private sidings, decreasing bulk transport, increasing

transport to seaports, higher punctuality of intermodal transport (than rail) and higher costs of pure railway transport.

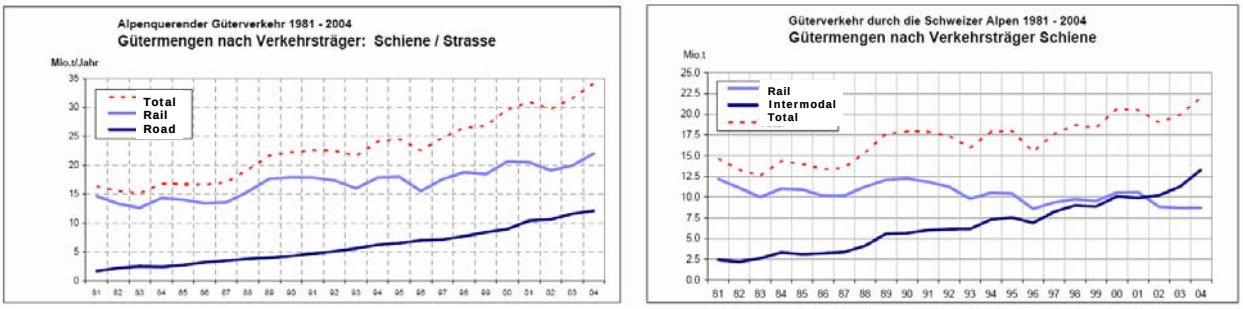


Figure 10: Transalpine Freight Transport development through Switzerland 1981 to 2004 (Source: BAV)

3.3. Problems caused by increasing freight transport

In Switzerland the problems focus on conurbations and on the transalpine freight transport corridors (Tab. 2, (16)).

	Freight Problems in Conurbations	Freight Problems on transalpine corridor
Increasing road freight traffic in mileage and tonne-kilometeres (especially in conurbations and transalpine)	XX	X
Limited capacity of the railway and intermodal network (incl. priority conflicts between freight and passenger transport)	XX	XX
Capacity problems on road network (also affecting accessibility and reliability of road freight transport including location attractivity for enterprises)	XX	X
Increasing share of environmental burdens of road freight (especially NOx, particles, CO2-emissions, noise)	XX	XX
Safety/security in freight transport (especially road tunnels)	X	XX
Higher external costs of road freight transport	X	X

Table 2: Freight Problems in Switzerland

4. NATIONAL FREIGHT TRANSPORT POLICY AND THEIR MAIN PILLARS

The Swiss freight transport policy aims at a more sustainable freight transport with the following objectives (www.are.admin.ch):

- The single modes should be used to their comparative advantages and combined in a suitable way.
- The (public) land transport relieve the roads from road freight transport.
- The high share in rail freight should be kept.
- Modal shift from road freight transport to rail and intermodal transport
- Improving attractivity and capacity for alpine crossing rail freight transport (including intermodal transport).

Relating to transalpine freight transport the following laws and regulations are relevant (17, 18), which are based on public votes in the beginning of the ninetees:

- Article 84 of the Swiss constitution: this article is the basis for the protection of the alps against negative impacts of heavy goods transport by
  - Modal shift of transalpine freight from road to rail (including intermodal transport)
  - Not increasing the road transport capacity through the alps.

- Based on the article 84 the traffic transfer act of 8th October 1999 defines the explicit modal shift target:
  - Reduction of the number of heavy goods vehicles crossing the alps by road to a maximum of 650'000 trucks per year (in 2005 approx. 1.2 mln. trucks)
  - This reduction must be reached two years after the opening of the new Lötschberg rail tunnel through the alps (in 2009).

This policy has been contractual secured with the European Union by the bilateral land transport agreement which was put in place in 2002 (19).

Main pillars of the Swiss freight transport policy are the Swiss heavy vehicles fee, the increase of railway capacity through the Alps and the railway reform (see Fig. 11). These measures are accompanied by further measures supporting intermodal and also railway transport as international support of railway transport, financial support of rolling motorway, funding of intermodal terminals in and outside of Switzerland, subsidies for unaccompanied intermodal transport, reduction of railway infrastructure charges, monitoring of productivity improvements in railway transport, partial reimbursement of the heavy vehicles fee for trucks used in the pre- and endhaulage of intermodal transport and road truck traffic management.

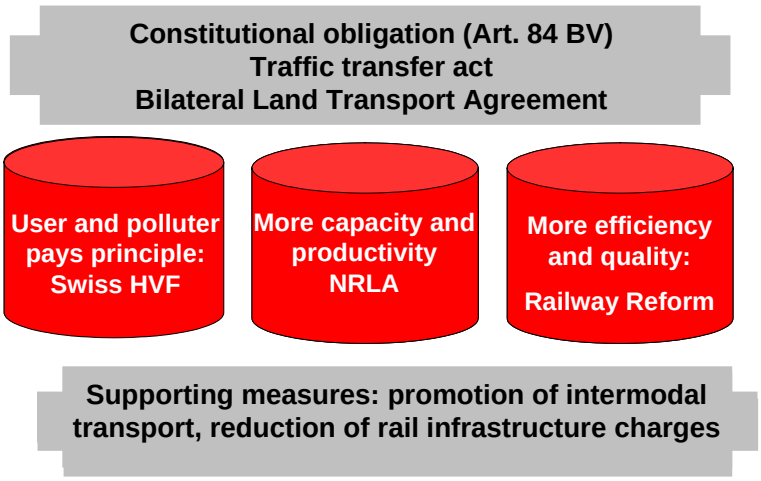


Figure 11: The pillars of the Swiss freight policy (M. Liechti, (20))

All the measures of the strategy above support and promote intermodal transport in one or the other way.

5. MEASURES TO SUPPORT AND PROMOTE INTERMODAL TRANSPORT

In the following chapters the most important measures to support and promote unaccompanied intermodal transport are outlined.

5.1. Measures directly influencing intermodal transport

Funding of intermodal terminals: Based on national laws and regulations (21), Switzerland can fund intermodal terminals to promote intermodal transport and to reach a modal shift. Elements financed are: buildings, acquisition or renewal of infrastructure, installations and equipment; extension of railway infrastructure for intermodal terminals; the acquisition of rolling stock for intermodal transport; and other investments to facilitate intermodal transport. The maximum share of co-financing is 80%, with 20% financed by the terminal investor. The share is dependent on the political interest and the degree of economic viability. The following minimum requirements have to be fulfilled:

- A modal shift from road to intermodal transport has to be proved.
- For the location, a need for trans-shipment capacity has to be accounted for.
- Investment is necessary for transport policy aims to be achieved.
- Terminals will not be built without financial aid.

A main requirement for funding is achieving the political aims with an acceptable cost/benefit factor. Specific for the Swiss funding scheme is that it is possible to fund terminals in other countries if these cause a modal shift in Switzerland. In addition to the law and regulations, there is a directive describing the process and content of how to deal with funding requests. The requirements to be fulfilled by the applicant are fairly strict, so there is a good chance that the conditions are fulfilled and the objectives are achieved. Switzerland funded terminals in 2002 with 25 Mio CHF, 2003 with 75 Mio. CH, 2004 with 49 Mio. CHF, 2005 with 12 Mio CHF (1CHF=0.6 EU). In the coming years a funding of 40 Mio CHF per year is expected.

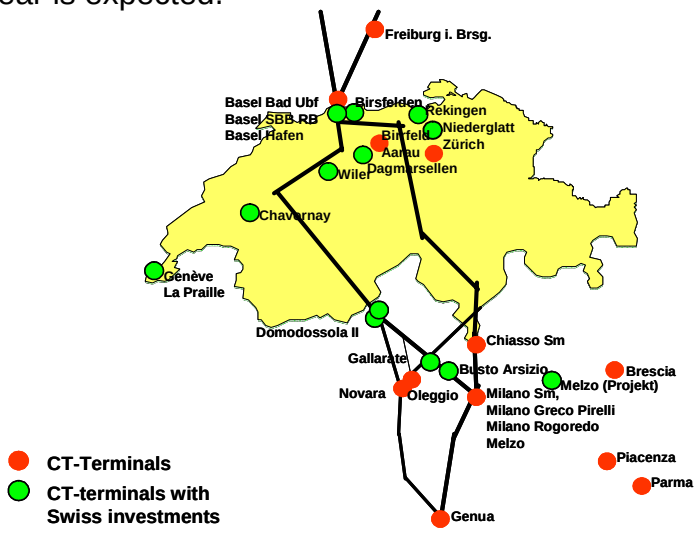


Figure 12: Intermodal terminals with Swiss Investments (M. Liechti, (20))

Railway reform: The first step of the railway reform came into force on 1st January 1999. This package included the organisational and accountable separation of infrastructure and traffic, the implementation of the order principle for operational subsidies, regulation for the railway network access and the liberalisation of the railway traffic. Further implementation

steps of the railway reform are in preparation taking into consideration also an independent railway track slot management.

New railway tunnels through the Alps: With these railway projects the political aims for modal shift can be supported by making rail freight more efficient (shorter leading times, higher productivity) and more reliable. The commencement of operations is 2007 for the Lötschberg route and 2015 for the Gotthard route.

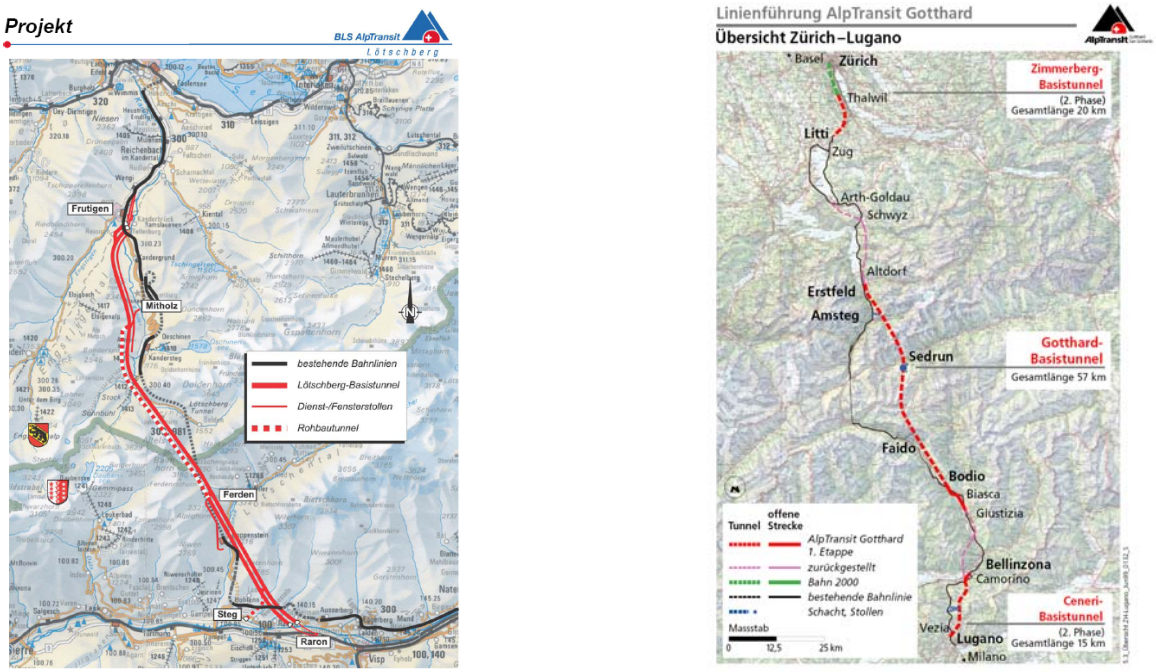


Figure 13: New railway tunnels through the alps (sources: Alptransit Gotthard, BLS Alptransit)

Subsidies for unaccompanied intermodal transport: Subisidies based on ordering intermodal transport by the Swiss government is one of the central measures to support intermodal transport (17). Since the year 2000 these subsidies are paid to the operators which provide the intermodal services. In agreements with the operators all the relevant parameters as the number of trains and consignments and the subsidy per relation is defined. According to the origin and destination area fixed subsidy amounts are distributed to the operators. In 2006 more than 1.2 million intermodal consignments have been subsidised, 900'000 in transalpine traffic. This is more than 1/3 of the whole intermodal transport through the Swiss alps. The following figure shows the split of financial support to intermodal transport and related measures.

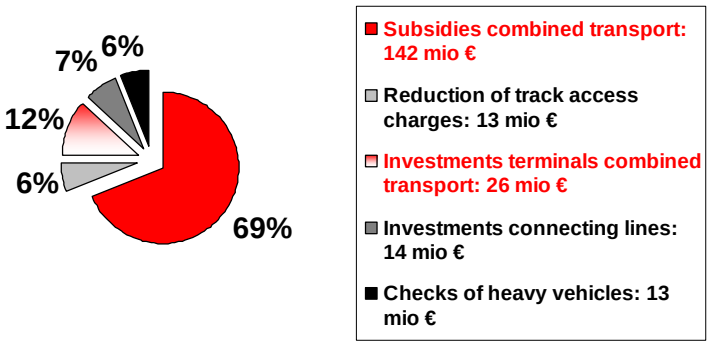


Figure 14: Financial support per year (M. Liechti, (20))

Reduction of railway infrastructure charges: This is a supporting measure to make the railway transport more competitive against road transport. The subsidies covers for intermodal transport two third of the infrastructure costs relating to the maintenance and the full contribution of margin. Relating to railway transport the subsidies cover only the contribution of margin and they will be cut back when the full heavy vehicles fee is implemented.

Partial reimbursement of the heavy vehicles fee for trucks used in the pre- and endhaulage: In Switzerland the Heavy goods vehicles fee was introduced in 2001 for trucks > 3.5t (see next chapter). Heavy goods vehicles which are used in the pre- and endhaulage of intermodal transport get a reimbursement of 14 to 22 Euro per transhipment depending on the size of the loading unit. This measure should contribute to a modal shift from road to intermodal transport in import/export and inland freight transport.

5.2. Measure indirectly influencing intermodal transport

Heavy goods vehicles fee: The Heavy Vehicles Fee (HVF) in Switzerland was implemented in Switzerland in 2001 mainly to internalise external costs of road freight transport, to reach a modal shift and to compensate the increase of the 28 t limit for trucks to 40 tons (22). The calculation of the fee considers the distance driven, the weight of the vehicle and the emission standard. All vehicles above 3.5 t have to pay this fee and for the use of all public roads. For a 40 t standard truck the charge level is 0.65 Euro per km. Figure 15 shows the system size of the HVF and the equipment for the trucks. Operator of the HVF system is the the Swiss Customs Authority. The HVF gives incentives to increase the utilisation degree and to use low emission vehicles. The revenues are used to finance big railway infrastructure projects and roads.

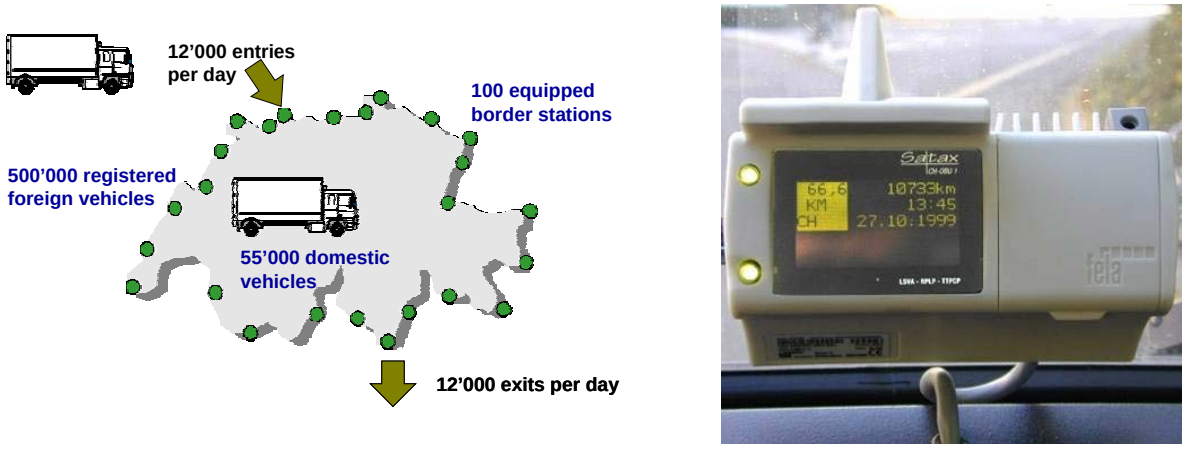


Figure 15: HVF System Size and On Board Unit (Rapp Trans AG)

Heavy goods vehicles management on alpine crossing: To improve safety in road tunnels through the Alps and to homogenise the traffic flows a heavy truck metering system has been introduced on Swiss Alpine crossings. The concept includes a capacity management with metering of heavy truck traffic at the tunnel entrance so that a minimum of 60 trucks per hour (high car volumes) and a maximum of 150 trucks per hour (low car volumes) per direction can pass the tunnel. Parking and waiting areas along the access motorway are also part of the system. There a rough pre-metering takes place. If the capacity of the tunnel is overstepped a ban to use the tunnels is put in place.

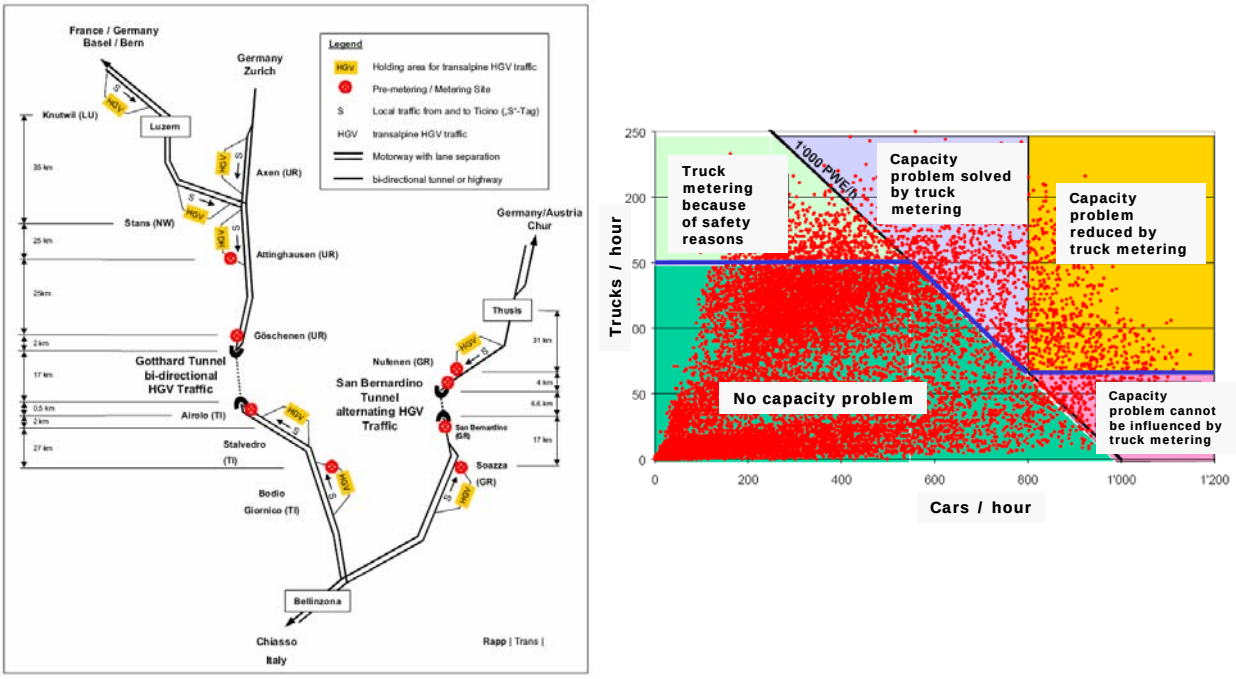


Figure 16: Truck metering system on Swiss alpine crossings (Rapp Trans AG)

Truck information system: In 2001 the Swiss Federal Roads Authority has set up a dedicated information system for trucks (www.truckinfo.ch) with a focus on transalpine traffic. Main objectives were that traffic management measures need to be explained to the truck industry, that dynamic information on traffic conditions has to be enhanced in order to limit the impacts of temporary closures (snow, accidents, etc.) and to promote the use intermodal transport. Main features of the services are real time information on the road and rail traffic situation, weather forecasts and related road conditions, explanation of permanent traffic management and the policy background and an intermodal routing. Further elements are timetables for intermodal alternatives and information on driving restrictions. The operation is based on a Public Private Partnership under the lead of the Swiss Federal Roads Authority.

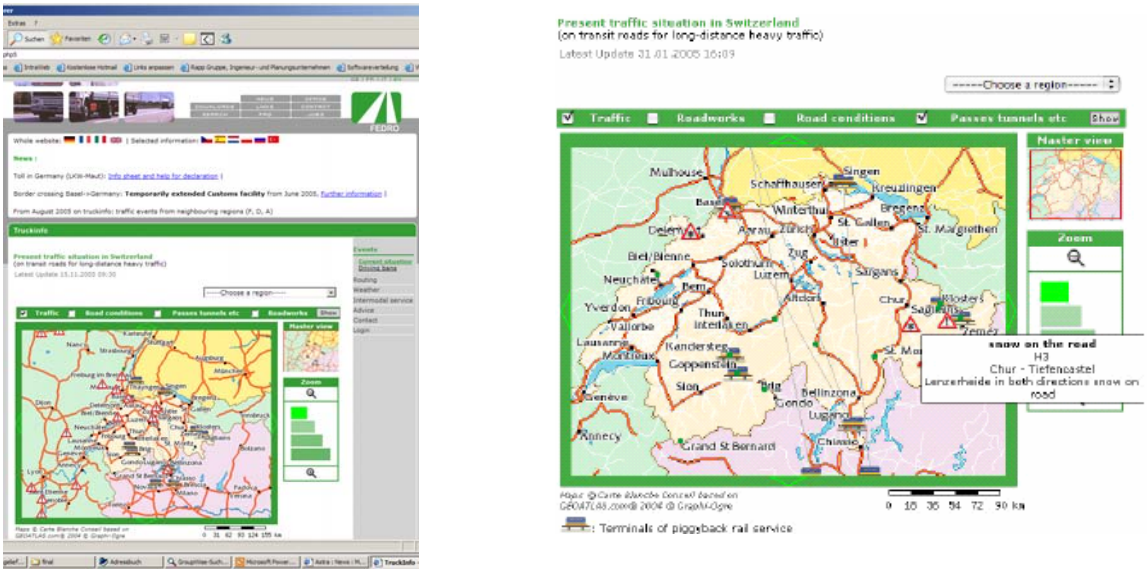


Figure 17: Truck Information System (Rapp Trans AG)

Enforcement of road freight transport regulations: To improve road safety and to provide a fair competition Switzerland intensified the enforcement of the relevant road transport regulations relating to driving and resting hours, weight, vehicle and driver conditions. The concept also includes Heavy Goods Vehcles service centers at key locations in the motorway network.

6. EXPERIENCES AND IMPACTS

Because it is not easy to isolate the effects of single measure for a bundle of implemented measures in the following only general impacts of the implemented measures can be shown. The experiences and the impacts have been identified within the monitoring project for transalpine freight traffic and specific evaluation studies (14, 15, 23, 24, 25).

6.1. Impacts on intermodal transport

The Swiss freight transport policy has an impact on the modal share of freight transport through the Alps (Fig. 18). Intermodal transport increased and road transport decreased.

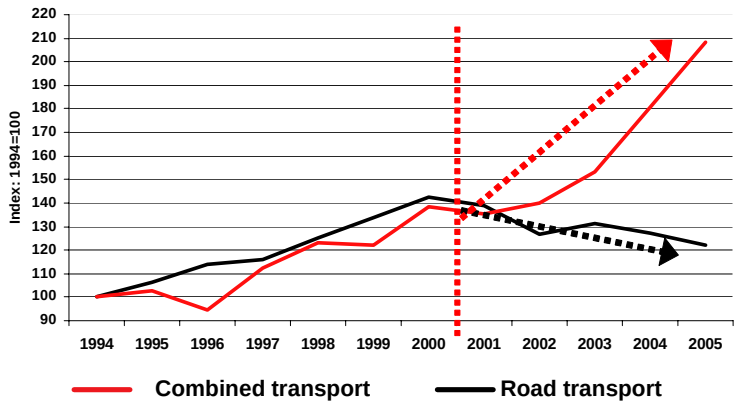


Figure 18: Development of road and intermodal transport 1994-2005 (BAV (17))

The quality of intermodal transport (and especially the railway part) could be improved (Fig. 19).

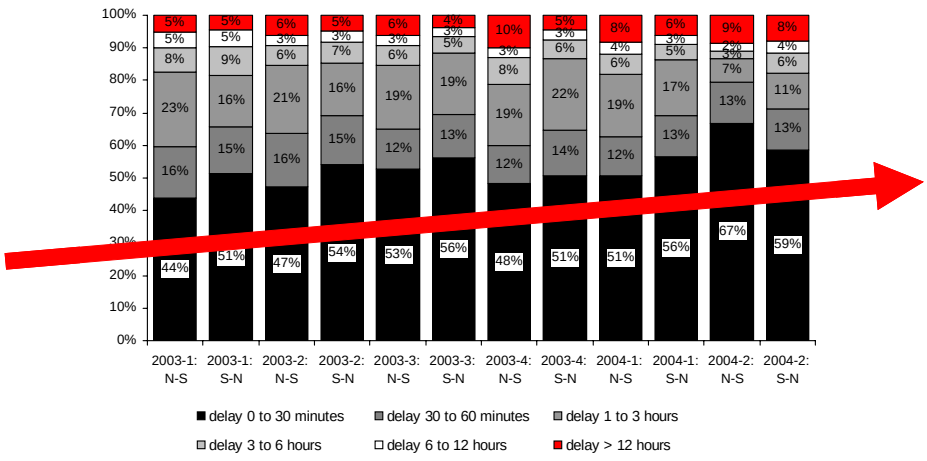


Figure 19: Development of Intermodal train quality (M. Liechti, (20))

The competition in railway and intermodal transport on the transalpine corridor could be increased (Fig. 20). More than 15 intermodal operators provide services on more than 60 transit connections. The railway reform show some progress.

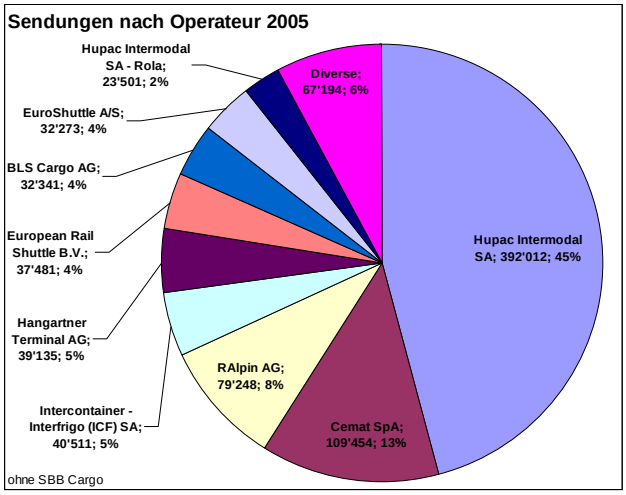


Figure 20: Intermodal Consignments by Intermodal Operator (Rapp Trans 2006, (24))

Further relevant results from monitoring and evaluation projects are:

- The intermodal ordering and subsidy system proved to be effective and efficient relating to the requirements. The subsidies per intermodal consignment could be reduced (Fig. 21). A further optimisation of the system is possible.

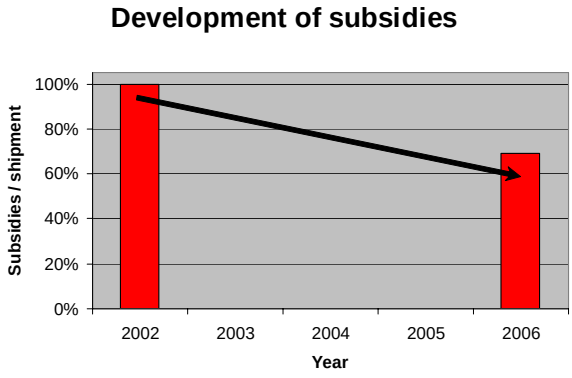


Figure 21: Development of subsidies to intermodal transport (M. Liechti, (20))

- Experiences with the terminal funding scheme have been positive. The directive (implemented in 2004) took account of some of the difficulties that occurred during execution of the regulations. The funding scheme speeded up the terminal realisation and guaranteed that certain conditions (e.g. modal shift) are fulfilled.

- The reimbursement for the Heavy Vehicles Fee for trucks used in intermodal transport seems to be only partly efficient. The contribution of this reimbursement to modal shift is relatively low.

- The supporting measures for intermodal transport have no negative impact on railway transport. The shrinking railway transport over the alps is caused by other reasons as changes in logistics requirements, changes in commodity groups,

quality differences of rail and intermodal transport and high shunting costs in pure railway transport.

6.2. Impacts on road freight transport

The Swiss freight transport policy shows a first progress reaching the target of max. 650'000 trucks per year over the Alps (Fig. 22). But it can be forseen that this target cannot be reached without additional measures.

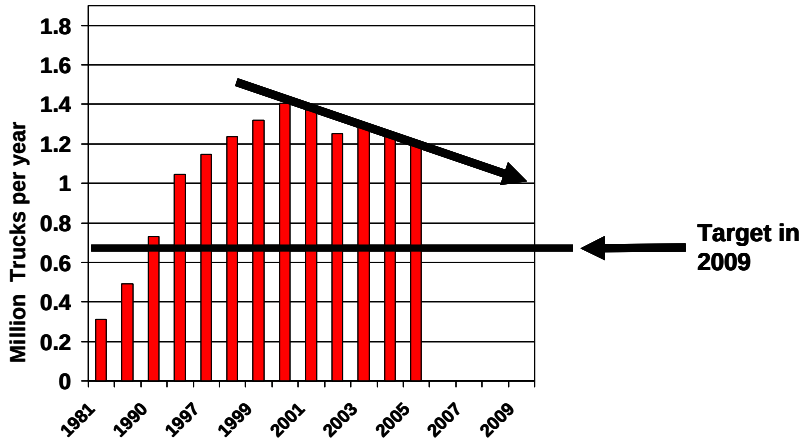


Figure 22: Road trucks development against the policy target (M. Liechti, (20))

The efficiency of road transport could be improved (Fig. 23). The utilisation degree of the trucks could be increased and the road truck mileage reduced.

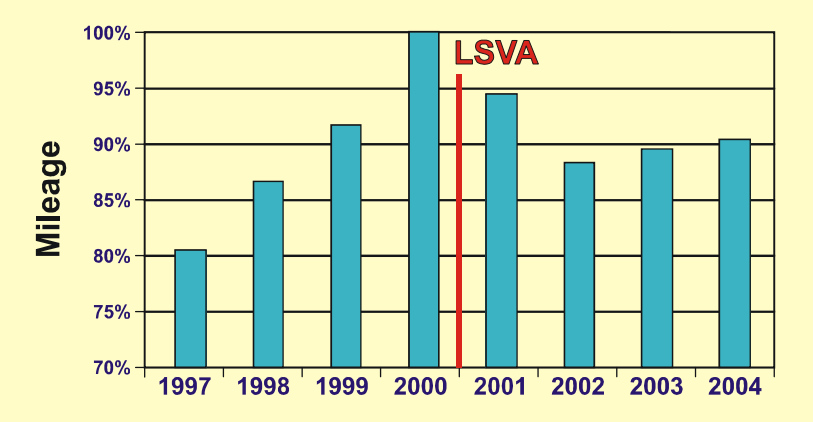


Figure 23: Road mileage development in Switzerland (Rapp Trans AG)

Further relevant results from monitoring and evaluation projects are:

- A significant reduction of empty vehicles on Swiss alpine crossing could be observed.
- A fleet adaptation with a replacement of high-emission trucks can be observed. The HVF caused a fleet renewal.
- There is no significant change from truck to lorries < 3.5 which was suspected before the implementation of the HVF.

- The traffic management measures on alpine crossings showed positive effects as a homogenisation of traffic flows and improved safety.

- TruckInfo is used and accepted by the transport industry. It is a good example for a successful PPP solution in freight transport.

7. CONCLUSIONS AND OUTLOOK

During recent decades, there has been very substantial growth in the freight transport sector. Freight transport is increasing faster than the economic growth and passenger transport. Road freight transport demand, in particular, is increasing faster than supply and is causing environmental and social problems. Increasing congestion is also affecting the efficient and reliable freight distribution which is required by the economy. Therefore intermodality is needed so that better use can be made of alternative modes that have accessible spare capacity, such as rail, inland waterways and short-sea shipping.

Based on freight developments and forecasts it becomes clear that freight transport gains more and more importance relating to capacity use, environmental and societal effects. An efficient transport system is crucial for the economy. Therefore freight transport should not be neglected in transport policy, transport planning and operation of transport networks. Besides long distance freight traffic also freight transport in conurbations is an important issue which should not be forgotten.

The results and experiences show that a bundle of measures relating to intermodal and road transport is needed to reach more sustainable freight transport. Such a freight strategy should cover economical, operational and infrastructural measures. Switzerland follows such an integrated approach and will implement further steps of the strategy. Several innovative measures could be successfully implemented in Switzerland but still there is a need for action to reach the policy goals. Subsidies for intermodal transport is not a long term solution and they will be reduced step by step. Subsidies should be limited to infrastructure or to start up aid for the operation of new intermodal services. Further measures as a alpine transit exchange with tradeable passage rights or a slot reservation system for road freight transport has to be taken into account. These measures are under development and in political discussion.

On European level further acitivities are needed to improve the efficiency and quality of intermodal transport as research and development, programmes and actions for new intermodal services and standardisation.

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