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## Fair and efficient

The Distance-related  
Heavy Vehicle Fee (HVF)  
in Switzerland



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## **Foreword**

### **By Federal Councillor Doris Leuthard**

When introducing the HVF in 2001, Switzerland paved the way for a modern freight policy. Logisticians are increasingly focussing on combined traffic. Thanks to the calculation of the fee in line with the kilometres travelled and the emissions generated, road freight traffic has become more efficient and environmentally friendly and the number of empty trips has decreased. At the same time, the inclusion of costs for accidents and environmental pollution has meant that the principle of true costs could be implemented and thus rail made more competitive. The HVF is therefore a key element on the way towards a sustainable transport policy and the transfer of heavy goods traffic from road to rail. An increasing number of countries in Western Europe are following in Switzerland's footsteps. With the EU Eurovignette Directive now intended to include at least some of the external costs in the fee calculation, a further step can be taken in this direction.

This brochure presents the background for the creation of the fee, its development, and the effects that have been identified so far. It is clear that it interacts with legal requirements and economic ties with the EU. The HVF shows that, even within this context, it is possible to find solutions that are forward-looking and take into consideration the interests of all players. This is also important because, in the transport sector in particular, further problems lie ahead, whose successful resolution depends on looking at the whole picture and taking an innovative approach.

Federal Councillor Doris Leuthard



Doris Leuthard,  
Federal Council Minister,  
Chair of the Federal Department of the Environment,  
Transport, Energy and  
Communications (DETEC)

## 1 Dominance of the road – The traffic situation



**Freight traffic in Europe is characterised by two aspects: Its overall volume continues to increase and the majority of it is transported by road. This is equally true for transport across the Alps.**

«This is not a tunnel for heavy traffic», the Swiss Minister responsible emphasised in 1980 on opening the Gotthard road tunnel. Initially, indeed, only a few hundred lorries made use of the new transalpine motorway. In the following years, however, the flow of goods increased considerably. In the year 2000, about 1.2 million heavy goods vehicles crossed the Swiss Alps. The proportion of transit journeys increased from about a quarter to about three quarters of the overall number of journeys between 1980 and 2000. The measures taken since have temporarily resulted in a change in trend. Nevertheless, noise and air pollution in the Alpine valleys along the northerly and southerly access routes to the Gotthard still often exceed statutory limits. And on peak days during the holiday season, regular traffic jams still form at the entrances to the tunnel.

### An international problem

Transit traffic has become a problem throughout the entire Alpine region. In France, in particular, the transfer of freight from rail to road continues unabated. The percentage of freight moved by rail here has decreased to around 15 per cent, while in Austria it is stagnating at around 30 per cent and in Switzerland at around 65 per cent. In 2005, the overall proportion of rail freight in the central Alps, between the Mont Cenis and Brenner crossings, amounted to just 37 per cent. Up to 1982, the railways transported more goods through the Alps than the roads did.

### General growth

The increase in transalpine traffic is in line with a general trend. Between 1970 and 2010, the transport performance of heavy goods traffic in the 26 countries of today's EU (excluding Cyprus) more than doubled, from 1,095 to 2,296 billion

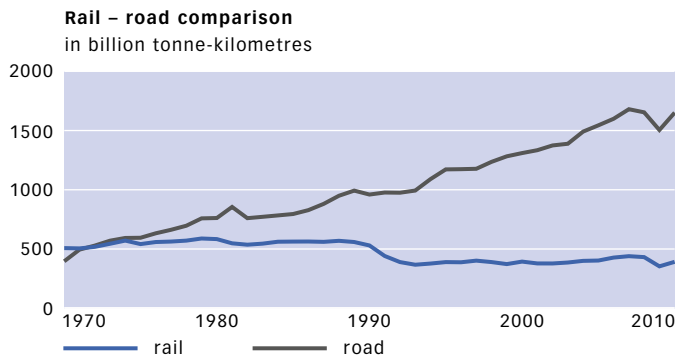
tkm. At the same time, the percentage of freight transported by road increased from 36 per cent to 72 per cent. For various reasons the railways became increasingly less able to compete. In the EU countries they had to concede a decrease in the transportation of heavy goods of around 24 per cent, to 392 billion tkm between 1970 and 2010. Their share of the total goods transported in the EU fell accordingly. In the reference year 2010, it still amounted to around 17 per cent.

### Political situation

All forecasts indicate that goods transport in the EU and Switzerland will continue to increase strongly in the medium and long term. Political measures have a substantial influence on the distribution according to the modes of transport. This is clearly apparent for Alpine transit. In the absence of the HVF and accompanying measures, an increase in the weight limit would have led to a doubling of heavy goods traffic on the Swiss road network from 2000 to 2015. Such a prospect seemed intolerable for the traffic-plagued population along the transit routes. From their midst, a popular initiative was launched to ensure the protection of the Alps from transit traffic. Thanks to a strong solidarity of the population not directly affected by transit traffic, this proposal for a new constitutional article was adopted by the Swiss population in February 1994. Based on the new constitutional article, a binding upper limit of 650,000 transalpine journeys was established. The goal is to be attained mainly by transferring traffic from road to rail.

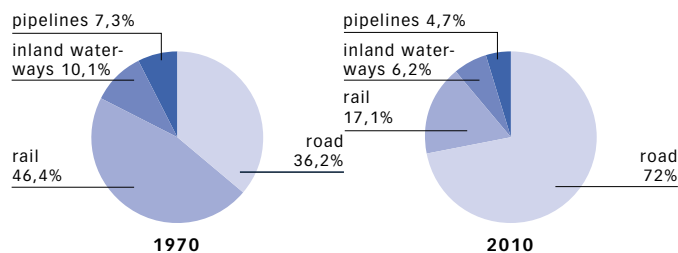
Traffic development of the past few years is marked by a significant increase in quantities transported and by a clear rail-to-road transfer.

### Goods Transport in the 26 EU member states <sup>1)</sup>



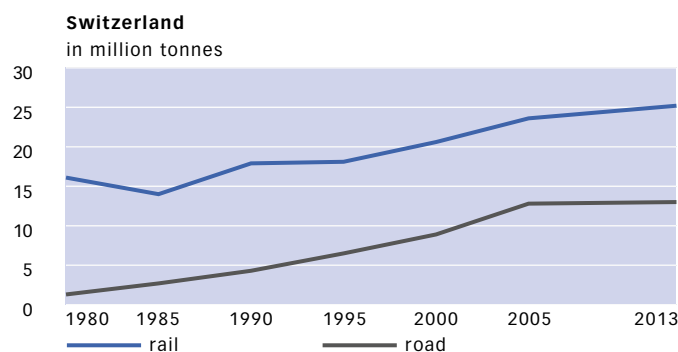
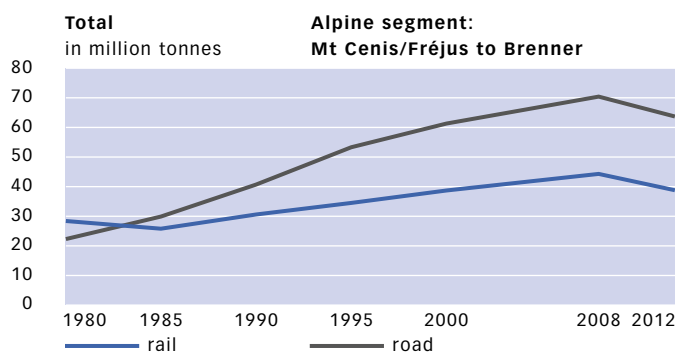
<sup>1)</sup> all except Cyprus (no data collection)

### Distribution according to mode of transport (modal split)



Transalpine goods transport has risen strongly overall and there has been a shift from rail to road. In Switzerland, the railways nevertheless still have a stronger position than in Austria or France. The strong increase on the road after the introduction of the new transport regime is due to the higher weight limit introduced on the 1st January 2001.

### Total transalpine goods transport (domestic, import, export and transit)



### Background

#### Gotthard is the most important crossing

The Gotthard is by far the most important Swiss Alpine transit route. 837,000 of the total 1,143,000 heavy goods vehicles that crossed the Swiss Alps in 2013 used the Gotthard. A total of 307,000 HGVs used the Great St Bernard, the Simplon and the San Bernardino combined. The Gotthard also comes first for rail traffic, ahead of the Simplon.

#### Greater rail share

In Switzerland, the railways carry a far higher share of goods across the Alps than in Austria and France. Besides the HVF, the most important reasons for this differing trend are a ban on driving on Sundays and at night. Up to 2001, there was also a significantly lower maximum weight limit of 28 tonnes (compared to 40 tonnes in the European Union), which favoured rail.

#### Diverted traffic

The lower weight limits that were in force before 2001 created so-called diverted traffic. Viewed from Switzerland, traffic was diverted in both directions. The lower weight limit acted as an incentive to use an Austrian or French Alpine crossing instead of the more direct route through Switzerland. When the weight limit was raised, this traffic returned. On the other hand, it was attractive to make a detour through Switzerland with vehicles of less than 28 tonnes, because it was considerably cheaper to drive through Switzerland than through neighbouring countries until 2000. With the new transport regime this situation changed as well.

## 2 Coordination with the EU – The legal situation



**In 2002 the Land Transport Agreement between Switzerland and the EU came into force. The lifting of the weight limit on Swiss roads and the introduction of the HVF are coupled together in an innovative way.**

Although Switzerland lies at the centre of Europe, it is not a member of the EU. Because important transit routes – especially in the north-south direction – lead through Switzerland, Swiss (goods) transport policy always has an impact on our neighbours too. It is therefore no coincidence that transport issues have long been a key factor in the relationship between Switzerland and the EU. Transit traffic across the Alps has been, and is still, of central importance. The adoption of the constitutional article for the protection of the Alps in 1994 created a new dynamic in this relationship. Switzerland's intention of limiting the number of lorries led to impassioned reactions from the EU, which continued to demand unhindered free movement of goods. After negotiations that lasted for almost four years and were occasionally quite difficult, both partners agreed on joint solutions in the form of a land transport agreement. The solutions

found allow both parties pursue their transport policy goals.

### Important elements

From a Swiss perspective, it was of particular importance that the EU explicitly recognised the main goal of Swiss transport policy, the transfer of traffic from road to rail. The most important instrument for the implementation of this goal is the heavy vehicle fee (HVF), which the EU also explicitly recognised. It is levied throughout the whole country, i.e. not only on transit routes. Both domestic and foreign vehicles have to pay it. The charge thus corresponds to the principle of non-discrimination. In return, Switzerland committed itself to progressively increase its weight limit from the then 28 tonnes to the EU level of 40 tonnes. It also confirmed an earlier commitment to expand its rail network for transalpine traffic, in particular to construct two

base tunnels at the Lötschberg and at the Gotthard crossings.

### Legal implementation

The result of the negotiations was recorded in the land transport agreement. The land transport agreement is one of seven individual agreements, the so-called bilateral agreements, which put Switzerland's relationship with the EU on a new basis. Its central components are the establishment of an upper limit for the HVF rate and the increase of the weight limit to 40 tonnes. The permissible charging rate was set at a level that ensures that the resulting price for a transit journey on the route from Basel to Chiasso does not exceed 325 Swiss francs. A decision was also made to introduce the new regime of HVF and increased weight limit progressively (see background). However, the land transport agreement not only regulates the questions of weight limits and the transit price. It also liberalises market access in road and rail transport. In road transport, the possibility for Swiss haulers to transport goods between two EU states, called Swiss home trade, was introduced in 2005. Swiss carriers, for example, can now load goods in Austria and transport them to Germany. In rail transport, Switzerland and the EU allow each other free access to the network. This enables cross-border competition between rail companies.

### A groundbreaking solution

The steps agreed with Switzerland to solve the transport problems are groundbreaking for the EU in several respects. Indeed, the EU is also conscious of the fact that the increase in road freight cannot continue unchecked. Its goal is to progressively replace the current taxes and charges in the transport system by instruments that most effectively incorporate both infrastructure costs and external costs. The Swiss HVF is consistent with this goal in many respects:



- it is dependent on transport performance (the level corresponds directly to the number of kilometres travelled), it is levied at the point of use and it differentiates according to EU emission categories. It is thus in line with the polluter-pays principle.
- it applies equally to both domestic and foreign vehicles, and to transit traffic as well as import, export and domestic traffic. It is non-discriminatory and does not lead to any kind of distortion of competition.
- when it was introduced, care was taken that the fee would be technically and administratively as compatible as possible with the systems planned in the EU.

#### Adaptation of the Eurovignette directive

One step in the right direction was made with the revision of the directive on the charging of heavy goods vehicles for the use of certain infrastructures (Eurovignette directive), which regulates the road user charges for heavy goods vehicles in the EU. Key points of this revision, which came into force on 9 June 2006, include:

- Road charges can be applied to vehicles from 3.5 tonnes (previously 12 tonnes)
- Compulsory user charges can be introduced not only on motorways, but also on other roads, and may include the whole network
- User charges can be time-related
- It is possible to levy mark-ups in sensitive areas

#### Background

##### Joker HVF

On 27 September 1998, the proposal for the HVF was adopted by a surprisingly clear majority of 57 per cent of the Swiss people. One fundamental reason for this positive decision was the interest of Switzerland in good relations with the European Union. After the Swiss people refused to join the European Economic Area in 1992, Swiss industry was very interested in concluding bilateral agreements with the EU. For these agreements to be concluded, however, Switzerland had to be willing to make concessions concerning the weight limit. Without accompanying measures, the EU's demand for an increase in the weight limit from 28 to 40 tonnes would have led to an enormous increase of heavy goods vehicle traffic on Swiss transit routes. Under these circumstances, the Swiss people were unlikely to adopt the bilateral agreements. The HVF offered a solution to this delicate situation: as a guarantee against an avalanche of foreign lorries, it created the condition for the acceptance of the intertwined requests of the EU (an increase in the weight limit) and Switzerland (the conclusion of bilateral agreements).

##### Stepwise Introduction

In order to give the transport companies time to get used to the new situation it was decided to introduce the new regime stepwise:

###### 1.1.2001:

- Introduction HVF at a rate of 1.6 Swiss cents and increase of the weight limit from 28 to 34 tonnes

###### 1.1.2005:

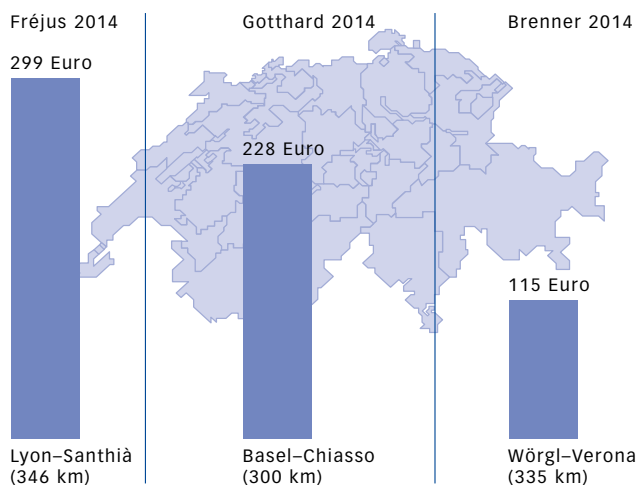
- Increase of rate HVF to 2.44 Swiss cents, increase of weight limit to 40 tonnes

###### 1.1.2008:

- Increase of rate HVF to 2.70 Swiss cents

Transit fees through Switzerland (Basel-Chiasso) and on two comparable trans-alpine routes abroad (Lyon-Santhià and Wörgl-Verona). The figure given for a 40 t lorry is an average fee, which can vary according to time of day, exchange rate, emissions etc.

#### Comparison of Transit fees on Fréjus, Gotthard and Brenner



### 3 A step towards true costs – Economic background



**The HVF aims to internalise all road freight transport costs. This means that, for the first time in Europe, users also have to pay for the external costs of road freight transport. The income helps to finance major rail projects. The HVF also helps to transfer traffic from road to rail.**

According to the law, the rate of the HVF may be at most 3 centimes per kilometre and tonne of total weight. In the Land Transport Agreement, Switzerland and the EU settled on a maximum transit price, which would permit an HVF of 2.70 centimes. This price scale is the result of the political agreement, but is also in line with one of the primary objectives of the HVF: internalising external costs, thus following the principle of «real costs».

#### **On the road to real costs**

Over the past few years a consensus has been formed within Swiss transport policy (and increasingly within European transport policy), that transport should pay for all the costs it produces. If it does not, the State and the public face high expenditures, which are equivalent to an indirect subsidy. This leads to a

disproportionate growth in transport, because it is too cheap. By internalising the full costs, this vicious circle, which is damaging to both the economy and the environment, can be stopped. In order to realise «real costs» it is important to take external environmental and health costs into consideration, in addition to direct payments for the construction and maintenance of roads.

The majority of economists and political authorities support internalising the full costs according to the polluter-pays principle. The external costs must first be calculated. The Swiss Transport Department has carried out wide-ranging studies for the Federal Council. These had concentrated originally on the three areas of a significant size, and that could easily be given a monetary value: health costs and damage to buildings caused

by air pollution, the costs of noise, and the costs of accidents. The external costs thus determined for goods transport by road came to almost exactly 1000 million Swiss francs. Taking into account the uncovered costs according to the road calculations and the necessary compensation for the HGV fixed fee, this sum was increased to 1150 million Swiss francs.

In recent years, these calculations have been updated. New areas have been included that had previously not been taken into consideration, such as landscape fragmentation and damage due to climate change. The areas that had already been quantified were recalculated on the basis of new scientific knowledge. In 2008, the decisive year of the appeal procedure, heavy goods vehicle traffic caused external costs of 1,554 million Swiss francs. Taking into account the excess direct costs of 75 million Swiss francs, the shortfall to be covered by the HVF is reduced to 1,479 million Swiss francs. In 2008, taking into account the increase in the fee, the net levy revenues amounted to 1,441 million Swiss francs. This left a shortfall of 38 million Swiss francs. The road transport industry lodged a successful appeal in the Federal Administrative Court against this method of calculation, in particular against the inclusion of congestion costs. However, the Swiss Federal Court annulled this decision on 19 April 2010 and confirmed that it was legal to include congestion costs and thus also confirmed the increase of the fee by the Federal Council on 1 January 2008. In a second appeal by the road transport industry, the Swiss Federal Court confirmed this decision on 8 August 2013.

#### **Compensation for higher weight limit**

The Heavy Vehicle Fee was planned while the Federal Council still stuck to the 28-tonne limit. When the limit was increased to 40 tonnes, the HVF acquired an additional purpose. It prevents

a disproportionate increase in HGV traffic. The higher weight limit makes it possible to increase productivity of goods transport by road: transport firms are able to transport more goods with fewer employees and fewer vehicles. In transit traffic, time will also be saved by avoiding a detour through neighbouring countries. The HVF balances out this productivity increase and thus prevents goods transport migrating from rail to road.

#### Source of finance Alpine tunnels

Any fiscal system generates expenditure as well as an income. The Swiss Parliament and the electorate decided to use the income from the HVF to increase the

impact of transport policy even further. Of the two thirds to which the Confederation is entitled, the majority is used to finance large-scale infrastructure projects in the public transport sector (Finöv). The HVF will thus become the most important means of funding the new rail links through the Alps (NEAT), which will play a decisive role in transalpine transport of the 21st century. The HVF will remain important for the NEAT even after its construction. By strengthening the competitiveness of the railways, it ensures that the capacities of the rail infrastructure are used optimally and in a way that covers costs.

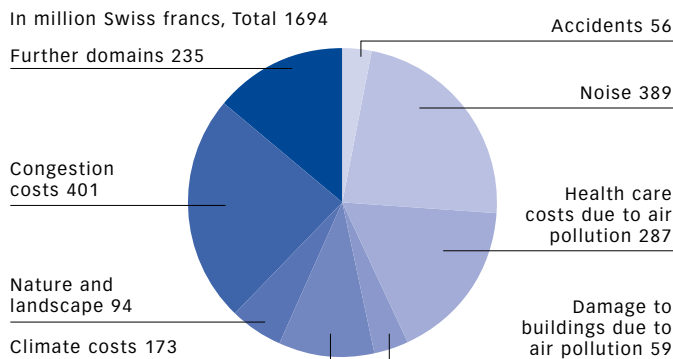
#### Background

##### Calculation of the HVF rate

To calculate the level of the HVF, the total transport performance in Switzerland was calculated for each weight category. These figures were then multiplied by the average weight in each category. For all classes combined, this gave the figure of 47 billion tonne-kilometres. Dividing the uncovered costs figured out (1.15 billion Swiss francs, including the loss of the fixed fee) by this figure gives the value of 2.5 centimes per tkm; here the highest authorised tonnage is the deciding figure for calculating the HVF. The calculation uses 1993 as the baseline year; the data has recently been updated (see graph).

According to updated and supplementary calculations, the external costs of heavy goods traffic in 2010 amounted to 1,694 million Swiss francs.

#### The external costs of heavy goods traffic in 2010



#### Clean lorries can drive more cheaply

The HVF is environmentally efficient in two ways. It is related not only to transport performance and the weight category of each vehicle, but also to the pollutant category. The toll is calculated using a division into three groups, corresponding to the EU pollutant categories (see page 15). The maximum price difference between these groups is 15 per cent.

## 4 Elements of a modern transport policy – The complementary measures



**The HVF is a fundamental component of a balanced Swiss policy on transit and freight traffic. Its objective is the most environmentally sound transport of goods across the Alps.**

As a country with a long tradition of transit, Switzerland wishes to take on its share of alpine transit traffic and in doing so, contribute significantly to the overall European domestic market. It insists, however, that the growing volume of traffic should be processed in the most environmentally sound way, primarily by rail. This particularly applies to transalpine transport.

### **The HVF as a cornerstone**

The HVF is the cornerstone of Swiss freight transport policy. It has been clear from the very beginning, however, that this instrument alone is not enough to attain the goals set. At 3.0 and 2.70 centimes per tonne/km (tkm), the maximum rates permitted by Swiss and international law are too low for this. Swiss freight transport policy therefore consists of a whole bundle of measures, some of which are very costly, and whose common denominator is the suc-

cessful transfer of freight transport from road to rail. The main measures are the new rail links through the Alps and rail reform. The Swiss Parliament has also adopted a law governing the transfer of transalpine goods traffic from road to rail, which includes further measures. It was replaced by the Freight Traffic Transfer Act in 2010.

### **The new transalpine tunnels**

The most important plans in terms of cost are two new transalpine rail routes, with base tunnels through the Gotthard (at 57 kilometres, this will be the longest tunnel in the world) and the Lötschberg (which opened in 2007). This new infrastructure raises transalpine rail links to a completely new level in terms of capacity and speed, thus making rail more competitive for both goods and passenger transport. The new tunnels mean that most of the growing volume of goods can be transported across the Alps by rail.

### **The rail reform**

It is also important that the railways do all they can to improve their productivity and competitiveness. Switzerland has therefore been progressively implementing rail reforms since 1999, thus also satisfying the relevant EU Directive. Since the Land Transport Agreement has come into force, a train path price has to be paid for free access to the network. As part of the rail reform, the debts of the Swiss Federal Railways (SBB) were largely cancelled and it became a limited company, which remains in the possession of the Confederation.

The aim of the increasing competition between railway companies on transalpine rail freight axes is to improve the quality of rail freight transport and the offer of innovative services, in order to strengthen the railways' ability to compete with road.

### **The Freight Traffic Transfer Act**

The Freight Traffic Transfer Act lays the foundations for the implementation of accompanying measures. These are intended to help achieve the transfer target that Switzerland has set itself. Additional funding to promote rail freight traffic forms part of these accompanying measures, which mainly focus on combined transport, the most important pillar of Switzerland's transfer policy. This funding will be used for the provision of unaccompanied and accompanied combined transport services.

Moreover, the new law contains a substantial innovation, the legal basis for the introduction of an Alpine Crossing Exchange (ACE). A central element of this exchange is the trading of crossing rights. The use of a transalpine road link would be coupled to the prior purchase of such a crossing right. The number of transalpine heavy goods vehicles can be controlled by means of a cap on the number of crossing rights. This ensures that transfer targets can be achieved.

In order to prevent traffic diverting via other routes, the ACE would have to be introduced in coordination with neighbouring states.

The HVF is one component in a whole package of measures that will strengthen the position of the railways.

### Most important accompanying measures of Swiss transit transport policy

Measure	Content	Period
AlpTransit/NEAT	New transalpine rail tunnels through the Gotthard and Lötschberg	Lötschberg: opened in 2007 Gotthard: Scheduled to open in 2016
Transfer Law	Foundations for accompanying measures such as promoting combined transport. Makes the necessary funding available (1,830 million Swiss francs). Contains the basis for introducing an Alpine Crossing Exchange.	Payment structure for 2011–2018
Rail reform	The rail reform introduces intra-modal competition into rail transport. There is free access to the European network for goods transport. The SBB is refinanced.	In force since the beginning of 1999

### Background

#### Supported by the population

By the rules of direct democracy, the electorate makes the final decision on many proposals. The government is therefore dependent on a popular majority for much of its business. In transit transport policy, this has been achieved. Thus, in autumn 1998 the population approved by a large majority both the HVF proposal and a new basis for financing major railway projects (including the NEAT project). The «Article on the Protection of the Alps», which requires the transfer of transit traffic from road to rail, was also included in the Federal Constitution after a referendum in 1994 (see page 4).

#### Double the capacity

The building of the NEAT will double rail capacity through the Swiss Alps from the current 30 million tonnes annually, to 60 million tonnes. Approximately two thirds of this will go through the Gotthard, and one third via the Lötschberg/Simplon route. Transalpine journey time will be shortened up to an hour and a half. The journey from Zurich to Milan will then take only about 2 1/2 hours. Thanks to the NEAT, some air traffic will also shift to the railways.

#### Money for high speed as well

Switzerland is making fundamental modifications to update its rail system. In addition to the transalpine tunnels, steps are being taken as part of the «Future Development of Rail Infrastructure (ZEB)» project to upgrade national passenger transport and improve links with the European High Speed network in France and Germany.

## 5 Simple and reliable – Collecting the data



**The data for the HVF are collected in the simplest – and at the same time most reliable – way. For this the Federal Customs Administration (FCA) uses the most up-to-date equipment.**

The Distance-related Heavy Vehicle Fee applies to vehicles for passenger and freight transport with a total weight of more than 3.5 tonnes. The fee is calculated according to three criteria:

- the kilometres travelled on Swiss roads
- the maximum authorised total weight
- the pollutants emitted by the vehicle.

In the recording procedure, although not in the calculation of the fee, domestic and foreign vehicles are differentiated. Some vehicle classes are also subject to a special regulation independent of their origin.

### Domestic vehicles

#### Data recording

The vehicles are fitted with an electronic recording device, the «On-Board Unit» (OBU). This appliance is coupled to the tachograph and records the kilometres travelled. If the vehicle travels over the

border, a device fitted above the street (microwave radio connection) deactivates the registration. On returning into Swiss territory, this reactivates the recording. Further information is either stored directly in the OBU (highest authorised weight and emission category of the vehicle), or can be entered by the driver (coupling or uncoupling of a trailer). The device thus records all the data necessary to determine the fee tariff.

#### Data registration

The operator who is subject to the fee registers the data each month on a chip card. He or she then forwards this to Customs, either using the chip card itself (by post) or electronically (by Internet). The Customs authorities investigate the plausibility of the details in their information system. The monitored, and if necessary corrected, data form the basis for calculating the fee and the appropriate monthly invoices.

### Foreign vehicles

#### Vehicles with OBU

The fitting of an On-Board Unit cannot be prescribed for foreign lorries. An operator may however fit it voluntarily. OBUs are distributed free of charge to domestic and foreign operators. The data will then be transmitted by radio to the central information system whenever the border is crossed, and form the basis for the regular invoices. The lorry driver must have an HVF account with Swiss Customs.

#### Vehicles without OBU

For vehicles without an OBU, an identification card, issued on the first entry into Switzerland, is used to record data. The appropriate data are also recorded in the central information system. The driver inserts the chip card into the Clearance Terminal on entry into the country and declares the current mileage. Customs will make random checks on these declarations. The fee must be paid at the latest on leaving Switzerland, either in cash or using a petrol or a credit card.

### Special regulations

#### Vehicles with flat fee

Certain categories of vehicle such as coaches (PSV), mobile homes and caravans, will continue to be subject to a flat fee and therefore do not require an On-Board Unit (see page 15).

#### Exemptions from paying the fee

Various types and categories of vehicles are completely exempt from the Heavy Vehicle Fee (military, agricultural and public transport vehicles etc.).

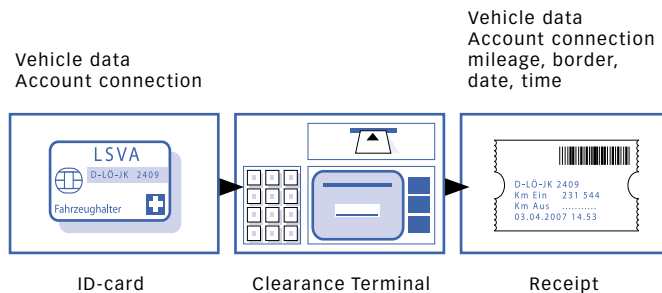
#### Combined road/rail transport

A special solution exists for containers on the initial and terminal sections of unaccompanied combined road/rail traffic. The vehicles used remain subject to the fee, but a flat-rate refund is made per journey, at the level of one average-length journey.

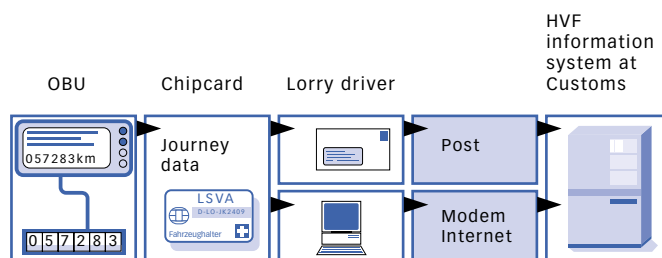
**Section 2: The design I Simple and reliable** – Collecting the data*Transport of timber, milk and cattle*

For the transport of milk and livestock, the fee will be reduced by 25 per cent. This also applies to the transport of timber, if the vehicles in question are being used to transport timber only. If the vehicles are also being used to transport other goods, it is possible to request a refund per m<sup>3</sup> of transported timber.

Foreign drivers without an On-Board Unit declare their mileage using an identification card at a Clearance Terminal.

**The procedure for foreign vehicles**

Data is read using a chip card and transmitted to Customs.

**The procedure for domestic vehicles****Background****The Federal Customs Administration**

The Federal Council has delegated the levying of the HVF to the FCA. Customs play an increasingly minor role in generating Federal income; however, the FCA collects also fees and taxes in the amount of about 23 billion Swiss francs annually for the Confederation (including mineral oil, tobacco, vehicle and value added taxes).

**The On-Board Unit**

The levying of the fee is only possible through the use of a well-functioning electronic system. A central role plays the On Board Unit. Operators receive it free of charge, but they are responsible for its timely fitting and the associated cost. The OBU must satisfy among others the following technical requirements:

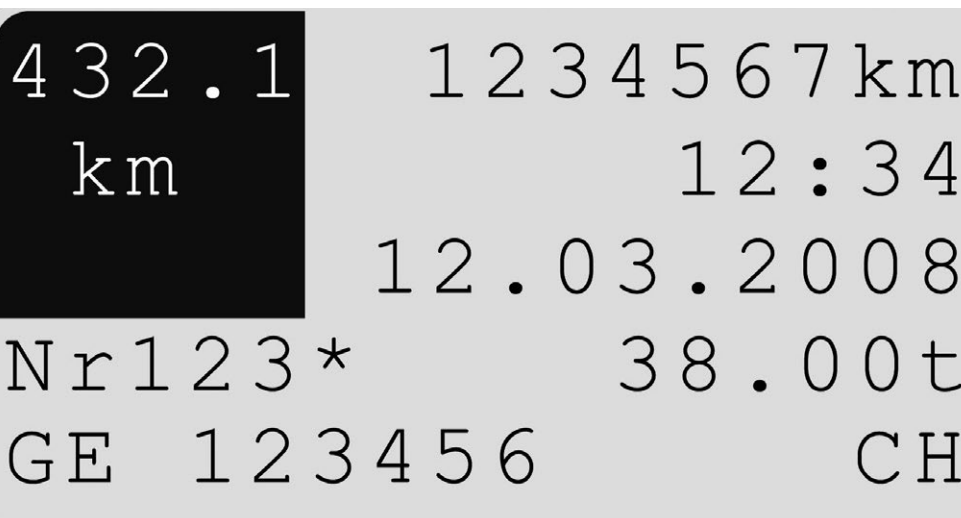
- automatic recording of transport performance through an electronic connection to the tachograph.
- automatic activation and deactivation at the national border through radio connections.
- methods of monitoring vehicle performance and switching at the border using GPS and a movement sensor.
- trailer recognition using a sensor.

The first generation On-Board Units were replaced by new units (OBU 2). Both their design and their function largely correspond to that of the units originally installed.

**The HVF collection system in figures (as at June 2014)**

On board units in use	approx. 55,000
Border crossings with appropriate equipment	88
DSRC beacons	218
Self-service machines	160
Daily entries/exits with OBU in each direction	approx. 4,500
Daily entries/exits without OBU in each direction	approx. 8,000
Automatic control stations	24

## 6 Clear principles – Determining the fee



For each vehicle the calculation of the fee owed has a clear basis.

Coaches and mobile homes continue to pay a flat-rate fee.

### Tonne-kilometres as a basis

Calculation is based on a transit journey from Basel to Chiasso with an assumed average distance of 300 km. In their negotiations, Switzerland and the EU agreed a transit price for this journey of a maximum of 325 Swiss francs, for a 40-tonne vehicle. This gives a maximum rate of 2.70 centimes per tonne and kilometre (tkm). Because of the steady renewal of the vehicle fleets and the introduction of a special discount for Euro VI vehicles, the actual scope for rates has not been exhausted so far.

### The weight of the vehicle

To determine the fees, the distance travelled in Switzerland (in kilometres) is multiplied by the weight of the vehicle (in tonnes). The tonne-kilometres calculated are then multiplied by the rate of the fee. Here it is not the weight during operation that is important, but the maximum authorised weight according to vehicle licence. The use of the – continually changing – operating weight would

have been impracticable. This solution also provides an additional incentive to use the vehicles to the fullest capacity and to avoid empty trips if possible.

### The emission category

The rates of the fee are average values. They apply to the middle of three emission categories defined in the Ordinance on the HVF (Category 2). The Land Transport Agreement limits the maximum difference between one category and the next to 15 per cent.

- Fee category 1  
(corresponds to Euro 0, I and II):  
3,10 centimes per tonne-kilometre
- Fee category 2  
(corresponds to Euro III):  
2,69 centimes per tonne-kilometre
- Fee category 3  
(corresponds to Euro IV and V):  
2,28 centimes per tonne-kilometre

- Euro VI:  
2,05 centimes per tonne-kilometre  
(special discount)

### Flat rate amount

The most important exception to the distance-related fee levy is the flat-rate fee for coaches. For this vehicle category the following rates apply:

- vehicles  
from 3,5 to 8,5 tonnes: 2,200 Swiss francs
- vehicles  
from 8,5 to 18 tonnes: 3,300 Swiss francs
- vehicles  
from 18 to 26 tonnes: 4,400 Swiss francs
- vehicles  
over 26 tonnes: 5,000 Swiss francs

For foreign vehicles the fee may be paid in fixed amounts per day or month:

- 0.5 per cent each for one to 30 consecutive days, but at least 25 Swiss francs per vehicle and at most the monthly fee.
- 5 per cent for ten freely selectable days.
- 9 per cent each for one to 11 consecutive months.


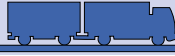


A 12-tonne bus thus pays 25 Swiss francs (minimum) for a journey through Switzerland from Germany to Italy. If the same bus stays in Switzerland for a week, the fee is 115.50 Swiss francs (0.5 % of 3,300 francs = 16.50 francs per day).



**Section 2: The design I Clear principles – Determining the fee**

The examples in this diagram show how the fee is calculated.

**Examples of the calculation of the fee**

tariff level in centimes <sup>1</sup>				kilometres travelled in Switzerland		truck and trailer <sup>2</sup>		Fee in CHF
1	2	3						
3,10			x	300	x	without trailer 	x 18t	167,40
	2,69		x	300	x	truck and trailer 	x 30t	242,10
	2,69		x	300	x	articulated lorry <sup>3</sup> 	x 30t	242,10
		2,28	x	300	x	truck and trailer 40t 	x 40t	Euro IV/V: 273,60 Euro VI: 246,00

- 1) = tariff per tonne and kilometre (tkm)  
 Level 1 = category 1 (corresponds to EURO 0, 1 and 2)  
 Level 2 = category 2 (corresponds to EURO 3)  
 Level 3 = category 3 (corresponds to EURO 4–6)

Some vehicles (e.g. coaches) are charged at the bases of flat rates.

- 2) maximum permitted weight according to the vehicle registration documents. In case of trailers and other combined vehicles the total of the weights are added.

- 3) separately matriculated articles: net weight articulated lorry and relevant weight of the trailer respectively.

**Background****Legal basis**

The implementation law, which the population approved in 1998, contains the most important guidelines for calculation of the HVF. It establishes which vehicles are subject to the fee and the tariff structure. The implementation provisions, which are essential for enforcement of the fee, are regulated by the Federal Council by means of a decree.

**Exceptions for buses and mobile homes**

With a view to tourism, Switzerland has agreed to an exceptional regulation for coach travel. Coaches will continue to pay a flat-rate fee. Foreign buses can pay this in daily or monthly rates, which are cheap in comparison with the fees of neighbouring countries (see main text).

For mobile homes, a similar regulation to that for coaches is applied, but based on the considerably lower rate of 650 Swiss francs per year. For a 14-day stay in Switzerland, the fee is thus 45.5 Swiss francs for a foreign vehicle. This is not much more than the motorway sticker for normal cars, which does not have to be paid by vehicles that are subject to the HVF.

## 7 The path to interoperability – Electronic fee collection



**Electronic technologies make it possible to record the data needed for charging without interrupting the flow of traffic. There are plans to standardise the systems at the European level, so that the On-Board Units can be used everywhere. This has already been partially achieved in the case of the HVF.**

For many years now, a number of European countries have been using electronic systems to collect motorway and bridge tolls automatically. These systems allow drivers to pay tolls via radio waves, so they do not have to stop at toll booths, thus preventing traffic jams. A radio beacon above the toll lane picks up the information being transmitted by the on-board unit (OBU) fitted to the vehicle (both passenger and goods vehicles).

### Traditional toll systems

In most cases, the operators of the road infrastructure have transferred the running of these electronic systems and the customer service network required to distribute the OBUs and collect usage fees to toll companies. The spread of these systems has resulted in a growing need to be able to use and pay for all

sections of the road infrastructure with a single OBU. This has prompted the various operators within individual states to network their automatic collection systems with each other.

### Interoperability

The technical term for the ability to use a single OBU in different toll systems is «interoperability». To achieve this, systems must have uniform technical standards for interfaces and data formats, and must also use the same data content. Here, «content» refers to the classification parameters that are relevant to the toll, a common understanding of the roles involved in the toll collection process, the clear allocation of tasks and responsibilities, and agreements between the parties concerned on data-sharing and methods of payment.

### National toll systems

The Swiss HVF was the first national, state-run electronic toll system in Europe. Unlike traditional toll systems, in which a private-sector infrastructure operator finances the building, maintenance and operation of a licensed infrastructure by charging a fee for its use, national systems levy a charge for using the state transport infrastructure. Shortly after the HVF was launched, Austria and Germany also introduced a distance-related toll for heavy goods vehicles on state motorways. While radio toll systems had been used exclusively prior to the HVF and the German HGV toll, these new levies brought with them new technologies, such as distance-recording coupled to the tachograph's odometer, satellite positioning (GPS), and mobile communications (GSM). In addition, these national systems meant that private-sector infrastructure operators and toll companies, levying private-sector charges, were now joined by public-sector bodies (such as the Swiss Federal Customs Administration), levying public-sector charges. These national systems thus increased the requirements for interoperability.

### EU policy and EETS (European Electronic Tolling Service)

The EU has supported and encouraged the standardisation of toll technologies from the very beginning. In 2009, the European Commission defined the key elements of the European Electronic Toll Service (EETS) as well as the schedule for its implementation. Despite EU targets, the barriers to the introduction of EETS are evidently still too high. As at the end of 2013, not a single European toll service provider had been licensed. The EU has thus launched REETS: a pilot project to implement a regional European toll service that is limited to a small number of states. The aims of the project are to fill in any remaining gaps in specifications, and to harmonise and simplify processes. The Swiss Federal Customs Administration –

as the operator of the HVF system – is participating in this project to ensure that EETS will also meet the needs of the HVF.

### Uniform standards

Switzerland is working within the major international standards organisations CEN (Comité Européen de Normalisation) and ISO (the International Organization for Standardization) to draft and maintain uniform standards for electronic fee collection. This will ensure that these standards meet the requirements of the HVF at the technical level. It has proven impossible to extend the model of interoperability that applies to traditional systems to cross-border cooperation between public and private sector organisations. Switzerland has thus also been involved in the relevant EU projects to define interoperable toll services, and helped to shape the EETS role-division model set out in the European Commission Decision.

### Swiss OBUs can be used in Austria

It has been possible to use the HVF recording device for the purposes of the Austrian HGV toll ever since the latter was launched in early 2004. The necessary agreements could be reached with the Austrian toll operator, because the Austrian radio toll system applies the same technical standards as the HVF. However, this bilateral system still demands that the user (the keeper of the vehicle) maintains a business relationship with the toll operator in Austria, because the Swiss Federal Customs Administration is unable to levy any charges on behalf of foreign systems. A decision was made not to extend this arrangement to other countries, because the bilateral approach with one recording device but several toll contact points is not ideal for either the user nor the toll operators.

### Background

#### Traditional toll systems

In **France, Italy, Spain** and **Scandinavia**, on toll booths on privately operated motorways and bridges charge fees for both cars and heavy vehicles are levied.

#### National toll systems

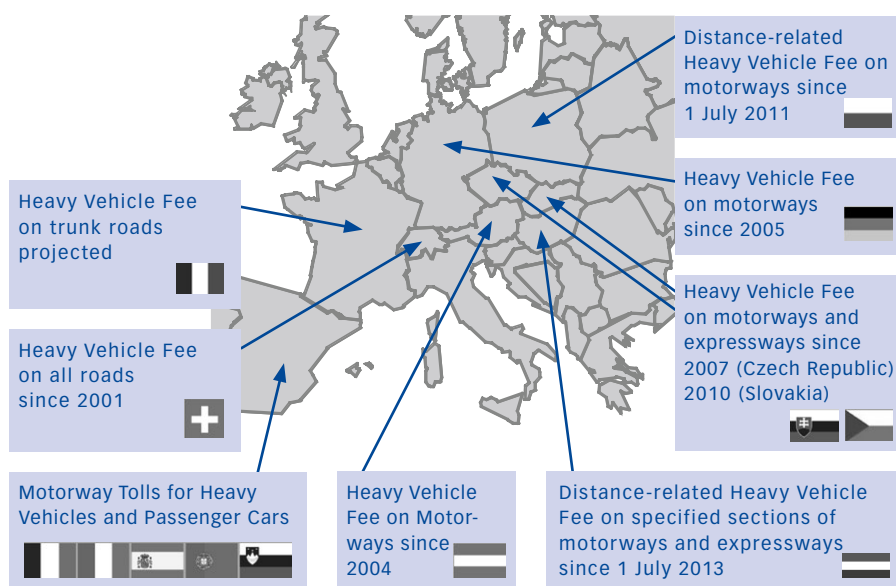
On 1 January 2004, **Austria** introduced a nationwide distance-related motorway toll for heavy vehicles with a total weight of over 3.5 tonnes. Tolls are charged via a compulsory on-board unit, which uses radio toll technology.

On 1 January 2005, **Germany** introduced a nationwide distance-related toll on motorways and selected sections of its A-road network for heavy vehicles with a total weight of over 12 tonnes. Users can choose between a fully electronic solution with an on-board unit, recording distance via the internet portal prior to travel, or using the manual terminal at the roadside. The OBU uses satellite positioning (GPS) and mobile communications (GSM) technologies.

#### Czech Republic, Slovakia, and Poland:

On 1 January 2007, the Czech Republic introduced a distance-related charge for heavy vehicles of over 12 tonnes on motorways and expressways. On 1 January 2010, parallel to the introduction of a corresponding charge in Slovakia and Poland for vehicles with a total weight of over 3.5 tonnes, this charge was extended as well to include vehicles of over 3.5 tonnes. In all countries, tolls are charged via a compulsory on-board unit.

### HV Schemes in Europe



## 8 Positive result – The impact of the HVF



**The new traffic regime has led to a sustained change in the road haulage sector. The trend towards an ever growing number of lorries on the roads has been broken and the negative effect on the environment shows a significant decrease. The rail sector's share of freight remained steady.**

The introduction of the HVF involved high expectations but also some fears. For this reason, the Confederation mandated an in-depth study of the effects of the HVF in 2006. When assessing the results, some of which have since been expanded and updated, it should be noted that the HVF was not implemented in isolation, but that the weight limits were increased at the same time.

### Increased efficiency

The new traffic regime with the HVF and an increased maximum permissible weight has resulted in a significant increase in efficiency. Between 2001 and 2005 the number of kilometres travelled by heavy goods traffic (kilometre performance) decreased by 6.4 per cent, whereas the goods transported (transport performance), measured in tkm, increased by 16.4 per cent. Since

then, the numbers of kilometres travelled has increased again. However, as the graph on page 19 shows, this figure would have been much higher had the old regime continued. In specific terms, 19.4 per cent fewer kilometres have been covered (see graph). According to a separate study around 30 per cent of the kilometres saved are due to the HVF, with around 70 per cent being due to the increase in weight limit.

### Positive effects on environment

The fact that the amount of the fee depends on the weight and emissions of the individual lorry already resulted in a significant move towards renovation of the lorry fleet in the year before the HVF was introduced. The reduction in the emission of noxious substances per vehicle combined with the reduction in kilometres travelled has resulted in a

substantial drop in the volume of pollutants attributable to heavy traffic. As it is difficult to measure the pollution attributable to heavy goods traffic in the field, the reduction of pollutants had to be calculated with the help of models. In order to obtain a comprehensive environmental balance, the reduction in road freight transport emissions due to the new regime also had to be compared with the increase in rail transport. The bottom line of the environmental balance is positive, in particular as regards air pollutants. They improved by 10 per cent (particle emissions) and 14 per cent (nitrogen oxides) respectively. The reduction of emissions was lower for CO<sub>2</sub>, which decreased by only 6 per cent. Overall, it has been possible to save 105,000 tonnes of CO<sub>2</sub> or 325 GWh compared to the reference scenario (28 t limit, no HVF).

### Effects on the labour market

With about 14,000 full-time equivalent employees, the number of people employed in road transport remained virtually stable. Because transport volumes have increased significantly, this lack of change confirms the identified gain in efficiency. According to computer modelling, retaining the old regime with a maximum permissible weight of 28 tonnes and without an HVF would have led to a significant increase in the number of people employed, bringing it to a total of 16,500. However, according to the same model, 900 people fewer would have been employed in the rail sector in 2005.

### Negligible effect on consumer prices

The impact of the HVF on prices remained low for various reasons. Firstly, thanks to the increase in efficiency, a significant proportion of the costs of the HVF could be offset. Secondly, the remaining additional costs could not all be passed on to consumers (according to representatives of the transport sector, depending on the company, between 40

per cent and 100 per cent of the additional costs of domestic transport were passed on). Thirdly, transport costs represent a comparatively small proportion of the end costs of a product. Seen as an average of all statistically collected groups of goods, the new regime has resulted in a cost increase of only 0.11 per cent.

### Different regional impacts

The effects of the new transport regime on mountain and peripheral areas have been studied in depth. It was shown that the new regime did, indeed, have a greater impact on these regions than on the rest of Switzerland. The main reason is that it is more difficult to access these areas with 40 tonne vehicles. With a calculated additional annual burden of 40 Swiss francs per employee in mountain and peripheral regions, however, this difference is small. Thanks to the special consideration given to mountain and peripheral areas in the distribution of the HVF, these additional impacts are more than compensated for. It is interesting to note that the borderline between

lower and higher impacts corresponds only partially to the borders between the mountain and peripheral regions and the other regions. The impact on some regions on the Central Plateau is significantly higher than it is in certain mountain and peripheral regions.

### Unchanged modal split

Despite the rise in transport costs for road freight, no significant change was observed in the modal split (the proportion of freight transported by different modes). This is due to different trends that partly compensate each other. The new transport regime for rail, for example, has led to advantages for light goods. On the other hand, road transport achieved a productivity gain due to the increased weight limit. The reduction in transport subsidies in 2005 worsened the basic conditions for rail. Finally, it should be noted that the choice of transport mode – in particular in international transport – depends on different factors, with reliability and simplicity being at least as important as price.

### Background

#### How traffic is measured

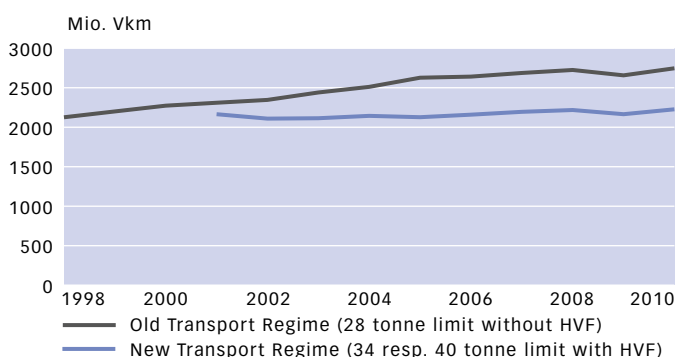
Various criteria are used to measure traffic volumes. For transalpine traffic, the focus is on the trip, because of the aims of the act on the transfer of transalpine goods traffic from road to rail. When the distance is counted in, this gives the road performance measured in lorry-kilometres. When the weight of the load is added in too, this gives the transport performance.

#### Virtually no diverted traffic

Since the introduction of the HVF in 2001, some people have claimed that the fee leads to increased traffic on the regional road network, because this enables hauliers to decrease distances and thus the HVF payable. A study commissioned by the Confederation has now shown that this is not the case. On the contrary, traffic on the regional network decreased more significantly than on the motorways. In contrast, passenger transport continued to increase, both on the motorways and on other roads. 11 specific case studies also showed that the HVF only exceptionally leads to diverted traffic. This is very well illustrated by the trend on the route between Payerne and Lausanne. Here, heavy goods traffic on the cantonal road decreased even more significantly than passenger traffic after the opening of the motorway, even though the new motorway increases the distance by 14 kilometres.

With the introduction of the new transport regime, kilometre performance decreased by around 7 %. In subsequent years, it remained virtually unchanged, only starting to increase again in 2005. Under the old transport regime, the number of kilometre performance would have increased steadily after the year 2000. In 2009, it would have been 23 % higher than the actual level observed.

### Change in kilometre performance in road freight transport under the old and new transport regimes



## 9 Fewer vehicles, more goods – The effects on transalpine traffic



**The higher weight restrictions have a particularly marked effect on transalpine traffic. Thanks to the HVF, it has proved possible to offset this advantage to the road transport sector.**

Measured in the number of kilometres travelled, transalpine traffic is not particularly significant, especially in comparison with the traffic flows of the Central Plateau. However, there are two reasons for giving it special consideration:

1. As shown above, the story of how the HVF came about, being gradually accepted and finally approved by the people of Switzerland, is closely linked to the question of transit traffic.
2. Because of the special structure of transalpine road traffic and a more detailed database, the effects of the new traffic regime (HVF plus higher weight limits) can be particularly clearly seen on these routes.

### **Number of trips reduced**

Development in the transalpine road haulage sector was uneven in the first few years after the introduction of the new transport regime with the HVF and the new weight limits. However, this was due not so much to the new transport regime but more to special circumstances. On the roads, the Gotthard tunnel remained closed for two months because of a fire in October 2001. This was followed by severe restrictions, and the Gotthard route was closed again in June 2006 following a rock fall. On the railways, the Monte Olimpino tunnel south of Chiasso was closed, first completely and then partially, which affected rail transport. Despite the aforementioned events, the previous trend was clearly broken (cf. graph). Not only was the new regime able to stop the continual growth since the opening of the Gotthard road tunnel, but it also initiated a phase of significantly decreasing numbers of

transalpine road freight vehicles. Between 2001 and 2006 the number of such vehicles decreased from 1,400,000 to 1,180,000. This corresponds to a decrease of 16 per cent. Since then, the number has more or less stayed the same. In 2013, 1,143,000 heavy goods vehicles crossed the Swiss Alps.

### **The effect of the new transport regime**

The decrease in the number of transalpine road freight journeys observed is due both to the HVF and the higher weight limit. Because of the change from a flat-rate charge to a distance-related charge, foreign vehicles could no longer cross Switzerland for a token sum of 40 Swiss francs, but had to pay an amount that is about 8 times higher. This significantly higher transit price is only worthwhile for efficient vehicles carrying full loads. This is reflected in changes to the composition of vehicle fleets. In the first years of the new regime, there was an extraordinary increase in the number of semi-trailers. This development was compensated by an even more pronounced drop in the number of lorries. The number of goods vehicles with trailers remained virtually constant. These shifts were clearly due to the higher weight limit. The traffic that was diverted out of Switzerland because of the lower weight limit, and which moved back when the weight limit was increased, is almost exclusively composed of semi-trailers. At the same time, journeys with lorries were replaced by journeys with semi-trailers, because the latter allow an optimum use of the higher weight limit. This second reason also explains the significant decrease of the number of lorries. Due to the shift from light lorries to heavier semi-trailers, the weight loaded per vehicle has increased considerably. This is why the modal proportion of road freight increased initially from 30 per cent to 37 per cent. Since then, the shift between vehicle categories has levelled off.

## Outlook

Since 2007, traffic has more or less been the same. The decrease in 2009 is due to the economic slump. Although the opening of the Gotthard rail base tunnel, scheduled for 2016, is an important prerequisite for further steps to transfer traffic from road to rail, it will not have enough impact on its own. The Confederation therefore plans to introduce additional instruments. One of them is the Alpine Crossing Exchange. This would

regulate the right of transit for heavy goods traffic with the help of the market economy. The overall number of annual permissible journeys would be fixed in the form of auctionable Alpine crossing rights. In order to prevent traffic diverting via other routes, the introduction of this measure will have to be coordinated with neighbouring countries. The new Freight Traffic Transfer Act authorises the Federal Council to enter into the relevant negotiations with the EU.

## Background

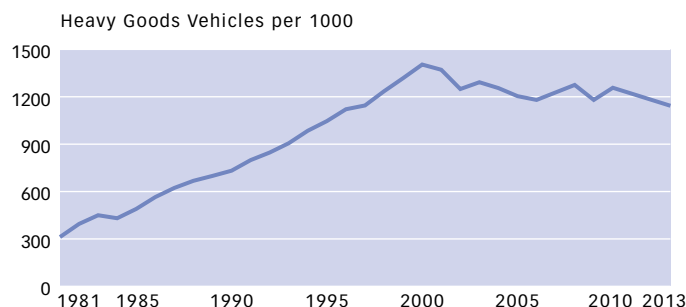
### Diverted traffic over-estimated

In estimating the effects of the Land Transport Agreement, the volume of diverted traffic was assessed at a very high level (see Background, page 5). The following results show that there was less traffic returning than expected:

- Although there was indeed an above-average increase in articulated and trailer lorries interested in taking advantage of the higher weight limits initially, this increase was also partly due to a shift in the type of lorry to more efficient lorry combinations.
- The volume of heavy goods traffic on the neighbouring alpine passes remained stable (Fréjus) or was influenced by other developments (Brenner).
- The quota of 40-t lorries allowed by the EU was not exhausted, so that supply exceeded demand.

In the first 6 years under the new regime, the number of journeys decreased by 16 %. Since then the number has more or less stayed the same. To achieve the Swiss legal goal of transferring traffic from road to rail, additional measures are necessary.

### Heavy goods vehicles through the Swiss Alps



Overall, the increase in the weight limits has probably led to 100,000 extra lorry trips through Switzerland at most.

## Chronology

**1984**

**26 February**

The electorate approves the fixed HGV fee (59 per cent vote yes).

**1986**

**7 December**

The popular initiative for a Distance-related Heavy Vehicle Fee is rejected at the ballot box (64 per cent vote no).

**1992**

**2 May**

The EU and Switzerland sign the Transit Agreement, which is valid for 12 years. Switzerland commits herself to building the New Rail Links through the Alps (NEAT), and to promoting combined road/rail transport. The EU accepts the 28-tonne limit for heavy goods vehicles.

**27 September**

The Swiss approve the building of the NEAT (64 per cent vote yes).

**1994**

**20 February**

The Swiss people approve the constitutional basis for a distance-related Heavy Vehicle Fee (67 per cent vote yes). They also decide in favour of the Alpine Protection Initiative (by a majority of 52 per cent). This calls for a shift of transalpine goods transport to rail, and limits the extension of the motorways in the Alps: provisions that are now part of the Federal Constitution.

**1998**

**23 January**

In Kloten, the negotiating delegations of the EU and Switzerland agree on a compromise for the overland transport sector. This forms the basis for the sectorial Land Transport Agreement.

**27 September**

The Swiss people approve the introduction of the distance-related Heavy Vehicle Fee (57 per cent vote yes).

**29 November**

The Swiss people are in favour of modernising the Swiss railways. At the polls they approve proposed financing of 30 billion Swiss francs in total. This also provides a new basis for the funding of the NEAT.

**1999**

**1 January**

The Swiss railway reform comes into force. Access to the rail network for goods transport is opened up for a usage charge.

**21 June**

In Luxembourg, Switzerland and the EU sign the seven sectorial agreements.

**2001**

**1 January**

The first phase of the HVF is introduced. The weight limit for HGVs is increased to 34 tonnes.

**2002**

**1 June**

The Land Transport agreement comes into force.

**2005**

**1 January**

The HVF is increased. In Switzerland, the 40-tonne limit applies generally.

**2007**

The first NEAT tunnel (Lötschberg) is opened.

**2008**

**1 January**

The third phase of the HVF is introduced.

**2009**

**21 October**

The Federal Administrative Court upholds the appeal by the road transport lobby against the increase in the HVF on 1 January 2008.

**2010**

**19 April**

The Swiss Federal Court upholds the appeal by the Federal Department of Finance (FDF) against the Federal Administrative Court's Decision, thus confirming the legality of the HVF increase on 1 January 2008.

**2013**

**8 August**

The Swiss Federal Court confirms the legality of the HVF increase as well as the earlier point of view to calculate the congestion delay costs attributable to heavy goods traffic on the basis of a comparison between a situation without heavy goods traffic and the actual situation with heavy goods traffic.

**2016**

The second NEAT tunnel (Gotthard) is scheduled to open.



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