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**THE WINDOW OF OPPORTUNITY: HOW THE OBSTACLES TO THE INTRODUCTION OF THE SWISS HEAVY GOODS VEHICLE FEE HAVE BEEN OVERCOME**

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## FOREWORD

This report has been prepared as part of the work programme of the Joint Meetings of Tax and Environment Experts under OECD's Fiscal Affairs Committee and Environment Policy Committee. It was written by Ueli Balmer, Federal Office for Spatial Development, Switzerland. Similar case studies on how the political obstacles to the introduction of economic instruments for environmental policy with potentially negative impacts on sectoral competitiveness have been overcome have been prepared concerning the Climate Change Levy in United Kingdom and the 'minerals accounting system' MINAS, that address nitrogen and phosphorous run-off from agriculture in the Netherlands. A similar study on the taxation of fuels used in domestic commercial aviation in Norway will be prepared in 2005.

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# THE WINDOW OF OPPORTUNITY: HOW THE OBSTACLES TO THE INTRODUCTION OF THE SWISS HEAVY GOODS VEHICLE FEE HAVE BEEN OVERCOME

## EXECUTIVE SUMMARY

### *Origins of the fee.*

The history of the distance-related fee for heavy goods vehicles started in the 1970s. More than 20 years later, the fee was successfully implemented. In-between lies an eventful history with many steps forward and back.

A first step was made in 1985 with the introduction of a flat fee for heavy goods vehicles. The main characteristics of this fee were very similar to the Eurovignette, introduced in several member countries of the EU later on. From the outset, the flat fee was to be an intermediary solution, to be replaced by a distance-related fee in the years to come. An important step in this direction was made in 1994, when a large majority of the Swiss people accepted the constitutional bases for a distance-related fee in a referendum. Two years later however, the realisation of the project seemed beyond hope: the outcome of the consultation about the proposal for a law that was necessary to implement a distance-related fee was negative and tactical manoeuvres against the envisaged change had stopped the technical work essential for a successful implementation. A change in the political environment, utilised successfully by the promoters of the fee, brought a change in trend: on the 27<sup>th</sup> September 1998 the proposal for the law, redrafted according to the critique in the consultation, was accepted by 57% of the Swiss people. Due to strenuous efforts by the Swiss Customs Authority, the authority in charge of the technical implementation, the fee could be introduced as planned on 1 January 2001.

### *Reasons for acceptance of the fee.*

Probably the most important step which was made towards gaining acceptance for the new fee was the use of the special political situation in the mid-1990s: In order to make up for the disadvantages that resulted from being neither a member of the European Union nor of the European Economic Area, Switzerland wanted to conclude bilateral treaties with the EU. One of the conditions of the EU for concluding such treaties was the raising of the Swiss weight limit for heavy goods vehicles from 28 to 40 tonnes. Due to the fear that Switzerland might be invaded by an avalanche of 40-tonne trucks when raising the weight limit, Switzerland had so far explicitly refused to make such a change. The change from a flat fee with a low rate to a distance-related fee with a much higher rate showed a way out of this impasse: the introduction of such a fee was considered a suitable means to make up for the raising of the weight limit and therefore met the needs of Switzerland as well as those of the EU.

To seize the favourable political situation - **the window of opportunity** - was not the only decisive step on the way to gaining acceptance for the new fee. The following factors proved to be essential as well:

- **Part of a policy:** the fee was (and still is) an essential part of a policy, aiming at transferring goods from road to rail. This policy has been accepted by Swiss people in several referenda;
- **Use of revenue:** the revenue is reinvested in the transport sector, mainly for projects in public transport, thus supporting the policy of transferring goods from road to rail;
- **Practical technical solution:** The technical solution is simple, reliable and suited to solving the problems resulting from the political guidelines;

- **Polluter-pays principle:** The calculation of the fee takes the external costs of heavy goods road transport into account. According to opinion polls, this was well accepted by the Swiss population.

### *Design of the fee.*

The fee depends on three factors:

- the distance driven on the Swiss road network (all roads)
- the maximum permitted laden weight of vehicle and trailer
- the emissions of the vehicle (there are three emission classes)

The fee was introduced on 1 January 2001 at a rate of 1.0 Ct/tkm (medium environmental class). In parallel, the weight limit was raised from 28 to 34 tonnes.

On 1 January 2005 the rate will be increased to 1.6 ct/tkm and the weight limit to 40 tonnes.

### *Impacts of the fee.*

As the fee was not introduced as an isolated measure, but simultaneously with a change of the weight limit, the results observed since its introduction have to be seen as a result of the interaction between these two factors. The main effect of the new regime with the new fee on the one hand and a higher weight limit on the other was that heavy goods transport on the road has become much more efficient. This increase of efficiency was mainly due to the following developments

- **Strong renovation of the truck fleet** In order to save fees, the hauler business bought cleaner vehicles belonging to the cheapest emission category and adjusted the size of their vehicles to the actual needs of the market. Previously, oversized vehicles were very common in the business.
- **Concentration in the hauler industry** Due to better capacities, bigger companies are able to operate their lorries in a more efficient way. This allows especially to avoid empty trips.
- **Less heavy goods vehicles on the road:** With the introduction of the new regime, the prior annual increases in vkm of about 7% were replaced by declines of about 4% in 2001 and 3% in 2002. In 2003, the traffic volume of lorries remained stable. Although it has to be admitted that the slow-down of economy has contributed to this change in trend, the new regime has obviously left its traces.

As to the envisaged shift of goods transport from road to rail, no remarkable shift could be noticed so far. Considering the fact that the competitive advantage gained by rail due to the introduction of the fee was more or less balanced out by the productivity gain of the road sector as result of the higher weight limit, this is not astonishing. A transfer of freight from road to rail will not be possible without strong additional efforts in the rail sector.

### *Conclusions.*

Though the development of the Swiss heavy goods vehicle fee was also influenced by some peculiarities of the political system of Switzerland, the conclusions drawn out of this case for a successful implementation of road tolling projects can be considered as being of general value. They can be summarised as follows:

1. The traffic (or transport) problem which is to be solved with the help of a road tolling project has to be acknowledged as such in public.
2. The authority in charge has to offer a solution that is understood as suitable to solve the recognised problem. Normally, the road tolling project is one part of a package of measures foreseen to solve the problem.

3. The acceptance of a road-pricing project can be increased decisively if the revenue is earmarked for transport matters. The use should, of course, also be in line with the policy developed.
4. It is decisive to start with the technical solution in time and it is an advantage to begin with a simple design and to shift to more sophisticated solutions later on.
5. The best project will fail, if it is launched in an unsuitable political environment. So seize the window of opportunity and good luck.

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## THE WINDOW OF OPPORTUNITY: HOW THE OBSTACLES TO THE INTRODUCTION OF THE SWISS HEAVY GOODS VEHICLE FEE HAVE BEEN OVERCOME

### 1. Introduction

1. The national referendum on the introduction of a distance-related fee for heavy goods vehicles (HVF) was one of the most controversial referenda Switzerland has ever seen. This is not surprising inasmuch as the HVF was considered as a new tax affecting – at least indirectly – almost all citizens. What is astonishing, at least at first sight, is the fact that a clear majority of 57% voted in favour of the new fee. The question is why a population which is neither fond of new taxes nor known for being particularly progressive accepted a new fee.

2. The present study tries to highlight the reasons for the outcome of the vote. The study is part of an OECD-wide project on how obstacles to the introduction of economic instruments that could promote sustainable development have been overcome. It is a project undertaken under the auspices of the OECD's "Joint Meetings of Tax and Environment Experts" which mainly comprise delegates from the Ministries of Finance and the Environment in member countries. The project aims to obtain a clearer picture of both the drivers that helped to facilitate the introduction of the fee and those that could have prevented it. In addition, the case study is to evaluate the economic efficiency and the environmental effectiveness of the fee.

### 2. Starting point

3. In January 1972, the Swiss government decided to set up a commission which was to elaborate an integral transport concept for Switzerland. The reason for the setting up of this commission was the insight *"that the state's existing legal, financial and organizational means could no longer cope with the strongly growing transport needs and the new major projects for rail, road, shipping and air transport. The state's available resources were also incapable of dealing with the massive expenditure, demands on regional planning and environment protection and the social consequence of transport arising from these projects under discussion. Possibilities for state intervention in the individual transport system, which have been elaborated in varying ways during the last 130 years according to prevailing circumstances, are not sufficient. The conflicts in objectives which arose made it imperative to work out a global method of overcoming the problem"*.<sup>1</sup>

4. Five years later, the commission presented its recommendations. One of them was that "heavy road transport, which does not cover the infrastructure costs it causes, will receive a new special tax linked to work performance."<sup>2</sup> The argument in favour of the suggested fee was that freight transport did not cover the costs of its use of infrastructure. As the possibility for the introduction of road user charges was

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<sup>1</sup> SICT p. 5.

<sup>2</sup> SICT p. 65.

- as a principle - excluded by the constitution<sup>3</sup> a specific amendment was planned to create the legal basis for the authority to “levy earmarked taxes for both public and private transport.”<sup>4</sup>

5. In the consultation that followed the publication of these recommendations the principle of fair competition, which included the introduction of a distance-related fee for heavy goods vehicle (HVF), was well accepted<sup>5</sup>. Some people asked for external costs to be considered for the calculation of the fee, others asked for the extension of distance-related charging to passenger transport. The report seems to indicate that enshrining the legal bases for road user charges was not controversial. The only exception to this outcome were road traffic organizations, who refused a general charging competence “*if the pending new check of the road budget shows, that the lack of costs coverage could be eliminated*”.<sup>6</sup>

6. For a correct assessment of the results of the consultation it ought to be considered that the heavy goods vehicle fee was just one element among many others, embedded in a global concept. Its comparatively good acceptance should therefore not be overestimated. It will be shown below that the battle begins when the principle is to be implemented in practice.

### **3. Too ambitious a goal**

7. In the political process which followed the elaboration of the integral transport concept in the eighties several of the principles that had been stipulated by the committee – and that had been welcomed in the consultation – were not maintained. The first steps in this direction were taken by parliament in the early eighties.

#### **3.1 Introduction of a flat fee**

8. In 1983, the Swiss Parliament decided not to wait until the whole project was implemented before it introduced the distance-related heavy goods vehicle fee (HVF), but to introduce it separately in advance. And as it assumed that the technological prerequisites for a distance-related fee were not yet fulfilled, it decided to introduce a flat fee instead. It was similar to the Eurovignette, introduced in several EU member countries later on. In addition to the introduction of a flat fee for heavy goods vehicles, the Swiss Parliament decided to implement a motorway user permit. The motorway user permit is a flat fee for private cars which has to be paid for the use of the motorway network. As passenger cars did cover their costs for the use of the roads (see box), the decision in favour of such a fee was even less in line with the integral transport concept than the one for the HVF. The reasoning behind these acts of parliament was clearly political in nature: both projects were considered to be promising. Both fees were designed as interim solutions that were to be replaced by definitive solutions later on in the framework of the integral transport concept.<sup>7</sup>

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<sup>3</sup> According to the Swiss Constitution, the use of the road network is free of charge. Exceptions of this principle are possible if the Swiss Parliament approves them. Up to today, the Swiss Parliament made use of this competence only once (for the use of a road tunnel connecting Switzerland and Italy). The principle of the free use of roads was weakened in 1984 (see next chapter) and in 1994 by creating the basis for the introduction of a HVF. It still is, however, a strongly defended principle explicitly mentioned in the Swiss constitution.

<sup>4</sup> SICT, p. 69.

<sup>5</sup> ICT, report on the consultation, p. 68-69.

<sup>6</sup> ICT, report on the consultation, p. 76.

<sup>7</sup> Federal council, explanations concerning the vote on 26 February 1984, p. 3.

### Cost coverage in Swiss Road Transport

Whether a vehicle category – and road transport altogether – is covering its costs or not can be learned from the Swiss Highway Report, which is published annually. In this report, income from road users and expenditure for construction and maintenance of the road network are summarised. As road pricing is, in general, not allowed in Switzerland (see footnote 3), the main components of the income were (and still are) fuel excise duties and vehicle licenses. According to this report, passenger transport covered the costs it caused during the period covered by this study whereas heavy goods transport did not. It should be noticed that the highway report refers only to road costs, external costs are not considered.

9. Even though it was not in line with the integral concept of transport, the approach of the Parliament proved to be successful. In the following referendum, which was compulsory for both projects (see box “Initiative and referendum”), both bills were accepted (57% in favour of the flat fee for heavy goods vehicles, 53% in favour of the motorway user permit).

10. The fees, which weakened the principle of a charge-free use of the road network, were accepted for different reasons:<sup>8</sup>

- The flat fee for heavy goods vehicles was considered to be justified because freight traffic did not cover its costs for the use of infrastructure. Furthermore, the fee was considered to be a catalyst for the transfer of freight traffic from road to rail, a goal that has a long tradition in Switzerland. Last but not least, trucks are often experienced as a nuisance by the other road users, who represent the majority of the voters.
- Whereas the acceptance of the fee for heavy goods vehicles comes as no surprise, the approval to the motorway user permit, which has to be paid by a large majority of the road users, seems to be more astonishing. It has to be considered, however, that this user permit is a practical means of getting a contribution from foreigners for their use of the Swiss road network.

### Initiative and referendum

The political system of Switzerland gives its citizens specific rights which are often used in context with transport matters and are therefore of importance in the context of this study.

People's initiative: 100,000 citizens can demand a change in the constitution by signing a corresponding text. Once the authority in charge has examined the initiative and declared it valid, the government writes a message to parliament and suggests to either accept or reject the initiative. The government can also submit an alternative to the solution proposed in the initiative. The Parliament is free to accept the suggestions of the government or to take its own decisions. It can, in particular, make its own, alternative proposal. It does not matter whether it is different from the one of the government or whether the government has made one at all. Once Parliament has decided, there is a federal referendum, either on the initiative, or on the counter-proposal (if the original initiative has been withdrawn by the committee in charge of the initiative), or on both. In the last case, the citizens have to declare, whether they prefer the initiative or the counter-proposal in case both should find a majority. To be accepted, an initiative needs to be accepted by both a majority of the individual votes and a majority of the cantons.

Referendum: There are two kinds of referenda: compulsory referenda and optional referenda. A compulsory referendum takes place when parliament wants to change the constitution. The introduction of the flat fee for heavy goods vehicles and the motorway user permit fell into this compulsory regime and so did the creation of a constitutional basis for a distance-related heavy goods vehicle fee (HVF) in 1994 (see chapter 4.3). If Parliament decides matters on the level of laws (be it changes to existing laws or the introduction or abolition of entire laws), an optional referendum may take place if 50,000 citizens sign such a demand. If they do so, the parliamentary decision has to be submitted to a national vote whose result is binding. This happened in the case of the law about the distance-related heavy goods vehicle fee (HVF) in 1998 (see chapter 6.3).

<sup>8</sup> GfS, Analysis of the vote on 26 February 1984.

### **3.2 *People's initiative rejected***

11. In 1982 the Swiss Association for Transport & Environment (ATE), a conservation group specialized in transport matters, submitted a people's initiative (see box) requesting the introduction of a distance-related fee for heavy goods vehicles. For the environmentalists, such a fee - which was to compensate not only the direct costs of road use, but also the external costs of air-pollution, etc. - was to play a key role on the way towards a more environmentally-friendly system of freight transport. With their initiative, they tried to support the corresponding idea in the integral transport concept and to influence the discussions and decisions in parliament that did not develop in the direction they wished.

12. Though the Federal Government and Parliament basically agreed with the motives of the initiative, they finally rejected it. According to the statements of the government before the vote in 1986,<sup>9</sup> the initiative came at the wrong time (the flat fee having been accepted only two years before), it focused one-sidedly on freight transport, and the government needed more time to establish a suitable fee system. The population followed its government and rejected the initiative with a majority of two to one. An important reason for the clear failure of the initiative may have been that the flat fee was to be tripled between 1988 and the time of the introduction of the new fee. It is remarkable that only 35% of the population took part in the vote. The question whether the system of charging freight transport should be altered apparently was not considered as a fundamental issue at the time.

### **3.3 *Coordinated transport policy refused***

13. Two years after the refusal of the initiative, a vote was held on the bill for a "coordinated transport policy". The bill, which had been accepted by a large majority in Parliament, consisted of an integral package of articles which, (if they had been accepted), would have provided the constitutional basis for the implementation of the integral transport concept. The paragraph which was to allow the introduction of a distance-related fee was not limited to heavy goods vehicles but implied a general competence to raise road user taxes. This general competence, though it was limited inasmuch as user charges were limited to a level necessary to cover uncovered costs, was one of the decisive points for the unsuccessful outcome of the vote. 64% of the opponents of the bill, which was refused by a majority of 54% of the voters, considered the coordinated transport policy as a tool to raise new taxes.<sup>10</sup> Since the refusal of the coordinated transport policy in 1988 several proposals of the integral transport concept have been introduced by separate steps (among others the distance-related HVF). The outcome of the process for an integral concept of transport is another proof of how difficult it is to find a majority for a global concept. Although the principle might be accepted as correct by a majority, it is finally refused due to the accumulated opposition of interest groups, who dislike specific – and different - aspects of the suggested bill.

## **4. Step by step**

### **4.1 *A clear hint***

14. The refusal of the bill for a coordinated transport policy did not solve the transport problems Switzerland was confronted with. One development in particular kept transport issues on the top of the political agenda: the increase of heavy goods vehicles transiting through the Alps. Up to 1980, the year of the opening of the St. Gotthard road tunnel, only a few hundred vehicles crossed the Swiss Alps every day. After the inauguration of the tunnel, the situation changed rapidly. In spite of the clear statement of the

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<sup>9</sup> Federal council, explanations concerning the vote on 7 December 1986.

<sup>10</sup> GfS, analysis of the vote on 7 December 1986.

responsible minister that “*this is not a tunnel for heavy goods traffic*”<sup>11</sup> the number of heavy goods vehicles transiting the Swiss Alps increased rapidly in the following years. The fact that an ever-increasing number of heavy goods vehicles came from abroad made the subject politically delicate and strengthened the need to find a solution that met both the Swiss need for a better protection of the population along the transit routes and the demand of the EU of sufficient transport capacity for transalpine traffic.

15. The suggested solution was to transfer freight traffic from road to rail. In order to achieve this ambitious goal – it has to be considered that at the time of this decision about 80% of freight traffic across the Alps was already done by rail – the Swiss Parliament decided to build two new rail links through the Alps. The heart of the project were two new tunnels with a length of 57km (St. Gotthard) and 34km (Lötschberg), respectively. The decision of Parliament in favour of two new rail links was all the more significant in the context of exhaustive research work carried out in the early eighties that had led to the conclusion that additional rail capacity across the Swiss Alps would not be necessary in the decades to come. The project, which was considered to be profitable in the long term, was to be financed mainly by loans. One quarter, however, was to come from vehicle excise duties. The argument in favour of this contribution from road users was the fact, that it also was in the interest of car users to relieve the transit routes from heavy goods vehicles.

16. On 27 September 1992, the Swiss people had to decide whether it approved the project or not. In the period preceding the vote, the decision of Parliament had been criticized in particular by environmentalists. They argued that:<sup>12</sup>

- transit capacity on the rail was not exhausted yet and two new rail links would therefore lead to tremendous overcapacity
- the extremely expensive project would end in a financial disaster
- new rail capacity would only make sense if the use of rail would be mandatory for transit traffic

17. Another group of opponents, defending the interests of car users, was afraid that Parliament might subsequently raise the share deriving from fuel excise duties.

18. In the final vote, a clear majority of 64% of the voters approved to the decision of Parliament. According to the opinion poll carried out after the vote, the following motives were decisive for the majority of voters approving the bill:<sup>13</sup>

- motives in favour of public transport (namely the transfer argument)
- ecological reasons
- project is in the interest of road users (namely less traffic on the road)
- project favours international integration

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<sup>11</sup> Statement of Federal Councillor Hürlimann at the inauguration of the tunnel on 5 September 1980.

<sup>12</sup> Federal Council, explanations concerning the referendum of 27 September 1992, p. 5.

<sup>13</sup> GfS, analysis of the vote on 27 September 1992.

19. Overall, the result can be interpreted as a clear hint in favour of the policy aiming at the transfer of freight traffic from road to rail. The introduction of a performance related fee is perfectly in line with such a policy.

#### **4.2 A hidden step**

20. Ten weeks after the acceptance of the new rail links across the Alps, the Swiss refused to join the European Economic Area (EEA, see box) in another referendum (with a very slim majority of 50.3%). At first sight, this verdict does not seem to have anything to do with the distance-related heavy goods vehicle fee introduced eight years later. Though it is true that the refusal of the EEA bill was indeed no decision in favour of such a fee, it is also true that the negative outcome of this vote was a necessary prerequisite for the introduction of such a fee later on. There are two points which support this argument:

1. If Switzerland had joined the EEA, EU regulations in transport (and many other) matters would have become part of the Swiss legislation. This means, that a distance-related fee as designed in Switzerland would not have been possible, because it would not have been in line with EU directive 1999/62 on the charging of heavy goods vehicles for the use of certain infrastructures. The problem can be illustrated with the example of Liechtenstein, which is a member of the EEA. When Liechtenstein wanted to introduce the Swiss heavy goods vehicle fee on its territory<sup>14</sup>, a sophisticated solution had to be found to avoid interference with this directive (see box). Such a solution would by no means have been possible for Switzerland.
2. If the EEA bill had been accepted, “economiesuisse”<sup>15</sup> would most certainly have refused the HVF bill in 1998 (because, in this case, the federation would not have been interested in concluding bilateral treaties). The same might be true for political parties allied with the industry. The support of industry (or at least of prominent parts of it) and of these political parties, however, was crucial for the acceptance of the HVF bill, as will be shown below.

#### **The European Economic Area (EEA)**

The agreement creating the European Economic Area was negotiated between the European Community and the seven member countries of the EFTA (European Free Trade Association) and signed in May 1992. Switzerland subsequently decided not to participate (see main text) and three other EFTA members joined the European Union. The EEA Agreement entered into force on 1 January 1994 and was maintained because of the wish of the three remaining EFTA countries – Norway, Iceland and Liechtenstein – to participate in the Single Market while not assuming the full responsibilities of membership of the EU. The Agreement is concerned principally with four liberties – free movements of goods, persons, services and capital.

<sup>14</sup> In a referendum, Liechtenstein had decided with a large majority to join the Swiss solution.

<sup>15</sup> “economiesuisse” is the largest umbrella organization covering the Swiss economy. It is the product of the merger between the Swiss Federation of Commerce and Industry and the Society for the Promotion of the Swiss economy which supported together the HVF in 1998.

### The Liechtenstein case

As an EEA member, Liechtenstein is bound to apply EU regulations in transport matters such as directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures. This directive forbids user charges on the entire network. But that was exactly what Liechtenstein intended to do. The way out of the problem consisted in introducing the Swiss system on the Liechtenstein territory by granting in parallel a flat reduction for the estimated use of the roads presumably not due to charging. In practice, the solution works as follows: The fee is due for the use of the entire road network of Liechtenstein. When leaving or entering Liechtenstein by Schaanwald, the only border crossing from Liechtenstein to Austria with a relevant volume of heavy goods vehicles, the hauler has a right to a flat reduction equivalent to a ride of 3 kilometres. It is self-evident that such a solution was possible only for a small region like Liechtenstein.

#### 4.3 *Two decisive steps*

21. The acceptance of the project for two new rail links across the Alps (see 4.1) was not only a clear hint in favour of the transfer of goods from road to rail, but also a catalyst in favour of a distance-related fee as a suitable means to push the policy forward. Because the bill for a coordinated transport policy, which would have comprised the constitutional bases for a performance related HVF, had been refused in 1988 (see chapter 3.3), it was necessary to draft a separate bill to create the constitutional bases for a HVF. In parallel to this bill, a popular initiative, the “Initiative for the protection of the Alpine region against transit traffic”, was put to the vote in a referendum. The core of this initiative was the compulsory transfer of all freight transiting through the Swiss Alps from road to rail. Although the Swiss government clearly acknowledged its support for a policy aiming to transfer goods from road to rail, it rejected the initiative. It argued that the initiative was discriminatory, and therefore not in line with the principles of international law and that its policy, which included a distance-related fee, would be sufficient to reach its goals.

22. The vote, which took place on 20 February 1994, ended with a surprise: the Swiss people not only accepted the constitutional bases for a distance-related fee (with a large majority), but also the popular initiative for the protection of the Alps.<sup>16</sup> The strongest arguments in favour of the initiative were the protection of the environment in general and the will to express solidarity with the troubled population living along the transit routes.<sup>17</sup>

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<sup>16</sup> The acceptance of a people’s initiative is rather rare.

<sup>17</sup> GfS, analysis of the vote on 20 February 1994.

### **The implementation of the Alpine Initiative**

The initiative's categorical demand that transit traffic (i.e. traffic which has neither its origin nor its destination on Swiss territory) crossing the Swiss Alps had to happen exclusively on the rail was considered to be discriminatory such as formulated in the text. It was therefore necessary to interpret the text of the initiative in a way that was both not discriminatory and respected the will of the majority of voters. The way out of the situation, to which all sides involved finally agreed, was to interpret the initiative as follows:

In 1994, the year when the Alpine Initiative was accepted, about 1.3 million heavy goods vehicles crossed the Swiss Alps. About 50% of these vehicles, i.e. 650'000, were vehicles in transit and therefore, according to the text of the initiative, ought to be transferred to the rail. Thus the number of vehicles crossing the Alps that people were willing to accept was 650,000. In order to achieve this figure in a non-discriminatory way, a policy was developed which considered traffic as a whole, regardless of its origin and its destination. The pillars of this policy are the distance-related HVF, the construction of two new rail links across the Alps (Gotthard and Lötschberg) and the rail reform which aims at making rail more competitive.

## **5. Last Setbacks**

23. After the clear mandate of the vote of February 1994, the administration started the work for the implementation of a distance-related fee. The work to be done was split between the Swiss Customs Authority (SCA), incorporated in the Swiss Ministry of Finance, and the General Secretariat of the Ministry of Transport.<sup>18</sup> The SCA, experienced in matters of raising taxes, was mandated to prepare the implementation on the technical level whereas the Ministry of Transport was to be responsible for the political part, in particular the elaboration of the future fee and the scientific work on which it was based. Opposition in both fields led to delays, proving that the implementation of the fee might become difficult.

### **5.1 Negative feedback**

24. Immediately after the vote of 20 February 1994, the Ministry of Transport started to draft the law that was necessary for the implementation of the fee. The draft, which was presented to the organizations having an interest in the subject in summer 1995, corresponded to a large extent to the law which entered into force on 1 January 2001:

- The fee was to depend on the distance driven and on the maximum permitted laden weight
- It was to be levied for the use of all roads on the Swiss territory
- The government was to be authorized to make exceptions
- The level of the fee was to be limited according to the total amount of costs caused by heavy goods vehicles (including external costs)
- The cantons were to receive parts of the net income of the fee

25. There were, however, also differences (see chapter 7):

- The maximum level of the fee was set at 2 Swiss cents (about 1.3 cents) per tonne and kilometre (tkm)

<sup>18</sup> The full name of the ministry is "Federal Department of Environment, Transport, Energy and Communications". For practical reasons, it will be named Ministry of Transport in this study.

- The fee was not differentiated according to vehicle emissions
- The share of the Federation in the income was supposed to be used mainly for road purposes
- The share of the cantons was not fixed
- The cantons were to be in charge of levying the fee for domestic vehicles

26. The feedback to the proposal described above was mainly negative<sup>19</sup>. A majority of the organizations consulted either refused it overall or considered that time as not ripe for the change envisaged. Of special importance was the refusal of five of the seven political parties involved, among them three of the four parties represented in government and disposing of a strong majority in Parliament (the only big party supporting the proposal was the Social Democratic Party).

27. The reasons for the refusal of the proposal were complex. They were, first of all, not due to the change from a flat-rate to a distance-related fee. The arguments forwarded against the fee were the following

- A strong minority suggested that the fee should not be based on distance, as proposed, but on the consumption of diesel
- The fee should, additionally, depend on vehicle emissions
- The fact that the fee would only apply to vehicles with a laden weight of more than 3.5 tons would lead to a shift to lighter vehicles.
- The scientific basis for the calculation of the external costs was not solid enough
- The rate of 2 (Swiss) cents per tonne-km was too high
- A reliable On Board Unit meeting the specific requirements inherent to a kilometre based fee was not available on the market
- The fee should not be introduced prior to a solution on EU level (or should at least be compatible with a solution on a European level).

28. A new idea, which had not been part of the proposal but was brought into the debate by a working group for the financing of the new rail links across the Alps (see 4.1), was clearly rejected in the consultation. A strong majority was against the idea of the group to use part of the revenue of the new fee to finance the new rail links.

29. It finally comes as no surprise that the cantons demanded a bigger share of the income of the fee.

## **5.2 *Scapegoat on board unit***

30. A specific On Board Unit (OBU), capable of registering the distance covered, was an obvious prerequisite for the implementation of the fee in the way it was designed (see 5.1). As such an OBU was not available on the market yet, the ministry in charge started a call for tender for the development of such

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<sup>19</sup> Department of the Environment, Transport, Energy and Communications, "Federal law on the Swiss heavy goods vehicle fee, report on the consultation".

a unit. A sum of 7.9 million Swiss Franks (about 5 million euro) was designated in the budget for 1996 to procure the necessary finances for the development of the unit. In the first chamber of parliament which debated the proposal, the Council of States<sup>20</sup>, it passed without difficulty. The second chamber, however, the National Council, decided not to follow the Council of States and the government, that had drafted the proposal. It refused to grant 4 million Swiss Franks, the sum designed for the development of the On Board Unit in the years to come (a part of the money had already been spent). The arguments raised against the full amount – Switzerland should wait until Europe had decided how it wanted to proceed, or the consideration of alternatives to a distance-related fee such as an increase of excise duties on diesel – raised the suspicion, that the real aim of the opponents was not the proposal but the fee itself: *“I get the impression, that you beat the bag and mean the donkey. The very subject is the fee and not really the On Board Unit.”*<sup>21</sup>

31. After the proposal was refused by the National Council it went back to the Council of States that decided to stick to the full sum –with a slim majority of only 16:14 – and sent the bill back to the National Council. When the National Council rejected the proposal once again, the Council of States finally decided to give in, thus following the arguments of the speaker of the commission responsible for the proposal. He argued that considering that the session would end the following day it would be time to put an end to the debate, mainly for reasons of opportunity. The fervent debate on a comparatively small sum was another clear hint that it would not be easy to introduce the fee.

### 5.3 *Beyond hope?*

32. The negative outcome of the consultation on the proposed law and the rejection of the credit to develop an OBU seemed to make the project of a distance-related fee rather hopeless. This at least was the comment of the former secretary general of the transport ministry, when he handed over the dossier to his successor in winter 95/96.<sup>22</sup>

## 6. The window of opportunity

### 6.1 *Different interests*

33. During the controversy about the EEA Bill in 1992, the opponents to the bill, or at least a majority of them, had not denied that it was necessary to improve the framework conditions for the Swiss industry such as it had been envisaged by the EEA. They had argued, however, that this could be done in a better way if Switzerland remained independent and thus had the possibility to formulate its economic policy on its own. Such a policy includes the possibility to conclude bilateral treaties, in particular with the European Union, Switzerland’s most important partner in international trade. Although the economic disaster that had been forecast by some of the promoters of the EEA bill did not take place when the latter was rejected, the claim for an improvement of the economic framework conditions, especially regarding trade with the European Union, was growing. The option chosen was to achieve the goals of the industry by negotiating bilateral treaties with the European Union. Even though the problems the EU wanted to solve in its relations with Switzerland were not as urgent as the ones forwarded by the Swiss, the EU also had an interest in negotiating bilateral treaties with Switzerland. In the context of this study the issue of

<sup>20</sup> The set-up of the Swiss parliament is similar to the one in the US: it consists of two chambers, the National Council (similar to the House of Representatives) and the Council of States (similar to the Senate).

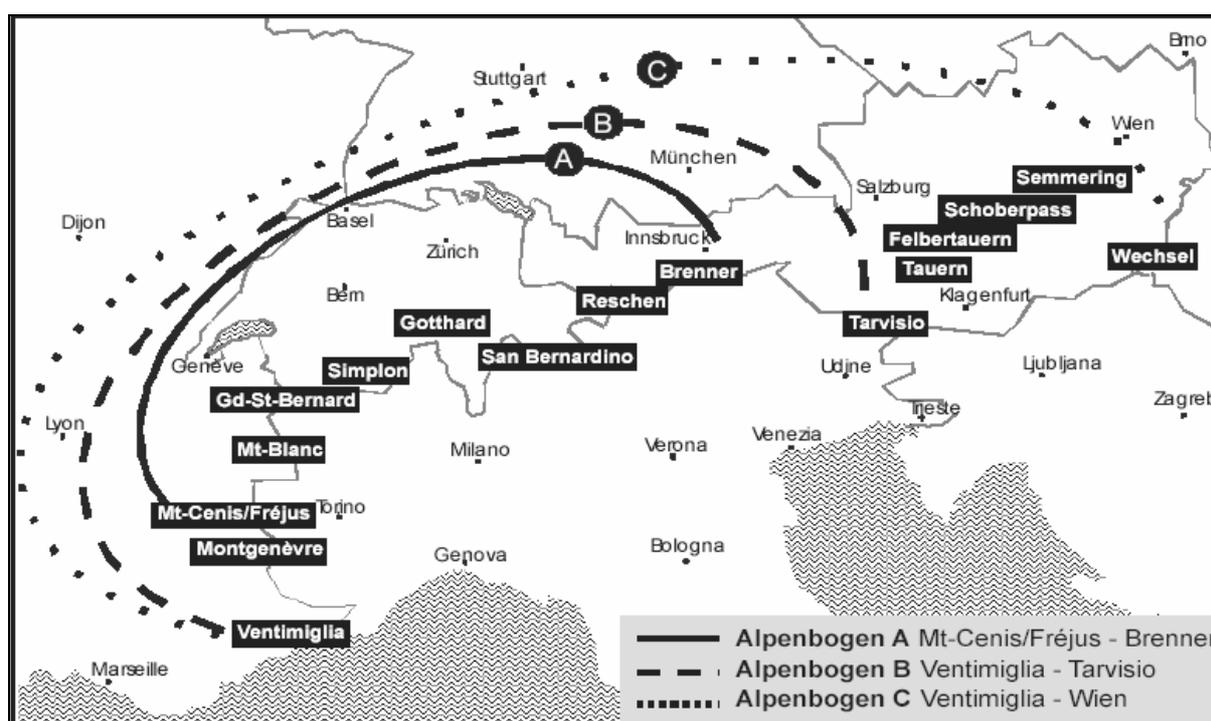
<sup>21</sup> Statement of the responsible minister Kaspar Villiger during the debate, Amtliches Bulletin der Bundesversammlung 1995, National Council p 2509. To beat the bag and mean the donkey is a famous German proverb meaning that you seem to attack one thing but in reality want to attack something else.

<sup>22</sup> Werder Hans, p. 6.

transalpine traffic was of special importance. The reasons for the interest of the EU in this subject were due to the geographical location of Switzerland on the one hand and to specific transport regulations in Switzerland on the other hand.

34. **Geographical location:** as the map illustrates, Switzerland not only lies in the heart of Europe, but also between three of the major members of the European Union, France, Italy and Germany. Of special importance is the heart of the heart: the St. Gotthard pass, the shortest route between the north and the south of Europe. Italy, in particular, was afraid to be cut off from the other members of the EU and interested in unhindered transport across the St. Gotthard and the other passes across the Swiss Alps.

**Figure 1. The location of Switzerland as a barrier to transport between Italy, France and Germany.**



This map illustrates the geographical location of Switzerland as a potential barrier to road transport between Italy and the two big EU member states France and Germany.

35. **Transport regulations:** Switzerland had (and partly still has) specific traffic regulations that are unfavourable to transport by heavy goods vehicles. The regulations have different goals such as promoting freight transport by rail or reducing noise pollution along the road: The permitted weight of heavy goods vehicles was limited to 28 tonnes and trucks with a laden weight of more than 3.5 tonnes are banned from the roads between 10 PM and 5 AM, (night ban). Both regulations were (and the night ban still is) highly popular in Switzerland. The fact that they had been integrated in the transit agreement of 1992, a treaty Switzerland and the EU had put in force in 1992 to regulate transit traffic through Switzerland – was considered a success in Switzerland. Together with the good performance of the Swiss railways these two measures have certainly been decisive for the comparatively high share of the rail in freight transport in Switzerland (about two third of transit traffic, about one third of the total of freight transport<sup>23</sup>). The

<sup>23</sup>

The figures refer to the share in tonne-km.

importance of these two regulations had even increased since the opening of the St. Gotthard road tunnel in 1980 that led to a steady increase of lorries crossing the Swiss Alps<sup>24</sup>.

## 6.2 *The key role of the fee*

36. The different interests described above led to a political deadlock. The EU was not willing to conclude bilateral treaties in matters that the Swiss industry, in particular, was asking for as long as Switzerland remained unwilling to make concessions to facilitate road transport, especially road transport across the Swiss Alps. The HVF provided a way out of the impasse. If it was high enough (see box), the fee was considered to be a valuable instrument to make up for the consequences of an increased weight limit. The 28-tonne-limit had forced the trucks with a higher weight to make a detour around Switzerland up to then. By introducing the HVF as a means to protect the Swiss Alps from an avalanche of trucks the policy aiming at transferring freight traffic from road to rail could be maintained and simultaneously one important precondition of the EU for accepting the package of treaties as a whole could be met.

### **The setting of the charge level**

The setting of the charge level was very delicate for the following reasons:

- to make up for the consequences of an increased weight limit it had to be high enough;
- to be accepted in a referendum, the charge was not to exceed a certain (i.e. politically acceptable) limit;
- the level had to meet both the requirements of EU legislation and of Swiss legislation, according to which “the revenue must not exceed uncovered infrastructure costs and the costs for society”.

After a long and very controversial process, which is described in detail in annex 1, it was decided that the maximum fee was to be limited to an amount equal to 1.8 cents<sup>25</sup> and that the fee was to be introduced gradually and in coordination with the increase of the weight limit. These are the key dates:

- 01.01.01 Introduction of the HVF at a rate of 1.0 ct/tkm. Simultaneous increase of the weight limit from 28 to 34 tonnes.
- 01.01.05 Increase of the rate from 1.0 to 1.6 ct/tkm and of the weight limit from 34 to 40 tonnes.
- Ca 2007 Increase of the rate to 1.8 ct/tkm

37. Politicians in favour of the new fee seized the opportunity to put this item on the political agenda again, using it as a bargaining power for the negotiations with the EU. The lobbying proved to be successful. The door to a change of the regime in freight transport was flung open within only one year. A significant proof for this change in trend was the fact, that the credit for the development of an OBU passed both houses without problems at the end of 1996.

38. To make the best use of the change in trend, the new head of the transport ministry, Moritz Leuenberger, and his secretary general, Hans Werder, organized the steps necessary to improve the acceptance of the suggested fee:

<sup>24</sup> This number has increased from a few hundred lorries a day before the opening of the tunnel to about 4,500 in 2000, more than eighty percent of them passing through the St. Gotthard.

<sup>25</sup> Unless specified otherwise the numbers in this study are from now on given in euro only.

- In a meeting with the representatives of the cantons it was agreed that one third of the net revenue of the fee should be allocated to their treasuries. This step of course helped to get their support for the fee.
- The remaining two thirds of the net revenue, allocated to the Federal state, were to be earmarked for the financing of the new rail links across the Alps. This step was decisive because it had become clear in the meantime that these rail links would not be profitable and could therefore not be financed on the basis of credits, as planned originally. This change of the use of the fee fitted perfectly into the developed policy that aimed at transferring goods from road to rail.
- By engaging one of the best Swiss pundits in the domain of external costs, professor René Frey from the University of Basle, the commission of Parliament in charge of the HVF-item could be convinced that the scientific basis for the calculation of external costs was solid enough.
- It was decided, that the fee should also depend on the emissions. In doing so, government not only took into account the corresponding demand expressed in the consultation, but could also balance the criticism of those who had favoured a fee on the consumption of diesel. Last but not least, taking into account the emissions had also been a demand of the EU when negotiating the treaty on land transport (see Box).

39. Thus the opportunity of the opened window on the political level was seized and the administration took the steps that were necessary to improve the acceptance of the HVF bill. This way, the field was prepared for a successful campaign in favour of the HVF in the final referendum.

#### **The bilateral treaties**

After the Swiss people had refused to join the European Economic Area (see 4.2), the Federal Council (Swiss cabinet) took the initiative and started bilateral negotiations with the European Union. Their aim was to avoid that the negative outcome of the vote led to substantial economic disadvantages, which the Swiss export industry, in particular, was afraid of. As a first step, certain economic areas such as air transport were to be liberalized and a full participation of Switzerland in the EU research program was to be realized. The EU was ready to negotiate, but made two conditions from the very beginning:

1. Liberalization was not to be limited to the areas favoured by Switzerland, but be extended to other areas such as free movement of persons and to land transport (including a raise of the weight limit).
2. The different treaties (seven in total) had to be part of a single package, which would have to be accepted or refused in its totality.

To get the advantages it was aiming for, Switzerland therefore had to deal with the disadvantages it had hoped to avoid, such as the liberalization of land transport. The negotiations concerning land transport were therefore especially controversial and more than once threatened by a dead end. The compromise finally found consisted in balancing the negative effects of the increased weight limit by implementing a substantial user charge for heavy goods vehicles. With this deal one of the main obstacles on the way to a successful conclusion on the bilateral treaties had been overcome. In the vote of 21 May 2000, the treaties were accepted by a large majority of 67% of the voters.

### **6.3 The final vote**

40. The government submitted the bill for a distance-related heavy goods vehicle fee to Parliament in 1997. It was amended in the way described above and despite the opposition on the right wing of the political spectrum the bill passed both councils with clear majorities (120:46 in the National Council,

22:14 in the Council of States). The fundamental driver for the clear acceptance of the bill was undoubtedly the context of the bilateral treaties, which induced two big parties<sup>26</sup> that had refused the draft in the consultation to the bill.

41. Immediately after the approval of Parliament, the opponents of the bill launched a referendum against it. Their main argument was that the new fee would lead to additional costs of 300€ per household and year. Further arguments were that the fee would neither lead to a transfer from road to rail nor would it work as a catalyst for the European integration of Switzerland. And finally, they criticized that the use of the revenue was not to be allocated strictly to road purposes, as had been stipulated in the vote of 1994. Apart from the lobbies of the road transport sector, the referendum against the HVF was supported by politicians unfavourable to a better political integration of Switzerland into the EU.

42. The referendum was successful inasmuch as it was signed within a short delay by about four times more signatures than necessary (50,000). In the campaign which preceded the final vote about the law on 27 September 1998, the main arguments were those put on the political agenda by the opponents:

- The costs the new fee might cause;
- The role of the fee as a driver to manage transport demand and;
- The integration of Switzerland within Europe.

43. Concerning the argument of costs, the different points of view of the opponents on the one hand and of the promoters on the other are of special interest. The figure of €300 per household claimed by the opponents was the result of a simple division of the total income of about 1.2 billion € (per year from 2005 onwards) by the number of about 4 million Swiss households.

44. The authorities criticized this calculation for three reasons:

1. It did not take into account the abolition of the flat fee;
2. One third of the revenue would be paid by foreign haulers;
3. The progressive increase of the weight limit to 40 tonnes would lead to gains in productivity that would more or less make up for the additional cost caused by the HVF.

45. Based on these arguments, their conclusion was, that the additional costs would constitute €7 per household at the most. It is interesting that this second way of calculating the fee was also supported by “economiesuisse”. The background for doing so was a calm analysis of the political situation. It clearly showed that the Swiss people would not accept the bilateral treaties (including the raise of the weight limit to 40 tonnes ultimately demanded by the EU) without having the HVF installed as a means of protection against the avalanche of heavy lorries they were afraid of. The high priority for the bilateral treaties even induced “economiesuisse” invest considerable amounts of money into the campaign in favour of the HVF. Together with the support of the moderate right-wing parties FDP and CVP (the left was in favour of the fee anyway), the alliance in favour of the new fee had grown strong enough to win the vote with a comparatively clear majority of more than 57% the voters. The opportunity had been seized.

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<sup>26</sup> Both parties, the FDP (Radical Free Democratic Party) and the CVP (Christian Democratic People’s Party) are situated right of the centre of the political spectrum

46. Although the specific context of the bilateral treaties was central for finding a majority other reasons were decisive for the acceptance of the fee as well:

- **Part of a policy:** the fee was (and still is) an essential part of a policy, aiming at shifting goods from road to rail. This policy has been accepted by Swiss people in several votes.
- **Use of revenue:** the revenue is reinvested in the transport sector, mainly for projects in public transport, thus supporting the policy of transferring goods from road to rail.
- **Practical technical solution:** The technical solution is simple, reliable and suited to solve the problems resulting from the political guidelines (see chapter 7).
- **Polluter pays principle:** The calculation of the fee takes in account the external costs of heavy goods road transport. According to opinion polls this was well accepted by the people.

## 7. Successful implementation

### 7.1 *Technical hurdles*

47. Successful implementation not only implies to provide political acceptance, but a reliable technical solution for the levying of the fee as well. The example of the German lorry toll (LKW Maut) shows that this aspect should not be neglected.<sup>27</sup>

48. In the case of the Swiss HVF, the Federal Council (Swiss cabinet) decided that the levying of the fee should not be privatised and delegated this task to the Federal Customs Authority (FCA). In this way, the large competence of this authority in taxation matters could be utilized directly. The knowledge of external experts was captured by integrating the consultants on all levels in the project organization established in January 1997 (immediately after the proposal for the development of the On Board Unit had been accepted in Parliament) with the clear objective to introduce the fee on 1 January 2001. The solution to be developed had to meet the following legal requirements<sup>28</sup>:

- The fee has to be paid by vehicles with a maximum permitted laden weight of more than 3.5 tonnes;
- In contrast to the existing toll systems in the neighbouring countries, the fee was to be levied on all roads;
- The fee was to be levied according to the maximum permitted laden weight of vehicle and trailer. It was therefore necessary to develop a mechanism registering the coupling or uncoupling of a trailer;
- The fee was to be differentiated according to the emissions of the vehicle.

### 7.2 *The Swiss solution*

49. One of the first problems to be met was the fact, that – due to legal reasons – Switzerland could not declare the installation of an on board unit mandatory for foreign vehicles. The installation of such a unit not only facilitates collecting the necessary data, but also is a helpful tool to avoid fraud, a crucial issue for the success of any fee.

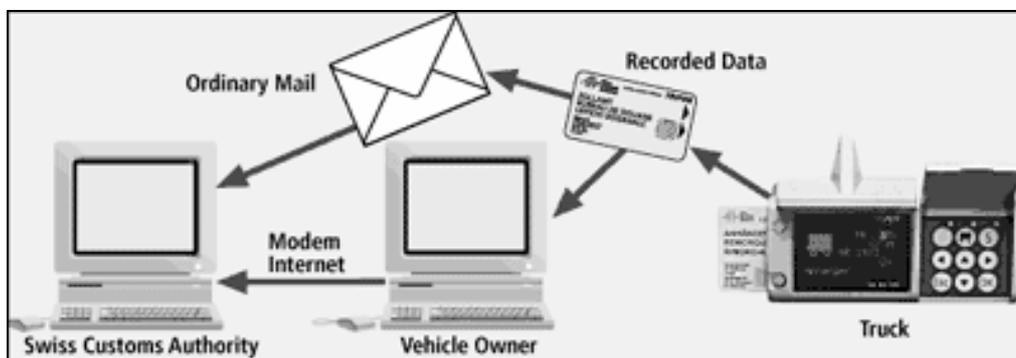
<sup>27</sup> Due to technical difficulties, the introduction of the lorry toll (Lkw-Maut) has been postponed first from August to November 2003, and then to an unspecified date

<sup>28</sup> Both the legal requirements of the Swiss legislation (constitution, law and ordinance) and those of the Land Transport Agreement Switzerland-EU have to be respected.

50. Switzerland therefore developed two systems, one for users equipped with an On Board Unit and one for users without an OBU.

51. System for vehicles equipped with an OBU: This system applies mainly to domestic vehicles, for which the installation of an OBU is mandatory. The maximum permitted laden weight of the vehicle and the emission class are stored in the OBU. In order to record the driven kilometres, the OBU is coupled to the tachograph. If the vehicle crosses the border, a device fitted above the street (microwave radio connection) deactivates the registration. When the vehicle returns to Swiss territory, the same device reactivates the recording. The recording of the data cannot be manipulated by the drivers. The only information they are entitled and able to enter themselves is the coupling or uncoupling of a trailer.<sup>29</sup> Every month the data stored in the OBU is registered by the introduction of a chip card into the OBU. This data is then forwarded to the federal authorities who use it to calculate the fee and write the appropriate monthly invoices.

**Figure 2. From data to billing**



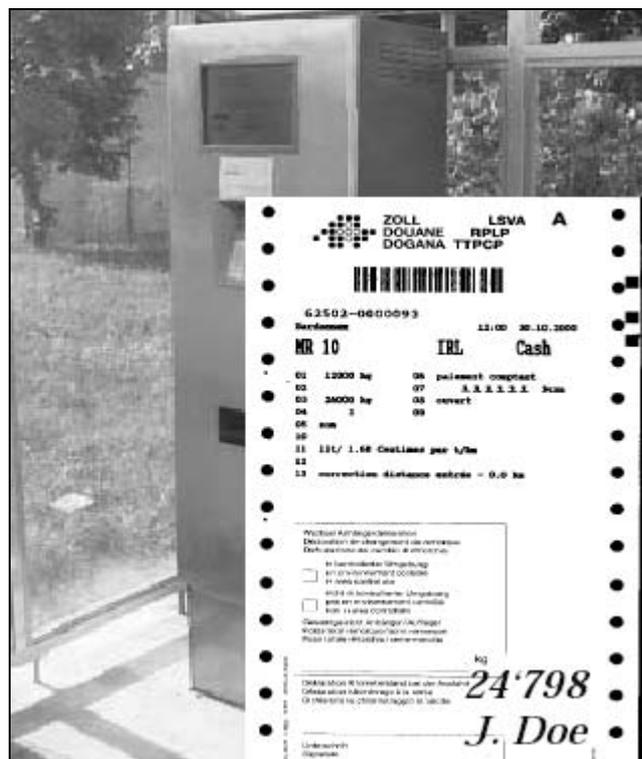
Every month the data stored in the OBU is registered by the introduction of a chip card into the OBU. This data is then forwarded to the Swiss Customs Authority who uses it to calculate the fee and write the appropriate monthly invoices. The data can be forwarded either by sending the Chip Card by mail or by sending the data directly via Internet.

52. System for users without OBU: as mentioned above, the installation of an OBU is not mandatory for foreign vehicles, although their owners can acquire them for free (like the domestic users) if they wish to do so. If the vehicle has no OBU, the fee is registered by using an identification card at the special terminals for HVF clearance. This identification card is provided when a lorry enters Switzerland for the first time and contains the relevant data, in particular the maximum permitted laden weight and the emission class. To get the distance relevant for calculating the fee, the driver has to insert the actual mileage of the tachograph on a form when entering and when leaving the country. To avoid fraud, the distance driven is checked occasionally by comparing the mileage declared on the form with the tachograph and by means of papers in possession of the driver concerning the destination of his goods. The fee has to be paid when leaving the country, either in cash or, preferably, by fuel credit cards or through an account with the Customs Authority.

<sup>29</sup>

Whether the coupling of a trailer has been registered correctly by the driver can be seen from the outside of the vehicle due to a specific configuration of lamps burning at the back of the OBU.

Figure 3. Clearance terminal for users without OBU



### 7.3 First of January 2001

53. Although a team of about seventy experts had been working hard for a successful introduction during four years, it was not without anxiety that the manager of the project, Hugo Geiger, Vice-Director of the Swiss Customs Authority, watched the day of introduction coming closer. What made things particularly difficult was the fact that many lorry owners installed the OBU at the very last moment, because they had hoped that the introduction of the fee might be postponed. But finally, all went well. The following facts helped a successful implementation:

- Both systems, the one for vehicles equipped with an OBU and the one for users without an OBU, are simple. The key element for measuring the distance in domestic and foreign vehicles alike is the tachograph which is a legally recognized instrument and which is compulsory in all commercial vehicles throughout Europe. The system for users equipped with an OBU relies on a technology that has been proven to be useful for electronic fee collection for a long time.<sup>30</sup> With the link to the tachograph the specific requirement of registering the distance driven could be met without having to implement additional delicate technologies for this matter. The procedures for vehicles without OBU is very practical. It does not require more time than has been necessary before for the payment of the flat fee. It is mainly for this reason that only few foreign lorries have been equipped with an OBU.<sup>31</sup>

<sup>30</sup> The so-called DSRC (dedicated short range communication) technology the Swiss OBU relies on has been (and still is) the most applied system for electronic fee collection, such as for tolls on the motorways in Italy, France, Spain and Portugal as well as for the heavy goods vehicle fee successfully introduced on 1 January 2004 in Austria.

<sup>31</sup> Up to now, only about 2,000 OBUs have been installed in foreign vehicles.

- Throughout the project, a practical solution was given priority. The approach was never technology-driven.
- The Swiss Customs Authority had a long-standing experience in implementing IT and automation projects. Throughout the project there was a good working relationship between the Swiss Customs Authority, the consultants and the industrial suppliers based on clear specifications, fairness and trust.
- The fact, that the fee had been accepted in a popular vote increased its acceptance within the road transport industry. Without the generally good cooperation with this industry a successful introduction of the fee would hardly have been possible.
- It proved to be wise to start the system at the beginning of January: The level of heavy goods transport is very low at this time of the year (especially on 1 January).

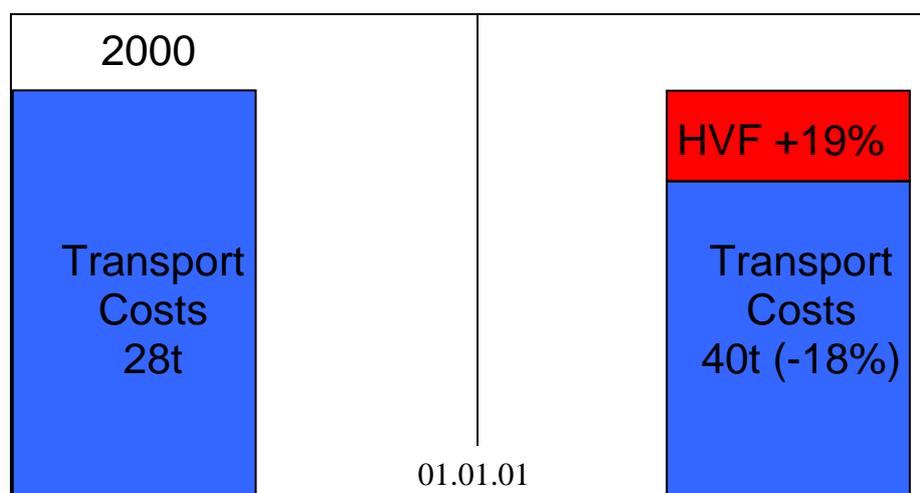
## **8. Economically efficient and environmentally effective**

### **8.1 *Preliminary considerations***

54. Part of the mandate of this study was to evaluate the economic efficiency and the environmental effectiveness of the fee. Before going into the details of a corresponding analysis, the following facts ought to be considered:

1. Although the HVF was introduced in the context of the situation in transit traffic, it is applied on the whole road network and therefore has an effect on the whole territory of Switzerland.
2. The introduction of the HVF did not only lead to a change of the structure of the fee system, but also of the (average) amount of the fee. On the average, the fee rate per truck is now five times higher than it used to be until 1999 (from 2005, it will be about 8 times higher).
3. Economic efficiency and environmental effectiveness can not be clearly separated. The corresponding effects are therefore presented together (chapter 9.2).
4. The fee was not introduced as an isolated measure, but simultaneously with a change of the weight limit: The consequences of raising the weight limit are ambiguous. On the one hand, it raises the productivity of road transport, which in short term leads to less lorry traffic on the roads. On the other hand, it more or less makes up for the price increase caused by the HVF (see figure below). This is why the costs of road transport remained practically stable overall. This is of importance when analysing the effects of the fee, especially for the road – rail ratio. For this reason, and because the transfer of freight traffic from road to rail has been declared a main objective of the fee, the rail-road ratio will be analysed separately (chapter 9.3). As all effects have to be seen as a result of the interaction between the HVF and the higher weight limit, it is more precise to speak of effects of the new regime instead of effects of the fee alone.

**Figure 4. Consequences of lifting the weight limit from 28 to 40 tonnes**



The figure shows that the overall gain in productivity of 18% in road transport due to the higher weight limit more or less makes up for the effect of the HVF, which increased the total costs in heavy goods transport by 19%.

## 8.2 *The chain of effects*

55. The new regime with a HVF and a higher weight limit led, first of all, to serious changes in the fleet composition and the structure of the road transport sector:

- In the year prior to the introduction of the HVF, sales of heavy goods vehicles increased by 45%. By renovating their fleets, truck owners saved money in two ways: new vehicles belong to the lowest and therefore cheapest emission class and the size (or laden weight) of the trucks in the fleet could be matched better to the actual needs of the market. As regards the second point, two trends have to be distinguished: On the one hand, there was a trend to buy vehicles with a lower maximum permitted laden weight by those haulers who formerly mostly used over-sized vehicles for their average loads (to do so mattered much less under the old regime with the flat fee). On the other hand, those haulers who could make use of the higher weight limit tended to buy heavier vehicles.
- The new system led to a concentration in the hauler industry, either through mergers or through the closure of smaller companies. Larger companies necessarily dispose of highly developed logistic systems. This enables them not only to utilize the best suited (i.e. especially not oversized) vehicle, but also to combine different transport-trips. Thus, empty runs can be avoided, or at least be reduced in distance.

56. The changes in fleet composition and the structure of the road transport industry led to a change of trend in the mileage<sup>32</sup> of heavy goods vehicles. Two levels have to be considered separately:

- On the national level, the new traffic regime led to a significant break of the former growth trend: annual increases in mileage of about 7% in the years before the introduction of the fee were replaced by a drop of around 4% in 2001 and of 3% in 2002. In 2003, the number of vehicle-km of heavy goods vehicles remained more or less stable. The decrease observed cannot, or at least

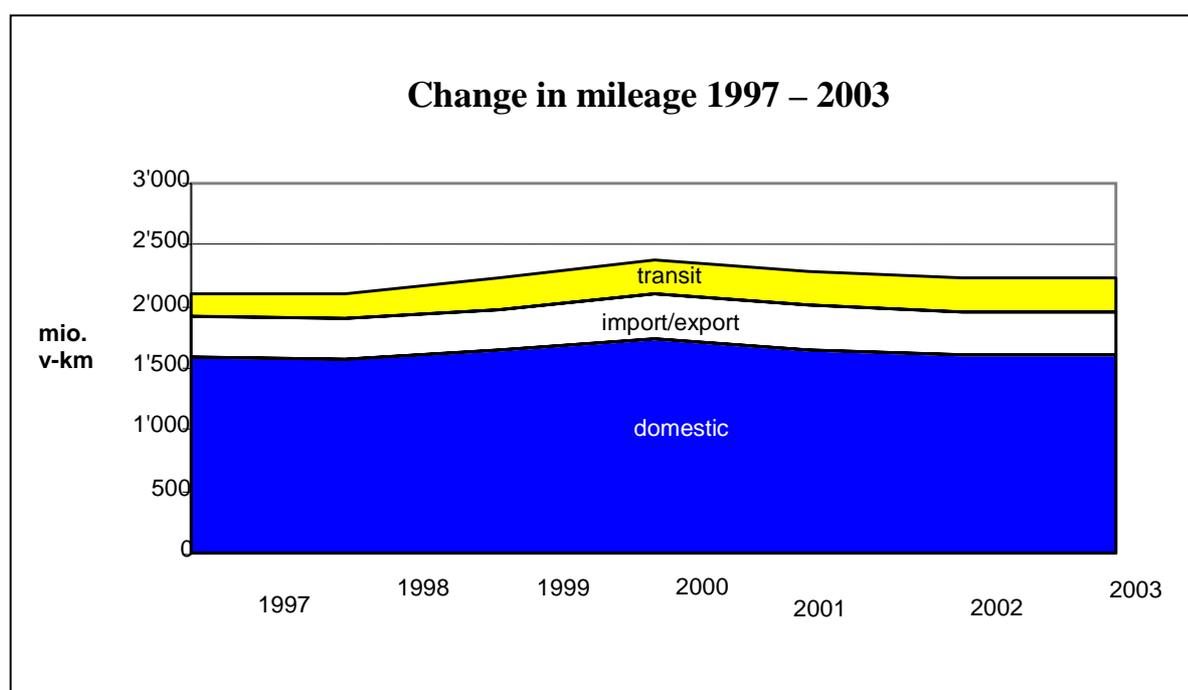
<sup>32</sup>

Number of vehicle-km.

not entirely, be attributed to the slowdown of the economy, because it was also recorded in the first half of 2001, when economic growth was still about the same as in previous years.<sup>33</sup>

- In transit traffic across the Alps the higher weight limit led to a significant increase of articulated lorries. As this increase was almost outbalanced by a significant decrease in the ratio of lighter lorries, the total number of lorries crossing the Swiss Alps in 2001 was practically stable. After the steady annual increase of about 7% before 2001, this meant a break in trend. In 2002, the number of lorries across the Swiss Alps was even reduced by 9%. As this reduction might mainly be due to the restrictive traffic regulation system introduced after the tragic accident in the St. Gotthard road tunnel on 24 October 2001, this decrease cannot be considered as representative. At present, the number of lorries crossing the Swiss Alps is about 8% lower than in the corresponding periods in 2000, the last year under the old regime.

**Figure 5. Mileage in freight transport**



After a strong increase between 1997 and 2000, mileage in freight transport (measured in vehicle-km) was reduced remarkably in the years after the introduction of the fee.

57. The development described above proved to be positive for both the economy and the environment:

- The introduction of the polluter-pays principle, inherent to the HVF, relieves the public hand by lowering external costs (e.g. damages caused by air pollution).
- In parallel, due to the reduction of the number of vehicle-km and the renovation of the fleet, external costs themselves were lowered as well. This effect can be illustrated with the help of the example of NO<sub>2</sub>, CO<sub>2</sub> and PM 10 emissions (see figure 6). Due to the new regime the emissions

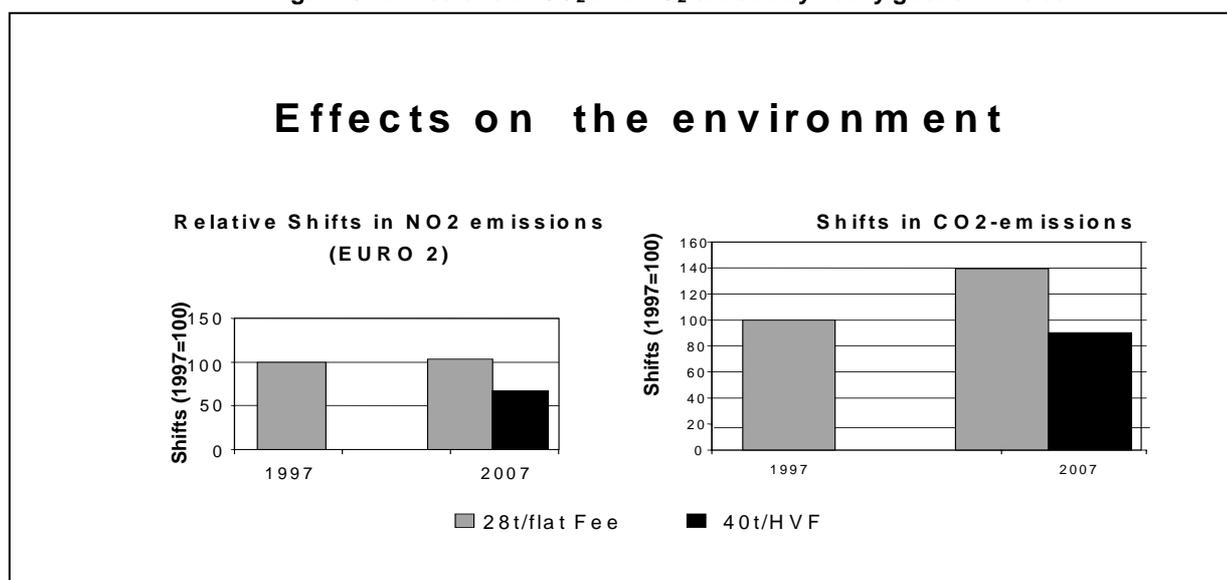
<sup>33</sup>

A study on the question which factors influenced the decrease of vehicle-km to what extent is to be carried out in 2004.

of these pollutants (caused by heavy goods vehicles) will be about 6 - 8% lower than they would have been if the old regime had been maintained.<sup>34</sup>

- For a country like Switzerland with a dense transport infrastructure it is economically interesting to put a break on traffic growth. In this way, expenses for the extension of the road infrastructure can be saved and used for other, more productive investment or for tax breaks.
- The new regime had practically no consequence on the cost of living. According to the federal office for statistics, the gross increase due to the new regime was 0.1% at the most.

**Figure 6. Emissions of CO<sub>2</sub> and NO<sub>2</sub> caused by heavy goods vehicles**



The graph, calculated by the Swiss Agency for Environment before the introduction of the fee, indicates, that in 2007, the emissions of CO<sub>2</sub>, NO<sub>2</sub> and PM<sub>10</sub> caused by heavy goods vehicles could be about 6-8% lower with the new regime than they might have been if the old regime (flat fee, no higher weight limit) had been maintained.

58. The economic efficiency of the new regime was improved by the fact that the implementation costs are rather small in relation to the revenue. Implementation and operation of the HVF costs about 40 Million euros a year. This amount includes the costs for research, investment, construction, replacement, operation and staff. In the short term, these 40 million euros correspond to about 8% of the gross revenue of about 500 million euros per year. In the long term, this percentage will even decrease: While the costs remain stable, the revenues will rise considerably due to the increase of the rate. The implementation costs therefore are likely to correspond to 5-6% of the revenue. In most other systems the corresponding ratio varies between 10 and 20% (In Austria, it is estimated to be about 13, in Germany to

<sup>34</sup>

As the new regime described concerns only a comparatively small part of the vehicle fleet on Swiss roads, its environmental benefit can only be figured out with the help of a model. It was provided by the Swiss Agency for the Environment, Forests and Landscape. Originally, an even stronger reduction had been forecasted. But the following factors limited the positive effects of the new scheme:

- On road, Euro 2 Vehicles emit much more NO<sub>x</sub> than in test cycles.
- The shift to heavier vehicles was stronger than expected. It clearly proved that the new regime would lead to remarkable emission reductions, especially in comparison to a status quo scenario with no HVF and a weight limit of 28 tonnes. As the corresponding data is currently being updated it is not yet possible to say to what extent the prognosis shown in figure 6 can be confirmed.

be about 19%). When comparing the very low operation costs of the Swiss system with those of other systems it should be considered that the rate of the fee is rather high.

59. On the whole, the new regime introduced on 1 January 2001 is a good example of how market-based instruments and environmental effectiveness can go hand in hand.

### 8.3 *The road-rail ratio*

60. One of the main objectives of the new fee was to encourage haulers to transfer freight transport from road to rail. So far, no general trend in this direction could be recognized. Given what was said above, this is not astonishing: The better competitiveness of rail due to the HVF was outbalanced by increased productivity in road transport caused by the higher weight limit. If railways are to reach a higher market share, they have to improve their productivity as well. With the ongoing construction of new railway infrastructure and the railway reform program (see chapter 2), the necessary framework has been established.

61. There remains the interesting question of what might have happened in the rail sector if the effects of the HVF had not been made up by the effects of the higher weight limit. In this context it is most interesting to know that rail now has a much bigger share in the transport of mineral oil from some Rhine ports to the oil storage sites in central Switzerland than it had before the introduction of the HVF. Though mineral oil is a heavy good it is, at least in the short term, not possible to profit from the higher weight limit in this transport sector for various reasons (e.g. safety regulations and the capacity of road tankers). This example clearly shows the importance of pricing where there is real competition between different modes of transport.

62. The importance of pricing is not the only lesson that can be learnt from the mineral oil example in the road-rail context. Another interesting fact is that this example took place in the short-haul sector where rail is said not to be competitive with the road. Other factors than distance seem to be more decisive for the choice of mode. This seems to be especially true for the factor of reliability, as the following example shows: A retail firm, which originally transported all their goods on the road, has now transferred their shipments to the Ticino (distance of about 200km) to the rail. One of the major arguments for doing so was the better reliability of the rail, due to the difficult situation along the Gotthard road connection. The HVF was important inasmuch as it compensated the gain in productivity of the road due to the higher weight limit. In conclusion, pricing measures can only develop their effects if other conditions for the transfer, like reliability and simple procedures (which is often not the case in international rail transport), are fulfilled.

*... "A transfer of freight from road to rail is therefore not possible without strong additional efforts in the rail sector. Two factors are crucial: The railway sector must realise substantial **gains in productivity** and has to improve its **reliability**. A specific problem to solve are the delays in transnational transports."<sup>35</sup>*

## 9. Conclusions

63. Having examined the long journey from the first ideas of realizing a distance-related fee for heavy goods vehicles to the final implementation, one might think that the successful outcome was mainly due to the particular characteristics of the Swiss political system. It is undoubtedly true that the specific features of the Swiss system played an important role:

<sup>35</sup>

Werder Hans, p. 6.

- without the right to launch a referendum against the EEA bill, Switzerland would have become a member of this area. As a consequence, “economiesuisse” and two major political parties would probably not have supported the campaign in favour of the HVF.
- The same is most probably true for the bargaining power in the negotiations with the EU, the weight limit. This limit – rather questionable from an ecological point of view - would certainly have been given up long ago, if government and parliament had not been conscious of the fact that such a change would have no chance in a referendum.

64. But the influence of the Swiss political system should not be overestimated. Often enough, people’s rights have not encouraged progressive ideas, but rather hindered them. Otherwise, the right of women to vote would not have been delayed until the early seventies of the last century! If one looks closer, one will soon realize that the real reasons for the acceptance of the fee are valid in general. In the context of the HVF, these reasons can be summarized and put in order as follows:

*First stage: Recognize the problem*

65. In the Swiss case, the decisive factor for finding a solution was the situation regarding transit traffic, where the opening of the St. Gotthard road tunnel had triggered an enormous growth in transit traffic, leading to strong reactions on the political level. In the London case (as well as in many others), the decisive factor favouring the charge was the huge volume of traffic in the city centre. In other cases, it was the need for financial resources for the building of transport infrastructure. In all cases, there is a traffic problem that needs to be solved.

*Second stage: Find a plausible solution*

66. The authority in charge has to offer a solution that is understood as suitable for solving the problem. In Switzerland it was the package of measures considered by the majority as suitable for achieving the goals the country was aiming for and in which the Fee played a central role.

*Third stage: Make correct use of the revenue*

67. The proposed method of using the revenue is part of the solution and therefore crucial for the success of the whole project. The safest way to scupper a road pricing project is to design the revenue for the treasuries of the state. The acceptance of the fee can be increased decisively if the revenue is used for transport matters. It is interesting that there seems to be no problem if the revenue of one transport mode is used to improve another. This finding complies with the experience of the London Charge<sup>36</sup> as well as the findings of the PRIMA<sup>37</sup> project.

*Fourth stage: Keep it simple*

68. For a successful implementation it is essential to stick to a simple solution and to select an experienced and committed operator:

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<sup>36</sup> The revenue derived from the London charge is used mainly to improve public transport.

<sup>37</sup> PRIMA was a research project of the European Union on PRicing Measures Acceptance (therefore the name), see bibliography.

- *Simple solution:* As can be learned from the Singapore case<sup>38</sup>, it is always possible to shift to more sophisticated solutions later on (for instance different tariffs according to the time of the day) once the system has been implemented successfully. Just make sure at the beginning that you do not set up a system which cannot be developed in a direction in which you might later like to move.
- *Experienced and committed operator:* In Switzerland, the strong commitment of the Customs Authority has led to highly usable processes and a practical technological implementation. The tight time schedule could only be met by limiting the system to the needs of this one operator, i.e. to fee collection, and not to include value added services.

*Fifth stage: Seize the opportunity*

69. Nothing can be learned better from the Swiss case than the importance of seizing the right moment for pushing through a delicate project on the political agenda, i.e. when the circumstances are favourable. But it is essential to have done the necessary basic work when the window of opportunity is open. Considering that on the one hand the number of vehicle kilometres is (in total, i.e. including passenger cars) still increasing steadily and that on the other hand the necessary resources for building a new infrastructure are getting more and more scarce it is simply wise to do this basic work now.

**10. Final remark**

70. The positive experiences with the Swiss HVF show that road pricing is a suitable means of managing transport demand. But it also shows that the possibilities it offers are limited. This is especially true for the transfer of goods from road to rail, a specific aim of the Swiss policy in freight transport. If the obstacles hindering international rail freight are not overcome, this policy will not be successful.

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<sup>38</sup>

In 1975, Singapore started with an Area licensing scheme, charging cars during the morning peak-time. In the years to follow, the system was continuously extended to additional vehicle categories and additional times of day. In addition to the Area Licensing Scheme, a Road Pricing Scheme was implemented progressively on the expressways from 1995 onwards. Both the ALS and the RPS were manual road pricing schemes which required the motorists to purchase paper licenses prior to their passage through control points set up on the roads. In 1998, both the ALS and RPS were replaced by an electronic version called the Electronic Road Pricing System (ERP) based on a Dedicated Short-Range Communication electronic system. Different In-vehicle Units were used for different classes of vehicles. When the vehicle passes under the ERP gantry, the appropriate charges are deducted from the smart card. The ERP system enables more frequent changes to the road pricing charges so that road usage can be optimised. The ERP system has enabled a finer graduation in rates e.g. currently for 2 types of roads: those in the Central Business District and expressways.

## ANNEX 1. SETTING THE RATE

The amount of the overall fee to be paid depends directly of the level of the rate. Setting the rate is therefore particularly delicate and needs to be carefully substantiated. In the Swiss case this was all the more true for the following two reasons:

- to make up for the consequences of an increased weight limit it had to be high enough;
- the fee would be payable for the use of all roads.

It seems therefore worthwhile to describe in detail the step-by-step process of how the rate for the Swiss HVF was set. The underlying idea was that heavy goods transport should pay for all the costs it generates.

### **First step: Summarizing the uncovered Costs of Heavy Goods Traffic**

In a first step, the uncovered costs of heavy goods traffic were summarized. This included on one hand the uncovered road costs, on the other hand the external costs caused by heavy goods vehicles. As the road costs were covered almost entirely by the users (mainly by fuel excise duties) the uncovered costs in this area amounted to only 10 million euros in this domain. In order to calculate the external costs, the Swiss Transport Ministry commissioned wide-ranging studies. These concentrated primarily on three areas of a significant size and that can easily be given a monetary value: health costs and damage to buildings caused by air pollution, the external costs of noise and the external costs of accidents (as the costs of accidents are mainly covered by insurance, the uncovered costs in this domain were relatively low). Altogether, the estimated external costs amount to 650 million euros. Non-considered costs comprised the damage caused by congestion and the greenhouse effect. Add to this the uncovered road costs and the amount to replace the flat fee, which was abolished in parallel to the introduction of the distance-related fee. The total of the uncovered costs caused by heavy vehicles therefore amounts to 750 million euros (see figure below). The calculations use 1993 as baseline year; the data is currently being updated.

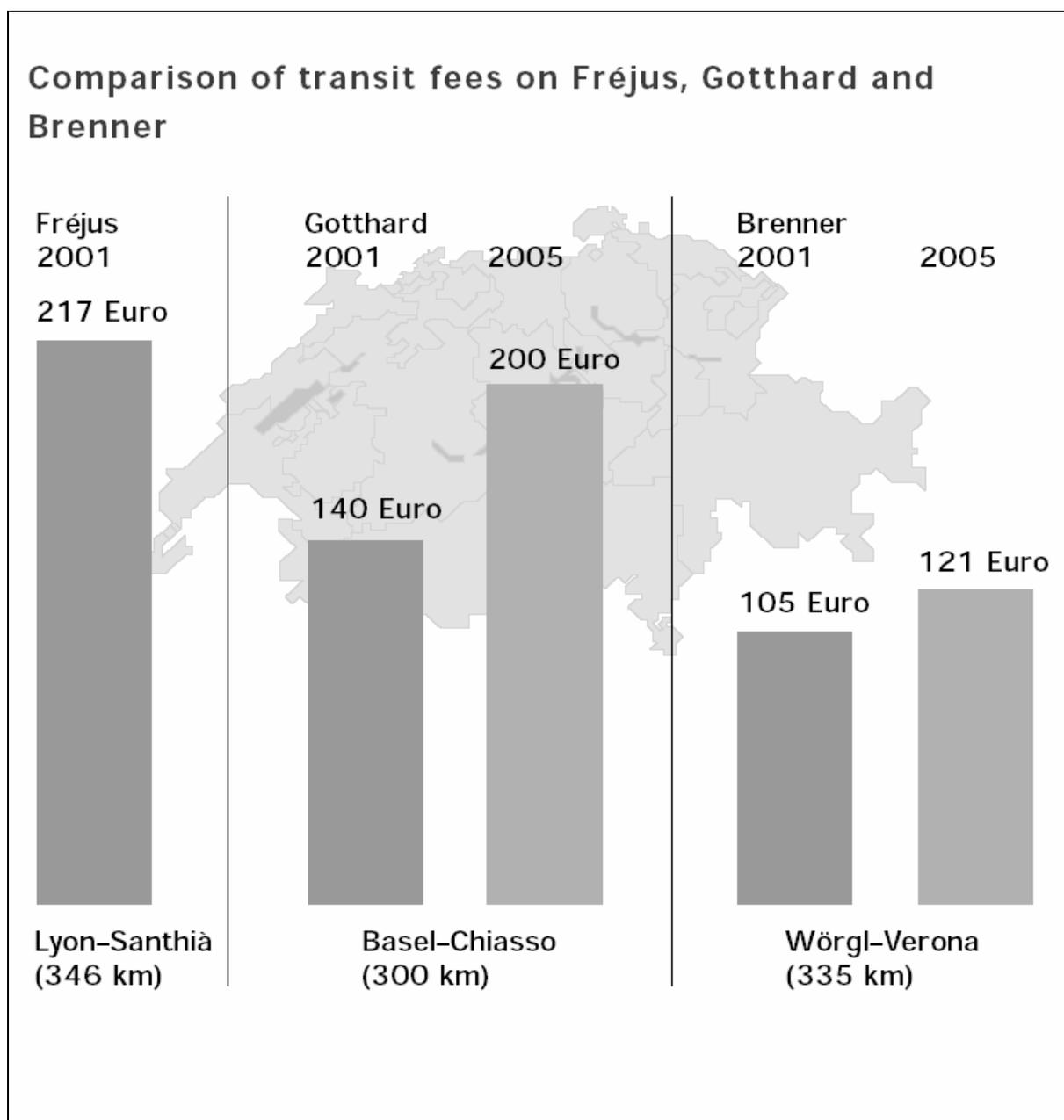
### **Second step: Calculation of the total transport performance**

In a second step, the total transport performance (number of tonne-kilometres /tkm) had to be calculated. First, the corresponding performance for each weight category was calculated. These figures were then multiplied by the average laden weight in each category. For all classes combined, this gave the figure of 47 billion tonne-kilometres.

### **Third step: Fixing the rate**

Dividing the uncovered costs of 750 million euros (as calculated in the first step) by the total transport performance in tkm (calculated in the second step) gives a value of 1.6 cents per tkm. This rate had to be brought in line with the result of the negotiations of the EU, where the setting of the charge level had been calculated using a different approach. After long and controversial discussions, the two partners agreed finally to the following compromise: The basis for the calculation was to be a transit trip from Basel to Chiasso with an assumed average distance of 300 km. For this journey a transit price of €200 (for a 40-tonne vehicle) was agreed. This amount is equal to a (maximum) rate of 1.8 cents. The outcome of the

deal with the EU has to be seen not only in the light of the Swiss calculations but also that of the charging levels in the neighbouring countries of Austria and France. As the figure below shows, the deal did not allow to Switzerland to ask for an exaggerated charge, but to reach a comparable level. The real difference from charging in other countries therefore is that Switzerland charges for the use of all roads.



The figure shows the transit fees through Switzerland (Basel-Chiasso) and on two comparable transalpine routes abroad (Lyon-Sanathià and Wörgl-Verona). The figure given for a 40t lorry is an average fee which can vary according to time of day, emissions etc.

Considering the fact that such a rate meant a huge increase (the average burden due to the former flat fee was about 0.2 cents), it was agreed with the EU to introduce the new fee in several steps and in parallel with the increase in the weight limit (see chapter 6.2 of the main text):

- 01.01.01 Introduction of the HVF at a rate of 1.0 ct/tkm for a vehicle in category 2. Simultaneous increase of the weight limit from 28 to 34 tonnes.
- 01.01.05 Increase of the rate from 1.0 to 1.6 ct/tkm and of the weight limit from 34 to 40 tonnes.
- Ca. 2007: Increase of the rate to 1.8 ct/tkm.

#### **Fourth step: Varying the rate**

To meet the requirement of differentiating the Fee according to the emissions, the vehicles were put into three categories according to their emission standards. The rates of the fee quoted above are average mean values, applying to the middle of the three emission classes. As the Land Transport Agreement limits the maximum difference between one category and the next to 15%, the following values are applicable (for the years 2001 to 2004):

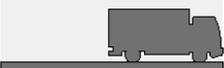
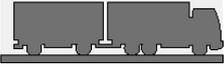
- Fee category 1 (corresponds to emission class Euro 0): 1.15 ct/tkm
- Fee category 2 (corresponds to Euro 1): 1.0 ct/tkm
- Fee category 3 (corresponds to Euro 2 and better): 0.85ct/tkm

As these rates refer to tonne-kilometres<sup>39</sup>, the fee can now be calculated by multiplying the rate by the distance travelled in Switzerland and the maximum permitted laden weight of vehicle and trailer. The diagram below gives several examples (tariff level in Swiss Cents).

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<sup>39</sup> The rate per t-km does not vary according to daytime, road type and different geographical locations.

**Examples of the calculation of the fee (2001–2004)**

tariff level in centimes <sup>1</sup>			kilometres travelled in Switzerland		truck and trailer <sup>2</sup>	Fee in CHF
1	2	3				
2,00			300	X	Without trailer 	x 18 t 108,-
	1,68		300	X	truck and trailer 	x 30 t 151,20
	1,68		300	X	articulated lorry <sup>4</sup> 	x 30 t 151,20
		1,42	300	X	truck and trailer 37 t 	x 34 t <sup>3</sup> 144,84

1) = tariff per tonne and kilometre (tkm)  
 Level 1 = emission category 1 (corresponds to EURO 0)  
 Level 2 = emission category 2 (corresponds to EURO I)  
 Level 3 = emission category 3 (corresponds to EURO II/III)

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) = the national weight limit is since 2001 34t (and consequently this figure applies to the fee levied).

4) = separately matriculated artic: net weight articulated lorry and relevant weight of the trailer respectively.

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

Source: SCA

## ANNEX 2. COMPLIANCE WITH MARGINAL COST PRICING PRINCIPLES

As it can be seen from the explanations in annex 1, the approach chosen for setting the charge level does not correspond with a number of requirements of marginal cost pricing principles. In this context it should be considered that some simplification of marginal costs into categories is always going to be necessary to derive a charging system in practice. Stephan Suter and Felix Walter from the Ecoplan office (an Economic Research and Policy Consultancy which was in charge of the economical design of the HVF), argued as follows in favour of the Swiss solution:

*“...we analyzed the HVF along a narrow pricing or internalisation approach. The strong and pure foundation on neoclassical welfare economics of pricing in transport is not uncontested. Some authors claim, ”that there should be the possibility left to put an internalisation strategy into a broader context of policy goals and strategies than is presented by the narrow fairness/efficiency philosophy behind neoclassic” (Rothengatter in Christensen et al., 1998). Policy goals of internalisation can then be*

- optimal use of existing capacity
- abolition of subsidies that are not justified by public good characteristics of the transport system
- allocation of the costs to the agent who is responsible for their production (polluter-pays principle)
- achievement of defined long term environmental/safety quality standards
- better balance of regional development
- better balance of social development
- development of new markets and new technology with lower consumption of natural resources

Without going into detail it is obvious that the HVF is very suitable to contribute to some of these objectives and shows advantages compared to a fuel taxation. It is in this light that, according to our view, the HVF should be judged.”<sup>40</sup>

It should be noticed that a better consideration of social marginal cost pricing principles such as a variation of the fee according to daytime or to road type has not only political, but also technical limits. A first and indispensable step towards implementing social marginal costs would be to oblige vehicles to install an OBU. With such a first step, a variation according to daytime should be feasible. The same is not necessarily true for a variation of the fee according to road type. If such a variation has to include the

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<sup>40</sup> Environmental Pricing – Theory and Practice – The Swiss Policy of Heavy Vehicle Taxation, see bibliography.

whole road network, as it is the case in Switzerland (and planned in Sweden and the UK) it will be possible only if the OBU includes both an updated electronic road map and, in parallel, a precise and a 100% reliable positioning system. For these reasons and due to a lack of corresponding political pressure other issues like a good interoperability with the charging systems in the neighbouring countries are of higher priority. It should be noticed however that the Swiss approach of charging all roads is certainly a solution much closer to social marginal cost pricing principles than the charging of motorways alone.

One specific approach to a better consideration of social marginal cost pricing would, however, be possible with the existing Swiss system: The charging system has been designed to incorporate an Alpine Transit Tax (ATT) at a later stage so as to have the possibility of managing transit traffic in particular. The ATT would be charged for passages of heavy goods vehicles on the major alpine routes, and the tariff could be varied according to route (road type), time of day, congestion levels or any other parameter which is applicable for a passage fee. Both Swiss Electronic Fee Collection schemes with and without OBU allow the collection of such additional passage fees.

### ANNEX 3. HISTORY OF ORIGINS

- 1972 Setting up of a commission to elaborate an integral transport concept for Switzerland
- 1977 Commission proposes a special tax for heavy roads transport linked to transport performance
- 1985 Introduction of a flat fee for heavy goods vehicles
- 1986 Initiative for a performance related HVF rejected
- 1988 Coordinated transport policy rejected
- 1992 Project for two new rail tunnels across the Alps accepted
- 1992 Refusal to join the EEA
- 1994 Constitutional bases for a distance-related HVF accepted  
Alpine Initiative, demanding a transfer of transit traffic from road to rail, accepted
- 1998 Law for a distance-related fee accepted
- 2001 Introduction of the distance-related HVF at an average rate of 1.0 ct t/km, in parallel raise of weight limit from 28 to 34 tonnes
- 2005 Raise (envisaged) of the average rate to 1.6 ct t/km, in parallel to a raise of the weight limit to 40 tonnes

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