The CER Essay series

Where academic analysis meets business insight

The Swiss experience to support modal shift

Performance-based road-charging and efficient rail infrastructure

by Professor Konstantinos Boulouchos and Vincent Ducrot, SBB

CER
The Voice of European Railways

SBB CFF FFS

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

CER Essays

The CER Essays initiative features a series of essays that show the rail sector as contributing not only to EU transport policy, but touching on different aspects of society at large. Topics covered by the initiative will range from modal shift, climate policy, infrastructure investment, high-speed rail, demography and more. Each essay will feature a different topic and be co-authored by a CER member CEO and a leading academic from the same country and will be used to spark debate among political stakeholders on the role of rail in the EU.

Follow the whole series

Contents

About the authors

Professor Konstantinos Boulouchos

ETH Zurich

Konstantinos Boulouchos holds a degree in Mechanical Engineering from the National Technical University of Athens (1978) and a PhD also in Mechanical Engineering from ETH Zurich (1984).

Following post-doctoral research at Princeton University he returned to ETH in 1988 to establish a new group in unsteady combustion research at the Institute of Energy Technology. In 1995 he was appointed Head of the Combustion Research Laboratory of Paul Scherer Institute and in 2002 Full Professor at ETH Zurich.

Research interests of Konstantinos Boulouchos focus on the one hand on turbulent-thermochemistry interactions in reactive energy systems both experimentally through non-intrusive diagnostic and through simulation based on high performance computing methods. On the other hand, his group has developed analysis and optimization methods, regional energy systems interfacing different sectors like mobility and decentralized power and heat generation.

Konstantinos Boulouchos is currently President of the extended Energy Committee of the Swiss Academies of Sciences and member of the Energy Steering Panel of the European Academies Science Advisory Council.

For his research he has received among others the Arch. T. Colwell-Medal: Society of Automotive Engineers, USA (1998), Innovation award of the German gas industry (2006) and Distinguished Paper Award on New Technology Concepts: Combustion Institute Pittsburgh, USA.

Vincent Ducrot

CEO, Swiss Federal Railways (SBB)

Vincent Ducrot holds the position of president of the management (CEO) of the Swiss Federal Railways (SBB) since April 1, 2020.

He is an electrical engineer by training (specializing in computer science) with a degree from the Ecole Polytechnique Fédérale de Lausanne (EPFL). He completed this training with a postgraduate diploma in industrial organization from the Center for industrial management (BWI) at the Swiss Federal Institute of Technology in Zurich (ETHZ), as well as a certificate in portfolio management (Certified Portfolio Director IPMA Level A) and the OWP (Orchestrating winning performance) continuing education program from the International Institute for Management Development (IMD) in Lausanne.

Vincent Ducrot has spent most of his career (1993 to 2011) in various positions at SBB. He began his career at SBB as Head of the software products division. From 1997 to 2002, he was appointed Delegate Expo.02 of SBB, where he was responsible for the organization of public transport for the 2002 Swiss National Exhibition. From 1999 to 2010, as Director of the Main Lines Division, he was responsible for the development and implementation of the transport strategy for long-distance lines. On the international level, he participated in the creation of Lyria, which provides high-speed train connections between France and Switzerland. From 2009 to 2010, he was acting director of SBB's Passenger Division.

From 2011 to 2020 he served as General Manager of Fribourg Public Transport (TPF).

Executive Summary

With the European Green Deal, the EU aims at shifting a substantial part of road transport to more sustainable transport modes – first and foremost to rail freight. In fact, modal shift from road to rail freight is a necessity for an adequate response to the climate crisis and a socially and environmentally efficient transport system.

Switzerland has had a dedicated modal shift policy for cross-alpine freight transport since the 1990s. Today more than 72% of cross-alpine freight traffic in Switzerland is on rail. This shows that a modal shift to rail freight is possible. A closer look at the Swiss experience can give ideas and inspiration.

With the New Railway Link through the Alps (NRLA) Switzerland invested heavily in rail infrastructure that serves the need of rail freight. In parallel, a system that, from an early stage, plans and safeguards capacity for rail freight was introduced. Today passenger and freight trains have similar rights on the Swiss rail network.

A fairer competition between road and rail was addressed through the introduction of a Heavy Goods Vehicle Charge (HGVC). With an average 3.4 CHF centimes (about 3.12 Euro cents) per tonne-km, this charge is relatively high. Nevertheless, calculations show that it is still not sufficient to put road and rail on an equal footing regarding the internalisation of external costs and an appropriate charge would be at 5 to 5.4 CHF centimes (about 4.6 to 5 Euro cents) per tonne-km.

The specific situation of the external costs of electric trucks - which are currently excluded from the HGVC - was examined in a research project by ETH Zürich. The result is clear: electric trucks also generate higher non-compensated external costs than rail freight. This shows that excluding electric trucks from a performance-based charge causes an unjustified competitive disadvantage for rail. To have a future-proof transport system that maximises social and environmental efficiency, Switzerland will have to include electric trucks in its performance-based HGVC. The same goes for all of Europe.

The Swiss example shows that a successful modal shift policy must rest on two pillars: rail infrastructure and capacity on one hand and a fairer competition between transport modes on the other.[1] For the latter, a performance-based HGVC is the most effective instrument.

With the EU Green Deal the moment is right for Europe to convert modal shift targets into concrete policy measures: Provide for the necessary rail infrastructure with sufficient and well managed capacity for rail freight and introduce a heavy goods vehicle charge that creates a level playing field between road and rail.

"A successful modal shift policy must rest on two pillars: rail infrastructure and capacity on one hand and a fairer competition between transport modes on the other."

1 *Besides these two central elements, the Swiss modal shift policy includes a range of additional measures such as dedicated financial support for rail freight, the prohibition of vehicles over 3.5 metric tons to travel on Swiss roads or highways at night or on Sunday and strict controls of these prohibitions and of social and security standards for road vehicles.*

Alberto Mazzola

CER Executive Director

Introduction

In December 2020, the European Commission, with the EU Sustainable and Smart Mobility Strategy, redefined its approach in rethinking the modal shift objectives, which were introduced by the 2011 Transport White Paper but had not been delivered until now. The future mobility demand clearly highlights that the bar should be set higher for railways and complemented by tangible actions to achieve progress.

The Strategy grants a prominent role to rail in the transition towards zero-emission mobility and the delivery of the EU Green Deal objectives. For rail to perform its backbone role in achieving sustainable and resilient mobility it is essential to speed up the implementation of infrastructure projects by making use of the existing financial tools and incentives. Infrastructure alone will not help modal shift to sustainable mobility, which also requires the correction of the market failure that is currently favouring polluters at the expense of sustainable modes such as railways. Internalisation of external costs should therefore no longer stay as a long-term target for transport policy but rather be implemented with concrete measures complying with the "user pays" and "polluter pays" principles.

An ambitious Eurovignette Reform complemented with emission standards and a market-based mechanism to reduce the CO2 emissions in the road sector will be crucial to achieve this goal.

This essay, authored by Swiss Federal Railways (SBB) CEO Vincent Ducrot and Konstantinos Boulouchos of ETH Zurich, shows that Switzerland is a best practice example with its modal shift policy for cross-alpine freight transport since the 90s. Today more than 72% of cross-alpine freight traffic in Switzerland is on rail. Ahead of the finalisation of the Eurovignette Directive and the political negotiations on the EU Emissions Trading System (ETS) Directive, this CER Essay presents the Swiss experience to support modal shift through consistent investment in rail infrastructure and capacity together with a fairer competitive framework between transport modes through a heavy goods vehicle charge. As for future-proofing transport systems as a result of the electrification of road transport, the CER Essay shows that electric trucks generate higher non-compensated external costs than rail and therefore must be included in the charging schemes.

"The CER Essay shows that electric trucks generate higher non-compensated external costs than rail and therefore must be included in the charging schemes."

A dedicated Modal Shift Policy that started in the 1990s

In cross-alpine traffic the modal share of rail freight today is

72%

With its geographical position right between Germany and Italy, Switzerland lies at the heart of one of Europe's most important transport corridors connecting the North Sea ports of Rotterdam and Antwerp with Genoa. Therefore, transport policy has always been of special relevance for the country. In 1994, to the surprise of many, 52% of the Swiss population voted in favour of a highly debated popular initiative: the initiative for the protection of the alpine region against transit road traffic ("Alpine Initiative"). From 1994 on, the aim of shifting freight transport through the Alps from road to rail was enshrined in the Swiss constitution. Later a law on modal shift specified this aim: there should be no more than 650,000 heavy goods vehicles transiting the Swiss Alps every year.

This marked the beginning of a dedicated modal shift policy to protect the sensitive alpine region against the negative impact of road traffic. In the 1990s climate protection was not in the focus yet. Rather the policy aimed at reducing noise levels, air pollution and road accidents and at increasing space efficiency of transport in the narrow alpine valleys.

The Swiss modal shift policy is based on a set of measures, which were approved in several referenda where the population continued to support freight transport by rail.

In cross-alpine traffic the modal share of rail freight today is 72%[2]. In cross-alpine transit traffic (i.e. traffic with origin and destination outside of Switzerland) it is even higher at 84%[3]. Since 2001 cross-alpine freight traffic volumes (road and rail) increased in total by 20%. Rail freight managed not only to absorb these additional volumes but also to increase its modal share by six percentage points. Thus, the Swiss modal shift policy for cross-alpine traffic can be called a success. Even more so as road transport became more attractive by

2 *Number for year 2020. Source: BAV; Alpenquerender Güterverkehr durch die Schweiz Kennzahlen 2020 und Interpretation der Entwicklung.*

3 *Number for year 2019. Source: BAV; Güterverkehr auf Strasse und Schiene durch die Schweizer Alpen 2019.*

gradually abolishing the 28t weight limit for trucks in favour of a 40t limit in 2001. The negative effects of this new weight limit on modal shift could be well offset.

The Swiss modal shift policy targets cross-alpine traffic only. However, other segments of rail freight also benefit to some extent. But the situation is more challenging for these segments, especially because subsidies for the extensive single wagon load system were phased out by 2019. Therefore, compared to 2001, the modal share of rail freight in Switzerland overall slightly decreased from a high of 42% to 37%. At least, in absolute numbers the volume transported by rail remained stable.

The Swiss modal shift policy rests on two pillars: rail infrastructure and capacity on one hand, and a fairer competition between transport modes on the other.

Infrastructure and capacity are of key importance for rail freight

Infrastructure is a central pillar of any modal shift policy. Already in 1992, the Swiss voted in favour of the so-called New Railway Link through the Alps (NRLA). In another popular vote in 1998, a dedicated fund for railway infrastructure permanently funded by various levies was established. This allowed for the financing of the NRLA. In 2007 with the Lötschberg Base Tunnel, the first axis of the NRLA was completed. In 2016 the Gotthard Base Tunnel – at 57 km the longest railway tunnel in the world – was handed over to operation. And with the opening of the Ceneri Tunnel in December 2020 the Gotthard axis of the NRLA was completed. In addition, support for the

"Based on the insight that in a dense mixed network, additional infrastructure alone does not automatically lead to more capacity for rail freight, a long-term concept for capacity planning was introduced."

construction of terminals for combined transport is also part of the modal shift policy.

Switzerland has a dense mixed network with passenger and freight trains on the same tracks. Based on the insight that in a dense mixed network, additional infrastructure alone does not automatically lead to more capacity for rail freight, a long-term concept for capacity planning was introduced. With the so-called Network Utilisation Concept, capacity for rail freight is included in the planning from an early stage. Also, instead of a priority concept that favours passenger trains, the Network Utilisation Plans puts passenger and freight trains on an equal footing and explicitly foresees and safeguards capacity for rail freight on each line and for each hour. As a result, freight trains have "rights" vis-à-vis passenger trains. With this system the much-needed predictability for freight trains is improved – it is in fact a prerequisite for rail freight to be able to contribute to the modal shift target.

Investment in infrastructure and a suitable capacity allocation system can provide something to rail that seems natural to the road sector: enough and flexible capacity, almost everywhere. However, to level the playing field between rail and road more is needed.

A heavy goods vehicle charge is an indispensable part of the modal shift policy

It is essential that all transport modes pay to the same extent for the external costs they cause. A central measure of the Swiss modal shift policy aims to ensure just that: the heavy goods vehicle charge (HGVC). It was introduced in 2001 based on a popular vote which took place in 1998. The HGVC is a performance-based charge for freight transport lorries with a total permission weight above 3.5 tones. It is calculated in function of the total weight, the distance driven and the pollutant emissions level. The charge is applicable on all roads – Switzerland was the first country in the world to do so. The emissions level is based on the EU emission standard and thus independent from CO_2-output. Electrically powered trucks are exempted from the charge. The aim of the HGVC is to compensate for the external costs of road transport that are not covered by other taxes. Unlike the Eurovignette (Directive 2011/76/EU)[4] the HGVC aims at internalising all kinds of external costs of road transport. In the Land Transport Agreement between Switzerland and the EU, maximum values for the HGVC are defined: On average a transit border to border along the north-south axis in Switzerland (i.e. the 290 km from Basel to Chiasso) should not cost more than 325 CHF (about 298 Euro). Per ton-kilometre the HGVC amounts on average to 3.4 CHF centimes (about 3.12 Euro cents). Two thirds of the money levied with the charge is put into the fund that finances rail infrastructure. The other third is distributed to the cantons to compensate for their costs related to road transport, with higher amounts going to peripheral and mountain regions with poorer accessibility.

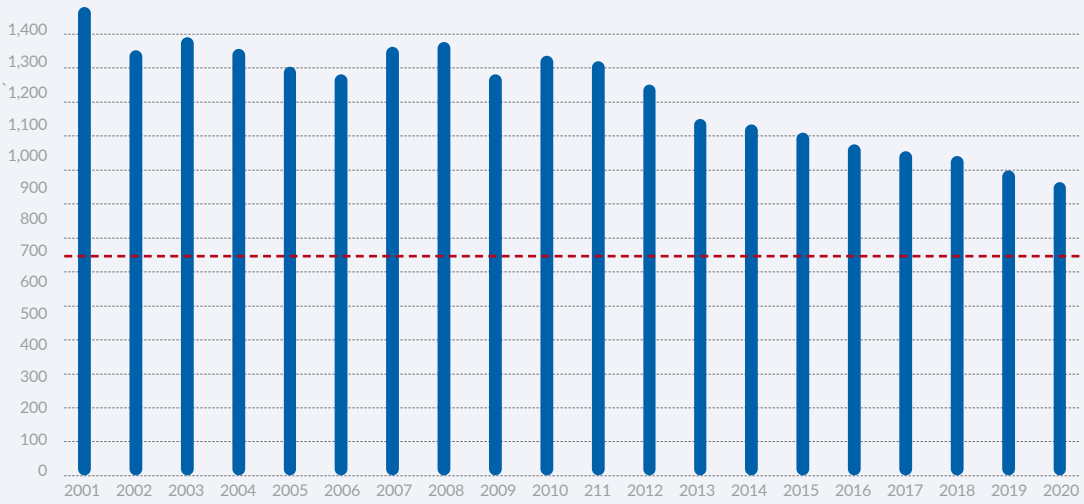
Since the introduction of the HGVC in 2001 the number or heavy goods vehicles crossing the Swiss Alps decreased by 37%. This clearly illustrates that the HGVC had some effect. But did the HGVC really create a level playing field between road and rail? And is there a need to adapt the instrument for the future? These questions will be discussed in the following sections.

What is needed to level the playing field?

The European Commission White Paper on Transport from 2011 stated the aim "to get the prices right" and to internalise the external costs

4 *See also: CER Fact Sheet of 2017 'Road charging / Revising the Eurovignette Directive'*

FIGURE 1: NUMBER OF HEAVY GOODS VEHICLES CROSSING THE SWISS ALPS



Since the introduction of the HGVC in 2001 the number of HGV crossing the Swiss Alps decreased from 1,380,000 to 863,000 in 2020. Even if the trend is encouraging, the aim of no more than 650,000 vehicles was not met. (Data: bfs)

of the different transport modes in order have a fair competition between them. However, little happened since. In autumn 2019 the European Commission presented a study titled "Sustainable Transport Infrastructure Charging and Internalisation of Transport Externalities" in which it took a closer look at the situation and found differences between the different transport modes on how the principles of 'user pays' and 'polluter pays' are implemented. The study showed rail's leading role in complying with these principles and rail's very low carbon footprint and low externalities in general. Remaining external costs and the marginal cost of infrastructure use are better covered by rail than by competing modes (see also the CER Position Paper on the Study). With the European Strategy of Sustainable and Smart Mobility presented in December 2020, the European Commission set a new aim: By 2050 at the latest, all external costs of transport within the EU should be covered by the transport users.

In fact, a level playing field is a precondition that different transport modes can play together in a way to maximise efficiency for society. For this purpose, policy instruments like taxes and other types of charges must appropriately reflect primarily external (social and environmental) costs and secondary marginal infrastructure costs. The Swiss HGVC is a proven tool that could serve as a model in this respect. Therefore, in this article we take a closer look at the instrument and on how well it performs in creating a fair competition in the Swiss surface freight transport system.

The assessment is based on data available for Switzerland in a study by the Federal Office for Spatial Development (ARE) on external costs and in the statistics of the Federal Statistical Office (BFS) on overall costs (including marginal infrastructure costs) and financing means of transportation. Furthermore, we draw from an ongoing research project at ETH Zürich. This project investigates options for electrification of road freight transport and potential impacts on the competition between road and rail. It thereby takes into account the expected reduced environmental externalities associated with electric trucks.

"In fact, a level playing field is a precondition that different transport modes can play together in a way to maximise efficiency for society."

5.4
CHF centimes per t/km
(about 5 Euro cents)

Instead of 3.4 CHF centimes (3.1 Euro cents) /tkm the HGVC should amount to something between 5 CHF centimes (4.6 Euro cents) /tkm and 5.4 CHF centimes (5 Euro cents)/tkm.

According to the ARE study, external costs of (traditional) road freight transport with heavy goods vehicles in Switzerland amount on average to about 9.8 CHF centimes (9 Euro cents)/tkm. These external costs refer primarily to atmospheric pollutants, noise, congestion, CO_2 emissions (climate effect), costs of accidents and negative effects on the landscape. Currently 3.4 CHF centimes (3.1 Euro cents)/tkm are compensated by the HGVC. Remaining non-internalised costs of heavy goods vehicles are therefore about 6.4 CHF centimes (5.9 Euro cents)/tkm. Externalities of rail freight transport according to the ARE study are of the order of 4.4 CHF centimes (4 Euro cents)/tkm with noise being a very important part of these externalities. Therefore, according to the ARE study the HGVC is not sufficient to create a level playing field between road and rail freight transport. In fact, an additional charge for trucks of about 2 CHF centimes (1.9 Euro cents)/km would be necessary.

The BFS data takes a slightly different approach: it uses ARE data for the external costs but includes, in a broader sense, marginal infrastructure costs as well.

For road freight transport with this definition it estimates overall externalities of about 10.1 CHF centimes (9.3 Euro cents)/tkm, of which in total 4.9 CHF centimes (4.5 Euro cents)/tkm are compensated by policy charges. These include, among others, the HGVC, which represents a large part of the charges. Apart from the HGVC the mineral oil tax is also important. The biggest part of this tax is used to finance road infrastructure. All in all, according to the calculation of BFS in road transport, about 5.2 CHF centimes (4.8 Euro cents)/tkm of external costs remain uncompensated. For the rail freight sector on the other hand, the BFS report estimates uncovered external costs to be about 3.6 CHF centimes (3.3 Euro cents)/tkm.

Therefore, according to this data that includes marginal infrastructure cost as well, an additional HGVC-type of charge of around 1.6 CHF centimes (1.5 Euro cents)/tkm would be appropriate to create a level playing field between road and rail freight transport.

Thus, although the estimates of the externalities differ between the two data sources for the Swiss case, both databases provide evidence of the need to increase the HGVC for creating a level playing field between road and rail freight by roughly the same substantial performance-based charge. Instead of 3.4 CHF centimes (3.1 Euro cents)/tkm the HGVC should amount to something between 5 CHF centimes (4.6 Euro cents)/tkm and 5.4 CHF centimes (5 Euro cents)/tkm.

Trucks with alternative propulsion systems should also pay for external costs

In the road freight sector, we anticipate that gradually alternative propulsion technologies and energy carriers will enter the market and probably capture a significant share in the next two decades. These alternatives will exhibit an improved environmental performance leading to less but still relevant externalities. But currently, all electric vehicles including those powered by hydrogen are excluded from the HGVC. Also, they will make additional energy transmission and distribution infrastructure necessary and of course use existing road infrastructure, so that they will need to pay for the "wear and tear" of the latter. Currently these infrastructure-related costs are supposed to be covered by the mineral oil tax corresponding to about 0.6 CHF centimes (0.5 Euro cents)/tkm. Vehicles with alternative propulsion technologies thus do not contribute to marginal infrastructure costs.

Options for alternative propulsion technologies are: a) battery electric trucks, b) catenary systems driven electric trucks, c) hydrogen / fuel cells trucks, and d) IC engine trucks with synthetic fuels. In a general sense options a), b) and c)

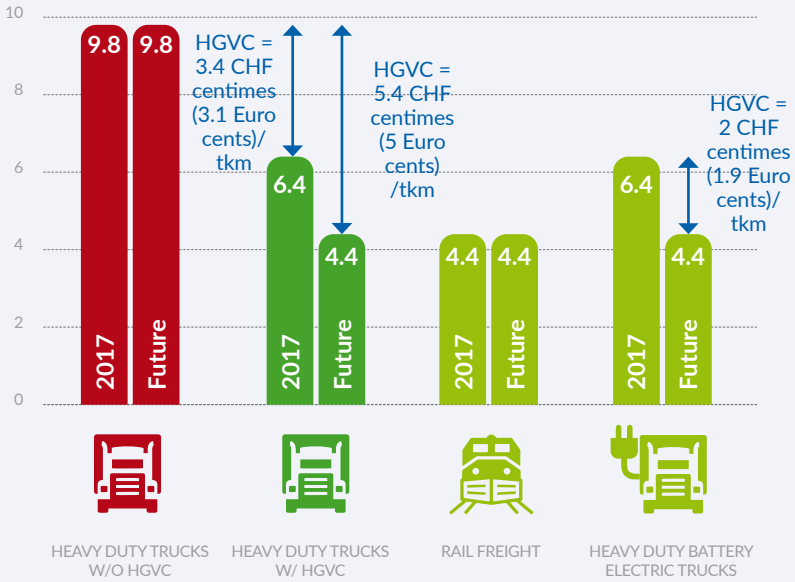
would reduce the overall environmental footprint of road freight transport primarily through less air pollution and climate-related impact. For option d) the environmental benefit would refer mainly to the climate-related impact. Space occupation and impact on the landscape would remain critical issues and so would limited space on the roads and accidents. Also, noise would remain an issue for all four options due to speed, especially on the highway where most of the heavy duty vehicles are driven.

The insights of the ETH Zürich study provide evidence that option a) cannot satisfy all – even domestic – heavy duty transport needs in Switzerland due to the insufficient capacity of batteries for long trips. While options b) and c) would be able to do so but at the cost of additional expensive infrastructure. Who should pay to which extent for this, is certainly an issue of political debate. It has to be clarified as it will substantially affect investment decisions.

The ETH Zürich study looked at the external costs of electric trucks (i.e. type a), b) or c)) and thereby applied the definition of external costs according to the methodology of the ARE study. Accordingly, the study did not look at direct infrastructure costs. It estimates for the electric trucks a reduction of about 35% of the total externalities associated with conventional trucks. This is a best-case scenario, assuming that electricity or hydrogen are produced CO_2-free. In absolute terms uncompensated external costs of about 6.4 CHF centimes (5.9 Euro cents)/km were calculated if electric trucks continue to be exempted from the LSVA. As Figure 2 shows, this would lead to a level playing field in the competition between diesel and electric trucks. However, to create a level playing field between road and rail freight the HGVC should amount to 2 CHF centimes (1.9 Euro cents)/tkm for electric trucks and as mentioned above should be increased by the same amount for diesel trucks.

FIGURE 2: EXTERNAL COSTS (CHF CENTIMES PER TKM)

In future external costs must be accounted for both diesel and electric trucks in order to create a level playing field between rail and road freight transport (Source: Albert Mancera/ETH Zürich)



- Current average values for HGVC create a level playing field for competition between diesel and electric trucks.
- Nevertheless, current average values for HGVC do not create a level playing field for competition between road and rail freight transportation.
- Hence, the HGVC should increase by about 2 CHF centimes (1.9 Euro cents)/tkm and amount to 5.4 CHF centimes (5 Euro cents)/ tkm for diesel and to 2 CHF centimes (1.9 Euro cents)/tkm for electric trucks.

Conclusion

The above discussion shows that transport policy must take a holistic approach and consider many different aspects. CO_2 and climate targets are an important part. However, for society other external effects are also relevant, such as space occupation and energy efficiency, noise, air pollution, costs related to accidents and congestion. To address all these external costs (and possibly also marginal infrastructure costs), a performance-based charge is the right tool. The flat-rate approach of a time-based charge is not a useful instrument to internalise external costs.

Switzerland has 20 years of experience in applying such a performance-based HGVC charge. Compared to other European countries, the Swiss average of 3.4 CHF centimes (3.1 Euro cents)/tkm is relatively high. Nevertheless, the above calculation on the relative competitive position of rail and road shows that to achieve a level playing field, it should be higher. Also, the current exclusion of electric trucks is not justified, as these also create negative externalities such as space occupation, impact on the landscape, noise and road accidents.

An ideal charge should include all these external costs. It thus would result in a performance-based charge for all types of trucks. To take into account the lower climate costs of alternative propulsion technologies, lower rates for such trucks are justified.

An additional important issue is the energy efficiency comparison between rail and road freight per net-tkm on a tank-to-wheel basis. Estimates (by SBB for rail and by ETH Zürich for 40t trucks) indicate that rail freight is clearly more efficient than road freight. Energy use by an average Swiss freight train amounts to 40 Wh/net-tkm, compared to a diesel truck at 120 Wh/net-tkm and by battery driven electricity trucks at 65-70 Wh/net-tkm.

To summarise in concrete terms, to create a level playing field with rail freight transport regarding externalities, diesel trucks should be charged by an HGVC of 5.4 CHF centimes (5 Euro cents)/tkm, while electric trucks with a charge of about 2 CHF centimes (1.9 Euro cents)/tkm. This calculation thereby does not include marginal infrastructure cost, where electric trucks do not contribute at the moment. Conventional trucks on the other hand pay 0.6 CHF centimes (0.5 Euro cents)/tkm via the mineral oil tax for infrastructure.

Outlook

An important takeaway from the Swiss example is that even though the HGVC does not create a perfect level playing field, it contributed to a modal share of 84% for rail freight in cross-alpine transit. In Switzerland, cross-alpine transit amounts to less than 300 km and represents the long distances. This clearly indicates that in a properly functioning market where the user pays and polluter pays principles are applied, rail freight would become the dominant, if not only, mode for long distance land transport. Furthermore, also on shorter distances, an increased HGVC that would be necessary to put rail and road on equal competitive positions, would significantly increase the modal share of rail.

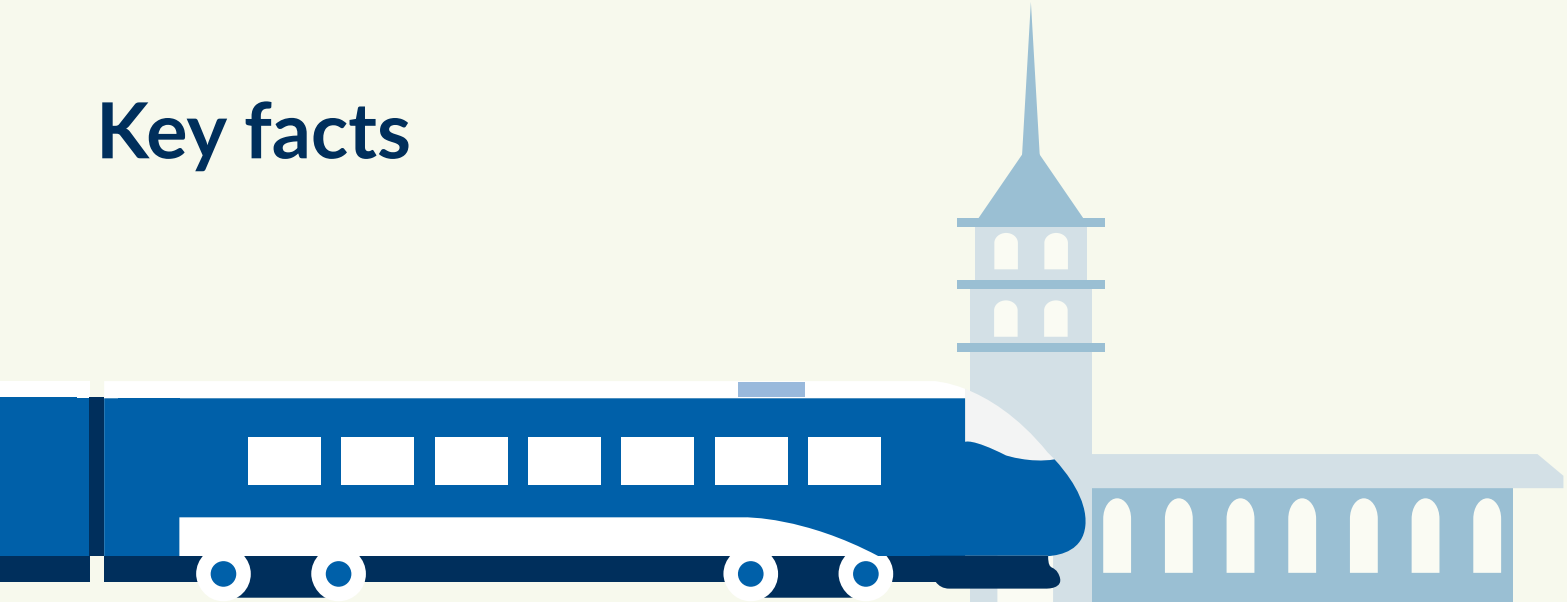
In addition to levelling the playing field regarding the charging for external costs, modal shift always requires infrastructure with sufficient capacity for rail freight. With the construction of the NRLA and Network Utilisation Plans, Switzerland provided for that. The main challenge remaining is to correspondingly improve the infrastructure for rail freight along the whole corridor between the ports on the North Sea and Italy and the international management and coordination of this capacity.

The European Green Deal provides momentum and leverage for Europe to make modal shift policy a political top priority – just as the vote on the "Alpine Initiative" in 1994 was for Switzerland. After that vote, Swiss policy makers came to the conclusion that cross-alpine goods transport should be on rail and acted accordingly. Even if the Swiss example is not perfect, it shows that a dedicated modal shift policy is possible and has its effects.

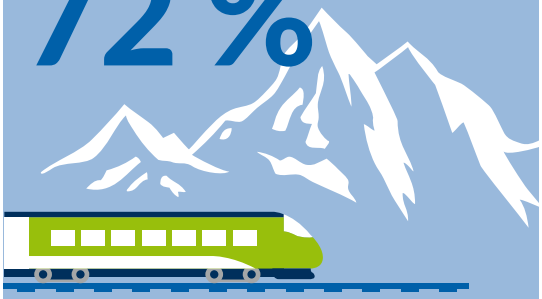
Modal shift targets will remain lofty ambitions and no more than words without a dedicated concrete policy. Such a policy should rest on two pillars: a performance-based heavy goods vehicle charge that creates a level playing field between road and rail and a rail infrastructure with sufficient and well managed capacity for rail freight.

"The European Green Deal provides momentum and leverage for Europe to make modal shift policy a political top priority – just as the vote on the "Alpine Initiative" in 1994 was for Switzerland."

Key facts

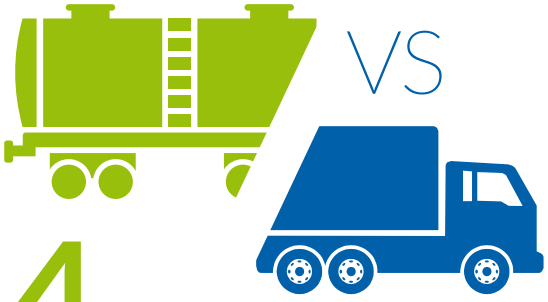


72 %



of cross-alpine rail traffic on rail.

The Swiss modal shift policy for cross alpine traffic consists of two main pillars: investment in rail infrastructure and a performance based heavy goods vehicle charge. Today more than 72% of cross-alpine rail traffic is on rail.



3.4 CHF centimes per t/km

(about 3.12 Euro cents)

Calculations show that the heavy goods vehicle charge of in average 3.4 CHF centimes per t/km is not sufficient to put rail and road on an equal footing regarding the internalisation of external costs.

Electric trucks account for substantially higher external costs than rail. A reduced heavy goods vehicle charge would be needed to achieve fair competitive conditions for rail and electric trucks.

References

BAV Bundesamt für Verkehr (2021); Alpenquerender Güterverkehr durch die Schweiz Kennzahlen 2020 und Interpretation der Entwicklung.

BAV Bundesamt für Verkehr (2021); Güterverkehr auf Strasse und Schiene durch die Schweizer Alpen 2019.

ARE Bundesamt für Raumentwicklung (2021), Externe Kosten und Nutzen des Verkehrs in der Schweiz. Strassen-, Schienen-, Luft- und Schiffsverkehr 2018.

BFS Federal Statistical Office (2021), Costs and funding of transport.

SBB

SBB, the Swiss Federal Railways, has been transporting people and freight for more than 100 years. Today SBB is the backbone of the Swiss public transport system, and day-to-day rail operations are the basis of what SBB does. SBB transports over 0.84 million passengers and 185,000 tonnes of freight to their destination every day. By doing so, SBB is making an important contribution to the quality of life and competitiveness in Switzerland.

But SBB is so much more than just the railway: 33,500 dedicated employees make SBB the backbone of public transport and work with SBB to realise its vision for the mobility of the future. SBB wants to continue this success story, even in times when the entire economy and society, including the mobility industry, are undergoing profound changes. SBB will therefore continue to fulfil its responsibility towards public transport and Switzerland in future.

ETH ZURICH

Ever since it was first founded, ETH Zurich has been a driving force behind Swiss industry, whose innovative products and services are in demand worldwide.

The successful combination of cosmopolitanism and strong connections at national level transformed the fledgling educational institution into one of the driving forces behind Swiss industrialisation: it has brought the necessary expertise into the country, trained experts and helped develop future-oriented national infrastructures.

Freedom and individual responsibility, entrepreneurial spirit and open-mindedness: ETH Zurich stands on a bedrock of true Swiss values. Our university for science and technology dates back to the year 1855, when the founders of modern-day Switzerland created it as a centre of innovation and knowledge.

ETH Zurich regularly features in international rankings as one of the best universities in the world and the leading university in continental Europe. When the rankings are differentiated by specialist area, ETH Zurich is in the first twelve for Science and Engineering in the THE and QS listings.

At ETH Zurich, students discover an ideal environment for independent thinking, researchers a climate which inspires top performance. Situated in the heart of Europe, yet forging connections all over the world, ETH Zurich is pioneering effective solutions to the global challenges of today and tomorrow.

ETH Zurich is home to many high-calibre scientists working diligently in their specialist fields. The numerous honours and awards that ETH researchers receive for their scientific work shows just how successful they are.

CER

The Community of European Railway and Infrastructure Companies (CER) brings together railway undertakings, their national associations as well as infrastructure managers and vehicle leasing companies. The membership is made up of long-established bodies, new entrants and both private and public enterprises, representing 73% of the rail network length, 76% of the rail freight business and about 92% of rail passenger operations in EU, EFTA and EU accession countries. CER represents the interests of its members towards EU policy makers and transport stakeholders, advocating rail as the backbone of a competitive and sustainable transport system in Europe.

CER
The Voice of European Railways

CER aisbl
COMMUNITY OF EUROPEAN RAILWAY AND INFRASTRUCTURE COMPANIES

Avenue des Arts, 53 1000 Bruxelles
Tel : +32 2 213 08 70
Fax : +32 2 512 52 31
contact@cer.be
www.cer.be
@CER_railways