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Current and alternative systems of road user charges in Switzerland

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Part I: Current system
Road taxes and fees

Overview of road funding sources (road taxes and fees)

Federal government	▪ Oil tax and oil tax surcharge ▪ Motorway sticker (“vignette”) ▪ Heavy vehicle fee (HVF)*
Cantons	▪ Cantonal motor vehicle registration fee ▪ Federal contributions (SFSV and the HVF) ▪ General tax revenue
Municipalities	▪ General tax revenue ▪ Cantonal contributions

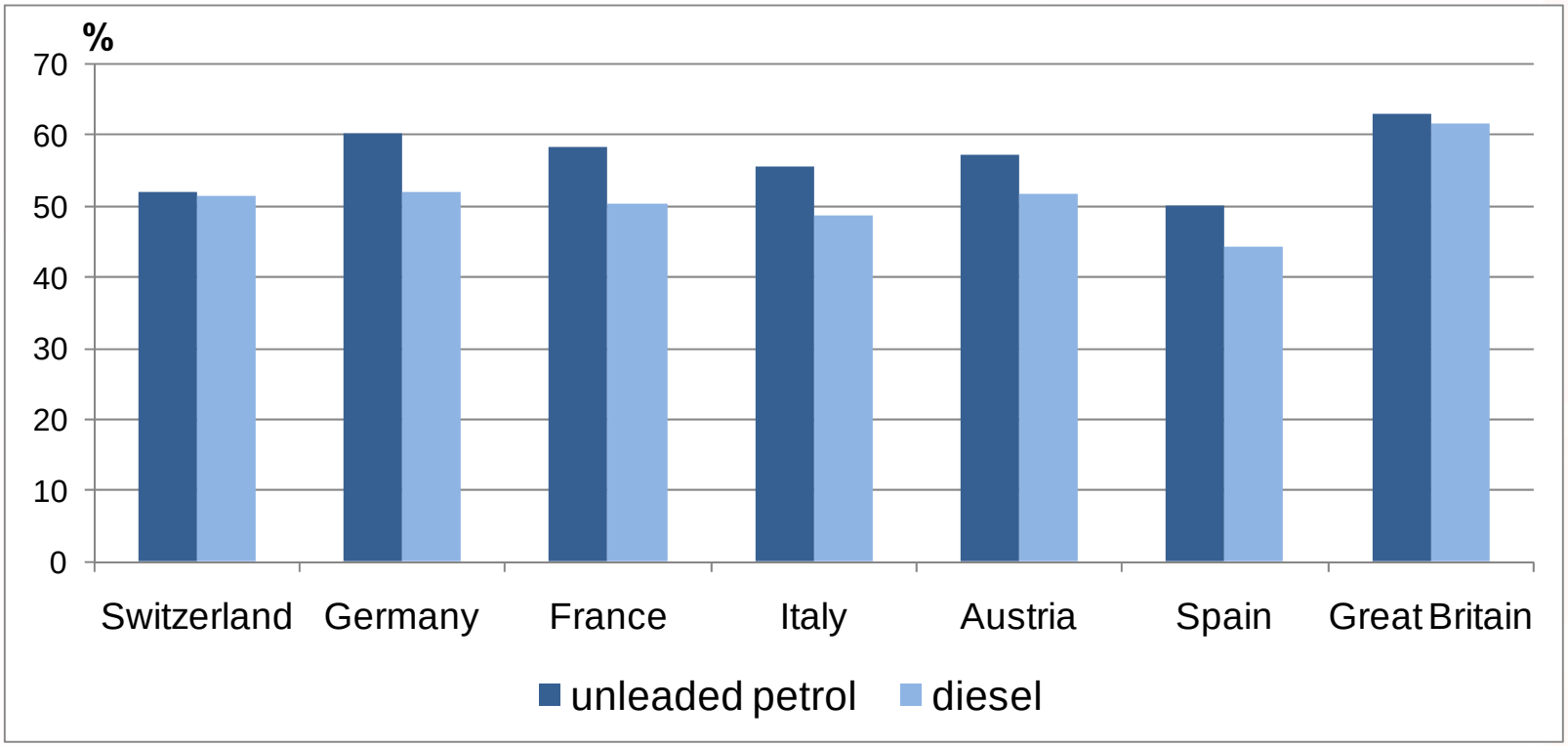
* 1/3 for the cantons (road expenditure), 2/3 for major railway projects

Overview of taxes and fees

Type of tax/fee	Amount
Oil tax (on fuel)	0.43 Swiss francs per litre
Oil tax surcharge	0.30 Swiss francs per litre
Motorway sticker	40.00 Swiss francs per year and vehicle
Heavy vehicle fee (HVF)	0.0226 – 0.0307 Swiss francs per kilometre and tonne
Motor vehicle registration fee (cantonal)*	200 – 1,730 Swiss francs per year and vehicle

* Example for the canton of Zurich (fee according to engine size)

Tax on petrol and diesel in European comparison (January 2011)



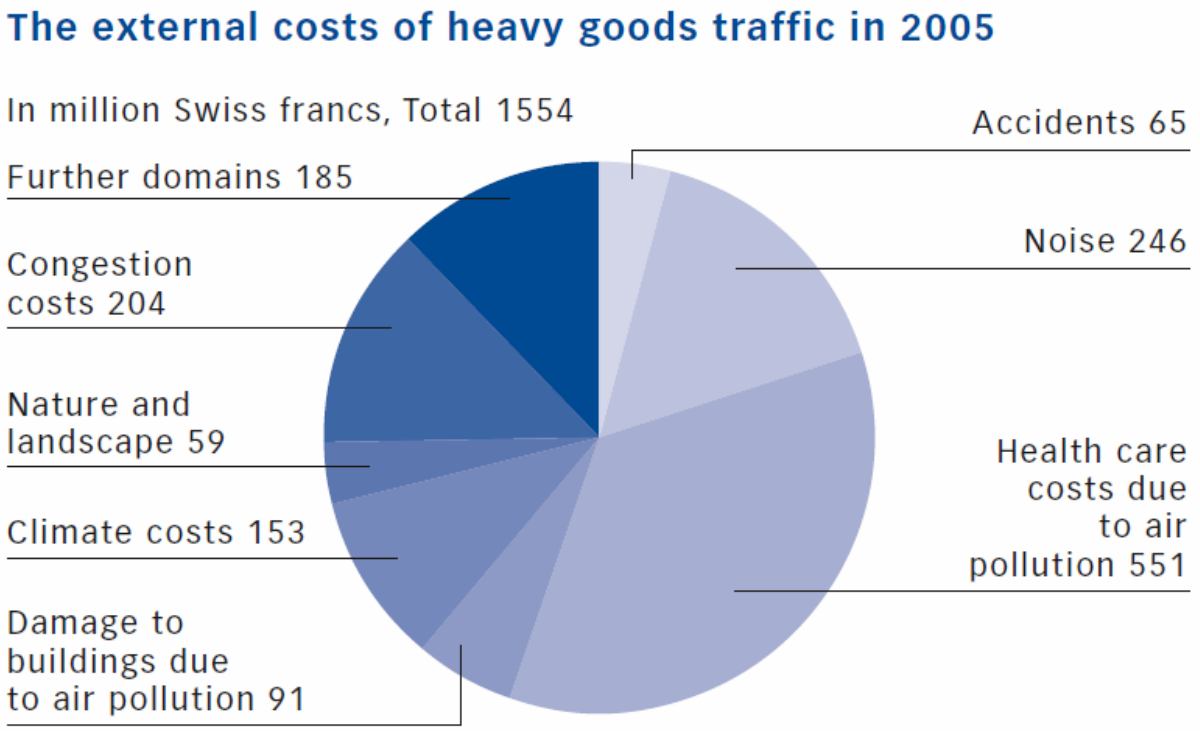
Total tax per litre of fuel (in percent of sale price)

The Swiss Heavy Vehicle Fee (HVF)

Objectives of the HVF

- “Polluter pays” principle
- Environmental protection
- Transfer to rail

Principle behind calculation of the fee



$$\text{Basis} = \frac{\text{Total uncovered costs}}{\text{Total transport performance}}$$

Structure of the fee

- Vehicles with max. admissible weight > 3.5 tonnes
- For use on **all roads**
- Performance related
  - Distance
  - Weight (vehicles and trailers, total admissible laden weight according to vehicle registration papers)
  - Emissions (situation since 2009)
    - Category I (Euro 0/1/2): 3.07 cents per tkm
    - Category II (Euro 3): 2.66 cents per tkm
    - Category III (Euro 4-6): 2.26 cents per tkm

Recording equipment

Domestic vehicles	Foreign vehicles
Mandatory: Onboard unit (OBU) 	**In general**: ID Card & self-service machine  
Exceptions in approved cases: Log book & TAG  	**Voluntary**: Onboard unit 

Control mechanisms

In order to ensure that the declarations made are accurate, various security functions have been included in the design of the recording devices. The recorder has a motion sensor, a GPS receiver and an electronic link to the vehicle.

Fixed and mobile monitoring points in traffic: The data from the recording device are transmitted via DSRC radio link to the 23 fixed monitoring stations currently installed on the Swiss motorway network and are automatically compared with the electronically stored data (licence plate, vehicle length, etc.)

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Impact on road transport operations

- **Modifications in fleet composition**
  - Cleaner = cheaper
  - Lower weight = lower fee

- **Changes for road transport companies**
  - Improvements through
    - Better use of logistics (fewer unladen journeys)
    - Fleet modification can be better realised

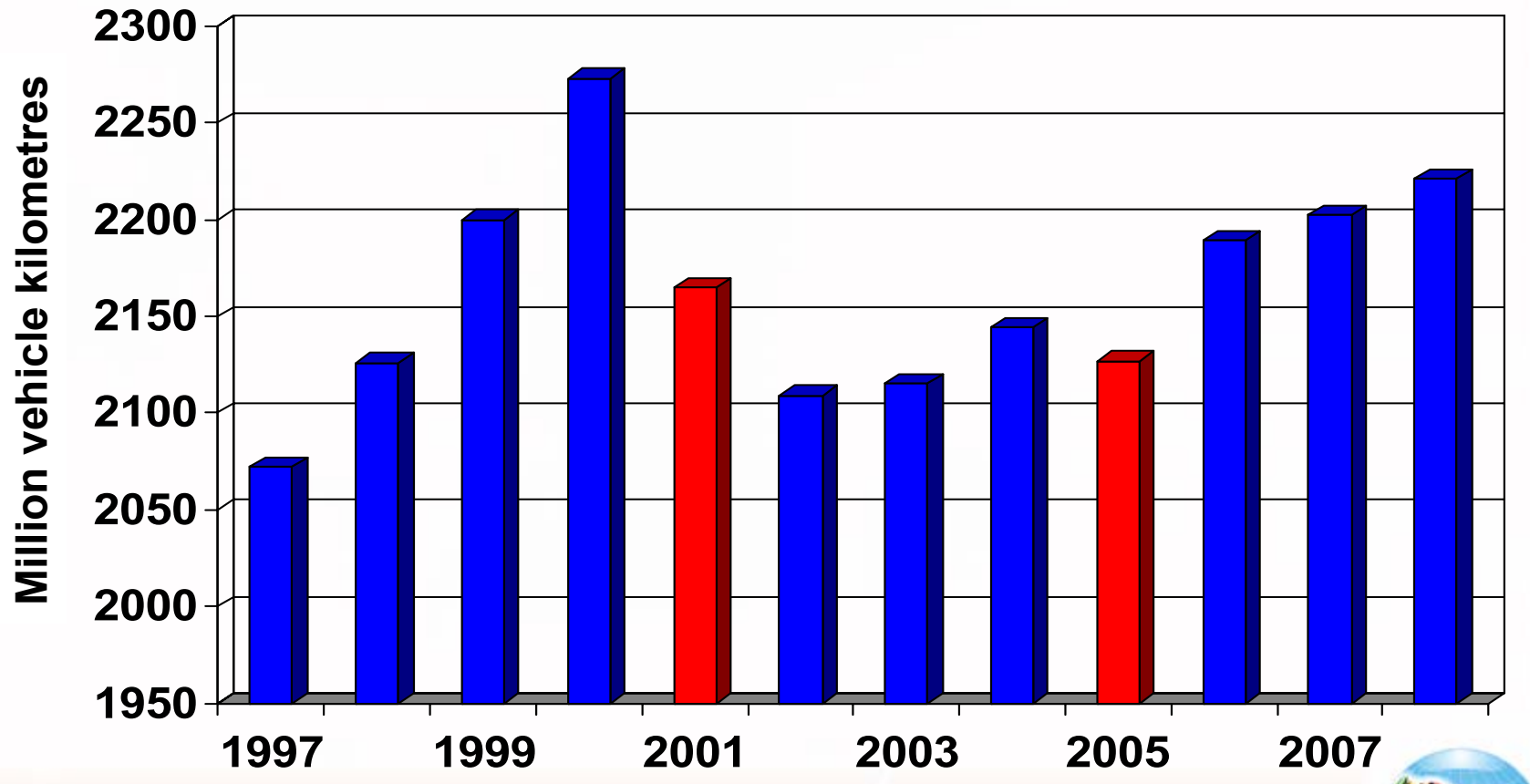
- **Employment: unchanged (14,000 employees)**

Impact on costs

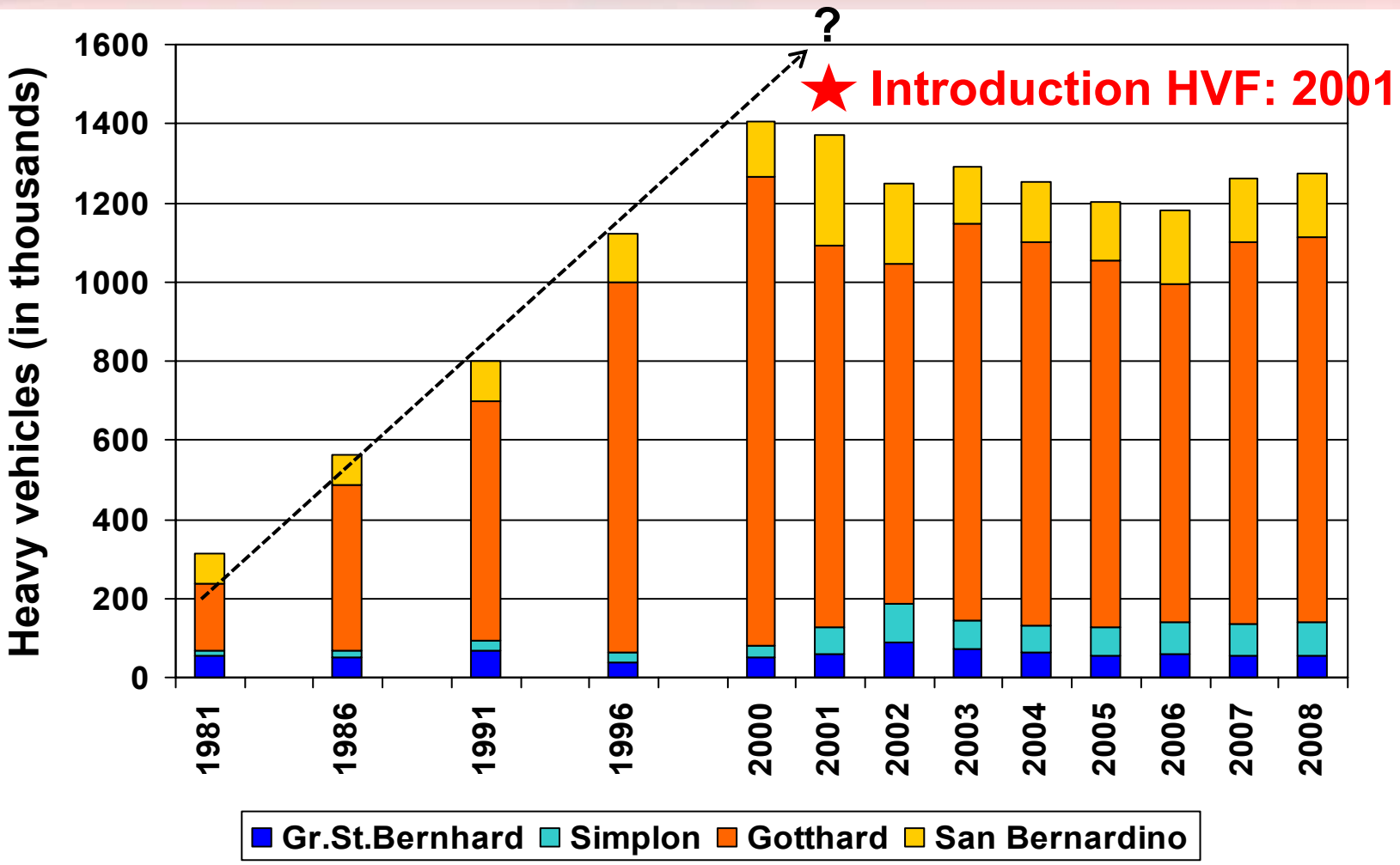
- **Impact on road transport costs: low**
  - Fee equivalent to about 20% of costs, but...
  - Offset by productivity gains
    - Higher weight limit
    - Fewer unladen journeys

- **Impact on end consumer price: negligible**
  - Transport costs: on average only 1 to 2% of final price
  - Impact on inflation: only 0.11% (according to the Swiss Federal Statistical Office)

Impact on vehicle kilometres



Impact on transalpine goods transport



Concurrent with introduction of the HVF: Increase in weight limit from 28 to 34 tonnes / 40 tonnes (2005)

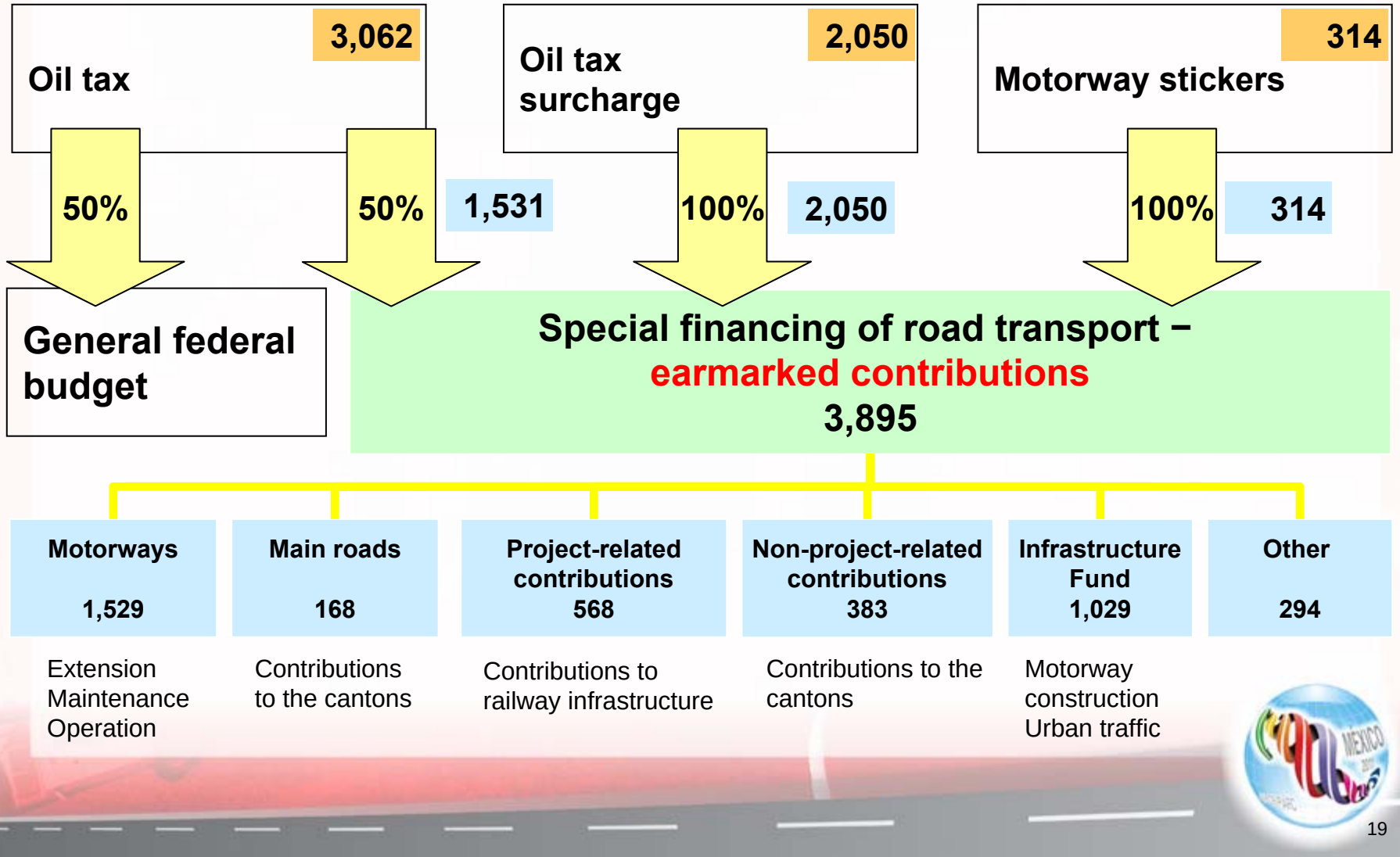
Impact on rail transport

- **No significant change because**:
  - Rail share is traditionally high
    - Overall 40%
    - Transalpine transport 65%
  - Higher weight limit for heavy vehicles

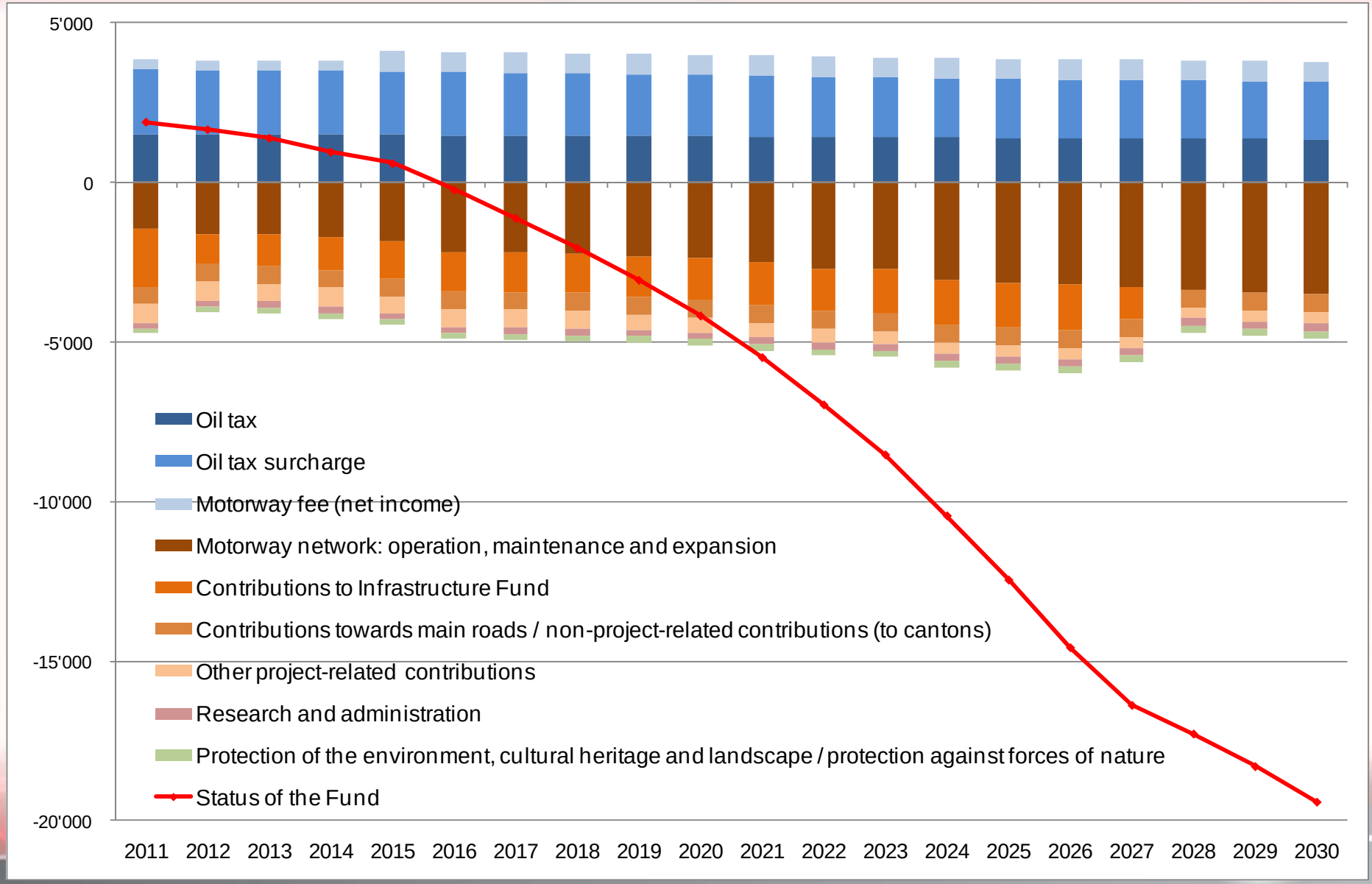
- **Pricing is only one of several factors**
  - Reliability
  - Simple procedures
  - Modern infrastructure

Financing system at federal level

Flow of funds in 2010 within the Special Fund for the Financing of Road Transport (SFSV) (million Swiss francs)



Financing gap in future



Road expenditure in million Swiss francs (2008)

	Motorways	Cantonal roads	Local roads
Construction / extension	1,453	1,129	930
Maintenance	499	292	205
Operation	492	1,184	1,655
Total	**2,444**	**2,605**	**2,790**

Total expenditure (2008): 7,839 million Swiss francs

- Spending on road infrastructure (investment and operations) was more than offset in 2008 (by 120%) through road traffic revenue.
- Road users therefore cover the full cost of the roads, i.e. the “user pays” principle applies in road traffic.

Balance and future challenges

Strengths and weaknesses of current financing system

Strengths	Weaknesses
▪ Good acceptance ▪ Transparent, technically plausible ▪ No problematic distribution effects ▪ Low collection costs ▪ Efficient source of revenue in the past ▪ Earmarking of funds is respected at political level ▪ In global terms, users pay for the relevant costs	▪ Instruments are lacking for steering traffic in terms of time and place ▪ High fixed costs and low variable costs lead to excessive mobility consumption ▪ Future of revenue source is somewhat uncertain ▪ Financing at level of cities/ municipalities is insufficient ▪ Lack of coherence: Revenue not earned in areas where expenditure occurs ▪ Enforcement problems with motorway sticker

Future challenges

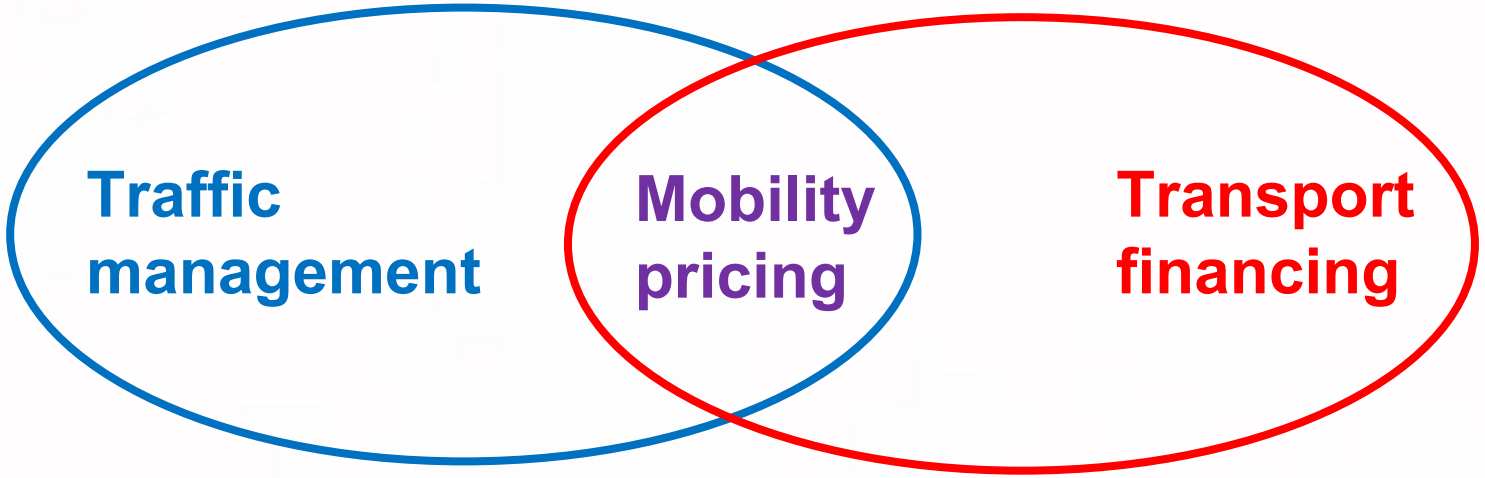
- Growing volume of traffic
- Capacity limits in cities, agglomerations and neuralgic points
- Climate policy: reduction of CO_2 emissions
- Energy policy: reduction in energy consumption
- More efficient and new drive technologies

⇨ New instrument is needed which can be applied more effectively to solving these problems.

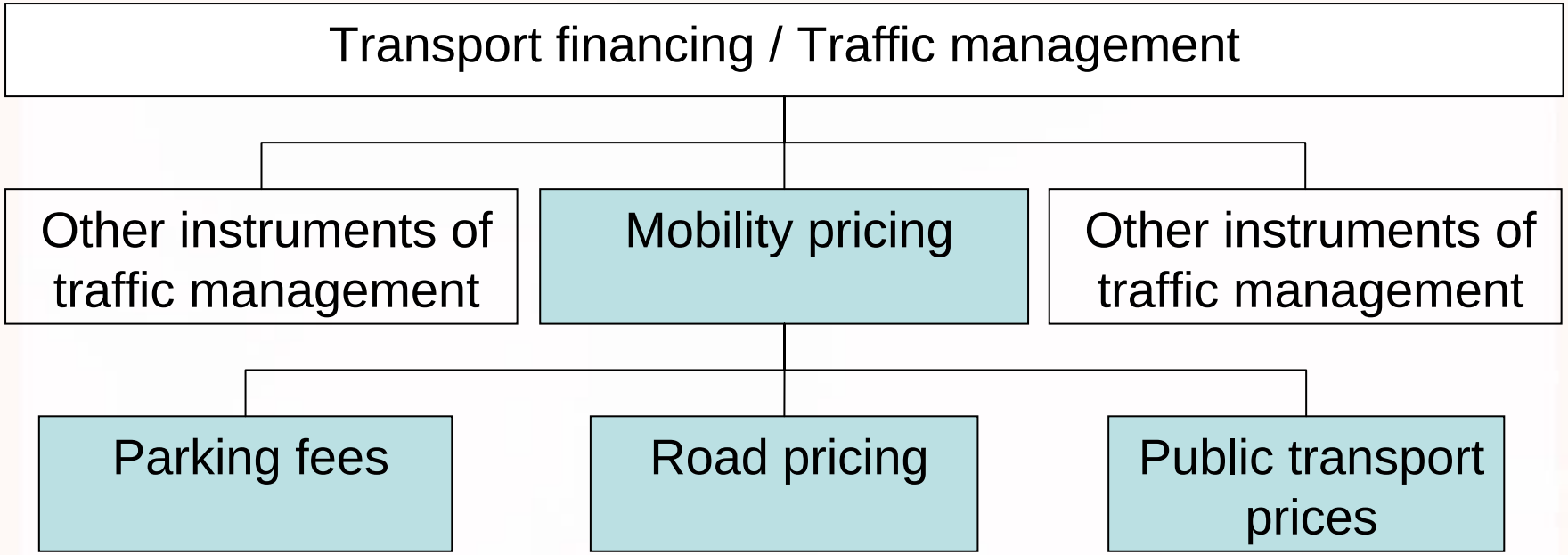
Part II: Considerations of the future
Mobility pricing

Concept of mobility pricing

Mobility pricing:
2 main goals – 1 instrument



Part II: Mobility pricing



Mobility pricing: User-based charges for infrastructure and services in motorised traffic **and public** transport, aimed at influencing the demand for mobility.

Road pricing: User-based charges for private motorised transport, aimed at influencing the demand.

Research findings on mobility pricing

Research programme

- Acceptance of mobility pricing measures
- Effects on mobility behaviour
- Traffic planning and environmental impact
- Financial consequences for the state
- Legal and institutional aspects
- Technical aspects including estimation of the costs of the fee collection systems

Overview of the models

Scenario	Road pricing strategy	Compensation strategy			Changes in public transport tariffs	
		Motorway sticker	Fuel taxes	Vehicle taxes		
A	Object pricing	no change		no change	no change	
B	Zone model	no change		reduce or eliminate	no change	
C	Network model	eliminate	no change	reduce		
D	Zone/road stretch model	eliminate	no change	reduce		
E	Nationwide model E1: low tariff E2: high tariff	eliminate	reduce	reduce	E1	no change
					E2	increase

Findings on acceptance: success factors for examples in Switzerland and abroad

Effectiveness (strongest factor)

- Pricing measure is perceived as a genuine solution to a problem

Implementation

- Simple, transparent design

Time frame

- Only in the course of a public debate on the issue do information levels within the public increase, opinions become more differentiated and acceptance levels grow

Model results: Impact on vehicle kilometres

Scenario	Road pricing strategy	Vehicle kilometres, 2030 model (total for Switzerland)	
		Million vehicle kilometres per day	Relative change versus reference in %
Reference		145.8	
A	**Object pricing**	145.4	-0.3
B	**Zone model**	144.0	-1.2
C	**Network model**	140.0	-4.0
D	**Zone/road stretch model**	137.3	-5.9
E1	**Nationwide model** (low tariff)	139.6	-4.3
E2	**Nationwide model** (high tariff and increase in public transport prices)	130.7	**-10.4**

Results for mobility financing models

Road pricing strategie	Assessment
Object pricing	Not financially productive, because tariffs for user fees have to be kept modest in order to keep traffic from diverting to other routes in order to avoid fee.
Zone model	Revenue from user fees may be greater, because when stipulating the road user charges, less attention must be paid to avoiding undesirable side-effects.
Network model	Limited potential for tariff increases, because traffic must not be displaced onto parallel roadways that are not subject to charge.
Zone/road stretch model	Overlap of effects of zone and network models.
Nationwide model	Nationwide model making all roads subject to road user charges could be financially very attractive depending on the tariff level. To compensate for elimination of the motorway sticker and fuel tax surcharge, the tariff would have to be 0.05 Swiss francs/kilometre.

Recommendations

- Road user charges in place of taxes on fuel
- Differentiated performance-related area charges as long-term goal
- Technology test and user trials to demonstrate feasibility
- E-vignette for motorway fee as first step
- FEDRO as regulator

Design of mobility pricing and challenges involved in changing systems

Design of mobility pricing depends on goals

Goal	Potential solution
Financing/coverage of costs of transport infrastructure:	▪ Basic charge per distance travelled (Swiss francs/km) on entire network ▪ Surcharge on very expensive stretches
Optimal utilisation of transport infrastructure:	▪ Charges differentiated by time and place
Reduction of harmful emissions:	▪ Charges differentiated by emission values in relation to distance travelled

Conclusions and findings (1)

- Structural problems are increasing with current financing system
- Infrastructure capacity problems are growing
- Acceptance of change of system depends on perception that problem is pressing
- Change of system not to be linked to price hike
- Clear information is required about how revenue is used
- Eliminate existing taxes and fees (clear compensation strategy)
- Long preparatory phase needed: political level, legal, organisation

Conclusions and findings (2)

- Comprehensive area-wide charges

- Problems on railways and roads are converging:
  - Capacity, noise, urban sprawl, financing
  - Specific energy input: becoming similar

- Railways and roads are complementary:
  - Advantage of railways: high volumes passengers/goods), long distances
  - Advantage of roads: area-wide coverage

⇨ **Mobility pricing for roads and railways**

⇨ **Mobility pricing designed to better combine the respective strengths of roads and railways**

Further information

Heavy Vehicle Fee (HVF)

- http://www.ezv.admin.ch/zollinfo_firmen/steuern_abgaben/00379/index.html?lang=en
- http://www.are.admin.ch/themen/verkehr/00250/00461/index.html?lang=en

Mobility pricing

- http://www.astra.admin.ch/themen/00901/index.html?lang=de