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Road Congress
Mexico 2011**
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„Appropriate Means of Transport for Goods: Results from the Swiss National Research Programme”

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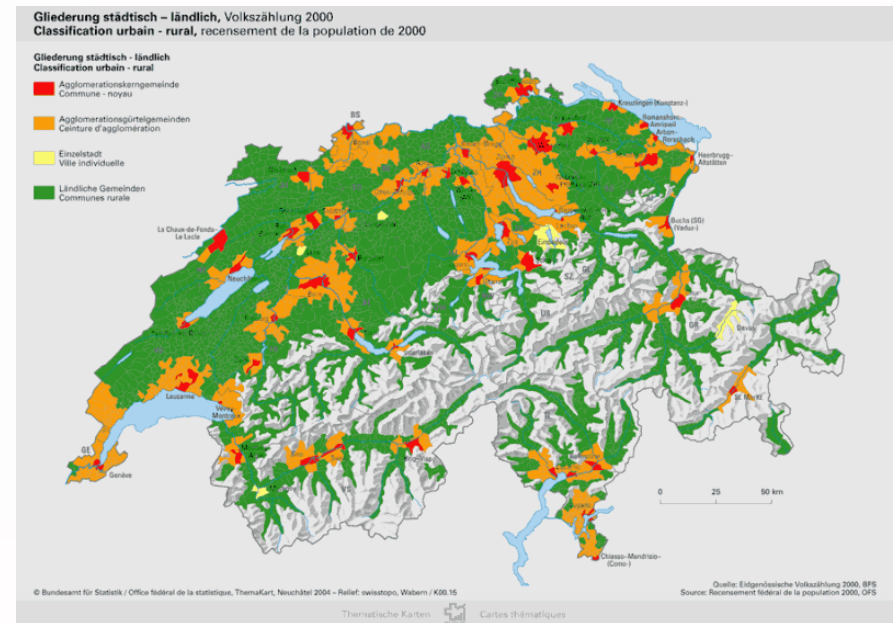


1. INTRODUCTION

Switzerland

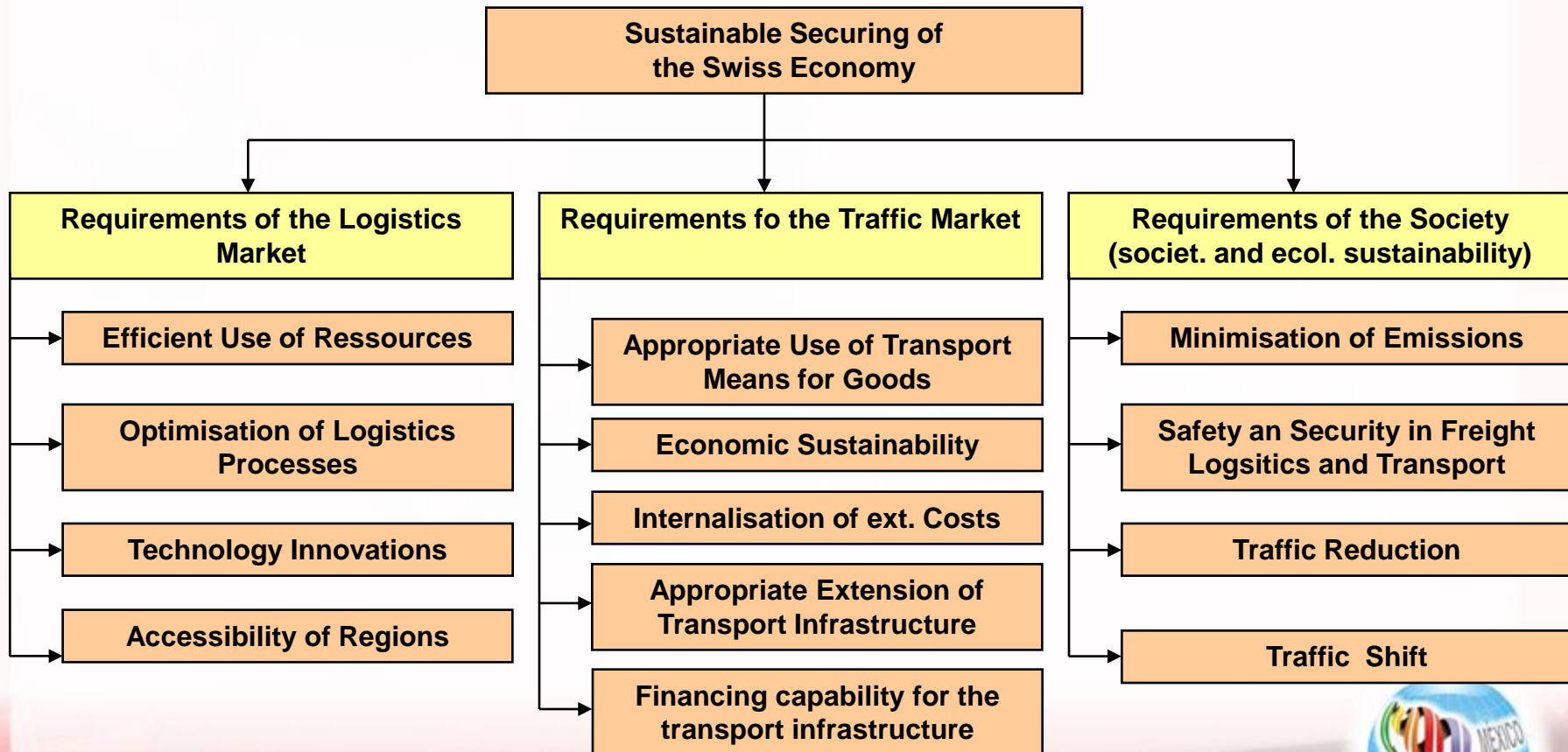
Key Figures (2010)

- Inhabitants 7.8 mln. (2010)
- Employees 2.7 mln (2010, FTE)
- Surface: approx. 41'300 sqkm
- GDP: 458'809 mln. Euro (2010)
- Transport Network
 - Road: 71'460 km (Total)
1'790 km (Motorway)
 - Rail: 5'107 km
 - Inland Waterway: Port of Basel
 - Airports: Zürich, Basel, Geneva



1. INTRODUCTION

Objectives of the Swiss Freight Research Programme



Projects of the Swiss Freight Research Programme

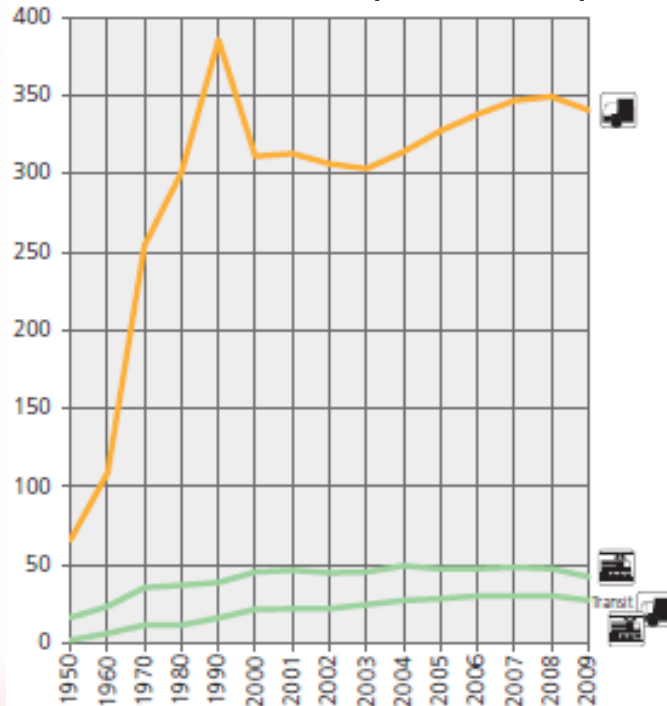
- Concept for the Efficient Collection and Analysis of Freight Data
- Freight Transport Intensive Industries and Freight Transport Flows in Switzerland
- Branch specific logistics concepts and freight volumes and their trends
- Freight Transport with Lorries: Developments and Measures
- Logistics/freight requirements regarding the development of the transport infrastructure
- Regulation in Freight Transport – Impacts on the Transport Sector
- Information Technology in Future Freight Transport Management
- Impact of combined measures of regulation and information technologies on transport infrastructure users
- Potential to increase efficiency in the transportation industry through integrated management tools from the perspective of the infrastructure operators
- Site related measures to reduce the environmental impacts of freight transport



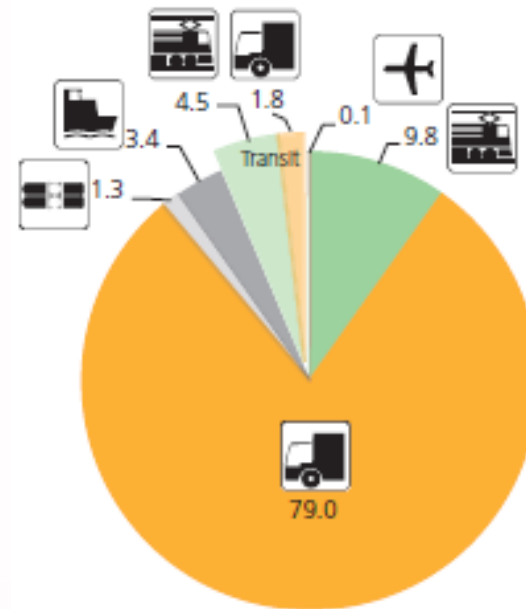
2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Development of Freight Volumes in Tons and Modal Split

Number of Tons per mode 1950-2009 (in mln tons)



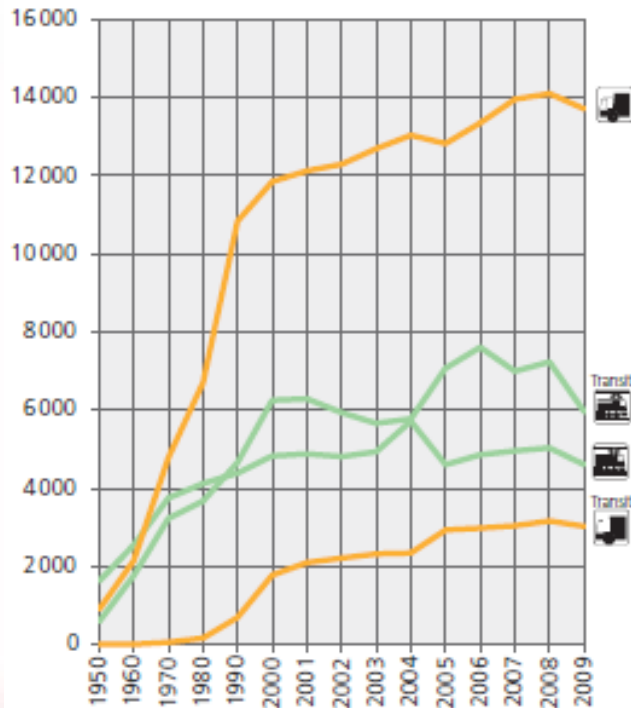
Number of Tons per mode 2009 (in %)



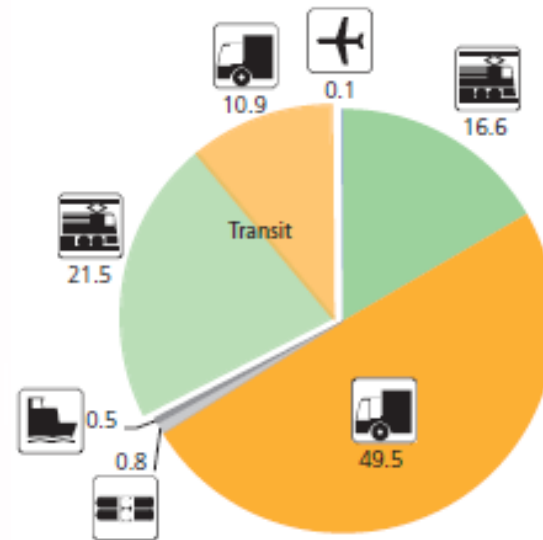
2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Development of Freight Volumes in Ton-km and Modal Split

Number of Ton-kilometres per mode 1950-2009 (in mln tkm)



Number of Ton-kilometres per mode 2009 (in %)

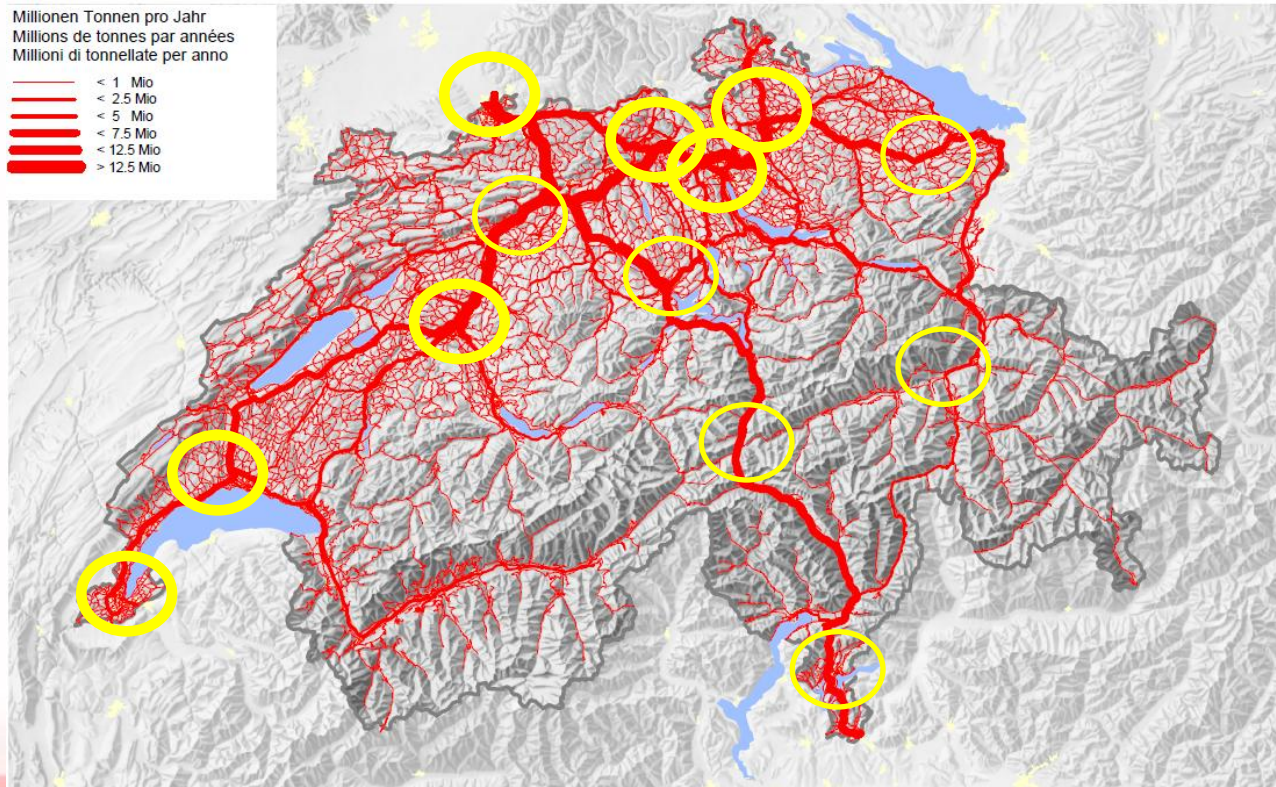
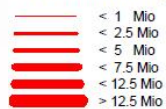


2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Freight Volumes on the Road Network (2008)

Güterverkehr 2008: Strasse
Trafic marchandises 2008: route
Traffico merci 2008: strada

Millionen Tonnen pro Jahr
Millions de tonnes par années
Millioni di tonnellate per anno



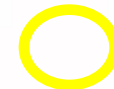
Quelle / Source / Fonte : Verkehrsmodellierung VM-UVEK (ARE), INFOPLAN-ARE, BFS-GEOSTAT, swisstopo

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Bundesamt für Raumentwicklung ARE
Office fédéral du développement territorial ARE
Ufficio federale dello sviluppo territoriale ARE
Uffiz federal da svilup dal territori ARE

Bottlenecks in
2020

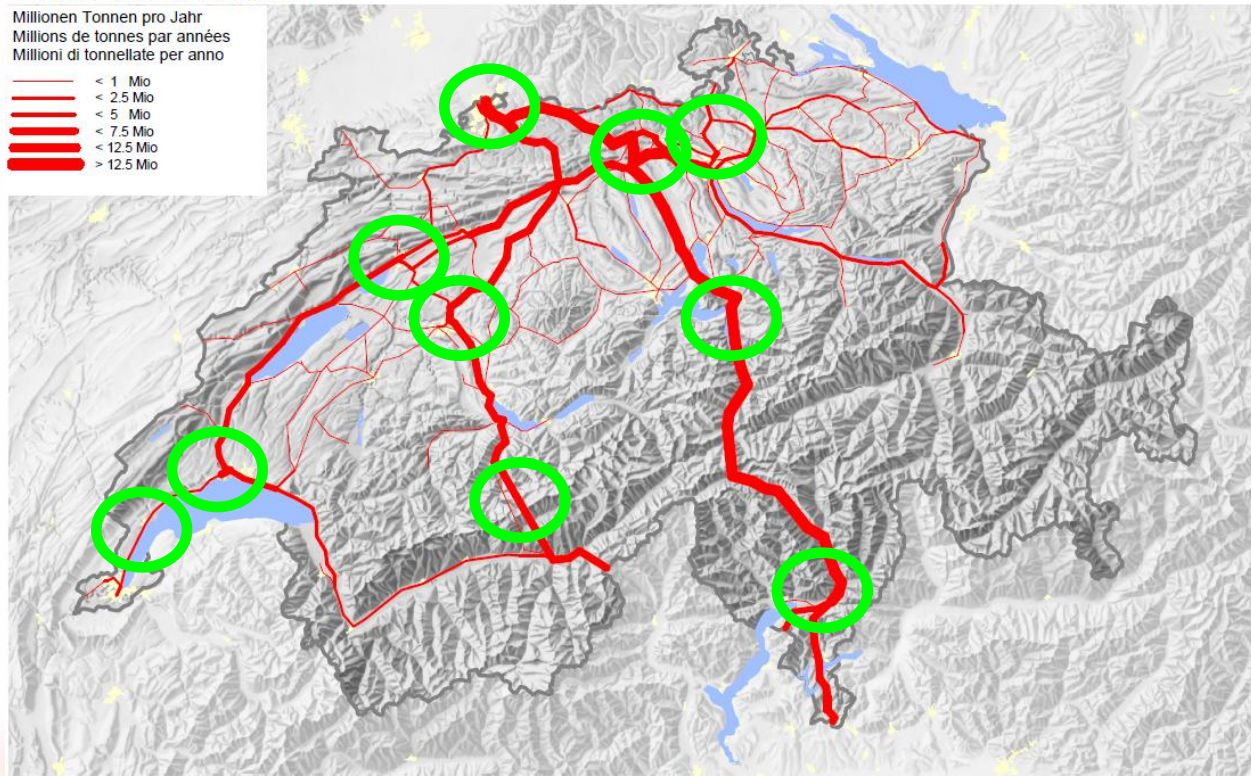


2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Freight Volumes on the Rail Network (2008)

Güterverkehr 2008: Schiene
Trafic marchandises 2008: rail
Traffico merci 2008: rotaia

Millionen Tonnen pro Jahr
Millions de tonnes par années
Millioni di tonnellate per anno



Bottlenecks in
2020 

Quelle / Source / Fonte : Verkehrsmodellierung VM-UVEK (ARE), BAV, INFOPLAN-ARE, BFS-GEOSTAT, swisstopo

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2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Intermodal Rail Transport:

Total 20 mln tons (2008)

- Inland: 3.1 mln tons
- Imp./Exp.: 3 mln tons
- Transit: 14 mln tons

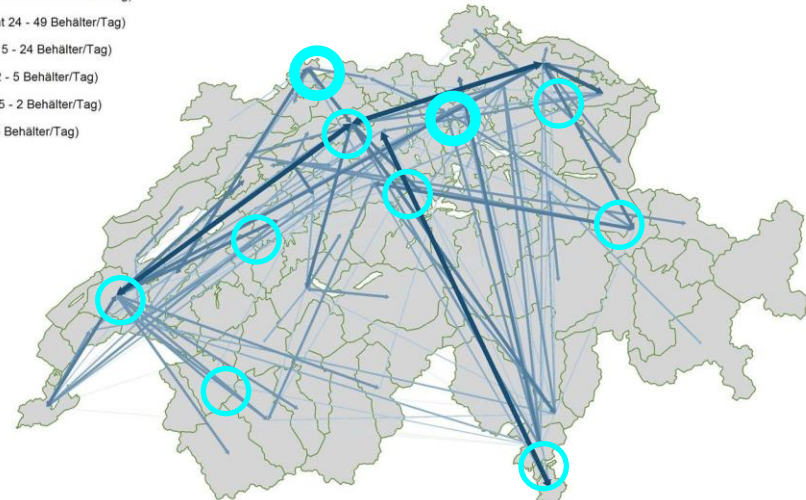
Approx. 5 % of overall volumes

Swiss Inland Intermodal Transport (Main Flows)

Total Versand + Empfang 2008 (Tonnen/Jahr)



Bottlenecks 2020 
Intermodal Terminals



2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Intermodal Transport: Inland Waterway based (2008)

Volumes:

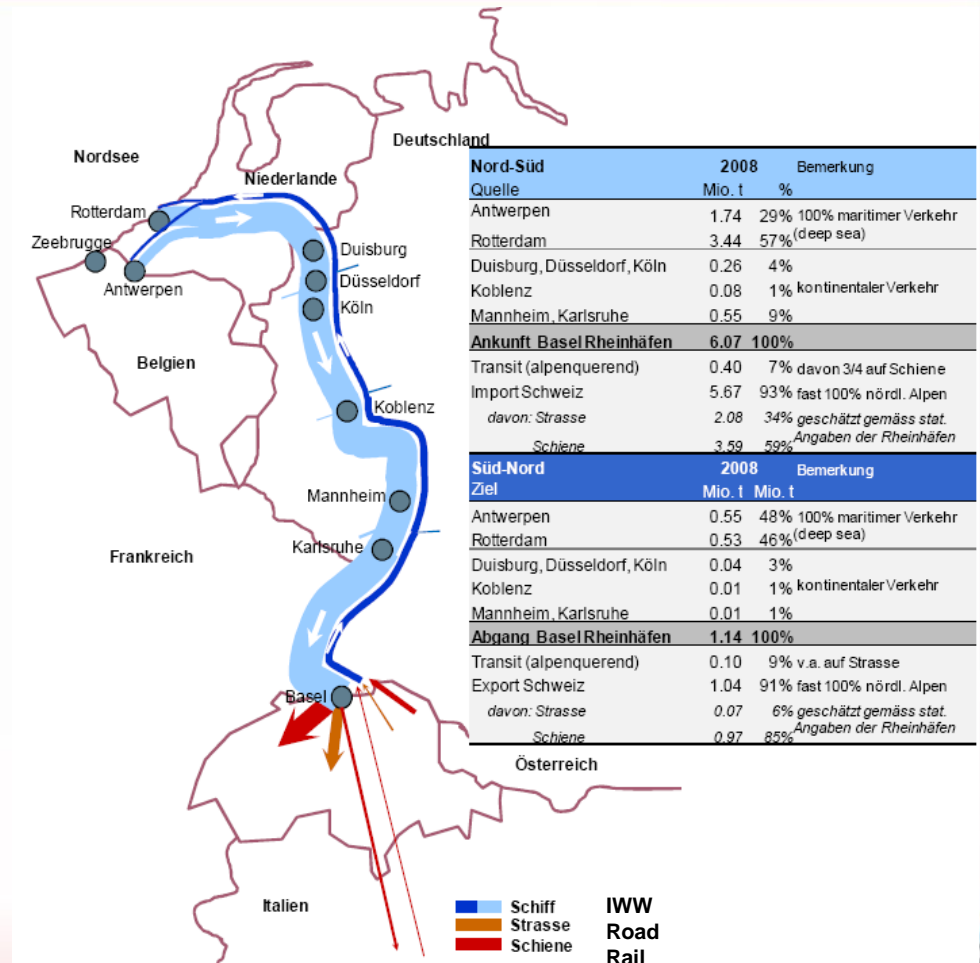
- 6.1 Mio. Tons (Import)
- 1.2 Mio. Tons (Export)
- (< 2% share of overall volumes)

Modal Split (Import):

- IWW-> Road 37%
- IWW-> Rail 63%

Modal Split (Export)

- Road-> IWW 7%
- Rail -> IWW 93%



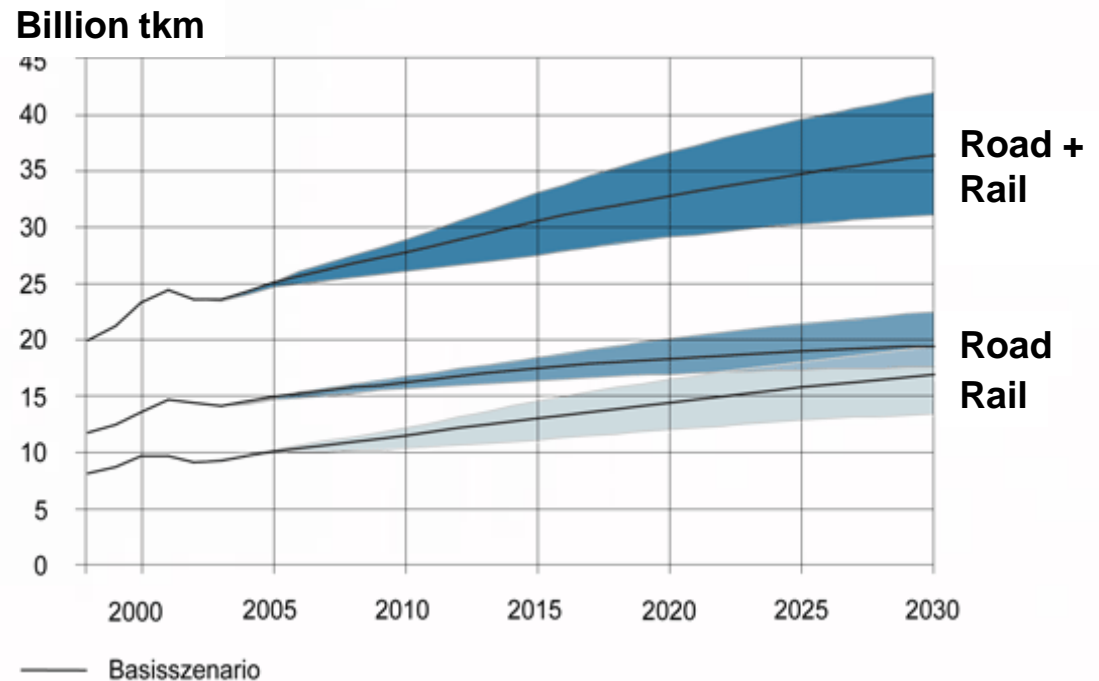
2. FREIGHT TRANSPORT DEVELOPMENT IN SWITZERLAND

Freight Forecast 2002 until 2030

Freight tkm

- +32% to 78% (R+R)
- +22% to 56% (Road)
- +47% to 112% (Rail)

Depending on Scenario



3. CHALLENGES AND FREIGHT POLICY

Challenges regarding Freight Transport

Problems

Increasing freight and passenger transport
Limited capacity and congestion

Decreasing reliability and Increasing costs for freight transport

Global warming, air pollution, noise, energy consumption, use of space

Safety problems especially on the road network

Limited financial means for road network extension

Transport means based freight statistics

Challenges

Make better use of the overall transport system (road, rail, iww)

Traffic reduction – Increasing efficiency of freight transport

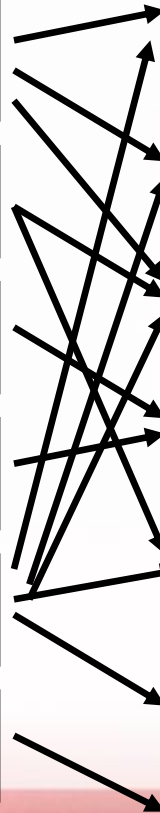
Traffic Shift – Use of other modes and mode combinations

Efficient use of resources, mitigation of negative impact

Appropriate Extens. of Infrastructure

Economic Sustainability, Financing capability for the transport infrastructure

Improving Freight Statistics



3. CHALLENGES AND FREIGHT POLICY

Transport policy based on the principle of sustainable mobility

General Objectives

- **Appropriate use of transport means**
- **Make use of technical possibilities to optimise infrastructures and vehicles**
- **Optimal use of infrastructures (management before construction)**
- **The transport modes must bear their uncovered costs, user pays principle**
- **Increase transport safety**
- **Coordination of Swiss with European transport policy**

Freight related policy objectives:

- **Promotion of Intermodal Transport**



Strengths of different Modes

Road	Rail	Inland Waterway
<ul style="list-style-type: none"> •Serving the surface •High frequency •High service degree •Low costs on short distances •High temporal flexibility •Short leading times also with small shipments •Simple information flow •Personal company •Strong competition 	<ul style="list-style-type: none"> •High mass productivity •High safety •Low costs on long distances (direct and shuttle trains) •Low energy consumption •Low environmental impact (esp. Pollution) •Night transport (restrictions on road) •Low dependency on weather conditions 	<ul style="list-style-type: none"> •High mass productivity •High safety •Low costs •Low energy consumption •Capacity

Intermodal transport tries to combine the comparative advantages of different modes, but needs transshipment and more organisation!



5. POTENTIAL OF INTERMODAL TRANSPORT

What is the Potential for Intermodal Rail Transport?

Today's share of intermodal rail transport

	Inland (mln. t, 2008)	Import/ Export (mln. t, 2008)	Transit (mln. t, 2009)
Road	271.2 (93%)	37.1 (69.7%)	13.36 (39.1%)
Rail	16.6 (6%)	13.1 (24.6%)	6.39 (18.6%)
Intermodal (Rail-Road)	3.1 (1%)	3.0 (5.7%)	14.45 (42.3%)
Total	290.9 (100%)	53.2 (100%)	34.2 (100%)
<i>Distance Range</i>	0 – 350 km	200 – 2500 km	300 – 2'500 km

Possible share in the future (from studies):

Inland: approx. 3% (short distances within Switzerland)

Import/export: approx. 11%

Transit: approx. Up to 60%



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Approaches (1/2)

Area	Measures	Status
Regulation	Railway Reform Truck Driving Bans (night, weekend) Enforcement of road traffic regulations	Implemented (1 step) Implemented Implemented
Land Use Planning / Transport Plans	Securing locations for intermodal terminals in national and regional land use plans Planning / Securing rail freight capacity on rail network Masterplan Logistics	Partly Implemented Partly Implemented Proposal
Funding	Co-funding intermodal terminals Subsidies for intermodal transport operation	Implemented Implemented
Infrastructure	New railway tunnels through the alps Railway by passes in conurbations (for freight)	In implementation Partly Planned

6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Approaches (2/2)

Area	Measures	Status
Operation / Traffic Management	Gotthard dosing system for truck traffic Truck information system Interoperable railway freight traction Terminal management systems Intermodal booking, tracking and tracing	Implemented Implemented Implemented Partly Implemented Partly Implemented
Economical	Heavy Vehicles Fee Alpine Transit Freight Exchange	Implemented In Discussion
Intermodal concepts	Intermodal Waste Logistics (KVA Thurgau) Rail and Transhipment (SBB Cargo)	Implemented Partly Implemented
Intermodal Statistics	Improving Intermodal Statistics	Proposal

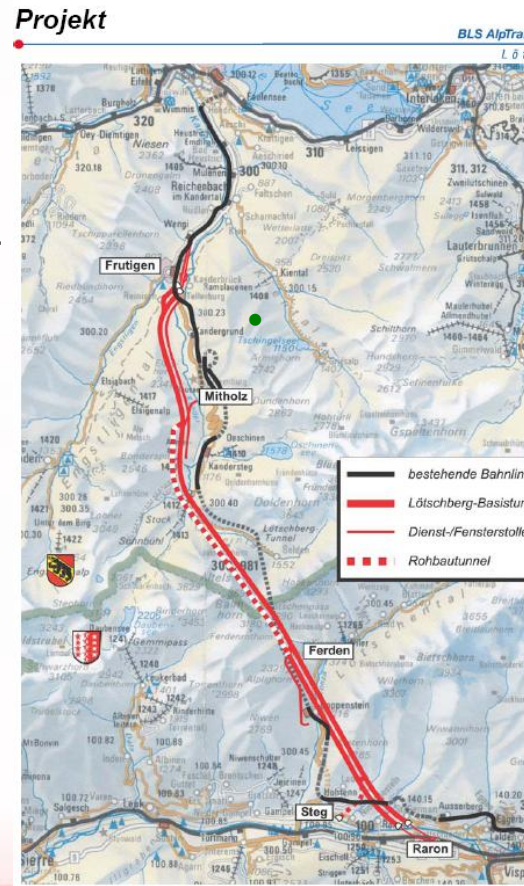


6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

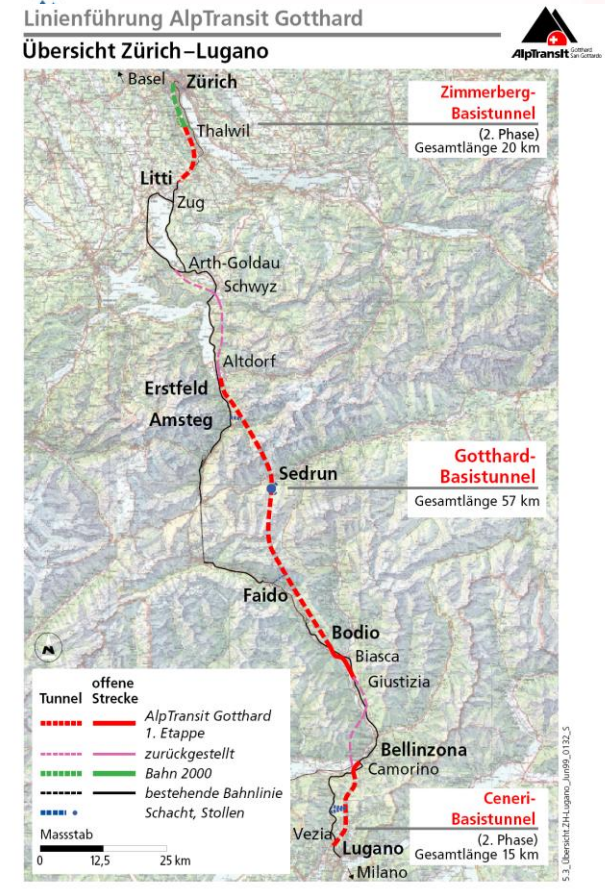
New railway tunnels through the alps

- Improved railway connections
 - Gotthard Tunnel: 57 km
 - Lötschberg Tunnel: 34 km
- Improving railway / intermodal transport
 - Increasing efficiency (shorter leading times, higher productivity)
 - Increasing reliability
- Start of operation
 - 2007 Lötschberg
 - 2017 Gotthard

Lötschberg



Gotthard



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Heavy Vehicles Fee

Legal basis:

- Federal Law for the Distance-related HVF of 19.12.1997

Objectives:

- True Costs
- Demand Management
- Reduction of Alpine transit road traffic and shift to rail

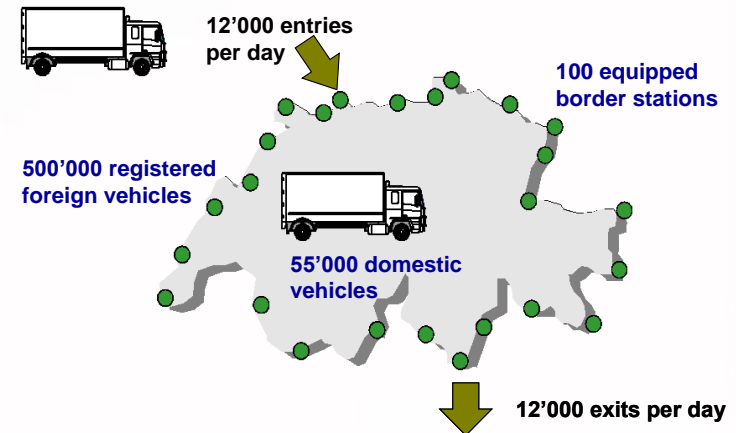
Subject: Heavy Vehicles > 3.5 tons

Infrastructure: All public roads

Tariffication:

- per Kilometre and per Ton
- Emission-dependent
- 40 t truck: **~0.75 Euro per km**

Operator: Swiss Customs Authority



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Co-funding of Terminals

National law for terminal funding

Financed elements:

- buildings/ infrastructure
- installations and equipment
- rolling stock
- other investments

Maximum share of co-financing is **80%**

Minimum requirements:

- Modal shift from road to intermodal transport
- Need for transshipment capacity
- Investment is necessary to reach policy aims
- Terminals would not be built without financial aid.
- Acceptable cost/benefit factor

Terminal funding outside CH possible

Switzerland funded terminals 2002-2008 with **12 to 75 Mio CHF per year** (1CHF=0.8 Euro).



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Truck Information System

Objectives

- Optimal use of transport capacity
- Support trip and route planning
- Support modal shift

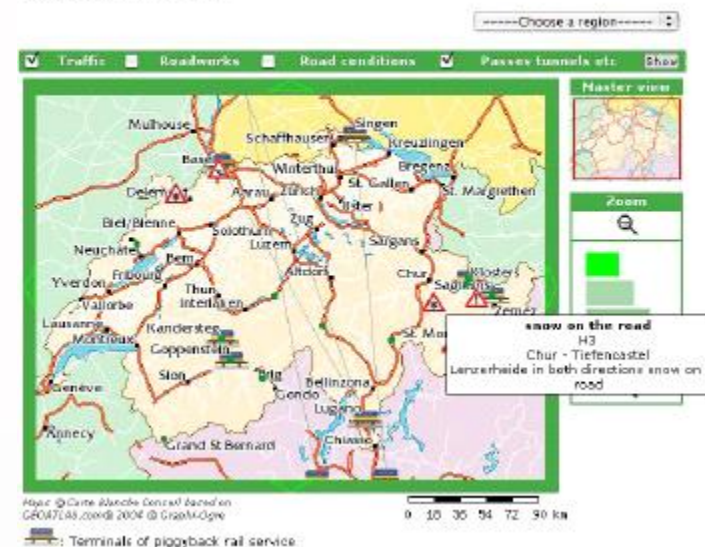
Main features of the service

- Real time traffic situation on road / rail
- Weather / Road Conditions forecasts
- Intermodal routing
- Explanation of permanent traffic management measures, intermodal supply, policy and legal background

Organisation

- Public Private Partnership
- Operated by the Swiss Federal Roads Office

Present traffic situation in Switzerland
(on transit roads for long-distance heavy traffic)
Latest Update: 31.01.2006 16:09



www.truckinfo.ch



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

National Masterplan Logistics

Objectives

- Coordination between land use, transport planning and requirements of logistics/transport activities
- Securing necessary space for logistics activities and capacity on transport network
- Promotion of Intermodal transport

Content

- Freight policy objectives
- Freight relevant transport network
- Locations for Freight Villages and intermodal terminals
- Priority areas for industrial zones with rail access option
- Infrastructural and land use measures to provide space and capacity for freight/Logistics

Responsibility

- DETEC: Department for Transport, Energy and Communication



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Trans - Alpine Crossing Freight Exchange

Basic idea

- Reduction of road freight transport through the Alps for ecological reasons
- Constitution → Target of max. 650'000 trucks over the Swiss Alps
- Management of truck freight transport using economical instruments
- Modal Shift

Cap-and-Trade

- Mandatory transit pass which is tradeable
- Limitation to 650'000 truck passages per year



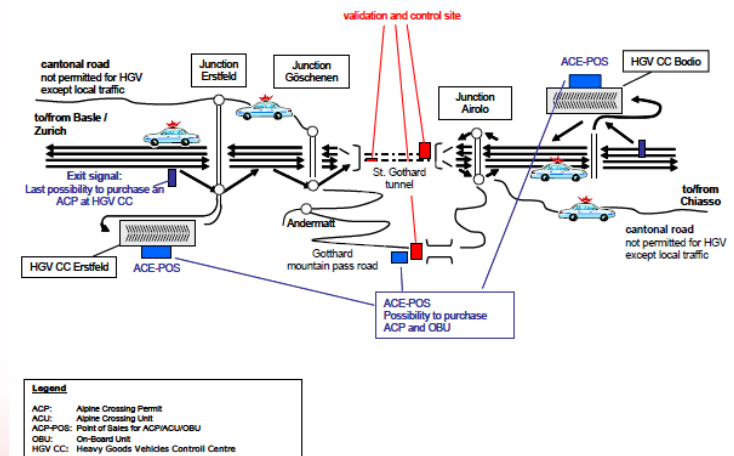
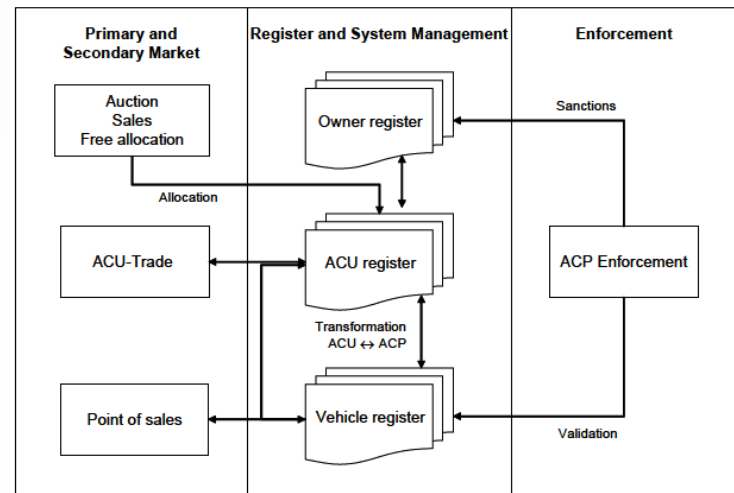
6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Electronic charging and enforcement system

- telematics applications with on board units, point of sales, charging and enforcement stations
- back office system

Results of studies

- Alpine Crossing Exchange technical and operational feasible
 - Target of 650'000 trucks per year could be reached
 - Implementation only in coordination with neighbouring countries possible
- It is still open if and when such a system will be implemented



Legend

- ACP: Alpine Crossing Permit
- ACU: Alpine Crossing Unit
- ACP-POS: Point of Sales for ACP/ACU/OBU
- OBU: On-board Unit
- HGV CC: Heavy Goods Vehicles Control Centre



6. SOLUTIONS / PRACTICES TO INCREASE INTERMODALITY

Improving Intermodal Statistics

Situation

- Mode based statistics
- Lack of good data for intermodal transport

Objectives

- Reliable data on intermodal transport for observation, monitoring and controlling

Elements/Indicators

- Loading units, tons, ton-km per year by commodity group and traffic type and O-D pair
- Differentiation by loading unit type



- Differentiation mode combinations
- Loading-units and tons by terminal, port, etc.

Methods

- Yearly business surveys (railways, terminal operators, port operators)



7. Conclusions and Recommendations

- **Need for action** to make freight transport more sustainable
- **Increase the share of intermodal transport is one solution**, but not the only one
- **Different approaches possible** to support intermodality
- Not one single measure – but a **bundle of different measures needed** to support intermodality
- Measures must be based on a **clear freight policy**
- Measures showed **positive effects on intermodal transport**, but intermodality is not the only solution
- **Measures need acceptance** – especially radical ones → public involvement important
- Important to **improve intermodal freight statistics** → monitoring and controlling



More Information

- Swiss Federal Roads Office:

www.astra.admin.ch



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The Research Programm «Strategies for an Appropriate Use of Transport Means in Freight Transport“

- **Patronage (Lead):** Swiss Federal Roads Office
- **Duration:** 2009-2012
- **Advisory Board:** Representatives of National Authorities, Logistics and Transport associations and Professional Bodies
- **Co-Financing:** Swiss Federal Office of Transport, Swiss Federal Office of Spatial Development, Swiss Federal Office of Environment, Swiss Federal Office of Statistics
- **Program Manager:** Christoph Stucki



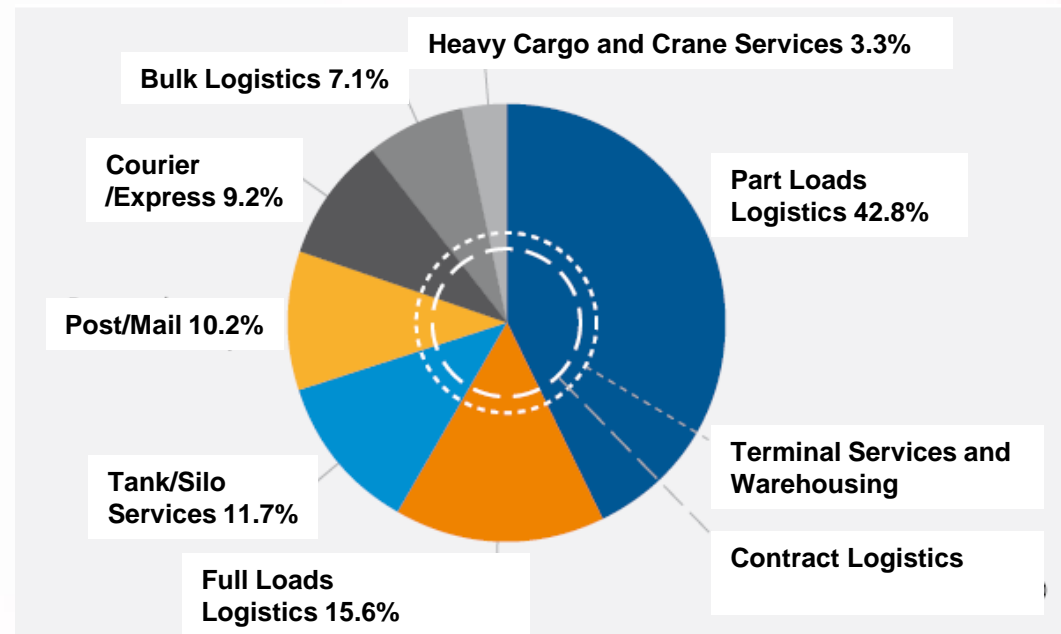
Status of projects of the Research Program

Nb	Title	Status	Results
A	Concept for the Efficient Collection and Analysis of Freight Data (A)	Running, finished in March 2012	Interim results available on freight data needs, SWOT of Swiss freight Statistics
B1	Freight Transport Intensive Industries and Freight Transport Flows in Switzerland	Completed	Complete report soon available
B2	Branch specific logistics concepts and freight volumes and their trends	Started, finished mid of 2012	No interim results available
B3	Freight Transport with Lorries: Developments and Measures	Running, finished end of 2012	Interim results available on current situation and trends
C	Logistics/freight requirements regarding the development of the transport infrastructure	Started, finished mid of 2012	Interim results available on current situation and forecast 2030
D	Regulation in Freight Transport – Impacts on the Transport Sector	Completed	Complete report soon available
E	Information Technology in Future Freight Transport Management	Running, finished end of 2012	Interim results available on technologies and their impact
F	Impact of combined measures of regulation and information technologies on transport infrastructure users	Started, finished mid of 2012	No interim results available
G	Potential to increase efficiency in the transportation industry through integrated management tools from the perspective of the infrastructure operators	Started, finished mid of 2012	No interim results available
H	Site related measures to reduce the environmental impacts of freight transport	Started, finished mid of 2012	Results on current situation on environmental impact

Swiss Logistics Market

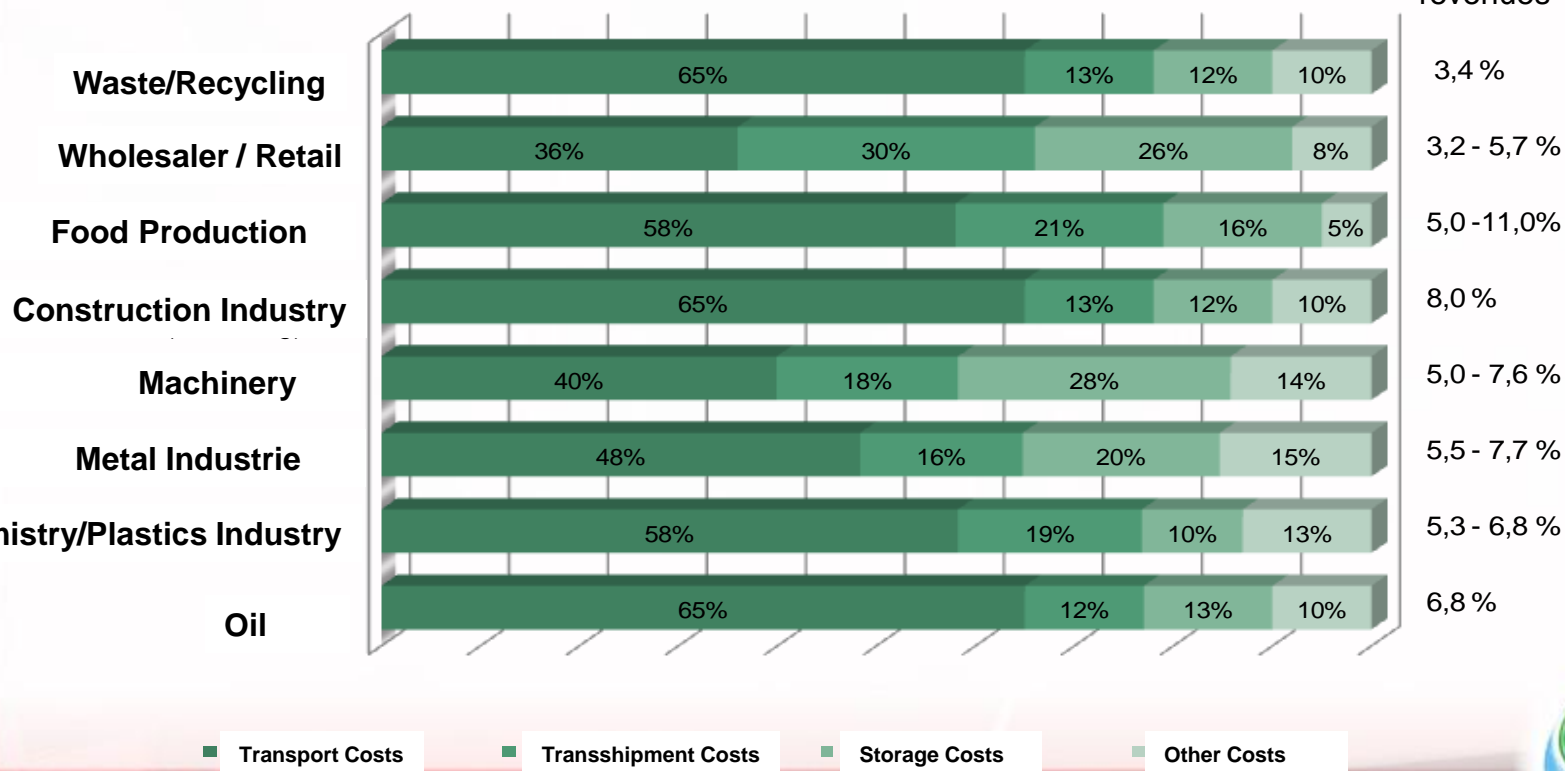
Key Figures (2010)

- 165'800 Employees
- Market volume:
28'750 mln Euro
6.5% of GDP
- Share of Services
43.7% Transport
23.5% Storage
17.7% Handling/Transship.
15.1% Various



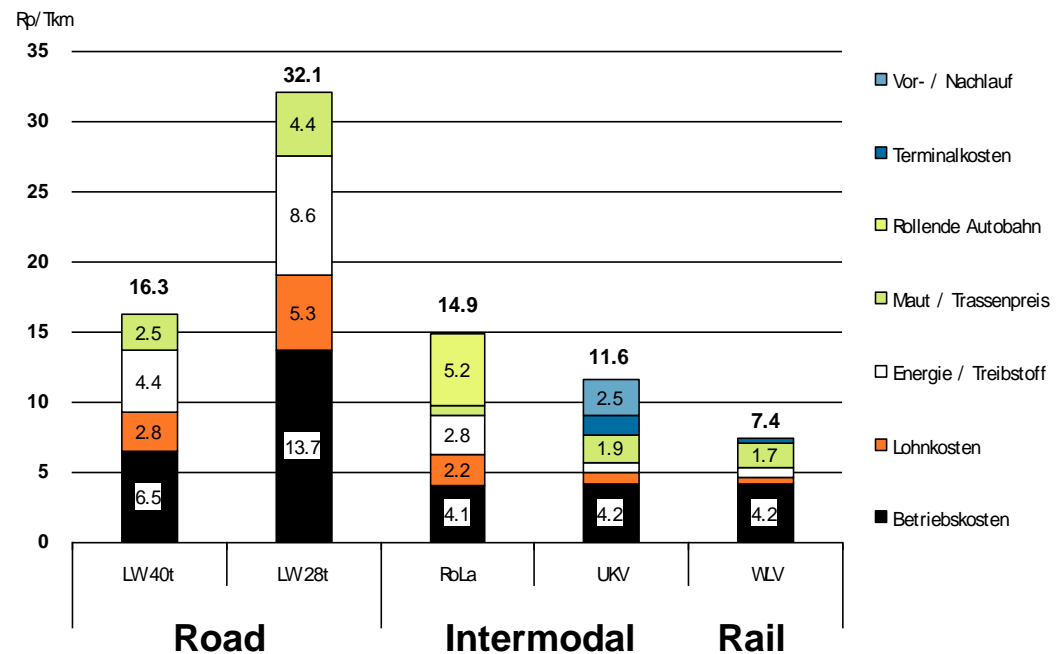
Comparison of Branches regarding Logistics Costs

Share of Logistics Costs in relation to revenues



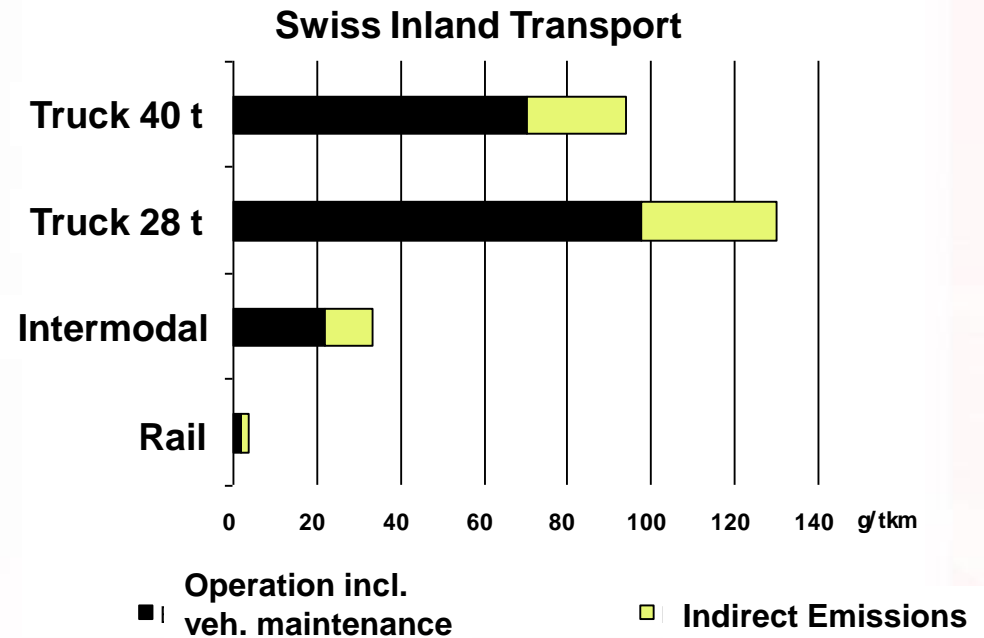
Cost comparison of different modes

- long distance (800-1000 km)
- 2 x 50 km pre- and endhaulage (intermodal)



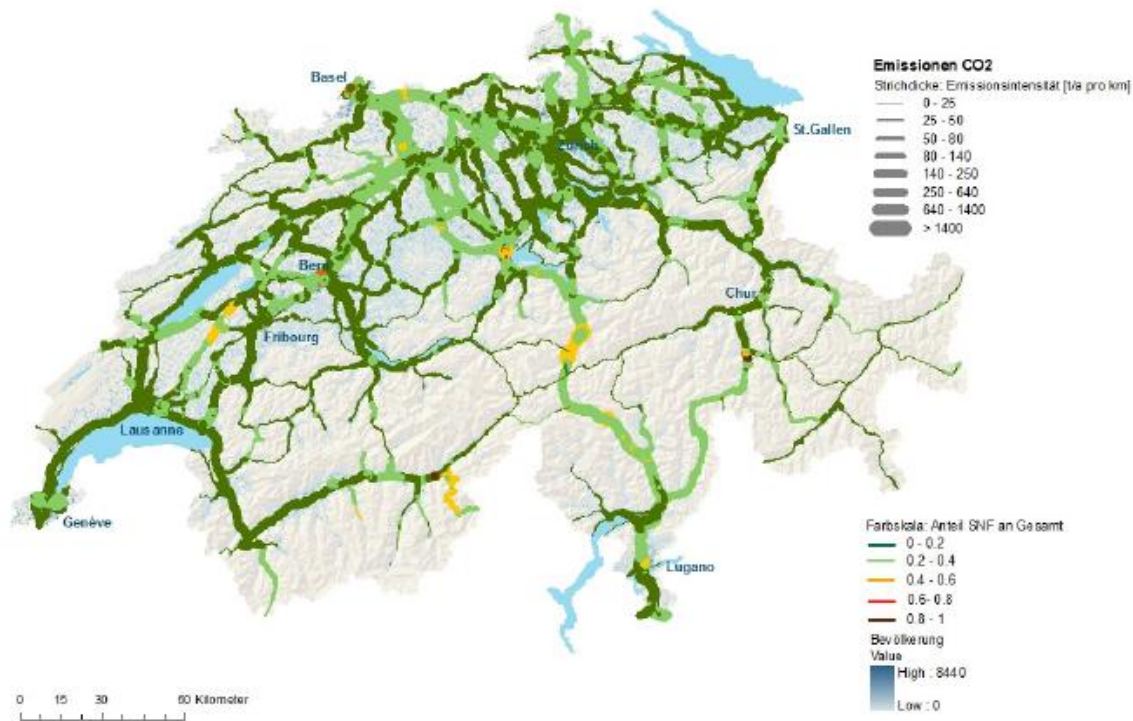
CO₂-Emissions of different modes

- Operation incl. energy production and veh. maintenance
- Indirect emissions: vehicle production, infrastructure construction, etc.



CO₂-Emissions by trucks on the road network (2010)

Emissionen Schwere Nutzfahrzeuge 2010



Decision Factors for Modal Choice

- **Main Decision Makers: Shippers, Forwarders, Logistics and transport service providers, Ocean Carriers**
- **Main decision factors**
 - **Cost- and quality criteria** (price, reliability, flexibility, leading time, frequency, safety, Security, added value services, etc.)
 - **Market criteria** (Shipper characteristics as size, locations, logistics concept, commodities, shipments, distances, economical framework c.)
 - **Infrastructure criteria** (Link and node capacities and densities, private sidings, Intermodal terminals, etc.)
 - **Institutional criteria** (Regulation, Standards, Incentives, etc.)



Strengths/Weaknesses of Road Freight Transport

Strengths	Weaknesses
<ul style="list-style-type: none">• Serving the surface• High frequency• High service degree• Low costs on short distances• High temporal flexibility• Short leading teams also with small shipments• Simple information flow• Personal company• Strong competition	<ul style="list-style-type: none">• Low mass productivity• Ecological impact (Noise, Pollution, Energy Consumption, Use of Space)• Traffic Safety• Dependency on congestion and weather conditions• Legal Restrictions (Night traffic ban, Weekend traffic ban, bans for dangerous goods, etc.)

Strengths/Weaknesses of Rail Freight Transport

Strengths	Weaknesses
<ul style="list-style-type: none">• High mass productivity• High safety• Low costs on long distances (direct and shuttle trains)• Low energy consumption• Low environmental impact (esp. Pollution)• Night transport (restrictions on road)• Low dependency on weather conditions	<ul style="list-style-type: none">• Surfing the surface (last mile)• Low temporal flexibility• Noise• High costs on short distances and with shunting processes• Capacity conflicts (passenger/freight)• Planning/Organisation effort• Partly limited competition

Strengths/Weaknesses of Intermodal Rail Freight Transport

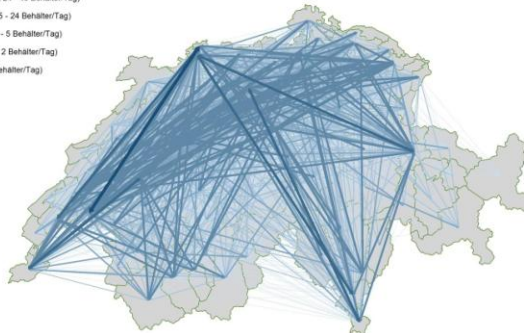
Strengths	Weaknesses
<ul style="list-style-type: none">• High mass productivity• High safety• Low costs on long distances (direct and shuttle trains)• Low energy consumption• Low environmental impact (esp. Pollution)• Night transport (restrictions on road)• Financial incentives• Higher max. Weight in Pre-/Endh.	<ul style="list-style-type: none">• Low temporal flexibility• Noise• High operation costs on low distances and with shunting processes• Capacity conflicts (passenger/freight)• Planning/Organisation effort• Partly limited competition• Costs and time needs for transshipment

What is the Potential for Intermodal transport (2030)? Structure

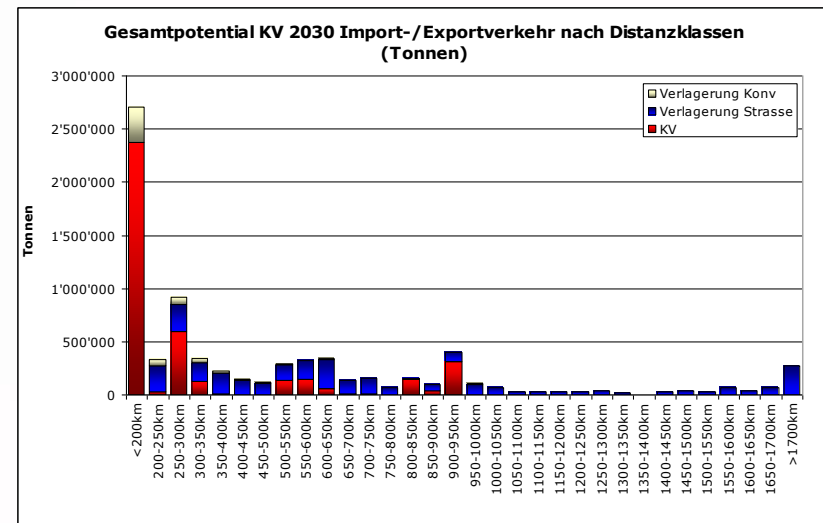
Inland: Modal Shift by O-D

Total Versand + Empfang 2030 (Tonnen/Jahr)

- > 100'000 (> entspricht 49 Behälter/Tag)
- 50'000 bis 100'000 (entspricht 24 - 49 Behälter/Tag)
- 10'000 bis 50'000 (entspricht 5 - 24 Behälter/Tag)
- 5'000 bis 10'000 (entspricht 2 - 5 Behälter/Tag)
- 1'000 bis 5'000 (entspricht 1 - 2 Behälter/Tag)
- 0 bis 1'000 (entspricht 0 - 1 Behälter/Tag)
- MS-Regionen (106)



Import/Export: Modal Shift by Distance Class



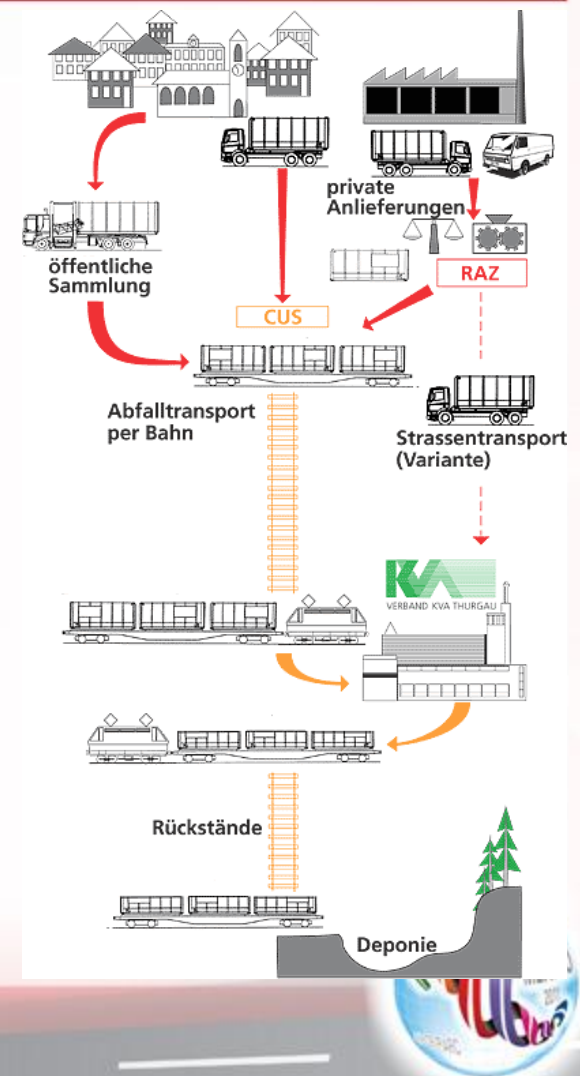
Intermodal Waste Logistics (1/2)

Situation / Problem

- New waste incineration plant in the Canton of Thurgau → Longer distances for waste transports
- Efficient and ecological logistics and transport concept needed with the use of rail

Measure/Solution

- Integral disposal system
- Intermodal solution consisting off
 - ACTS-System with compress containers
 - 5 regional intermodal transfer points
 - 3 Regional waste treatment facilities
 - Optimisation of collection tours



Intermodal Waste Logistics (2/2)

Effects/Experiences

- More than 50% rail share (before 0%)
- Increasing payload of trucks (about 50%)
- Higher collection performance
- Reduction of collection vehicles by 50%
- Reduction of truck-km (20%)
- Reduction of overall costs (8-10%)

