



innova*train*

easy cargo moving

Innovative technology for smart rail freight logistics



UNECE

Intermodality leads to Sustainability
30 November 2015 Palais des Nations, Geneva

Presentation

1. Innovatrain Ltd

2. Transport Volumes

3. Megatrends

4. Combined Transport today

5. Switzerland

6. Some intermediate conclusions

7. Modern commuter transports

8. Swiss COOP Group

9. Implemented innovations

10. City Cargo Geneva

11. New developments

Innovatrain Ltd (AG)

- I. Competence centre** for intermodal train and transshipment concepts to help facilitate a shift from road to rail of time sensitive cargo on short routes.
 - II. Supplier of smart logistical solutions** to facilitate the introduction of combined rail/road networks in highly populated urban regions.
-
- ✓ Founded: May 2010
 - ✓ Where: Basel, Switzerland

Innovatrain Ltd (AG)

As our focus is on highly populated urban regions, we know we have to cope with restrictions on:

1. available surface for transshipment and intermediate storage,
2. available time slots on rail and in urban locations,
3. sizes of local railway sidings and tracks.

Transport Statistics

Continental Cargo Transports in Europe:

There is a big volume, but what volume is transported over what distance?



Austria

DVZ 18.06.2013

Transportaufkommen

5

DVZ • THEMENHEFT ÖSTERREICH • DIENSTAG, 18. JUNI 2013

LKW-Transit macht nur 0,5 Prozent aus

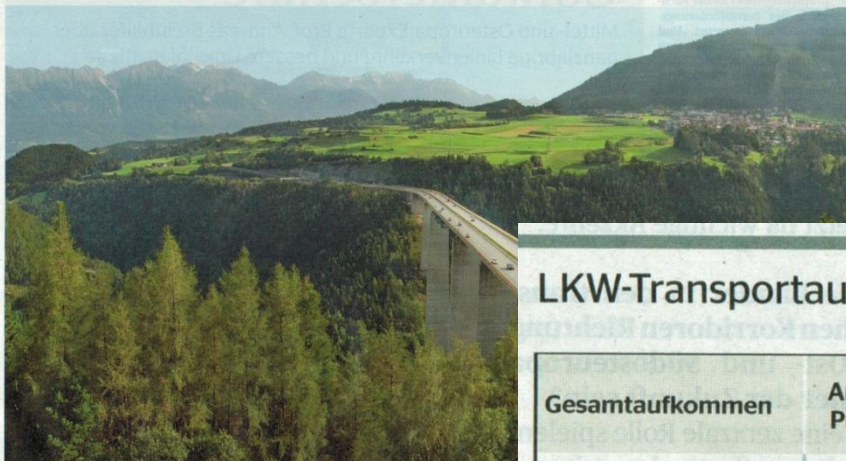
Straßen- und Schienentransporte entwickelten sich 2012 rückläufig - nur Binnenschifffahrt legte zu

Das Transportaufkommen in 2012 ist deutlich zurückgegangen. Nur die Luftfracht legte zu. LKW, Bahn und Binnenschiff verzeichneten ein Minus. Trotzdem sieht die österreichische Transportwirtschaft der Zukunft positiv entgegen.

von Wilfried Schneider

Nach einer kurzen Erholungsphase in 2011 verzeichnete der österreichische Straßengüterverkehr im vorigen Jahr wieder Rückgänge. Insgesamt wurden 2012 bei 25,4 Mio. beladenen Fahrten 333,91 Mio. t bewegt. Das entspricht einem Rückgang des Transportvolumens um rund 3,1 Prozent gegenüber 2011 (344,7 Mio. t). Davon entfielen 56,6 Prozent (89,1 Mio. t) auf gewerbliche Transporte, während 43,4 Prozent (144,8 Mio. t) im Werkverkehr transportiert wurden. Für Transportunternehmen liegt hier also noch viel Potenzial drin.

Auch die Transportleistungen entwickelten sich in allen Verkehrsbereichen rückläufig: Inlandsverkehr 14,1 Mrd. tkm (minus 2,5 Prozent), grenzüberschreitender Empfang 4,6 Mrd. tkm (minus 14,9 Prozent), Versand 4,8 Mrd. tkm (minus 16,8 Prozent), Transitverkehr 1,9 Mrd. tkm (minus 15,2 Prozent), sonstiger Auslandsverkehr 1,4 Mrd. tkm (minus 6,9 Prozent).



Güterverkehr Österreich in Prozent

(40), Tschechien (44), Slowakei (51) und Slowenien (34). EU-Neueinsteiger Kroatien rangiert auf Platz 42.
Teurer Standort

Binnenschifffahrt: Auf dem österr. Donau wurden Güter befördert im Vergleich zu

Austria Cargo 2012

Type of cargo-traffic	Mio tkms	%
National cargo traffic	14'100	53%
Import-traffic	4'600	17%
Export-traffic	4'800	18%
transit	1'900	7%
other intern. traffic	1'400	5%
Total	26'800	100%

LKW-Transportaufkommen Österreich

Gesamtaufkommen	Anteil in Prozent	2011 in Mio. t	2012 in Mio. t	Veränderung zum Vorjahr in Prozent
Inlandsverkehr	91,5	313,1	305,3	- 2,5
Import	3,4	12,7	11,3	- 11,1
Export	3,5	13,3	11,8	- 11,2
Transitverkehr	0,5	1,8	1,6	- 13,1
Sonstige Ausland	1,2	3,8	3,9	+ 2,7
Gesamt	100,0	344,7	333,9	- 3,1

Quelle: Statistik Austria

tkm = tons x km:
2 tons over 1'000 km = 2'000 tkm
200 tons over 10 km = 2'000 tkm

Holland

<i>Holland cargo traffic 2011</i>	in 1'000 tons			
Type of cargo-traffic	road	rail	Total Ktons	%
National cargo traffic	492'700	5'550	498'250	76%
International traffic	124'724	31'779	156'503	24%
Total	617'424	37'329	654'753	100%

inland shipping
344'095

source: CBS



Traffic jam on the A13

Germany

Beförderungsleistung nach Hauptverkehrsrelationen und Verkehrsträgern 2012						
Verkehrsträger	Einheit	Insgesamt	Davon			
			innerdeutscher Verkehr	grenzüberschreitender		Durchgangsverkehr
				Versand	Empfang	
Eisenbahn	Millionen Tkm	110'065	56'325	20'310	23'159	10'269
Binnenschifffahrt	Millionen Tkm	58'488	10'912	12'688	22'228	12'659
Straßenverkehr inländischer Lastkraftwagen ¹	Millionen Tkm	307'106	254'491	26'406	20'030	1'334
Summe	Millionen Tkm	475'659	321'728	59'404	65'417	24'262

Quelle: Statistisches Bundesamt (destatis.de) 1) Quelle: Kraftfahrt-Bundesamt (KBA), Flensburg.

Relative Beförderungsleistung nach Hauptverkehrsrelationen und Verkehrsträgern 2012						
Verkehrsträger	Einheit	Insgesamt	Davon			
			innerdeutscher Verkehr	grenzüberschreitender		Durchgangsverkehr
				Versand	Empfang	
Eisenbahn	Millionen Tkm	100%	51.2%	18.5%	21.0%	9.3%
Binnenschifffahrt	Millionen Tkm	100%	18.7%	21.7%	38.0%	21.6%
Straßenverkehr inländischer Lastkraftwagen ¹	Millionen Tkm	100%	82.9%	8.6%	6.5%	0.4%
Summe	Millionen Tkm	100%	67.6%	12.5%	13.8%	5.1%

Quelle: Statistisches Bundesamt (destatis.de) 1) Quelle: Kraftfahrt-Bundesamt (KBA), Flensburg.

83% of the total road transports in Germany, performed by german-owned trucks is inland transport.

Germany

Beförderte Güter und Beförderungsleistung 2011

Transported cargo in tons and tkms		Beförderte Güter	Beförderungsleistung	Durchschnittliche Wegelänge	
		Mill. t	Mrd. tkm	km	distance
Insgesamt	total	4 387	654	160	
Straßenverkehr ¹	road	3 406	469	138	
Eisenbahnverkehr	rail	375	113	302	
Seeverkehr	sea	293	X	X	
Binnenschifffahrt	inland shipping	222	55	248	
Rohrleitungen	pipelines	87	16	180	
Luftverkehr	air	4,5	1,5	332	

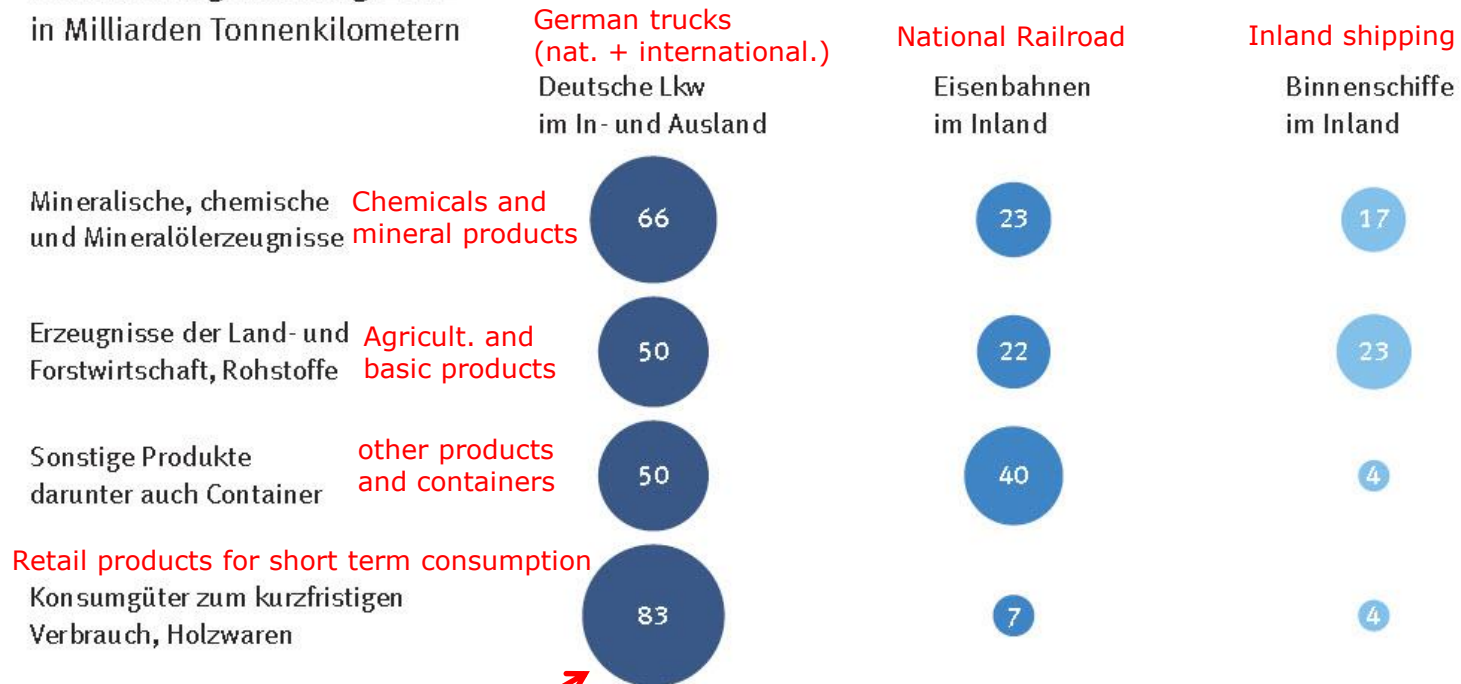
¹ Quelle: Mittelfristprognose, Intraplan.

Statistisches Bundesamt, Verkehr auf einen Blick, 2013

72% of all transports in Germany is done by road. Interesting is the fact that these transports on German roads only had an average german distance of **138** km

Germany

Beförderungsleistung 2011 in Milliarden Tonnenkilometern



Quelle: Kraftfahrt-Bundesamt.

Statistisches Bundesamt, Verkehr auf einen Blick, 2013

The largest share of the road transports in Germany consists of daily consumer products

National Swiss Cargo Volume

In Switzerland 2/3 of the total transported cargo-volume is national transported cargo (19'543 mio tonkm*).

From this national transported cargo;



74% is transported on the road

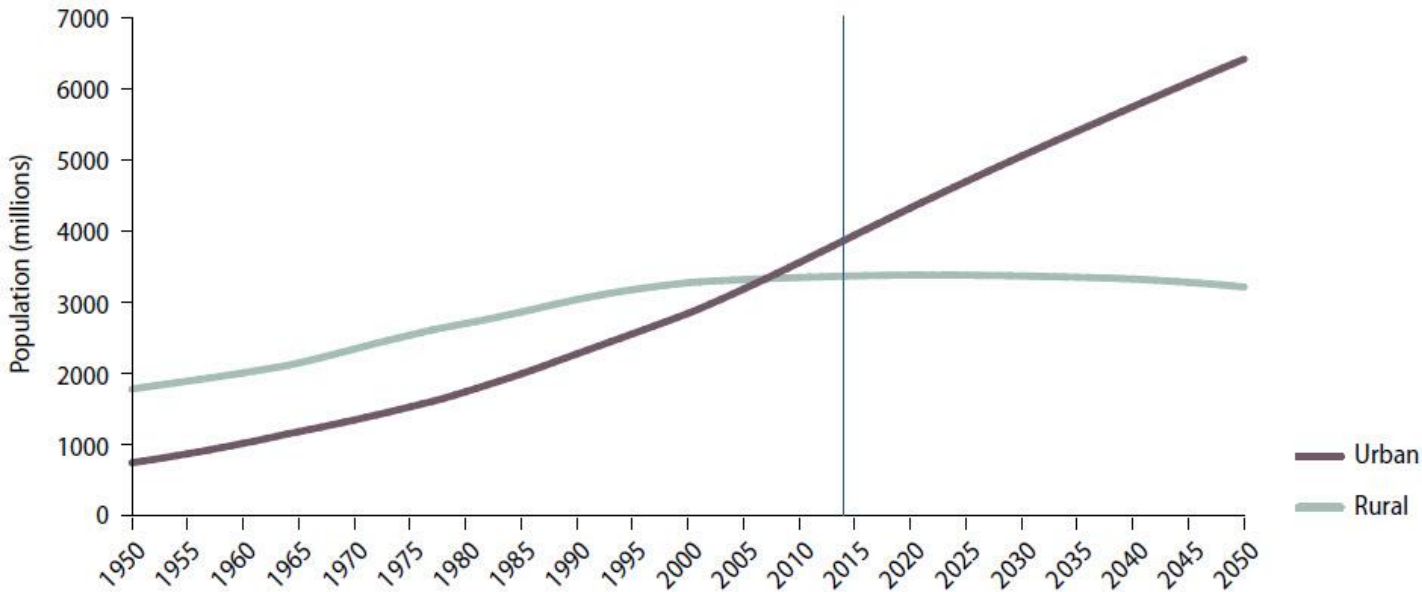
26% is transported by rail

(*transit /imp-export= 11'446 mio tonkm: 40% by road / 60% by rail)

Megatrend Urbanisation

Figure 2.
Urban and rural population of the world, 1950–2050

A majority of the world's population lives in urban areas

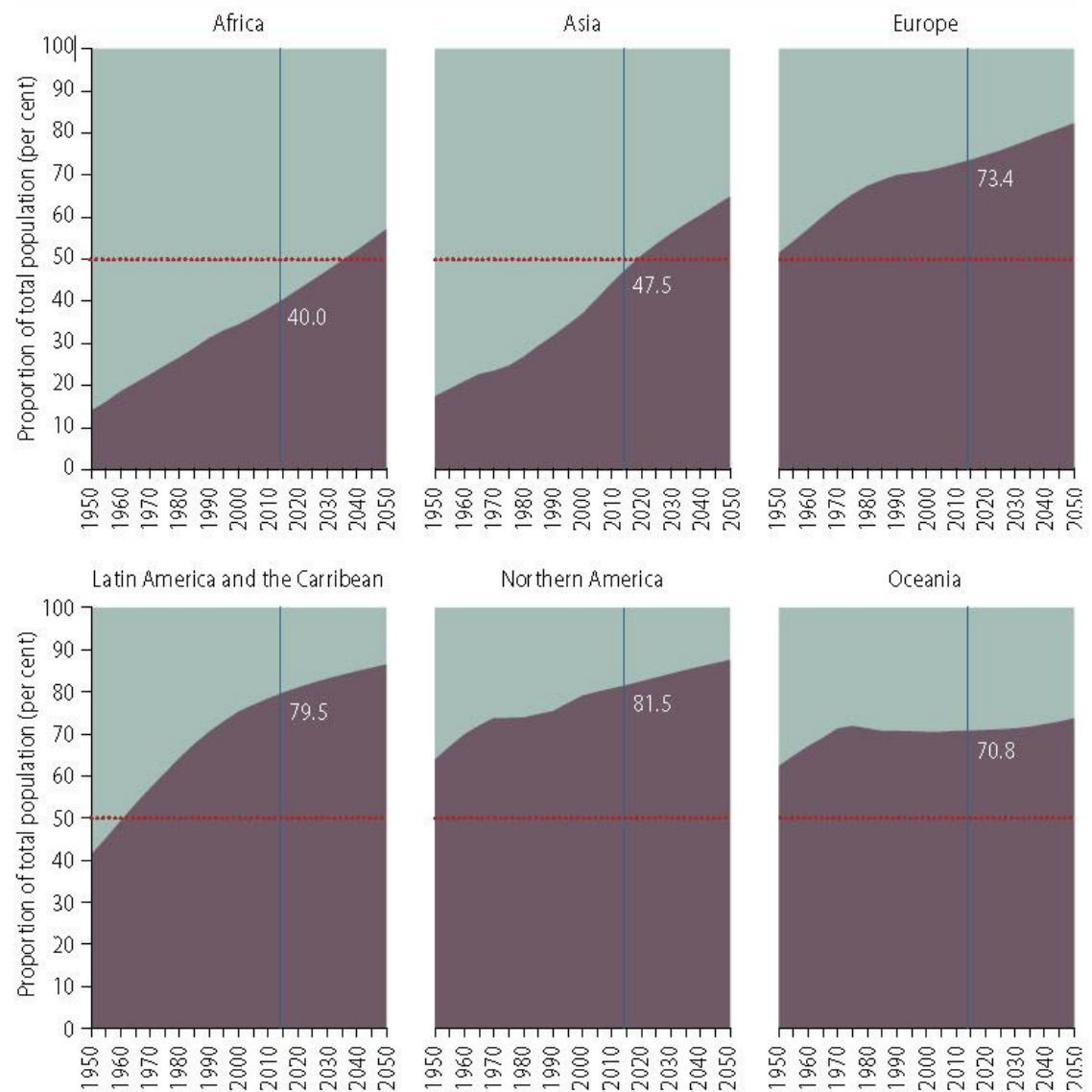


Quelle: UN Department of Economic and Social Affairs

Megatrend Urbanisation

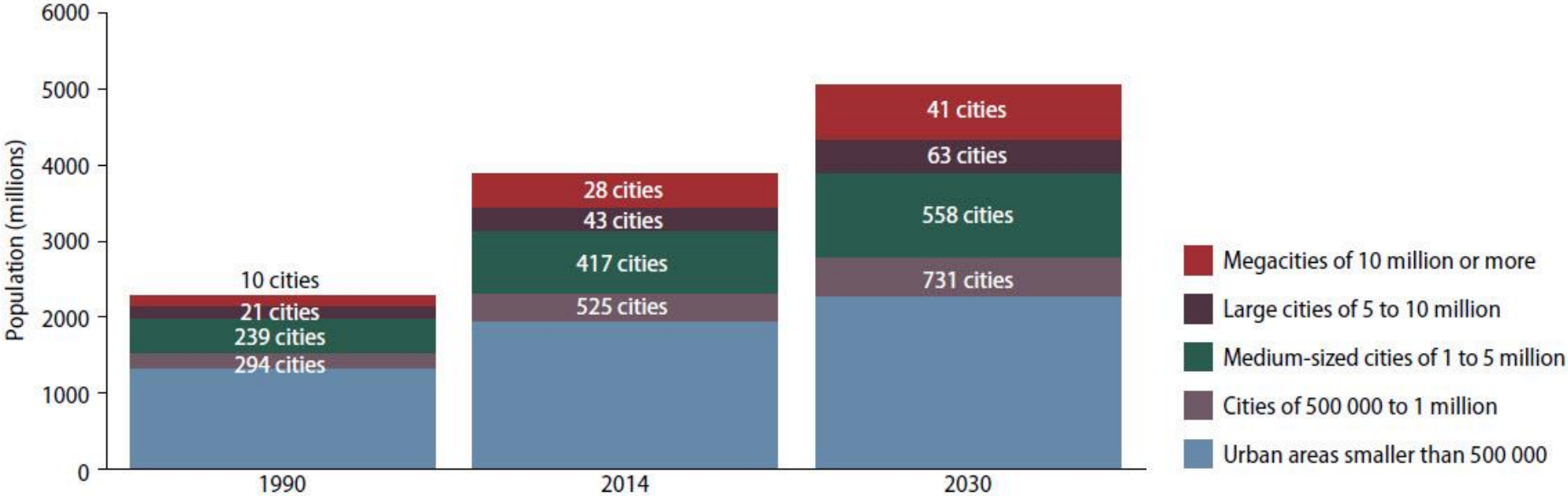
Urbanization has occurred in all major areas, yet Africa and Asia remain mostly rural

Figure 3. Urban and rural population as proportion of total population, by major areas, 1950–2050



Megatrend Urbanisation Megacities

Figure 8.
Global urban population growth is propelled by the growth of cities of all sizes



source: UN Department of Economic and Social Affairs,

today's Combined Transport road/rail



today's Combined Transport road/rail

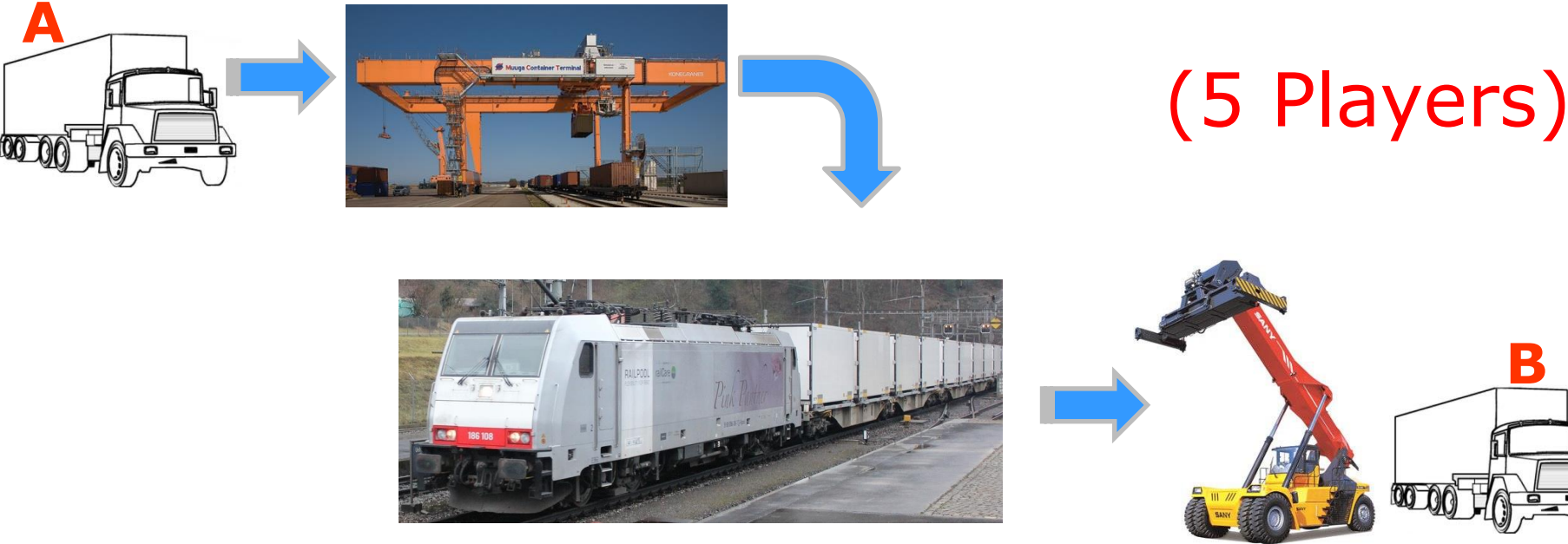


Combined Transport road/rail versus direct road

Road transport A to B:



Transport chain combined transport A to B:



Costs: The basic comparison : road versus rail

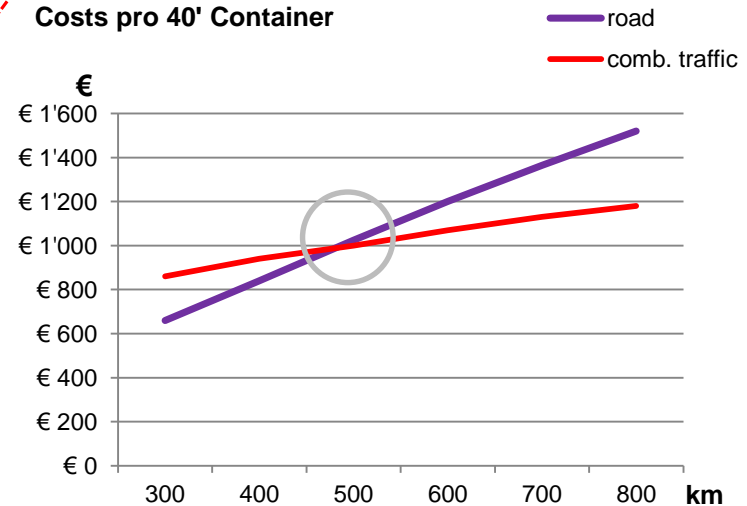
A 40' container per road or per intermodal-transport ? :

km	pre haul	tranship- ment	rail transport	shunting	tranship- ment	after haul	total
100	€ 200	€ 30	€ 150	€ 40	€ 30	€ 200	€ 650
200	€ 200	€ 30	€ 260	€ 40	€ 30	€ 200	€ 760
300	€ 200	€ 30	€ 360	€ 40	€ 30	€ 200	€ 860
400	€ 200	€ 30	€ 440	€ 40	€ 30	€ 200	€ 940
500	€ 200	€ 30	€ 500	€ 40	€ 30	€ 200	€ 1'000
600	€ 200	€ 30	€ 570	€ 40	€ 30	€ 200	€ 1'070
700	€ 200	€ 30	€ 630	€ 40	€ 30	€ 200	€ 1'130
800	€ 200	€ 30	€ 680	€ 40	€ 30	€ 200	€ 1'180
900	€ 200	€ 30	€ 720	€ 40	€ 30	€ 200	€ 1'220
1000	€ 200	€ 30	€ 750	€ 40	€ 30	€ 200	€ 1'250



km	road	comb. traffic
100	€ 240	€ 650
200	€ 460	€ 760
300	€ 660	€ 860
400	€ 840	€ 940
500	€ 1'025	€ 1'000
600	€ 1'200	€ 1'070
700	€ 1'365	€ 1'130
800	€ 1'520	€ 1'180
900	€ 1'665	€ 1'220
1000	€ 1'800	€ 1'250

Costs pro 40' Container



Dogma on Combined Transport

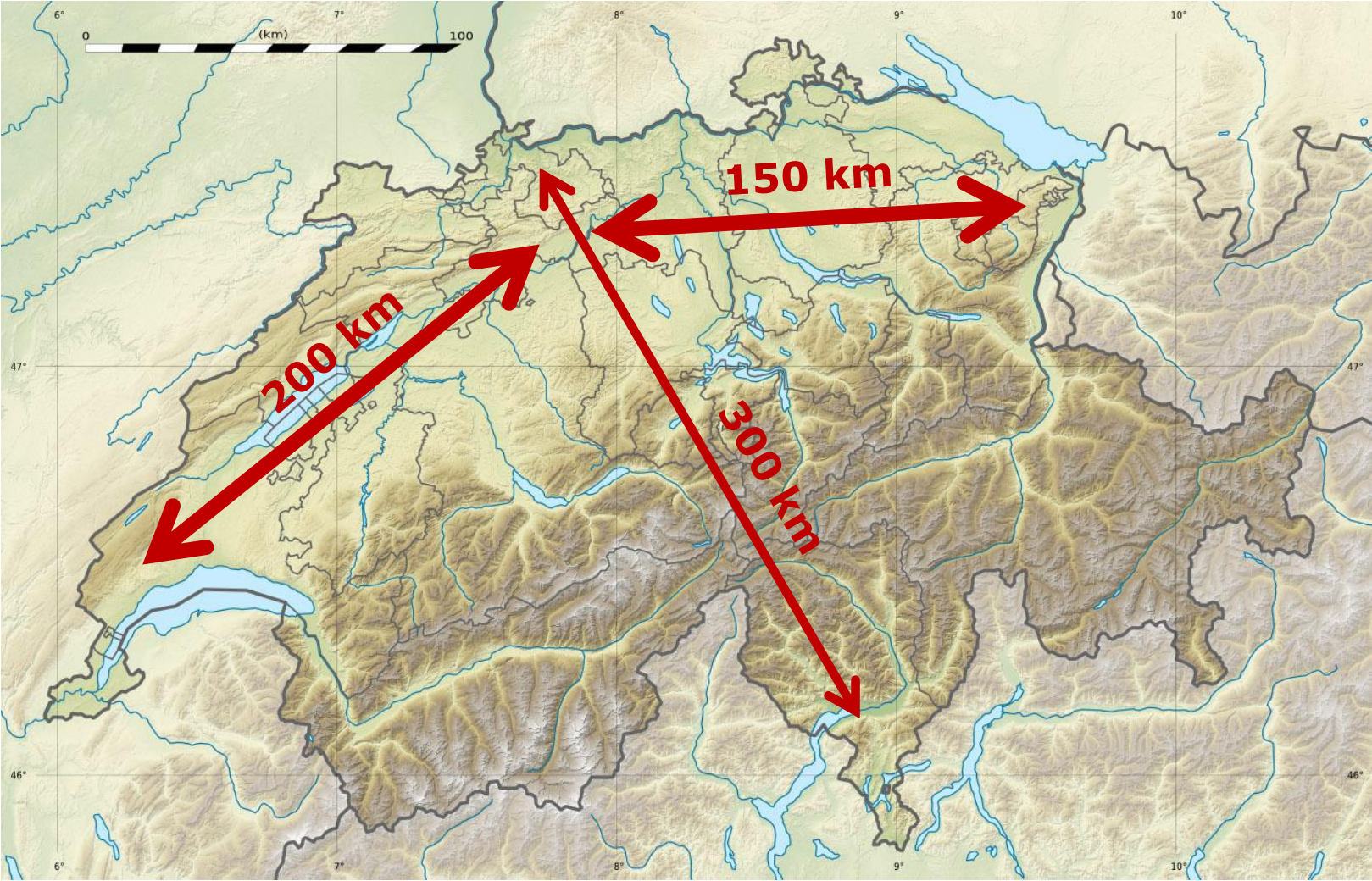
„Combined Transport Road/Rail only makes sense on distances over 500km“

This assumption stems from the 1970-ties, when combined transports with sea-containers and trailers (Huckepack) started.

From this moment on, this assumption has been in the heads of many (EU)-politicians.

The question is: Is this assumption still valid ?

Main transport routes in Switzerland (national traffic)



- 1 APPENZEL (RHODES-EXTÉR.)
- 2 APPENZEL (RHODES-INTÉR.)
- 3 BÂLE-VILLE
- 4 BÂLE-CAMPAGNE
- 5 BERNE
- 6 UNTERWALD (NIDWALD)
- 7 UNTERWALD (OBWALD)
- 8 SOLEURE
- 9 SCHAFFHOUSE
- 10 THURGOVIE
- 11 VAUD
- 12 Zoug



Description of a problem

daily traffic jams:

- West-East : A1 Geneva- Bern – Zürich / Zürich – St Gallen
- North – South: A2 Basel- Gotthard Highway Tunnel-Chiasso

At the same time, the Industry needs reliable logistics ...

- Wholesalers : COOP / Migros / Lidl / Aldi / Spar
- Food suppliers: Heineken / Feldschlössen / Nestlé / Coca Cola
- Postal Services (Swiss Post): 400'000 parcels per day

... and high quality transports:

- Within 2 – 6 hours
- Fixed distribution patterns
- Temperature controlled

Trying to solve the problem

- ✓ on short distances, costs of rail transport are not really the problem

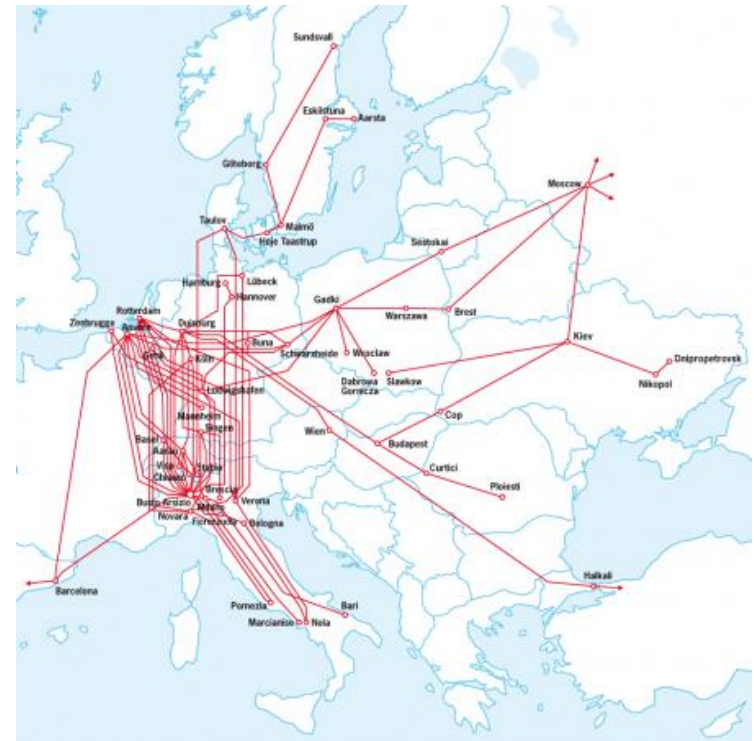
km	pre haul	tranship- ment	rail transport	shunting	tranship- ment	after haul	total	% rail transport	% other costs
100	€ 200	€ 30	€ 150	€ 40	€ 30	€ 200	€ 650	23%	77%
200	€ 200	€ 30	€ 260	€ 40	€ 30	€ 200	€ 760	34%	66%
300	€ 200	€ 30	€ 360	€ 40	€ 30	€ 200	€ 860	42%	58%
400	€ 200	€ 30	€ 440	€ 40	€ 30	€ 200	€ 940	47%	53%
500	€ 200	€ 30	€ 500	€ 40	€ 30	€ 200	€ 1'000	50%	50%
600	€ 200	€ 30	€ 570	€ 40	€ 30	€ 200	€ 1'070	53%	47%
700	€ 200	€ 30	€ 630	€ 40	€ 30	€ 200	€ 1'130	56%	44%
800	€ 200	€ 30	€ 680	€ 40	€ 30	€ 200	€ 1'180	58%	42%
900	€ 200	€ 30	€ 720	€ 40	€ 30	€ 200	€ 1'220	59%	41%
1000	€ 200	€ 30	€ 750	€ 40	€ 30	€ 200	€ 1'250	60%	40%

- ✓ on short distances, the “other costs” are the problem,
- ✓ so we have to look at pre-haul, shunting and transhipments

5 ascertainments

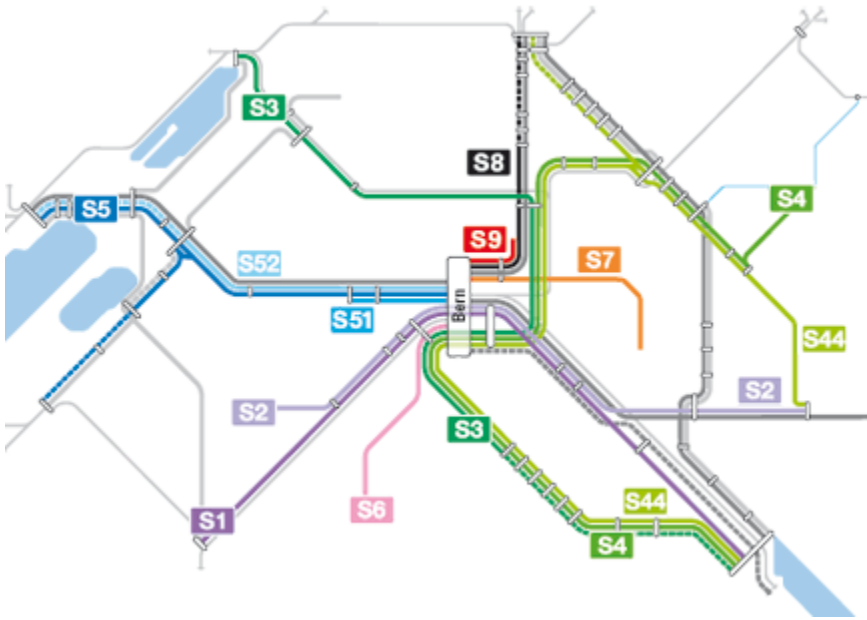
1. The combined transport road/rail has developed well in Europe on long distances and from ports. The typical appearance is „mass production“: big Terminals, heavy trains on long distances (ship on wheels)
2. This “mass production” works well where transport volumes are big (see ports and big industries) and big areas for big terminals are available.
3. Volumes on short distances, especially in urbanised areas are very big (supermarket and shop distribution)
4. Traffic jams in the urbanised areas are getting worse by the day, also adding to the environmental problems
5. In highly urbanised areas, there isn't much room for big container terminals

Hupac network



our example

- ✓ Every day, in highly populated areas around the world, well organized passenger commuter train systems bring hundreds of thousands of people punctually to their work places in an ecologically sound and safe way.



- ✓ No transshipment costs
- ✓ very low costs of the last mile (by foot, tram bike)
- ✓ No costs calculated ...



innova*train*

easy cargo moving

It must be possible to deliver goods by cargo train into these same urban areas, with the same efficiency and effectiveness, over the same short distances.

But how can this be done ?

A first attempt: what again was the problem ?

- ✓ on short distances, costs of rail transport are not really the problem

km	pre haul	tranship- ment	rail transport	shunting	tranship- ment	after haul	total	% rail transport	% other costs
100	€ 200	€ 30	€ 150	€ 40	€ 30	€ 200	€ 650	23%	77%
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1000	€ 200	€ 30	€ 750	€ 40	€ 30	€ 200	€ 1'250	60%	40%

- ✓ on short distances, the “other costs” are the problem,
- ✓ so we have to look at **pre-haul**, **shunting** and **transhipments**


Transshipment and last mile



- ✓ How can we lower the cost of the last mile ?
 - to lower the trucking cost per km is a mission impossible, but
 - *you can try to lower the trucking distance*
- ✓ How can we simplify the transshipment of containers , making it smaller, smarter faster, and cheaper ?



Mayor Player : CH-retail-company: **coop**-group

- ✓ COOP is the largest retail and wholesale company in Switzerland (2013: 28 bld CHF turnover, 1'933 sales points)
- ✓ In 2008 COOP decided on their strategy to become a CO₂ neutral company latest per 2023 (reduction of 50% on the 2008 CO₂ level which can be affected by COOP)
- ✓ As transports to regional distribution centres are already done by rail, good potential for an ***additional shift to rail was to be found with the transports to the final shops.***
- ✓ However, as the final points of sale lacked appropriate railway sidings, solutions using combined transport rail-road had to be found.
- ✓ COOP had had some first experience with a new service from a small private company railCare 

Mayor Player : CH-retail-company: **coop**-group

- ✓ The pioneer developments of railCare, who used an earlier form of direct horizontal transshipment of containers instead of cranes or reach stackers. This was the key to the transfer of the final shop-distribution to the rail.
- ✓ As railCare was using an old system for the horizontal transfer, for which you needed specially designed swap bodies. They asked the Innovatrain if we could find a solution to horizontally transfer standard swap bodies and standard ISO-containers between truck and railway wagon.
- ✓ 2010 COOP bought railCare ltd in order to be able to implement the new logistical strategy. This was the start of a very fruitful cooperation between railCare and Innovatrain for the development, testing and improvement of a new technique.



Our first innovations

Solution 1: horizontal transfer system by the truck itself:

The development of a simple, but robust horizontal transfer system for swap bodies and 20 foot containers which has low costs also at low volumes.



ContainerMover 3000 for standard 20' container and standard swap bodies

ContainerMover-3000®



Our first innovations

The **ContainerMover-3000®** ;

- ✓ Is compatible with standard 20 foot containers and swap bodies (C715, C745, C782)
- ✓ can be used at all locations and can be easily transferred between locations
- ✓ no costly infrastructure, just a simple railway siding and an asphalted road surface
- ✓ compatible with normal standard container wagons
- ✓ easy to control by the truck driver himself, using a remote control
- ✓ can be used for a wide range of containers and therefore products, e.g. fresh consumer products, frozen and deep-frozen products, bulk & liquid products, industrial products, timber

As the recently introduced trains in Switzerland show, real solutions for City-Logistics and wholesale distribution logistics, without the use of expensive container terminals, are now within practical reach.

Instead of € 30.- , a container-move now costs less than € 15.-

Our first innovations

► Small and narrow infrastructure in urban regions

The containermover is able to perform on narrow infrastructures. In most cases, the available local industrial railway sidings are already sufficient.

On the other hand, the local operation and shunting of the train can be time consuming and costly, due to the fact that you need to change the loco and operate with 2 persons.

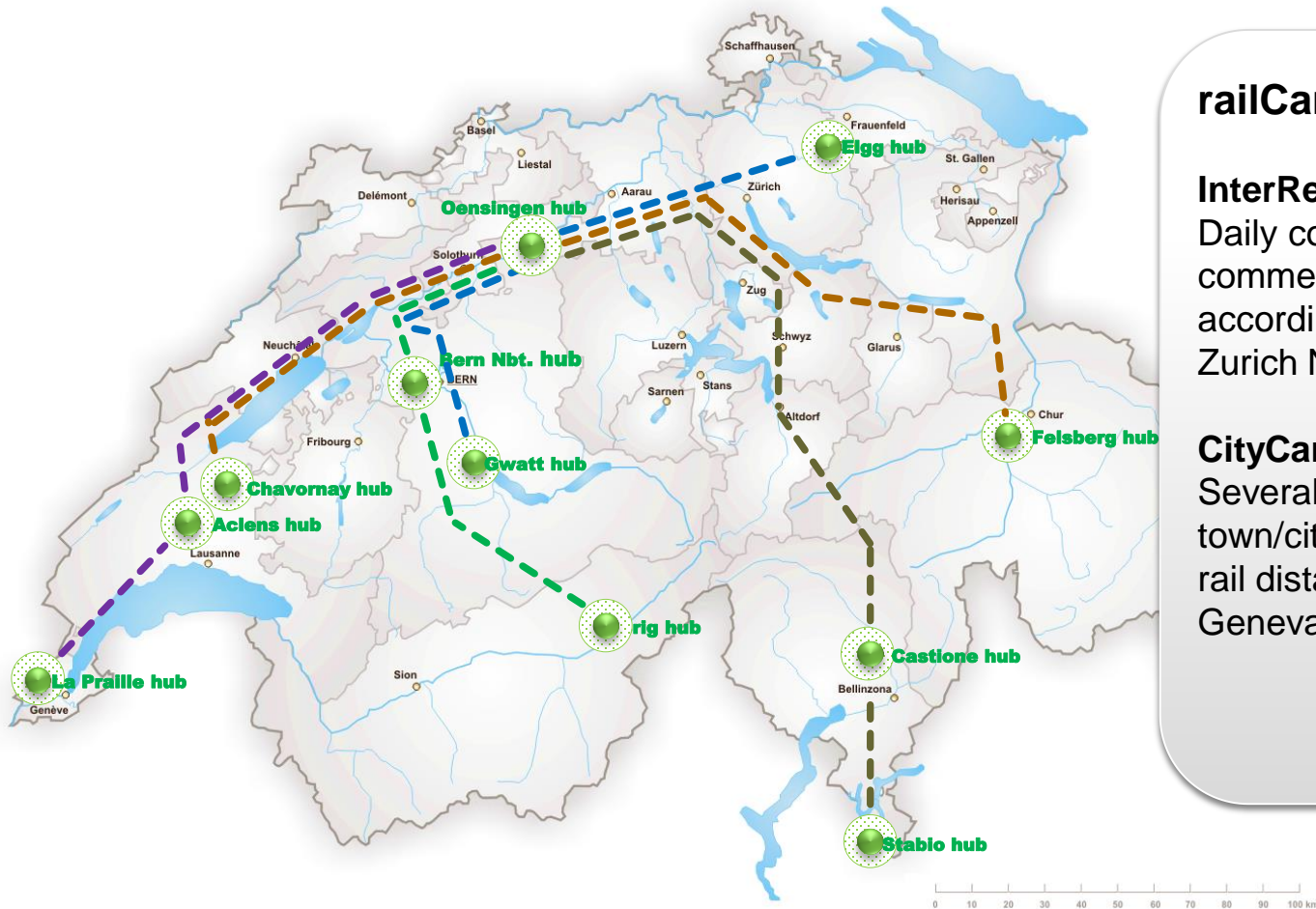


First customers of Innovatrain

railCare



The logistical network of railCare in Switzerland



railCare products

InterRegioCargo trains

Daily connections between commercial centres according to timetable, e.g. Zurich North – Lausanne

CityCargo trains

Several connections to a town/city per day over short rail distances, e.g. Aclens – Geneva 3x daily

Example: City Cargo Geneva

Versorgung für Genf

Vom Rail-Care-Terminal Aclens via Genf-La Praille werden 42 Verkaufsstellen beliefert.

Aclens (Lausanne) <-> Geneva : 69 Km
- 3 fast shuttle trains per day
- capacity: 90 containers per day

Karte der
Rail-Care-Terminals
der Schweiz

Genf

Genf-La Praille

Oensingen

Bern

Gwatt

Chavornay

Aclens

Genf-La Praille

Brig

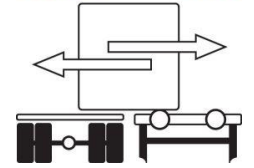
Rail-Care-Terminal

Verkaufsstelle

So funktioniert
der Warentransport
mit Rail Care

City Cargo Geneva

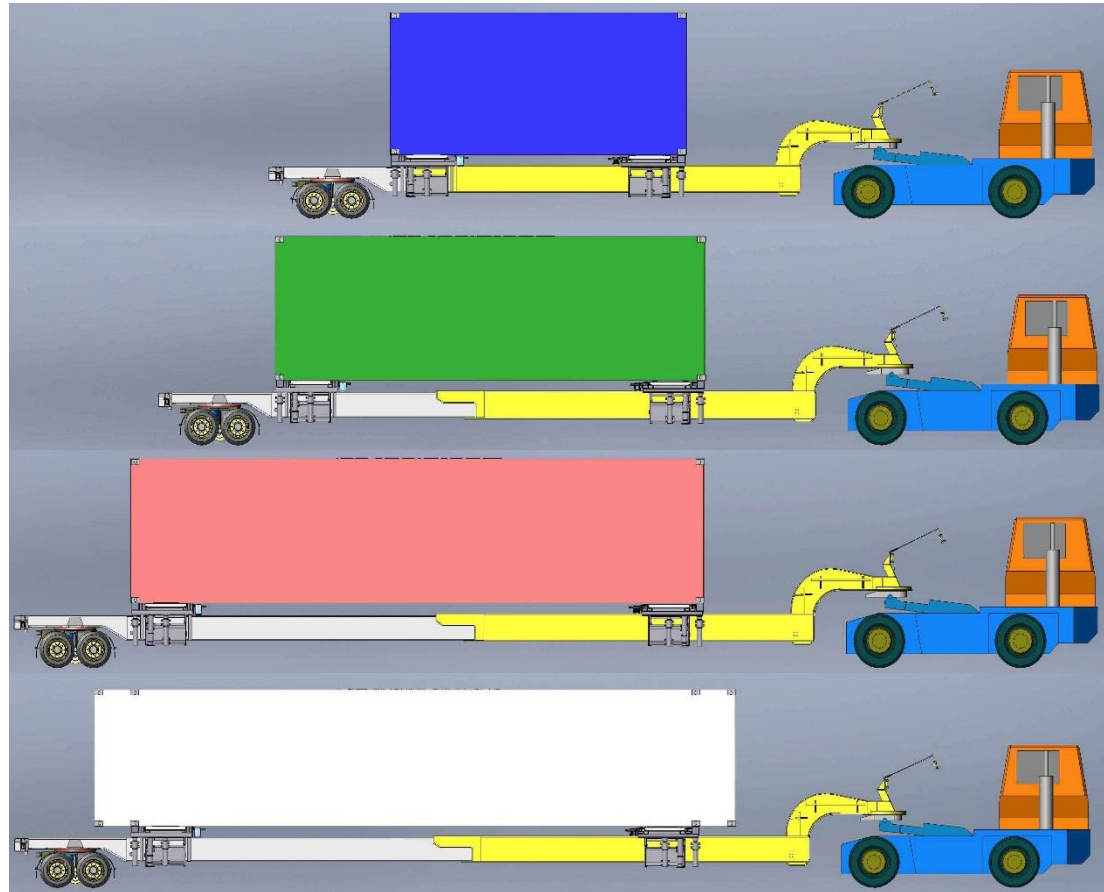


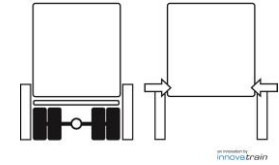


New developments: ContainerMover

- Horizontal transfer for 20 – 45 foot containers and 13.60m SB

Ready in
the spring
of 2016





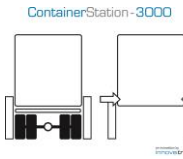
New developments: ContainerStation 3000

**EU swap bodies:
Putting a swap body
on ist legs in the old way:**



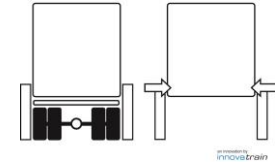
**The new way:
With the ContainerStation:**





New developments: ContainerStation 3000





New developments: ContainerStation 3000

What is the idea:

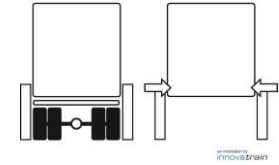
For our mayor client COOP, its just a matter of time. With the Container Station, the loading up of a swap body on a HGV just takes 3 minutes. Taking up two swap bodies by at the same moment is done in 5 minutes.

ISO Containers don't have any legs, and can also be heavy (32 tons). When the container is on the truck, you are dependent on a crane or reach stacker to get it off. At the delivery point (loading-bay), the container blocks the HGV or the trailer. It needs to stay there until the container is (un)loaded.

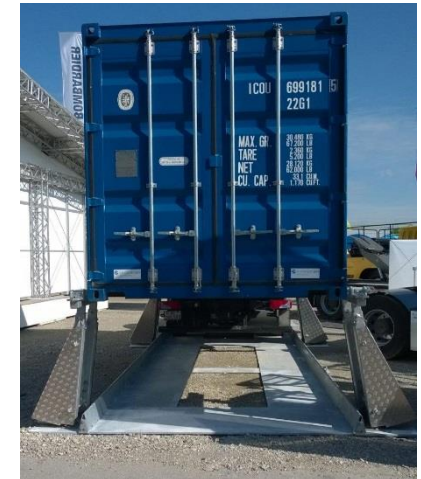


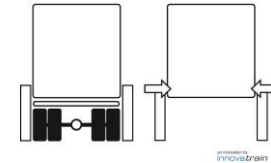
ContainerStation 3000

ContainerStation -3000



➤ First efforts for the ISO Containers 2014:

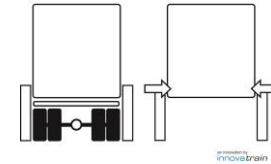




New developments: ContainerStation 3000

requirements to the Container Station:

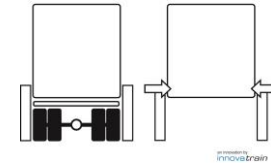
- ✓ Accessible for any truck with normal pneumatic suspension (adjustable)
- ✓ High stability up to 35 tonnes container weight
- ✓ Easy positioning of the container due to horizontally and vertically adjustable support heads on the supporting legs
- ✓ Special designed guiderails which are gentle to the truck tyres
- ✓ Very robust construction
- ✓ Affordable



ContainerStation 3000

- **Newest Prototype for Container Station 3020/3040:**
 - **20 or 40/45 Foot 35 tons capacity**





ContainerStation 3000



The ContainerStation 3020/3040 will be available in the beginning of 2016

Thank you very much

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Innovative technology for smart rail freight logistics

