
# INTERMODAL SOLUTIONS FOR TRANSALPINE FREIGHT TRAFFIC

*Results of the European project TRANSITECTS*
*Transalpine Transport Architects*

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The TRANSITECTS project is being carried out within the framework of the Alpine Space Programme – European Territorial Cooperation 2007-2013 (INTERREG IV B) and funded by the European Regional Development Fund (ERDF) and national co-financing.

# Table of ConTenTs

# foreword

Sustainable and balanced economic growth requires accessible locations as well as mobility of goods and people. Consequently, transport and mobility are a main basis for development and wealth of regions. But, from an ecological point of view, due to its emissions and noise pollution, transport has a negative side. Therefore the task is to design environmental friendly solutions to mitigate negative effects of continuously rising transport volumes for environment, economy and quality of life. In this context „green logistics" currently is on everyone's lips. This approach represents one important element to achieve the EU 2020 goals of smart, sustainable and comprehensive growth. Economy and politics therewith respond to severe environmental objectives and rising oil prices.

Source: IPG

A sustainable transport organisation is one important action field to implement green solutions. How can we organise transports more efficiently and therewith environmentally friendly? How can we shorten distances and optimally use intermodal transport? These are important questions which also the European project TRANSITECTS dealt with. By improving rail services for combined transport and optimizing intermodal nodes, it supported the modal shift in favour of the railway system.

Particularly in the Alpine Space, the geographical focus of TRANSITECTS, green alternatives to the road are urgently needed: the region is at the same time a transit-area and an obstacle in the European transport network. Continuously growing transport volumes concentrate on the few existing alpine passes – accompanied by the related problems as e. g. environmental damages, reduced safety, high economic losses.

As the Alps are situated in the centre of the European Transport System and crossed by several corridors and priority projects, capacity bottlenecks in the Alps concern a large number of countries and regions. Organising innovative transport solutions therefore requires cooperation between all affected regions - especially with traffic flows becoming increasingly complex. In TRANSITECTS German, Austrian, Italian and Slovenian partners worked together to develop and realise long-lasting alternatives to the road.

Based on the formerly mentioned tight correlations between transport, economic growth and quality of life, TRANSITECTS did not only develop technical solutions. It also gave impulses for a sustainable territorial development in the Alpine Space. Thus it has taken some small steps forward in order to implement EU transport policy and territorial cohesion aims.

Let us get on with it.

Yours,

Christian Huttenloher

Secretary General of the German Association for Housing, Urban and Spatial Development, representing the Lead Partner of the project TRANSITECTS.

Source: IPG

# InTroduCTIon

This document summarises the main results of the project TRANSITECTS.

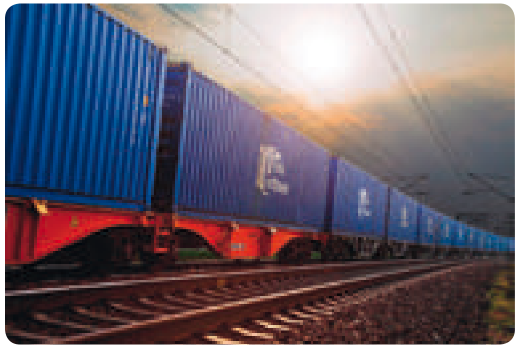
TRANSITECTS is a European project aiming at developing and implementing attractive rail products and systems to disburden traffic bottlenecks in the Alps and to mitigate related negative effects of traffic. To implement the shift from road to rail related traffic TRANSITECTS creates sustainable intermodal solutions to fit changing markets - especially combined transport products for transalpine freight traffic. Furthermore, the project supports the development of intermodal nodes and proactively fosters the railway system.

TRANSITECTS started in July 2009, with a run-time of three years. The project budget is 3.2 million Euro. The project is being carried out within the framework of the Alpine Space Programme – European Territorial Cooperation 2007-2013 (INTERREG IV B) and funded by the European Regional Development Fund (ERDF) and national co-financing.

16 partners from four countries (Austria, Germany, Italy, and Slovenia) are collaborating in a transnational network. Cooperating national Ministries are the Italian Ministry of Environment, Sea and Land Protection as well as the Austrian and Slovenian Ministries for Transport. Regional partners are Carinthia, Salzburg, Tyrol, Berlin Brandenburg, Donau-Iller, Stuttgart, Friuli Venezia Giulia, Lombardy and Veneto, further partners representing research institutions, agencies, chambers of commerce or associations are the European Academy of Bolzano, the Agency of East Lombardy for Transports and Logistics (A.L.O.T.), Veneto Chambers of Commerce and the German Association for Housing, Urban and Spatial Development. The Logistik-Kompetenz-Zentrum Prien has been involved as project- and financial manager.

This report is meant to give an overview on the results of TRANSITECTS. It mainly focuses on elaborated ideas about new transalpine train services, describing approaches and presenting different pilot connections in combined transport. Furthermore, the report provides an insight in the environmental model which has been elaborated to calculate the environmental benefit of these new train services. Not least, approaches in regard to the improvement of intermodal nodes and transalpine passes as well as networking activities with other projects are described. Finally, the interested reader finds an overview on available dissemination material.

# 1 absTraCT: whaT are The resulTs of TransITeCTs? (*)


Source: IPG

The Alpine Space contains several bottlenecks of the European transport network. As road traffic congestion is growing continuously and at a rapid pace, alternative means of transport are in urgent need of being strengthened. TRANSITECTS optimised the use of existing rail infrastructures and the efficiency of rail services in order to relieve the burden on the area, the people and the roads.

Administrative institutions, enterprises, an association and a research institute from Germany, Italy, Austria and Slovenia worked together pursuing a common aim: the optimization of transalpine rail capacities.

During the three-year runtime, numerous measures have been developed:

The partners elaborated traffic-studies for selected transport-relations. Most of them refer to transalpine connections, a few to selected long-distance connections running from the Baltic to the Adriatic Sea and offering alternative routings through Upper Austria or Hungary.

Furthermore, an evaluation-study of transhipment technologies has been worked out. This study underlined that the accompanied combined transport (RoLa) as well as unaccompanied combined transport are very suitable variants of combined transport, which was one main starting point for the pilot projects.

The main content of TRANSITECTS has been the development of additional transalpine train services for combined transport. At the end of the project the status of the processed pilot projects is different: The output reaches from feasibility studies via implementable concepts to signed declarations of intent or initiative test-trains.

In any case, the development of new train connections went along with the establishment of new contacts between public authorities and train operators respectively potential clients - not least this is a basis for a sustainable planning of future transport infrastructures. Furthermore, in some cases, existing infrastructures could be reactivated alongside the development of a new train service (e. g. in Landsberg am Lech).

* *the results presented in this chapter have been compiled and formulated by the lead partner of the project "German association for Housing, Urban and spatial Development".*



A main aspect when convincing operators or clients to implement the proposed concepts is the environmental benefit provided by the new services. An environmental model, developed in TRANSITECTS is able to calculate the potential reduction of emissions by comparing road and train related emissions. Given the availability of data, it can be adapted for any possible connection.

Apart from that, TRANSITECTS designed innovative concepts that aim to improve the functionality of intermodal nodes. In case of the Premium Dry Port-concept for Villach-Fürnitz a declaration of intent concerning the implementation of this innovative idea has already been signed by the Carinthian hub and all NAPA-ports.

Additionally TRANSITECTS implemented some "soft measures". Firstly, the project strengthened cooperation networks across borders: among TRANSITECTS partners who are willing to proceed with cooperation e. g. in a new project; but also beyond the project, involving other projects and initiatives – also from other programme regions. Secondly, TRANSITECTS contributed to enhance attention for the necessity to implement a shift to the railway system. For this purpose, communication and dissemination activities – e. g. in the frame of the international fair "Transport Logistik" in Munich or the Symposium "Logistik Innovativ" in Prien am Chiemsee have been launched.

The achieved results are summarised in this report. Readers who are interested in more detailed information concerning the presented outputs are kindly requested to consult either the TRANSITECTS website – www.transitects.org – or the responsible project partners.

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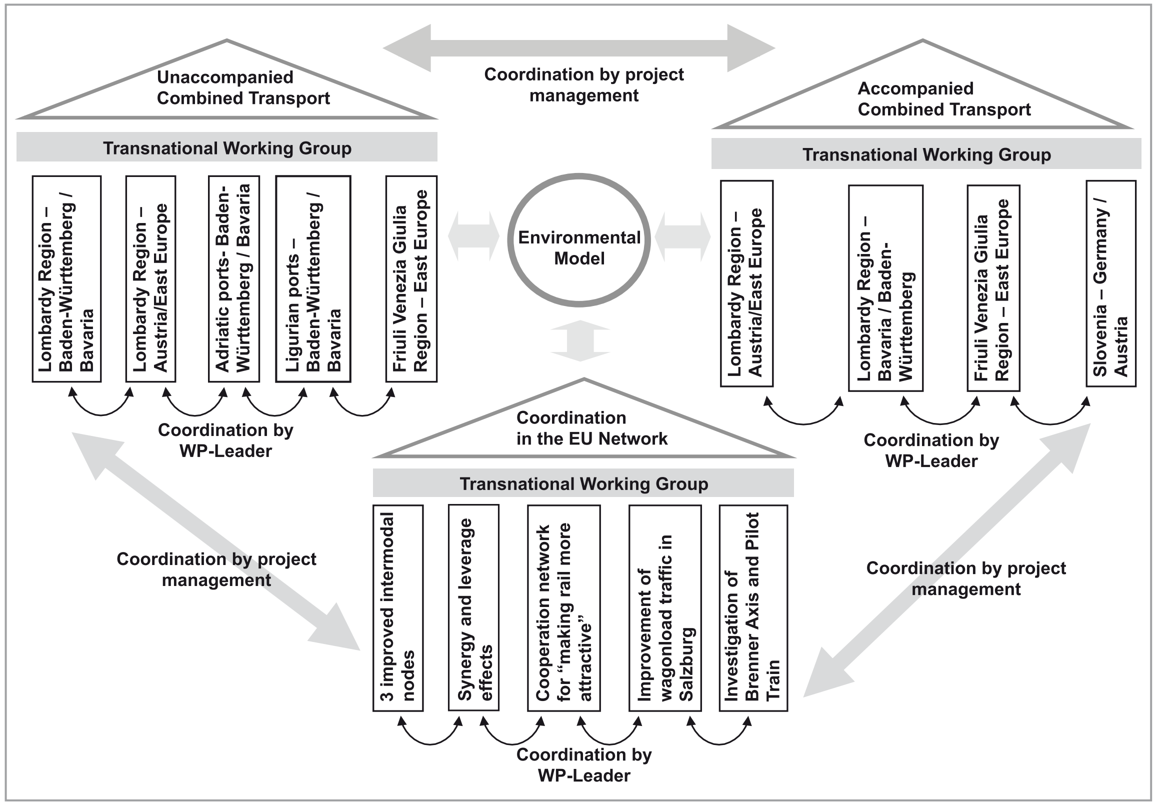
# 2 ProjeCT organIzaTIon and managemenT (*)

TRANSITECTS is a transnational project. 16 partners are working together to implement a couple of measures. A smooth organization structure is essential to realize project goals. Therefore, the project was divided into work packages. Some of these work packages were dealing with content related issues – like the development of new train services, the creation of an environmental model or the improvement of nodes, passes or systems. Others focussed on organisational issues. One work package was dedicated to communication and dissemination.

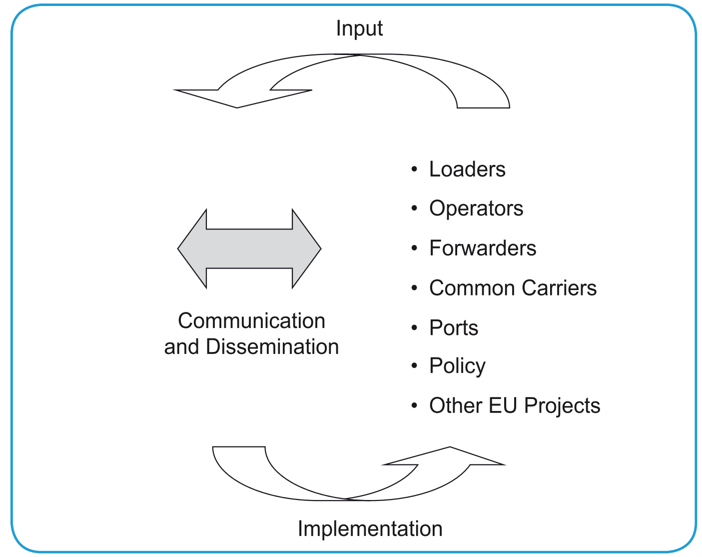
The coordination within each work packages was guaranteed by one partner who took over the responsibility. The coordination between work packages was assured by the project management team. The scheme below gives an idea about interlinkages and coordination structures within and between work packages.

To guarantee best possible external networking the project established close contacts to the market. Information from the market side has been used as an input for capacity optimisation and the development of specific services and measures. Furthermore, concepts and ideas have been intensively communicated to the market – as a basis for their future implementation.




**Organization structure of the TRANSITECTS project.**
Source: illustration by LKZ Prien 2009

* *this chapter has been compiled and written by the lead partner of the project “German association for Housing, Urban and spatial Development”.*




**external networking in TransITeCTs.**
Source: illustration by LKZ Prien 2009

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Source: Matthias Wagner

# 3 deveLoPIng CombIned TransPorT soluTIons (*)

## 3.1 Facing the Future alpine crossing transport – aims, approaches, methods

### 3.1.1 Problem statement

Since earlier times transport crossing the Alps has changed tremendously. The exchange of goods, persons and services was concentrated more and more to the main transport transit axes. The Alpine Space is reacting very sensitive to the influences of raising transport volumes crossing the Alps. The specific topographical and climatic situations in the narrow alpine valleys sharpen negative effects of traffic. The quality of life for people living along these corridors is suffering more and more from congestions, land consumption as well as air and noise pollution.

Based on different former projects raised under the framework of the Alpine Space Programme we know very well about the situations and conditions of alpine crossing transport. In whole Europe traffic is rising; especially growth in freight transport reached an enormous level. Although the global economic crisis caused a decrease of transport flows, the negative effects of freight traffic remain present. And almost all prognoses are assuming further growth in the future. Between 1994 and 2007 the transit volumes over the entire Alpine Arc almost doubled from 65 to 119 billion tonnes.[1] Roads crossing and heading the Alps are not able to fulfil the needs of growing transport demands.

The modal split is in favour of the road (e. g. 71% for 2007 on the Brenner Axis) which means that the majority of the existing traffic is still running on the road. Reasons for that are: the rail is not attractive enough, existing rail products are not suitable (wrong connection, wrong system) nor sufficient (no capacities), the intermodal system is not easily accessible and intermodal nodes with sufficient capacities are missing (e.g. fewer terminals in Southern Germany than in Northern Italy).

The different arguments mentioned in regard to the transport of goods crossing the Alps and brought into discussion by stakeholders show mainly the price as most important. After different bilateral meetings, workshops and conferences with stakeholders, loaders, shippers and forwarders organised within TRANSITECTS a clear picture of price-building processes in Alpine crossing transport can be drawn. Especially prices for road transport are often such low that railway transport hardly gets the chance to compete. Political pressure on road transport sector fostering pricing policies to cause shifts to rail does not exist in needed level.

*\ the contents presented in this chapter have been elaborated in work packages 4 and 5. Generally responsible for contents, illustrations and texts are the transitects project partners “regional association Donau-iller” (chapter 3.1-3.2) and “a.L.O.t. – agency for transport and Logistics of the east Lombardy region” (chapter 3.3-3.5). Project partners who elaborated the single pilot train concepts (see abbreviations in headlines) delivered substantial input concerning their trains.*

1 *http://www.zuerich-prozess.org*

## *different transport policies*

**switzerland** uses a distinct transport policy. It aims to have a long-lasting shift from road to rail with few, but effective instruments. Switzerland's target is to have a maximum possible amount of trucks transiting the country in North-South direction and vice versa shifted to rail transport. This is fixed in legal rights after referendum in 1994. Within those regulations the shifting policy regarding Alpine crossing transport uses the following instruments: New Alpine Crossing Railway Connections (called NEAT), Performance-related Heavy Vehicle Fee (HVF), liberalization of railway market and other control instruments and state aids.

The new Alpine crossing railway connections (called NEAT)(2) are linked directly to the target to reduce road transport and use the new possibilities to cross the Alps with almost flat tracks. Within the year 2011 the target for truck transit is levelled to one million trips. Two years after finalizing the works on Gotthard base tunnel this target will be fixed to 650,000 crossings. But the shift report for 2011 states that these targets cannot be achieved without additional actions. The current data claims 1.25 million truck trips for 2011.(3)

A second instrument is the performance-related Heavy Vehicle Fee (HVF).(4) This is a pricing system based on the "polluter pays principle". It is calculated on covered distances, possible maximum weight of truck and emissions. For instance a truck trip between Basel and Chiasso on the classic transit route, having a maximum tonnage of 40 tonnes and emissions category EURO 4, costs about 270 CHF/220 €.(5)

It can be concluded, that Switzerland's policy is fully oriented to achieve sustainable shifts from road rail. From the forwarders' point of view transport via Switzerland is more cost-intensive compared to the routing via Austria.

**austria** as the other major transit state in the Alpine Arc is dealing with similar problems but with different instruments. Their main axis is the Brenner route. Especially in the Province of Tyrol, the valley of the river Inn between Rosenheim and Innsbruck, suffers highly under raising freight transit amounts. Due to the more prohibitive Swiss shifting policy many road shippers are doing a detour via Brenner in order to maintain costs on a low level.Respecting European rights for non-discriminating market access, highly prohibitive regulations are not implemented in Austria. For the Austrian Federal Ministry for Transport, Innovation and Technology and the Province of Tyrol shifting transport from road to rail is one of the most important political targets. Therefore transport-political instruments with numerous financial, fiscal and regulative measures as well as infrastructural improvements like the new railway tracks in the Inn valley and the Brenner Base Tunnel support these efforts to achieve traffic shifts. Actions like the Sectoral Driving Ban(6) and supporting the ROLA (Rolling Road) cause concrete movements of freight transport to rail, but in 2009 about 68% of freights crossing Tyrol were transported on road.(7)

The case of Tyrol's Sectoral Driving Ban has been heard at the Court of Justice of the European Union. In December 2011 the judgement stated that the Sectoral Driving Ban is a limitation of free freight transport, but that those measures could be justifiable especially to succeed aims of environment protection. Attended with different measures, the Tyrolean Government supposes to relaunch this measure in the future.

Above all, the logistic market and the environmental sensitive Alpine Space will face following new challenges in the long term: The global growth of containers will spill over to the ports of the Adriatic (e.g. Koper) and Ligurian (e.g. Genoa) sea and the Alpine Space. Following different prognoses northern ports like Rotterdam or Hamburg will lack capacity in few years, therefore the relevance of southern ports as alternatives will grow fast. If no new attractive rail products are offered, the existing problems arising from the growth of freight traffic on the road will be sharpened strongly. This awareness is a result of the project AlpFRail(8) in which an approach for the shift from road to rail could be developed and a basis for cooperation and solutions could be created. But as the traffic volume is enormous and many different political and economic interests are represented, the need for further development of transnational measures as well as attractive and suitable intermodal services is clearly visible. In times of economic crisis like these, many companies find time to restructure their organisations and their logistics and will be open to innovative ideas and products. The market is waiting for suitable intermodal solutions. And freight traffic does not end at the borders of the Alpine Space, but is a long-running transport. Therefore transnational intermodal solutions that can be extended and joint to spaces and actions beyond the Alpine Space are necessary.

## *combined transport crossing the alps – objectives for transitects*

The project name "Transalpine Transport Architects" describes how the cooperation worked. As adumbrated above one of the main targets was to design common transnational intermodal solutions. Involved public institutions worked together to build "bridges" in order to improve transalpine transport. They acted as "architects".

Due to the fact that public institutions were working together in the project consortium, a high level of objectivity was granted in all activities. Public bodies are not driven by business management reasons, because they are not working as market players. They are able to plan independently and according to different specific market needs. So a high level of

*2 Further information: http://www.bav.admin.ch/alptransit/index.html?lang=de*

*3 http://www.bav.admin.ch/aktuell/00479/index.html?lang=de&msg-id=42735*

*4 Further information: http://www.ezv.admin.ch/zollinfo_firmen/steuern_abgaben/00379/index.html?lang=en*

*5 By the end of the year 2011*

*6 The Sectoral Driving Ban had forbid transports on the road besides others for the following goods: waste, soil, cutting, round timber, cork, flagstone, steel, iron and marble*

*7 Traffic report Tyrol 2009: http://www.tirol.gv.at/fileadmin/www.tirol.gv.at/themen/verkehr/verkehrsplanung/mobil/downloads/VB_09-Neu.pdf*

*8 www.alpfrail.com/*

neutrality was established. Public institutions as "architects" furthermore guarantee that besides economic interests also environmental aspects were considered, which is of crucial importance for sustainable solutions.

The focus of the project laid on making the Alpine crossing railway system more attractive, functional, reliable and accessible to all involved logistic market players. In this regard intermodal transport is a sustainable alternative to road transport and thereby it can help to mitigate the immense negative effects of freight traffic transiting the Alpine Arc.

The main target of TRANSITECTS was the development of concrete products for unaccompanied and accompanied combined transport.[9] As road infrastructure is not able to handle raising volumes of freight transport and people living in alpine valleys are suffering more and more under traffic, alternatives have to be designed. Through new innovative, sustainable and transnational solutions, attractiveness of intermodal Alpine crossing transport is fostered.

Within the project real goods flows created the framework for the development of new railway services. Furthermore specific market needs, e.g. cost-effectiveness and efficiency, were directly considered. As overall target concrete concepts for marketable services in unaccompanied and accompanied combined transport are developed and ready for realization by intermodal logistic market.

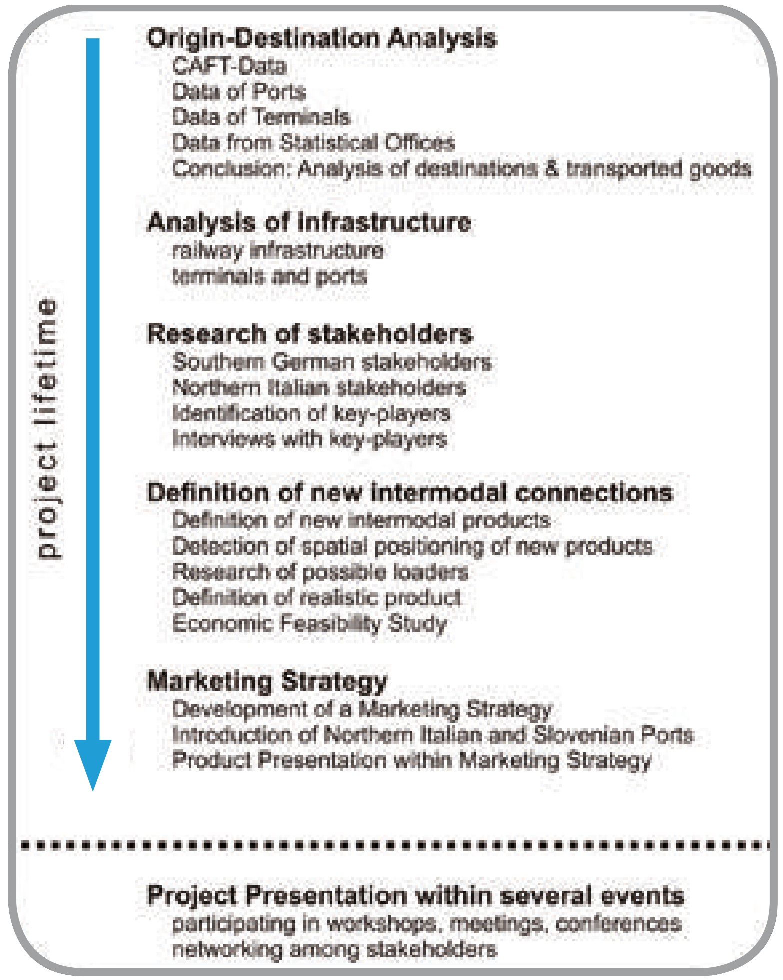
The main targets for TRANSITECTS are directly linked to the measures stated in the Alpine Convention. It says that sustainable national and European transport policies are to foster environmental friendly modes of transport, especially through transferring the increasing freight amounts to intermodal systems at economically bearable costs. Therefore these intermodal transport systems are to be supported aiming to shift long-running alpine-crossing transport to rail. By developing concrete intermodal products the project TRANSITECTS promoted this mode of transport as highly efficient and cost-effective alternative.



### 3.1.2 Creating pilot train connections – methods

Within work package 4 (WP4) concrete solutions for Unaccompanied Combined Transport and in work package 5 (WP5) new connections for Rolling Roads in Accompanied Combined Transport were elaborated. Due to almost similar concerns and requirements for management and working, a common structure was established by the work package leaders "Agency for Transport and Logistics of East Lombardy Region – A.L.O.T." (for WP5) and "Regional Association Donau-Iller – RVDI" (for WP4). This structure was used within the work frame of TRANSITECTS by the involved project partners.

**Common Working Structure for WP4 and WP5**




Source: own illustration, RVDI

As basis for all further surveys and elaborations an analysis of origin and destination of concrete freight amounts was done. Using the official CAFT-Data[9] no new data was collected by the project partnership. In addition to CAFT-Data, different databases that were available out of former transnational projects in the Alpine Space Programme have been used. Thereby the TRANSITECTS project cooperation focused a time- and money-saving working structure.

Another part in the frame of the working structure was the analysis of railway and terminal infrastructure. Especially capacity constraints and gaps in the network were investigated in order to gather information for planning of concrete and realistic routings for new intermodal products.

As two transport market areas exist, one south of the Alps in Upper Italy and Slovenia, the second north of the Alps in Southern Germany and Austria, these were considered as most interesting for the development of new intermodal services. Concrete transport flows investigated with the analysis of CAFT-Data verified the chosen market areas and therefore represented the background for possible start and end points of new intermodal connections. Then market analyses were carried out especially in these areas. Out of former studies, e.g. carried out during the project AlpFRail, and the identification of key-players the freight potential was estimated, not least with the help of numerous interviews with entrepreneurs and logistics market experts.

The concrete concepts for new intermodal connections were developed in the framework of pilot projects. Based on different interviews, workshops and meetings – often on a transnational level - with the logistic market key-players in the area of survey, concrete requirements and specifications could be defined. After identification of transport flows and real business connections, start and end points for intermodal trains have been fixed. These pilot projects are to offer intermodal solutions; especially in market niches without any existing cross-alpine train connection. For those pilot trains possible customers as well as interested carriers and intermodal operators were identified. An economic feasibility study including the defined market needs was elaborated. Depending on how promising these activities for concrete pilot train connections are, the project partners worked out further features e.g. concrete timetables or possible prices for the transport of intermodal units.

9 *Means "Cross Alpine Freight Transport", for further information compare next chapter*



The last step in the management structure for the work packages 4 and 5 was the elaboration of the possibilities for establishing the pilot project with its concrete intermodal train in cross-alpine transport market. Accompanying this, especially the Northern Italian and Slovenian ports were presented as alternatives to Northern Ports which will have lacking handling capacities in middle-term future. Detached from the project lifetime the activities around developing cross-alpine intermodal pilot trains were presented to the market within several workshops, meetings and conferences as well as with face-to-face contacts to key-players and networking.

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## 3.2 transalpine combined transports – basic conditions and status quo in alpine-crossing transport market

### 3.2.1 Infrastructure

TRANSITECTS did not aim at fostering the establishment of new infrastructures. Instead the project investigated existing infrastructures - especially the great alpine-crossing transport axes - in order to get a precise picture of capacities and routing options for the new intermodal connections. Nevertheless infrastructure constraints and planned developments were taken into consideration as they could influence future transport flows and capacities.

While the planning and construction for base tunnels on the most important Alpine crossings Lötschberg/Simplon, Gotthard, Brenner and Koralm are in progress or even finished partly, particularly the necessary improvement works on railway tracks approaching these main crossings are proceeding slowly. Next to infrastructure constraints in Alpine crossings also limitations concerning the access to Ligurian and Adriatic Ports have to be considered. Often financing for improving infrastructure projects is the main problem. The following overview shows the most significant infrastructure constraints found during the development of intermodal pilot projects:

| *location:* | *access to:* |
|---|---|
| Rheintalbahn (D) | Gotthard and Lötschberg/Simplon |
| Southern Access (CH/IT) | Gotthard |
| München-Kufstein (D) | Brenner |
| Verona-Bolzano-Fortezza (IT) | Brenner |
| Terzo Valico (IT) | Ligurian Ports |

**Infrastructure constraints regarding Alpine crossing transport.**
Source: own table, RVDI

Source: IPG

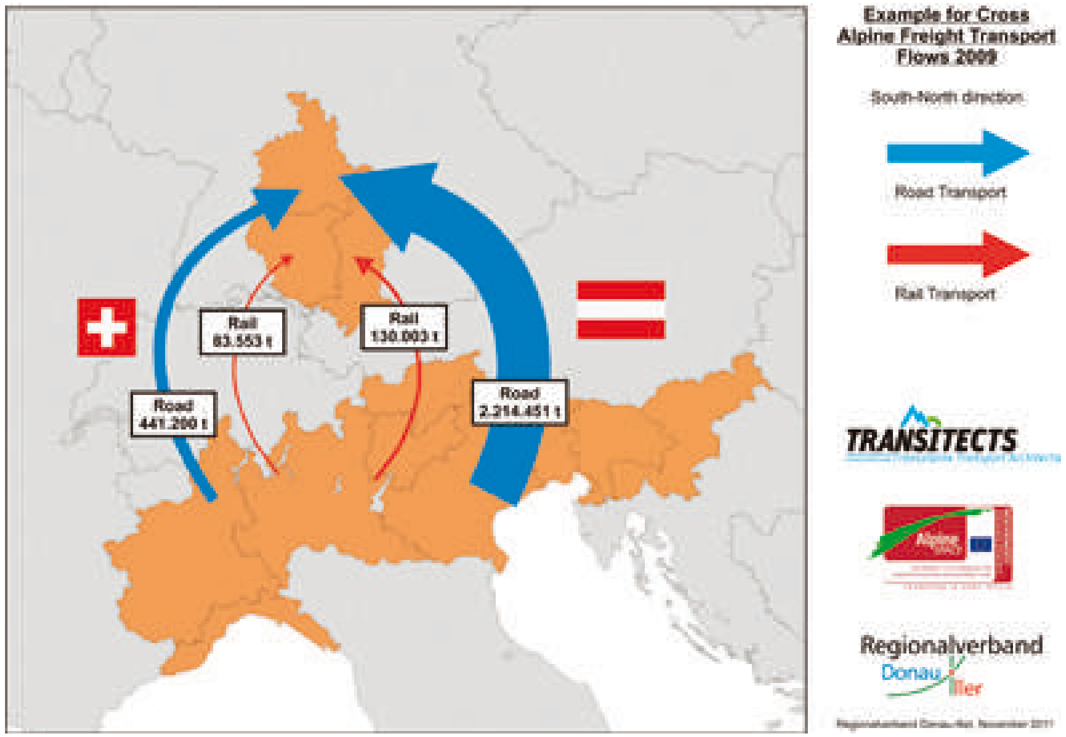
Besides these main routes also more regional rail tracks are showing different obstructions like single tracks and non-electrified routes, especially regarding the railway tracks Munich/Ulm-Zurich, the Luino-Line or the access to the port of Koper. The project partnership therefore underlines that facing the prognosticated tremendous increase of alpine-crossing freight amounts requires the fast improvement of the alpine railway network, especially regarding the different access routes.

The involved project partners also turned their attention to the situation of terminal infrastructures found in the area of survey. In Northern Italy the density of terminals for combined or intermodal transport is very high whereas in Southern Germany the situation is different with a lower quantity. It seems to be notable that both, north and south of the Alps, more and more private initiatives emerge, aiming to improve the spatial distribution of intermodal terminal infrastructure.

## 3.2.2 freight amounts

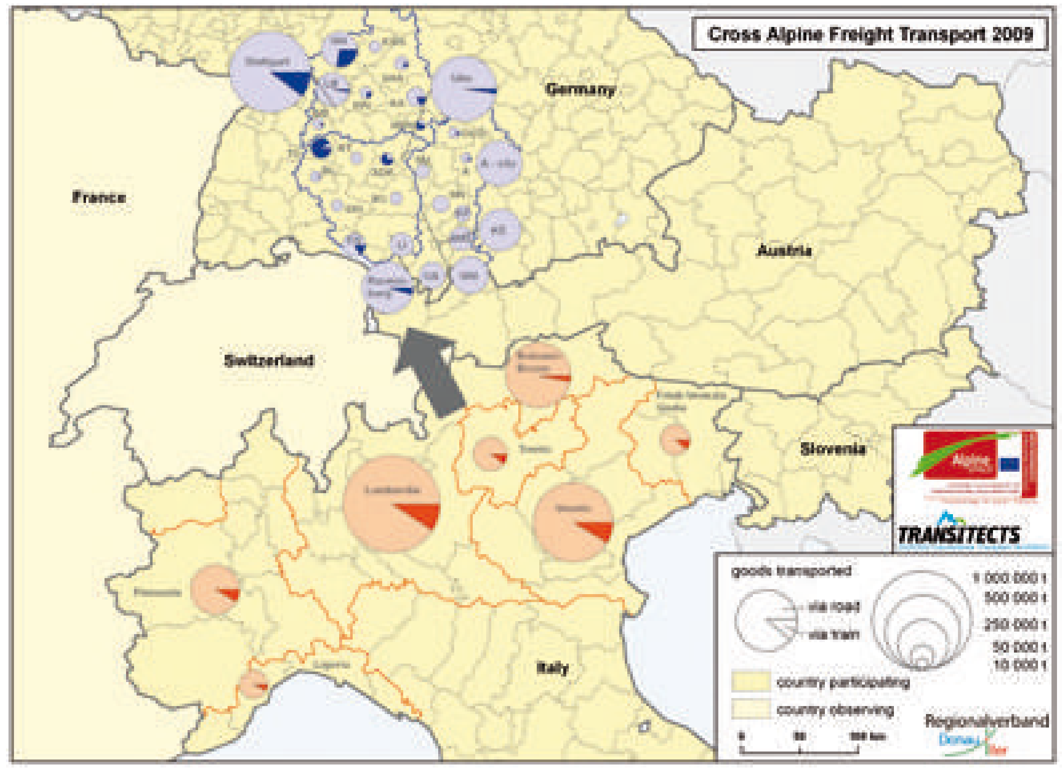
As we know from other European projects, freight amounts crossing the Alps as a geographical barrier have reached tremendous amounts. But which are the concrete amounts? The cooperation of transport ministers of Germany, Italy, France, Switzerland and Austria signed the joint Declaration of Zurich on 30 November 2001. Slovenia joined later. Within this "Zurich Process" a commonly agreed statistical database is surveyed every 5 years. This database is called "CAFT-data", Cross Alpine Freight Transport data, and builds a representative background. Covering all Alpine passes the last survey from 2009 shows transported freight amounts crossing the Alps in different means of transport.(11) Within the project TRANSITECTS concrete transport flows were surveyed between Northern Italy, Slovenia and South-West Germany.

For the exemplary direction South-North, also shown in the map below, the main part of total 2,870,000 tons were transported via Austria (2,345,000 t). The routing via Switzerland with about 525,000 tons was not the first choice for shippers and forwarders in the year 2009.

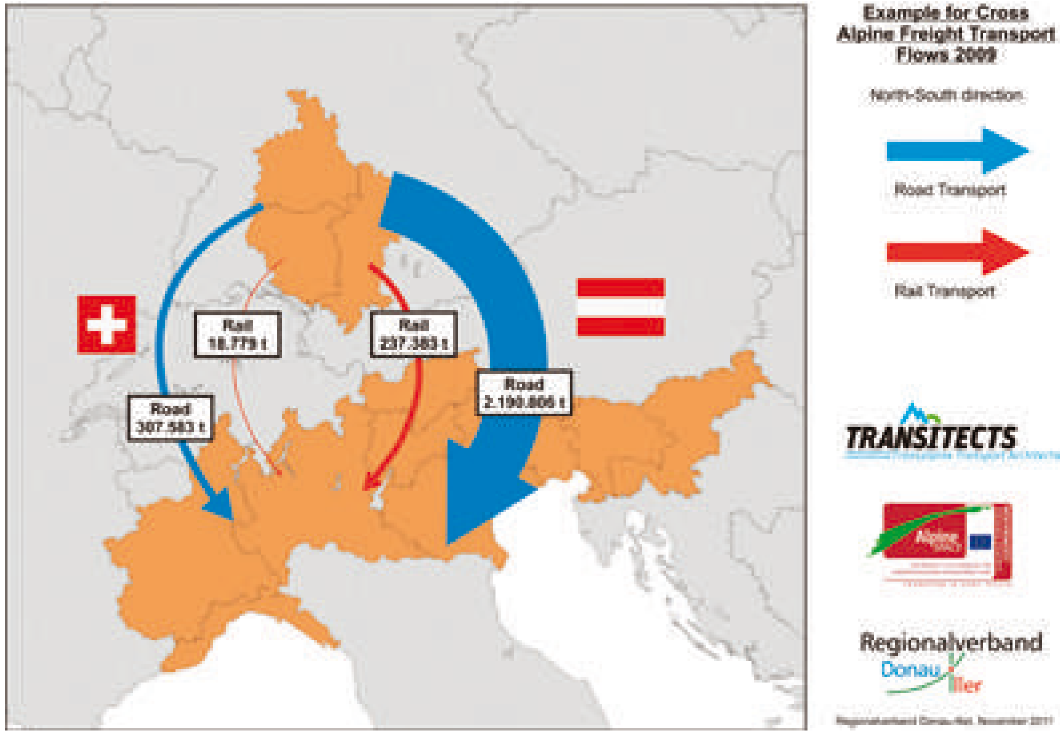



**example for Cross alpine freight Transport flows 2009, south- north.**
Source: own map according to CAFT 2009, RVDI

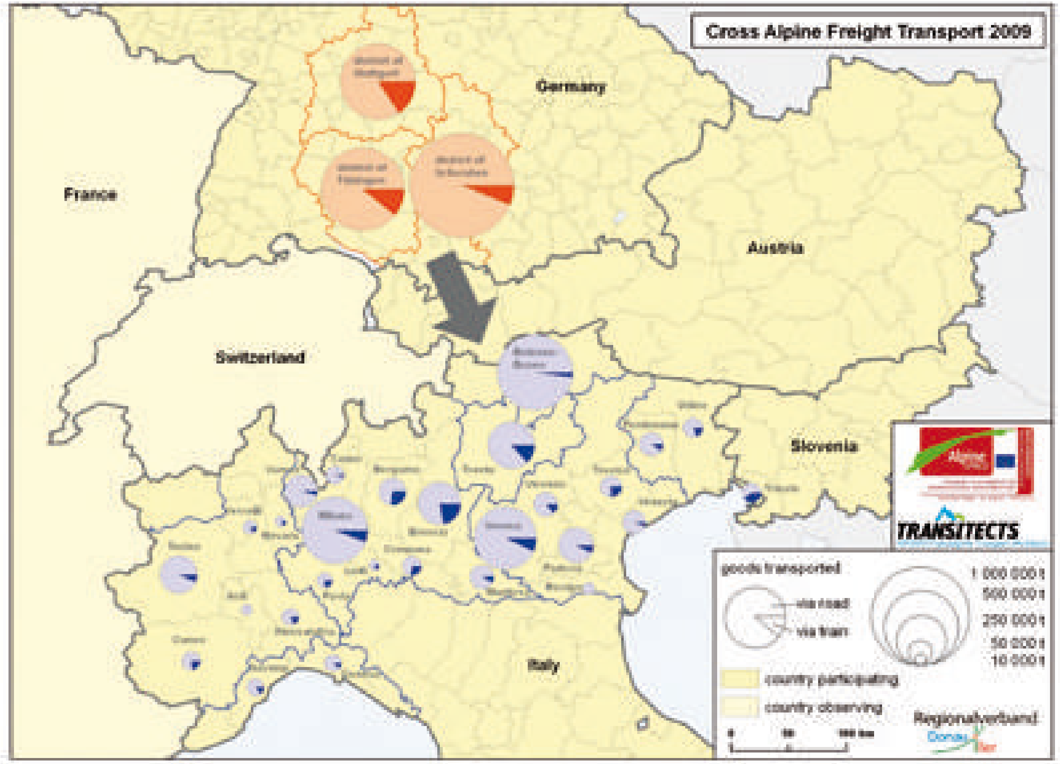
The modal split was very unbalanced. Road transport with total 2,656,000 tons was chosen for most freights via Austria (about 2,214,000 t) and via Switzerland (about 441,000 t). In the year 2009 rail transport as alternative with an entire amount of 214,000 tons did not fully exhaust existing potentials. The main destinations (NUTS 3 level) for South-North transport flows were Stuttgart (road: 574,000 t, rail: 66,000 t), Ulm (road: 408,000 t, rail: 11,000 t), Ravensburg (road: 249,000 t, rail: 12,000 t), Augsburg (road: 204,000 t, rail: 1,000 t) and Kempten (road: 172,000 t, rail: 1,100 t) followed by the Bavarian Allgäu (road: 155,000 t, rail: 700 t). High incoming freight amounts transported especially by rail can be detected in Stuttgart (66,000 t), Tübingen (36,000 t) and Heilbronn (35,000 t). Within South-North directed transport about three quarters of the entire rail-transported freight amount is produced by combined trains.




**Cross alpine freight Transport 2009, south-north.**
Source: own map according to CAFT 2009, RVDI




**example for Cross alpine freight Transport flows 2009, north-south.**
Source: own map according to CAFT 2009, RVDI



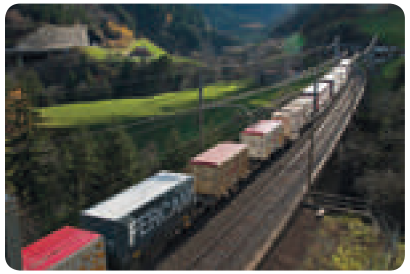

**Cross alpine freight Transport flows 2009, north-south.**
Source: own map according to CAFT 2009, RVDI

For the exemplary North-South direction the picture is almost similar. About 2,428,000 tons, the main part, was transported through Austria. Only 326,000 tons of freight had a routing via Switzerland. Like for South-North direction the modal split for North-South transport flows was highly uneven: 2,498,000 t on road are opposed to 25,000 t on rail. This unbalanced picture can be drawn also for routings via Austria with about 2,191,000 t transported on road and 237,000 t on rail. Via Switzerland about 307,000 t were transported on road while only 19,000 t crossed the Swiss Alps on railway tracks. The main destinations of freights with origin in South-West Germany were areas in Lombardy Region (road: 773,000 t, rail: 107,000 t) and South Tyrol (road: 501,000 t, rail: 9,400 t). Other destination regions (NUTS 3) with high amounts of freights are Verona (road: 327,000 t, rail: 25,000 t), Trento (road: 171,000 t, rail: 26,000 t) and Torino (road: 119,000 t, rail: 8,400 t). In three quarters of occurred trips rail transport in North-South direction was produced as combined transport.

## 3.2.3 Intermodal cross-alpine transport market

### *differentiation of unaccompanied and accompanied combined transport*

Before talking about the intermodal cross-alpine transport market the different specifications of combined transport have to be defined. The concept of "Intermodal" or "Combined" Transport describes transport chains with standardized loading units like containers, swap bodies, whole lorries or trailers. The intermodal character of this type of transport is produced by the use of different means of transport. Parts of the entire logistic chain are covered by transport on road, rail or ship. Intermodal or combined transport can be divided into two branches: Unaccompanied Combined Transport on the one hand, Accompanied Combined Transport on the other hand.



Source: Matthias Wagner

- Unaccompanied Combined Transport: Standardized loading units like containers, swap bodies or craneable trailers are loaded on a train for the main part of the transport chain. Beforehand and afterwards this loading unit is transported on road by truck between intermodal terminals and sender/recipient.

**Typical train in Unaccompanied Combined Transport.**
Source: Matthias Wagner

Source: Matthias Wagner

- Accompanied Combined Transport: Within this type of intermodal transport the whole lorry is loaded on a train. The driver accompanies his truck in a special sleeping car. It is called "Rolling Road" or "Rollende Landstraße" (RoLa).

**Typical train in Accompanied Combined Transport.**
Source: Matthias Wagner

The typical element of Combined Transport is the interlinkage between the systemic advantages of road and rail transport. Rail transport provides mass transportation possibility especially for longer distances over 300 km. Road transport including the flexibility of trucks is highly adequate for short distances and distributional functions. In general every type of cargo transported on road is qualified for rail handling.

### *alternative handling techniques*

Unaccompanied Combined transport has one great disadvantage: special equipment built for transhipment in terminals is required. Especially small-sized transport entrepreneurs are not able to invest in container chassis, swap bodies or craneable trailers. According to current estimations only about 2% of all trailers running on European streets are useable for unaccompanied combined transport. In the last years a lot of initiatives in particular for horizontal handling techniques for existing logistics equipment without any special modifications were undertaken.

A study elaborated within the project TRANSITECTS gives an overview about different new intermodal handling techniques developed in Europe in recent years, including an evaluation (whereas possible) of their specific technical details and their commercial life. The aim of those techniques is to shift as much freight as possible from road to rail and to offer a wider range of opportunities to those transport entrepreneurs who cannot use unaccompanied combined transport. Unfortunately, most of the techniques were not implemented successfully.

Therefore the following reasons have been identified:

- Some technologies need a totally new designed loading unit or a re-design of existing loading units.
- Some technologies suggest additional pieces of equipment (adapter) such as an intermediate platform between loading unit and transfer system.
- Some technologies require specialised road rail vehicles.

The investment in such vehicles would only make sense if the system was fully introduced and maintained throughout the depreciation period. Nobody can guarantee an economic success over many years, so the commercial actors hesitated to go for large-scale investments into such technologies. Only few of the described systems were realized and are in daily use today. The study is available from the work package leaders.[10]

*10 the study is available from: ALOT and Regionalverband Donau-Iller*

## *alpine crossing transport market*

In alpine crossing transport market a few key-players and especially in Upper Italy numerous small- and medium sized carriers and transport entrepreneurs are playing the major roles. The following overview shows some very important companies in combined transport:

| ***company*** | ***mode of transport*** |
|---|---|
| Alpe Adria | UCT/RoLa |
| Ambrogio | UCT, Road |
| Arcese | Road |
| CEMAT | UCT |
| Ewals Cargo Care | Road, UCT |
| Hangartner | Road, UCT |
| Hannibal | UCT |
| HUPAC | UCT |
| Inter Ferry Boats | UCT |
| Italcontainer | UCT |
| Kombiverkehr | UCT |
| LKW Walter | Road, UCT |
| RailCargoAustria | UCT |
| Ökombi | RoLa |
| Ralpin | RoLa |

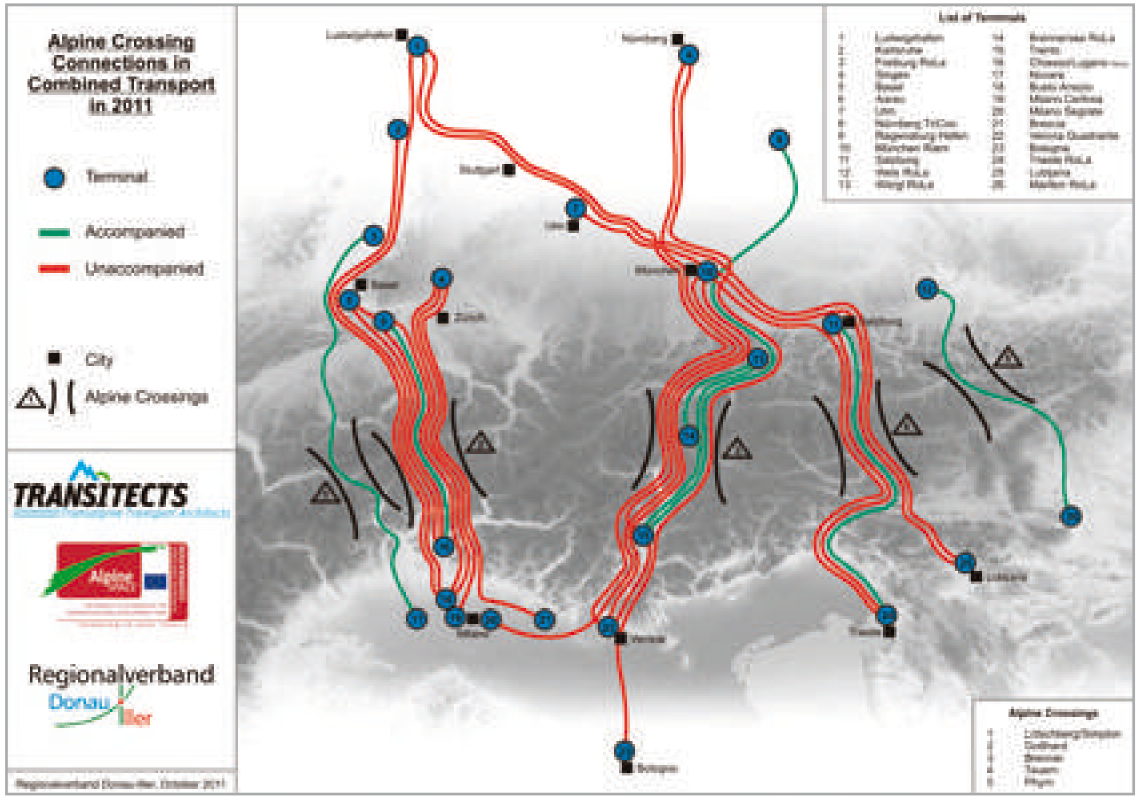
**Sample of intermodal transport companies in Alpine crossing logistics market.**
Source: own table, RVDI

A survey particularly on combined transport crossing the Alps between Northern Italy/Slovenia and Southern Germany/Austria is indicating the offered connections.

| ***alpine crossing connections in combined t ransport 2011*** | | | | |
|---|---|---|---|---|
| | **from** | **to** | **via** | **operator** |
| RoLa | Freiburg | Novara | Lötschberg/Simplon | Ralpin |
| RoLa | Basel | Lugano | Gotthard | Ralpin |
| RoLa | Regensburg | Trento | Brenner | Ökombi |
| RoLa | Wörgl | Brennersee | Brenner | Ökombi |
| RoLa | Wörgl | Trento | Brenner | Ökombi |
| RoLa | Salzburg | Trieste | Tauern | Ökombi/Alpe Adria |
| RoLa | Wels | Maribor | Phyrn | Ökombi/Adriakombi |
| UCT | Basel/Aarau | Busto Arsizio | Gotthard | Hupac |
| UCT | Aarau | Chiasso | Gotthard | Hupac |
| UCT | Basel | Chiasso | Gotthard | Hupac |
| UCT | Singen | Brescia | Gotthard | Hupac |
| UCT | Singen | Milano Certosa | Gotthard | Hupac |
| UCT | Singen | Busto Arsizio | Gotthard | Hupac |
| UCT | Ludwigshafen | Busto Arsizio | Gotthard | Hupac |
| UCT | Karlsruhe/Neuss | Busto Arsizio | Gotthard | Ambrogio |
| UCT | Ludwigshafen | Verona | Brenner | Kombiverkehr |
| UCT | Ludwigshafen | Lubljana | Tauern | Kombiverkehr |
| UCT | Nürnberg | Trento/Verona | Brenner | Kombiverkehr |
| UCT | Nürnberg | Bologna | Brenner | Italcontainer |
| UCT | München | Lubljana | Tauern | Adriakombi/Kombiverkehr |
| UCT | München/Ulm | Trieste | Tauern | Società Alpe Adria/RCA |
| UCT | München | Verona | Brenner | Kombiverkehr |
| UCT | München | Milano Segrate | Brenner | Kombiverkehr |
| UCT | Salzburg | Trieste | Tauern | Società Alpe Adria/RCA |
| only UCT A-B and RoLa connections | | | | |

**Sample of alpine crossing connections in combined transport 2011.**
Source: own table, RVDI

A map illustrates the outcomes. The Gotthard and Brenner axes are the most frequented routes followed by Tauern. It is easy to see that major economic centres like Milan, Verona, Munich and Mannheim/Ludwigshafen are connected very well. Although freight potentials were verified, for smaller economic regions no satisfactory intermodal connections are offered. Having a look at the map it is easy to discover that especially the area along the axis (Munich)-Augsburg-Ulm-Stuttgart is lacking a day to day (A-B[(11)]) connection to Lombardy or Veneto. Also only one direct train connection with access to maritime network is offered between (Ulm/)Munich and Trieste. Direct connections to Ligurian ports are not available at all.



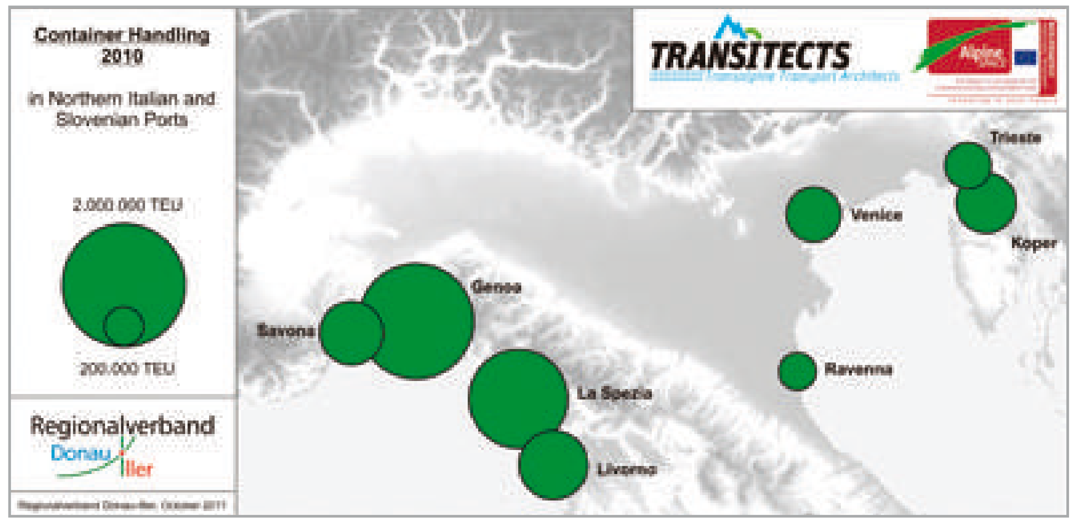

**Alpine crossing connections in Combined Transport in 2011.**
Source: own map, RVDI

11 *A-B describes a train connection e.g. starting on Monday evening and arriving Tuesday morning.*

## *maritime market*

Direct railway connections to the Ligurian and Adriatic ports are interesting in particular because of the fact that these Southern Ports will become notable alternatives to the Northern Ports like Rotterdam, Antwerp or Hamburg, which will have considerable increases in container handling and therefore capacity problems. But also the shorter and more environmental friendly transport possibilities through the Southern Ports especially to Far East are significant arguments. As a result, the European transport market will more and more focus on Southern Ports. Future tasks are consequently to avoid increasing road transport from and to Southern ports, to provide solutions and to gather experiences with new intermodal services serving the maritime market. The TRANSITECTS project partnership integrated Southern Ports into their pilot projects for new combined train connections.

| | | t ransported containers in teu | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | adriatic ports | | | | ligurian ports | | | |
| | port of | Koper | Trieste | venezia | ravenna | livorno | la spezia | genova | savona |
| year | 2010 | 476.731 | 281.624 | 393.913 | 183.041 | 625.200 | 1.285.155 | 1.758.858 | 533.235 |
| | 2009 | 343.165 | 276.957 | 369.474 | 185.022 | 592.050 | 1.040.000 | 1.533.623 | 408.270 |
| | 2008 | 353.880 | 335.943 | 379.072 | 214.324 | 778.864 | 1.246.000 | 1.766.605 | 252.837 |
| | 2007 | 305.648 | 265.863 | 329.512 | 206.580 | 745.557 | 1.187.000 | 1.855.026 | 242.720 |
| | 2006 | 218.970 | 220.310 | 316.641 | 162.052 | 657.592 | 1.137.000 | 1.657.113 | 231.489 |
| | 2005 | 179.745 | 201.290 | 293.842 | 168.508 | 658.506 | 1.024.000 | 1.624.964 | 219.760 |
| | 2004 | 153.347 | 174.729 | 290.898 | 179.432 | 638.586 | 1.040.438 | 1.628.594 | 83.754 |




**Container handling in north-Italian and slovenian ports.**
Source: own table and map according to data from port authorities, RVDI

Therefore the Southern Ports along the Ligurian and Adriatic Coast were surveyed. The respective ports offer a wide range of destinations. Especially Mediterranean destinations can be reached as well as Near and Far East and America. Among the Ligurian Ports Genoa and La Spezia are playing the major role. Although the data reflects the economic crisis in 2009, the table shows very high increase rates in container handling for the port of Savona. In the Adriatic Sea the port of Koper is leading in both, absolute and relative according the increase ratio.

### *concrete activities*

During the lifetime of TRANSITECTS the project consortium organised several events, meetings and excursions in order to foster the targets of the work packages 4 and 5 – meaning the development of pilot trains. Concrete discussions with numerous stakeholders allowed getting precise information on the Alpine crossing transport market. In this context the activities within the development of the two pilot projects Ulm-Lombardy (WP4) and Landsberg-Trento (WP5) described below, stand as examples for the processes made for all other pilot projects in TRANSITECTS.

After defining the basic conditions for a new intermodal service between Baden-Württemberg/Bavaria and Lombardy with a further connection to Ligurian Ports in an early project phase the necessity of on-site visits and direct contacts to responsible persons became apparent. North and south of the Alps the project partners Lombardy Region, Stuttgart Region Economic Development Corporation and Regional Association Donau-Iller investigated the available terminal infrastructure and had different bilateral meetings with terminal and intermodal operators. To foster the market transparency in the seaport sector in the Alpine Space, a contact journey to the Ligurian Ports Genoa, Savona and La Spezia was organised in November 2010. During the journey the participants, mainly south-German representatives of logistic companies, research and regional business development institutions as well as from the Ministry of Economics Baden-Württemberg, had the possibility to get in direct contact with the port authorities, local transport and terminal companies. On-site excursions allowed a view on the handling possibilities in the ports. In addition the project and its ideas were disseminated in the seaport sector. After this journey a delegation of the port authorities from Genoa, La Spezia and Savona also visited Baden-Württemberg in March 2011 in order to get in direct contact with regional companies. With a public event in Stuttgart a high number of stakeholders could be involved into the discussions about demands and needs for a new intermodal connection between Baden-Württemberg/Bavaria and Lombardy. In summer 2011 a workshop in Mortara was to clarify concrete demands, especially regarding the different market dimensions between maritime and continental intermodal market. Another workshop in Milan in November 2011 brought together port authorities, forwarders and railway companies. In February 2012 the participants of a technical workshop discussed about best routing options, best quality for a new train and also price estimations esp. for train paths and railway traction. The information gathered within these workshops and public events was directly used for the development of an intermodal train concept connecting Baden-Württemberg/Bavaria and Lombardy.

For the development of a new RoLa connection between Baden-Württemberg/Bavaria and Lombardy (WP5), a different approach was used. Possible loading sites in south Germany were investigated in the frame of excursions and a concrete facility was found in Landsberg/Lech. As the market for Accompanied Combined Transport is split into two areas, one via Switzerland with offers by Ralpin and the other via Austria served by ÖKOMBI, the possible RoLa loading site in Landsberg only allows feasible connections via the Brenner. Therefore, further investigations were made in direct cooperation with ÖKOMBI which provided the information needed for the development of the pilot project. In 2011 numerous small multilateral meetings with ÖKOMBI and other experts were organised in order to get a view on technical needs for infrastructures. An excursion to the RoLa-Terminal Wörgl as best-practice brought information about ideal infrastructure and terminal management. Discussions with railway traction companies and the owner of the possible loading site in Landsberg gave operational details and data for price estimations. In September 2011 the first detailed concept was presented in a public workshop in order to get the feedback from the market side.

The feedback from the participants showed that TRANSITECTS has evolved high interest. Besides all pilot project related activities the project kick-off and interim conferences were also used for publicity and networking with important stakeholders.

Contact Chapter 3.2

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Source: IPG

## 3.3 pilot projects – combined transport methodology

This chapter contains the “table of contents” the project partners utilized for describing each pilot. This report includes a short description (as introduction), a map and tables containing:

*Physical features:*
departing terminal; arrival terminal; distance; border crossing(s); track technical information (single/double track, electrification, profile, maximum length, track speed/ limits; limit weight along the route)

*Main characteristics:*
frequency, pricing (price for a single loading unit), train time schedule, possible loading units, freight/goods transported (allowed)

*commercial features:*
handling terminal operators further rail bound connections from and to start respectively end points.

The two following chapters resume detailed information for each pilot project according to the previous contents. The first includes unaccompanied combined transport (WP4) and the latter the accompanied combined transport (WP5).

Contact Chapter 3.3

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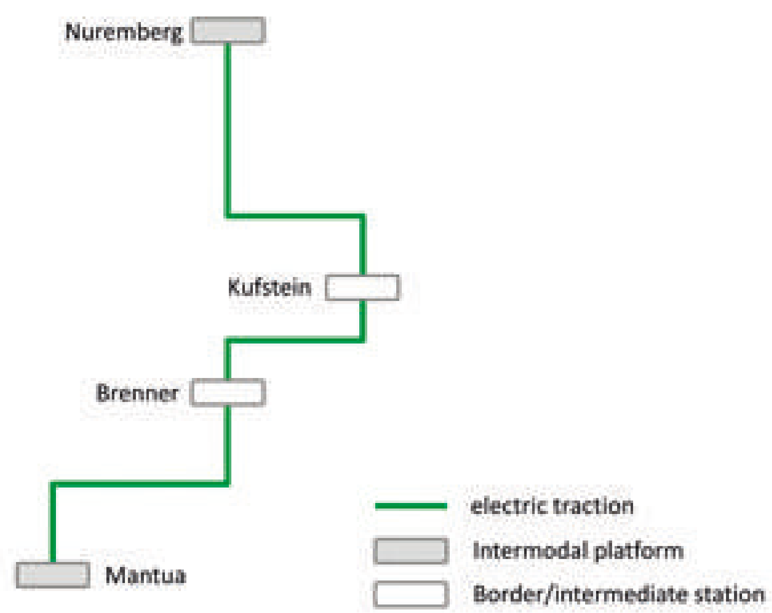
## 3.4 pilot projects - unaccompanied combined transport

### 3.4.1 Pilot trains from lombardy region to baden-w uerttemberg/bavaria

- ***mantua – nuremberg (alot)***

The link between Mantua and Nuremberg connects two tri-modal terminals, which can act both as hub for new services (for example towards Southern Italy or Port of Venice and Northern Germany) and as a centre for the distribution in two important final markets (Eastern Lombardy/Emilia Romagna and Bavaria). Mantua area has an important role for “conventional” freight, while Nuremberg is connected to international waterways via its port on the Main-Danube Canal. The freight traffic centre in the port of Nuremberg is one of the most important transfer centres in Southern Germany.




**Course of the connection Mantua - Nuremberg.**
Source: Own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | Mantua Valdaro Terminal |
| Arrival terminal | Port of Nurnberg |
| Distance | 654 km |
| Border crossing(s) | Brenner (IT-AT)<br>Kufstein (AT-GER) |
| Track technical information: | |
| *single/Double track* | *single track Valdaro-Mantova and Mantova-Verona;<br>double-track Verona-Nurnberg, locomotive changing or multiple-system-locomotive* |
| *Electrified/not electrified* | *Electrified (with electricity changing at Brenner)* |
| *Profile* | *D4* |
| *Maximum length* | *550 m* |
| *track speed limits* | |
| *Maximum weight* | *1,200 t (South to North)<br>1,100 t (North to South)* |

*Main characteristics:*

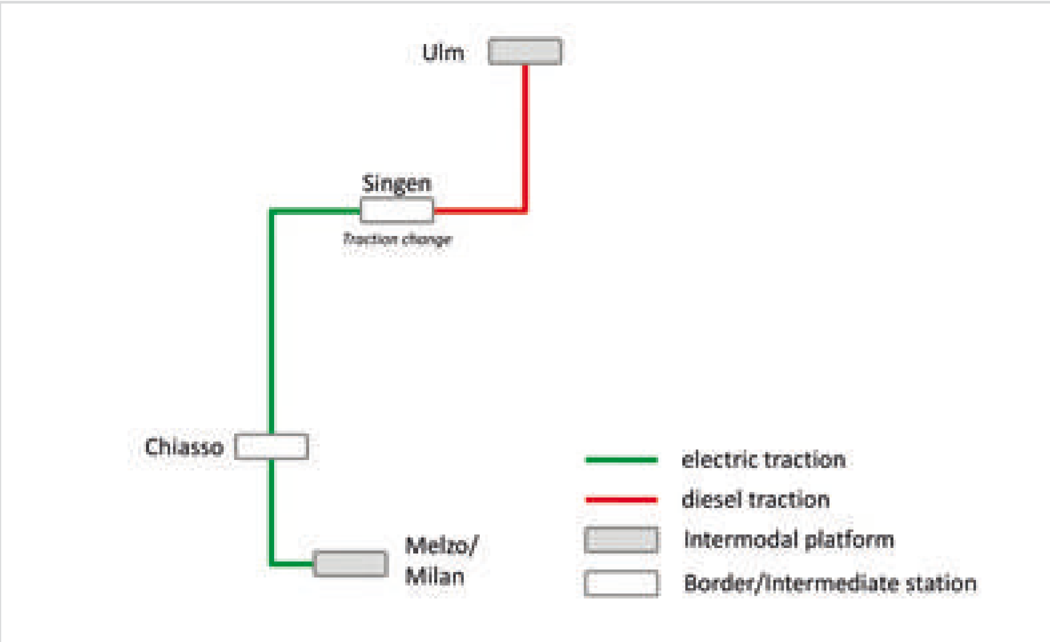
| | |
|---|---|
| Frequency | One departure per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | 15.35 Euro train/km<br>650 Euro/unit |
| Train time schedule | Starting from Mantua: 18.00<br>Arrival in Nurnberg: 5.00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | containers |

*commercial features:*

| | |
|---|---|
| Handling terminal operators:<br>*Departure terminal*<br>*arrival terminal* | |
| Further rail bound connections from and to start respectively end points | - Nuremberg as hub to Northern Germany, both via rail and water<br>- Mantua directly connected to the Port of Venice via IWW |

- ***ulm – melzo [option a] (rVdi, rl)***

This connection fills a gap in the Alpine crossing combined transport market. Especially companies located on the axis between Augsburg, Ulm and Stuttgart do not have the possibility to use direct, modern and regular railway freight transport to one of their major market areas in Northern Italy. Therefore the new intermodal train offer is to connect two economic regions. Both Terminals north and south of the Alps provide further connections to maritime networks.




**Course of the connection Ulm – Melzo. Source:**
Own illustration, RVDI

## *Physical features:*

| | |
|---|---|
| Departing terminal | Ulm Nord-Dornstadt |
| Arrival terminal | Melzo |
| Distance | Ca. 600 km via Gotthard |
| Border crossing(s) | Singen/Schaffhausen (D-CH)<br>Chiasso (CH-IT) |
| Track technical information: | Via Gotthard |
| *single/Double track* | *single track Friedrichshafen-radolfzell, possibility to use a special cargo-dedicated track via Mengen-Stockach* |
| *Electrified/not electrified* | *Electrified in Italy and Switzerland, not electrified on German part* |
| *Profile* | *P/C 400* |
| *Maximum length* | *510m* |
| *track speed limits* | *Main parts with 90 km/h* |
| *Maximum weight* | *1,200t* |

## *Main characteristics:*

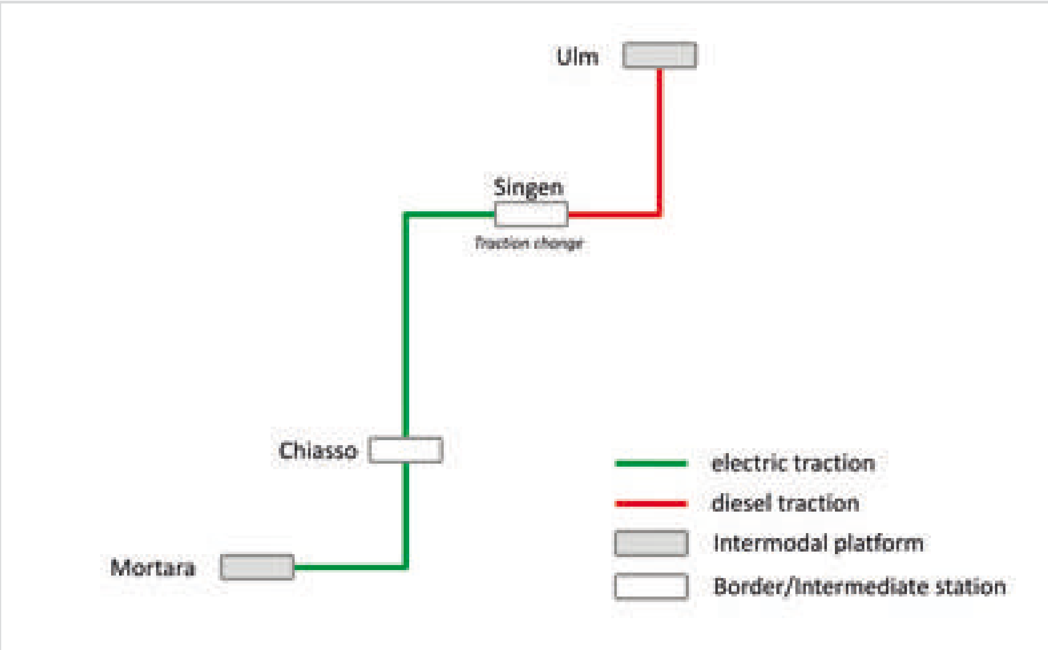
| | |
|---|---|
| Frequency | 5 departures per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | € 280/TEU |
| Train time schedule | Closing Ulm 12:00, Availability Melzo 06:00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Containers, swap-bodies, trailer |
| Freight/goods transported (allowed) | Dangerous goods |

## *commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *DUss in Ulm* |
| *arrival terminal* | *Hannibal in Melzo* |
| Further rail bound connections from and to start respectively end points | - Ulm: Northern Ports, Ruhr Area<br>- Melzo: Genova, La Spezia, Ravenna |

- ***ulm – mortara [option b] (rl, rVdi)***

As the previous case, the connection Ulm - Mortara aims at extending the combined transport market with a further connection between Lombardy and Baden-Württemberg. Moreover a shuttle service between two terminals which nowadays are not directly connected shall be established.




**Course of the connection Ulm – Mortara. Source:**
Own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | Ulm-Nord/Dornstadt |
| Arrival terminal | Mortara |
| Distance | Ca. 605 km |
| Border crossing(s) | Singen/Schaffhausen (D-CH)<br>Luino (CH-IT) |
| Track technical information: | Via Gotthard |
| *single/Double track* | *single track Friedrichshafen-radolfzell, possibility to use a special cargo-dedicated track via Mengen-Stockach, Single Track Luino Line has to be used* |
| *Electrified/not electrified* | *Electrified in Italy and Switzerland, not electrified on German part* |
| *Profile* | *P/c 384*<br>*P/C 80 available in 2012 in Italian track segment* |
| *Maximum length* | *550m* |
| *track speed limits* | *Main parts with 90 km/h* |
| *Maximum weight* | *1,200t (1,600t southbound)* |

*Main characteristics:*

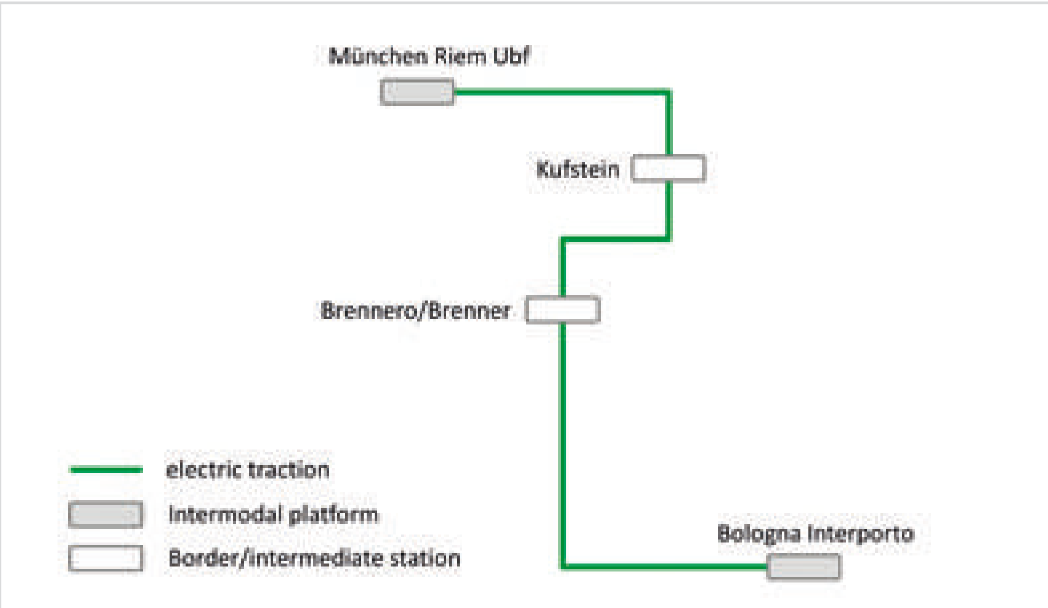
| | |
|---|---|
| Frequency | 5 departures |
| Pricing Estimation of Price for a loading unit (container/swap body) | € 280/TEU |
| Train time schedule | Closing time: 16.00<br>Availability time: 10.00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Containers, swap bodies, trailers |
| Freight/goods transported (allowed) | Dangerous goods |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *DUss* |
| *arrival terminal* | *TIMO - Terminal Intermodale di Mortara s.p.a. (http://www.terminalmortara.it/ita/)* |
| Further rail bound connections from and to start respectively end points | Shuttle connection to Savona Vado Reefer Terminal (containers and swap bodies) |

- ***munich - bologna (bmvit, tyrol)***

Based on a study commissioned by bmvit and Land of Tyrol, a concept for an additional intermodal transport service across the Brenner was elaborated. A regular block train was proposed between Munich and Bologna. The terminal Munich Riem is the most suitable terminal in Bavaria, due to its geographical location and its technical equipment. Bologna is the capital of Emilia-Romagna, one of the economically strong regions in the North of Italy and offers a major transportation hub. Furthermore, the motorway network provides ideal connections to the Tuscany region and the Adriatic coast. The potential modal shift from road to rail is approximately 216,000 t per year.




**Course of the connection Munich - Bologna.**
Source: Own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | München Riem Ubf |
| Arrival terminal | Bologna Interporto |
| Distance | 551km |
| Border crossing(s) | Kufstein (GER-AT)<br>Brenner (AT-IT) |
| Track technical information: | |
| *single/Double track* | *double track* |
| *Electrified/not electrified* | *electrified; multisystem-locomotive* |
| *Profile* | *D4* |
| *Maximum length* | *Munich 700m, Bologna 550m* |
| *track speed limits* | *average speed: 50km/h* |
| *Maximum weight* | *train weight: 1,100 t (average)* |

*Main characteristics:*

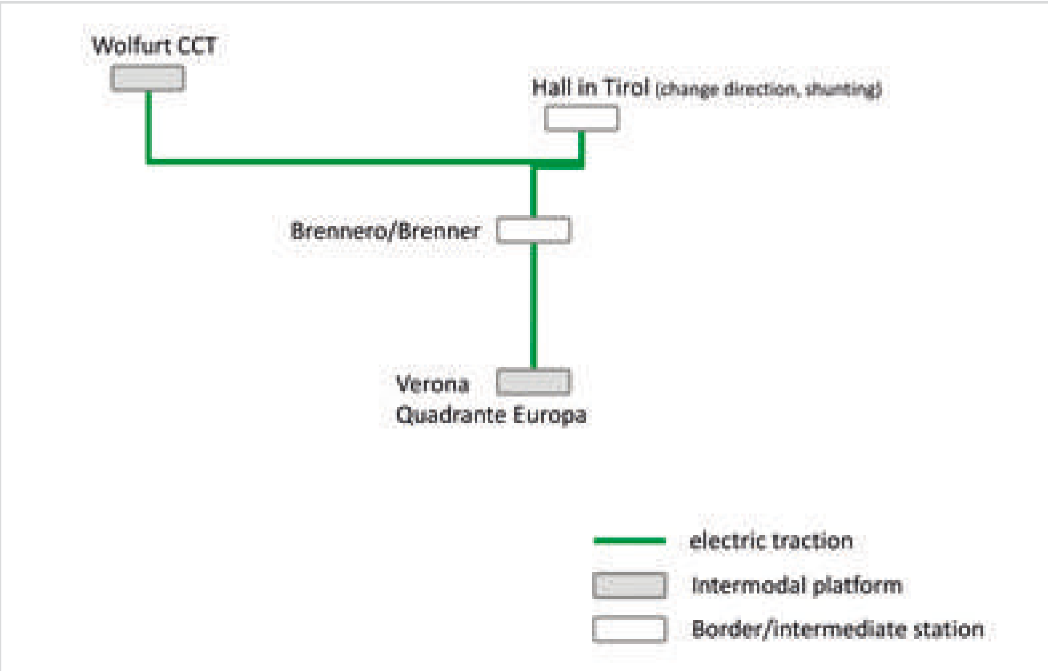
| | |
|---|---|
| Frequency | five runs per week in each direction |
| Pricing Estimation of Price for a loading unit (container/swap body) | Main leg by rail (551km) incl. cargo handling:<br>€ 274.76/swap body |
| Train time schedule | Departure: from Munich at 19:00; from Bologna at 19:30<br>Arrival: in Bologna at 06:00; in Munich at 06:30 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | container, swap-bodies, semi-trailer |
| Freight/goods transported (allowed) | general cargo |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Munich: DUSS* |
| *arrival terminal* | *Bologna: Terminali Italia* |
| Further rail bound connections from and to start respectively end points | - Bologna to Bari, Catania Bicocca, etc. (Cemat), Bologna to Nola (Hupac);<br>- Munich to Nuremberg, Leipzig or Hamburg, etc. (Kombiverkehr), Munich-Ulm or Rostock (TX Logistik) |

- ***Wolfurt - Verona (bmvit, tyrol)***

A pilot project across the Arlberg was elaborated, based on a study commissioned by bmvit and Land of Tyrol. Taking into account interviews with enterprises, for the Arlberg-axis, half a block train was suggested between Wolfurt (Vorarlberg) and Verona (Veneto), with shunting in Hall in Tirol. The terminal Wolfurt CCT is the most suitable terminal for this pilot in Vorarlberg, the full enlargement is expected to be completed by 2015. The terminal in Verona is located inthe South of the Brenner-axis with the largest relevant catchment area. The potential modal shift is approximately 108,000 t per year.




**Course of the connection Wolfurt - Verona.**
Source: Own illustration, RVDI

### *Physical features:*

| | |
|---|---|
| Departing terminal | Wolfurt CCT |
| Arrival terminal | Verona Quadrante Europa |
| Distance | 475km |
| Cross-Border(s) | Brenner (AT-IT) |
| Track technical information: | |
| *single/Double track* | *double track* |
| *Electrified/not electrified* | *electrified; multisystem-locomotive* |
| *Profile* | *D4 + D2* |
| *Maximum length* | *Wolfurt 550m, Verona 650m* |
| *track speed limits* | *average speed: 50km/h* |
| *Maximum weight* | *train weight: 1,100 t (average)* |

### *Main characteristics:*

| | |
|---|---|
| Frequency | five runs per week in each direction |
| Pricing Estimation of Price for a loading unit (container/swap body) | Main leg by rail (475km) incl. cargo handling:<br>€ 249.38/swap body |
| Train time schedule | Departure: from Wolfurt at 17:00; from Verona at 19:00<br>Arrival: in Verona at 02:00; in Wolfurt at 05:00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | container, swap-bodies, semi-trailers |
| Freight/goods transported (allowed) | general cargo |

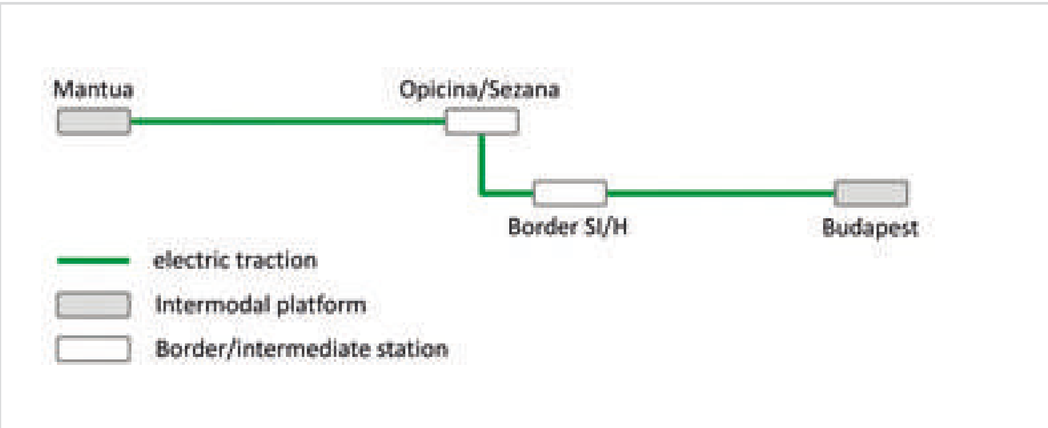
### *commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Wolfurt: rail cargo austria aG* |
| *arrival terminal* | *Verona: Terminali Italia* |
| Further rail bound connections from and to start respectively end points | - Wolfurt toHamburg or Bremerhaven (RCA);<br>- Hall to Munich, Ulm or Hamburg (TX Logistik);<br>- Verona to Bari or Bologna, etc. (Cemat), Verona to Nola (Hupac), Verona to Pomezia (TX Logistik) |

## 3.4.2 Pilot train from lombardy region to austria and eastern europe

- ***mantua – budapest (alot)***

The link between Mantua/Cremona area and Budapest is dedicated to the transport of Cereals and Seeds from Eastern Europe to Mantua/Cremona Ports. Particularly this service is a prolongation of the existing connection between Rovigo and Budapest that currently amounts to 120,000 annual tonnes of cereals.




**Course of the connection Mantua - Budapest.**
Source: Own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | Mantua Valdaro Terminal |
| Arrival terminal | Budapest |
| Distance | 1200 km |
| Cross-Border(s) | Villa Opicina/Sezana (IT-SI)<br>(SI-H) |
| Track technical information: | |
| *single/Double track* | *Single track Valdaro-Mantova and Mantova-Verona; double-track Verona-Budapest,* |
| *Electrified/not electrified* | *Electrified (with electricity changing at SI-H border) locomotive changing or multiple-system-locomotive* |
| *Profile* | *D4* |
| *Maximum length* | *550 m* |
| *track speed limits* | |
| *Maximum weight* | *1,200 t* |

*Main characteristics:*

| | |
|---|---|
| Frequency | One departure per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | 15.35 Euro train/km<br>1,070 Euro/unit |
| Train time schedule | Starting from Mantua: 17.00<br>Arrival in Budapest: 7.00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | containers |
| Freight/goods transported (allowed) | Cereals |

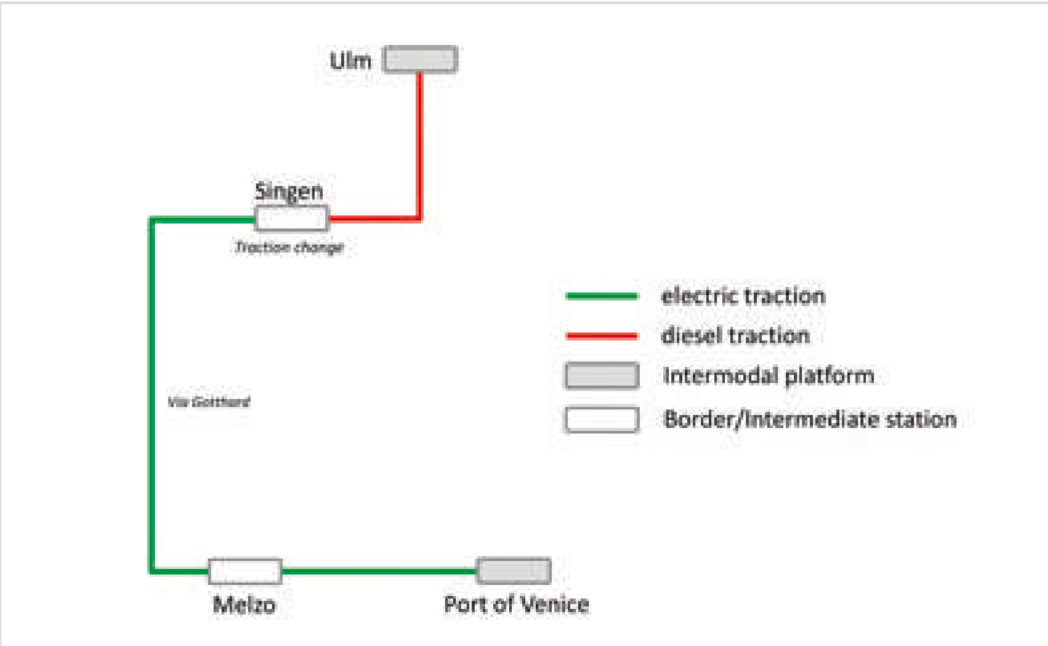
*commercial features:*

| | |
|---|---|
| Handling terminal operators:<br>*Departure terminal*<br>*arrival terminal* | |
| Further rail bound connections from and to start respectively end points | - Budapest connected to main Eastern Europe network<br>- Mantua directly connected to the Port of Venice via IWW |

## 3.4.3 Pilot trains from Adriatic Ports to Baden-Wuerttemberg/Bavaria

- ***ulm - Venice (rVdi)***

Due to the fact, that the demand structure does not allow a further direct maritime connection (beside the train Munich/Ulm-Trieste) between Baden-Württemberg/Bavaria and Adriatic ports, this connection uses the pilot train from Ulm to Melzo as basis within a combination of demands. The intermodal platform Melzo offers trains to the port of Venice, where a wide maritime network is available.




**Course of the connection Ulm – Port of Venice.**
Source: Own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | Ulm |
| Arrival terminal | Port of Venice, handling stop in Melzo |
| Distance | Ca. 900 km |
| Cross-Border(s) | Singen/Schaffhausen (D-CH)<br>Chiasso (CH-IT) |
| Track technical information: | |
| *single/Double track* | *single track Friedrichshafen-radolfzell, possibility to use a special cargo-dedicated track via Mengen-Stockach* |
| *Electrified/not electrified* | *Electrified in Italy and Switzerland, not electrified on German part* |
| *Profile* | |
| *Maximum length* | *500m* |
| *track speed limits* | *Main parts with 90 km/h* |
| *Maximum weight* | *1,200t* |

*Main characteristics:*

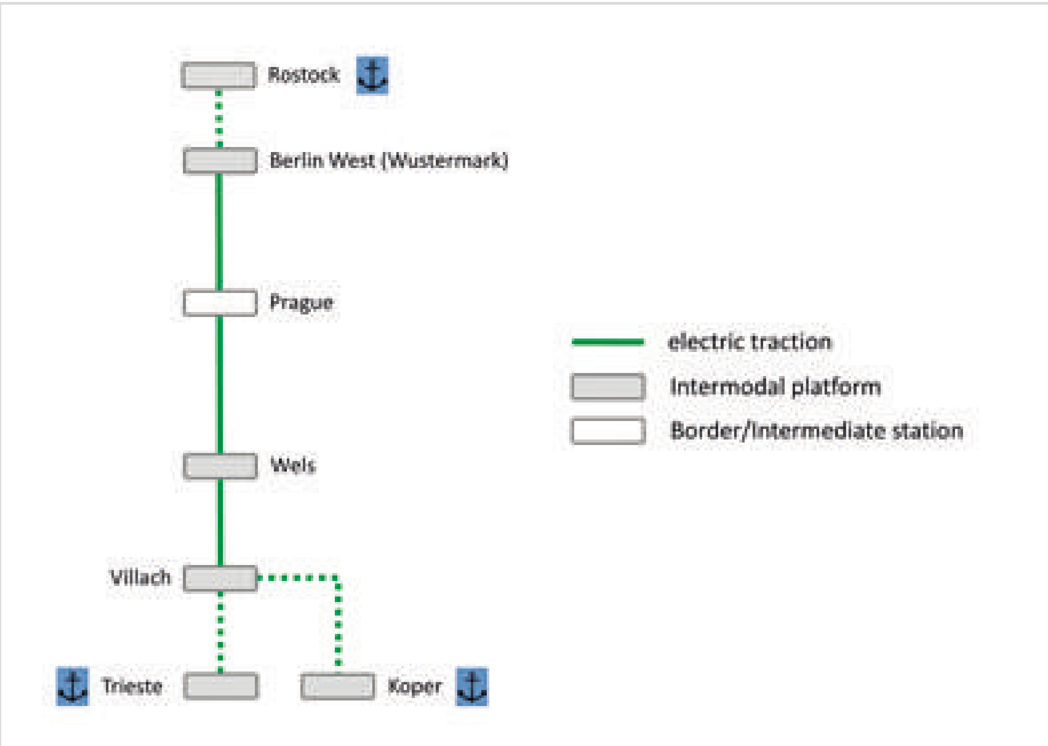
| | |
|---|---|
| Frequency | 5 departures per week possible |
| Pricing Estimation of Price for a loading unit (container/swap body) | Ca. € 450/TEU |
| Train time schedule | A-C via Melzo |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Containers |
| Freight/goods transported (allowed) | |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *DUss* |
| *arrival terminal* | *Port of Venice* |
| Further rail bound connections from and to start respectively end points | |

- ***berlin-Wustermark – prague – Wels – Villach-Fürnitz – adriatic ports (t rieste/koper) (gl)***

The service from Berlin-Wustermark via Prague and Wels to Villach-Fürnitz offers an effective rail connection between Scandinavia (via Rostock/Saßnitz, access in Berlin-Wustermark) and the strategically located hub of Villach-Fürnitz. There are efficient train shuttle services to the NAPA ports (North Adriatic Ports Association: Trieste, Venice, Ravenna, Koper, Rijeka) existing ore planned. The freight village Berlin West Wustermark is serving as important distribution centre in the metropolitan area of Berlin-Brandenburg.




**Course of the connection Berlin – Villach-Fürnitz.**
Source: Own illustration, GL

*Physical features:*

| | |
|---|---|
| Departing terminal | BLTW Terminal at Freight Village Berlin West Wustermark |
| Arrival terminal | Dry Port Villach-Fürnitz |
| Distance | 1012 km |
| Cross-Border(s) | Germany/Czech Republic (Bad Schandau/Decin)<br>Czech Republic/Austria (Horni Dvoriste/Summerau) |
| Track technical information: | |
| *single/Double track* | *Single-track Benesov-Linz (widely), Loifarn-Böckstein (particularly); Double-track Wustermark-Benesov, Linz-Loifarn, Böckstein-Villach* |
| *Electrified/not electrified* | *Electrified (different systems, locomotive changing ore multiple-system-locomotive necessary)* |
| *Profile* | *D4* |
| *Maximum length* | *530 m (restriction of Tauern axis)* |
| *track speed limits* | *80-100 km/h for freight traffic* |
| *Maximum weight* | *1,050 t (restriction of Tauern axis)* |

*Main characteristics:*

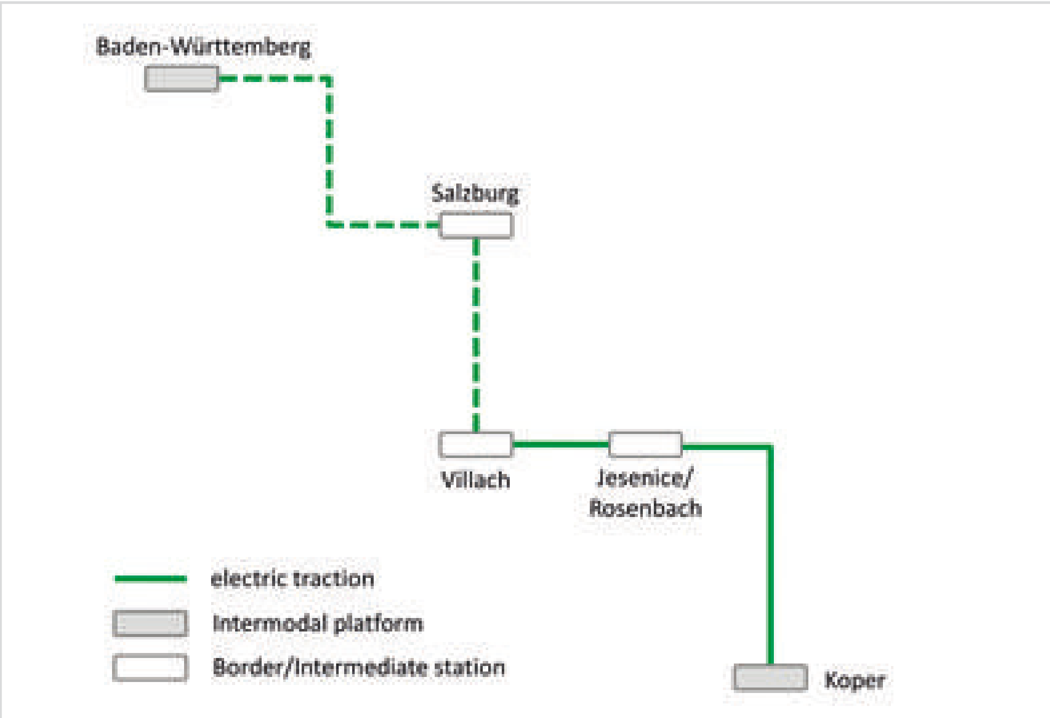
| | |
|---|---|
| Frequency | 2 departures per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | 22 EUR for container handling<br>1.25 EUR per km for transport (CT wagon) |
| Train time schedule | Departure Berlin-Wustermark: 05:00<br>Arrival Dryport Villach-Fürnitz: 06:50 (next day)<br>Departure Dryport Villach-Fürnitz: 12:30<br>Arrival Berlin-Wustermark: 14:20 (next day) |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Particularly ISO-containers and vehicles (special car transport wagon), others possible (e.g. swap-bodies, trailers) |
| Freight/goods transported (allowed) | Particularly general cargo and cars, no transports of hazardous goods |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *BahnLogistik Terminal Wustermark GmbH (BLTW)* |
| *arrival terminal* | *rail cargo austria (rca)* |
| Further rail bound connections from and to start respectively end points | - FV Berlin West Wustermark as hub to Scandinavia via Baltic Sea ports<br>- Dryport Villach-Fürnitz as starting point of services to the NAPA ports |

- ***koper – ljubljana – baden-Wuerttemberg***

Port of Koper is the main Slovenian transport hub, which generates approx. 15 million tonnes of cargo a year of which 54% is carried by rail. Railway transport has potential to grow in the future, because Slovenian motorways are crowded with heavy duty vehicles, mainly in peak hours and working days. Currently, intermodal transport represents approx. 4 million tonnes of cargo manipulation.




**Course of the connection Koper – Baden-Wuerttemberg.**
Source: Own illustration, RVDI

### *Physical features:*

| | |
|---|---|
| Departing terminal | Port of Koper, Slovenia |
| Arrival terminal | Not defined yet (final destination in Baden Wuertemberg, Germany; option: an additional stop in Austria in order to connect new units) |
| Distance | 600+ km |
| Cross-Border(s) | Jesenice/Rosenbach (SI-A) |
| Track technical information: | |
| *single/Double track* | *Single Track (Koper-Divača and Ljubljana-Jesenice); Double track (Divača-Ljubljana);* |
| *Electrified/not electrified* | *Electrified* |
| *Profile* | *P/C 80* |
| *Maximum length* | *550 m* |
| *track speed limits* | *100 km/h* |
| *Maximum weight* | *1,700 gross tones (in Slovenia, at maximum weight double traction is needed on some sections* |

### *Main characteristics:*

| | |
|---|---|
| Frequency | One departure per week (one per both directions) |
| Pricing Estimation of Price for a loading unit (container/swap body) | 20 Euro train/km |
| Train time schedule | Starting from Koper: 20.00 h<br>Arrival in final destination: 8.00 h (next day) |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Containers |
| Freight/goods transported (allowed) | Some types of dangerous goods are not allowed (according to ADR) |

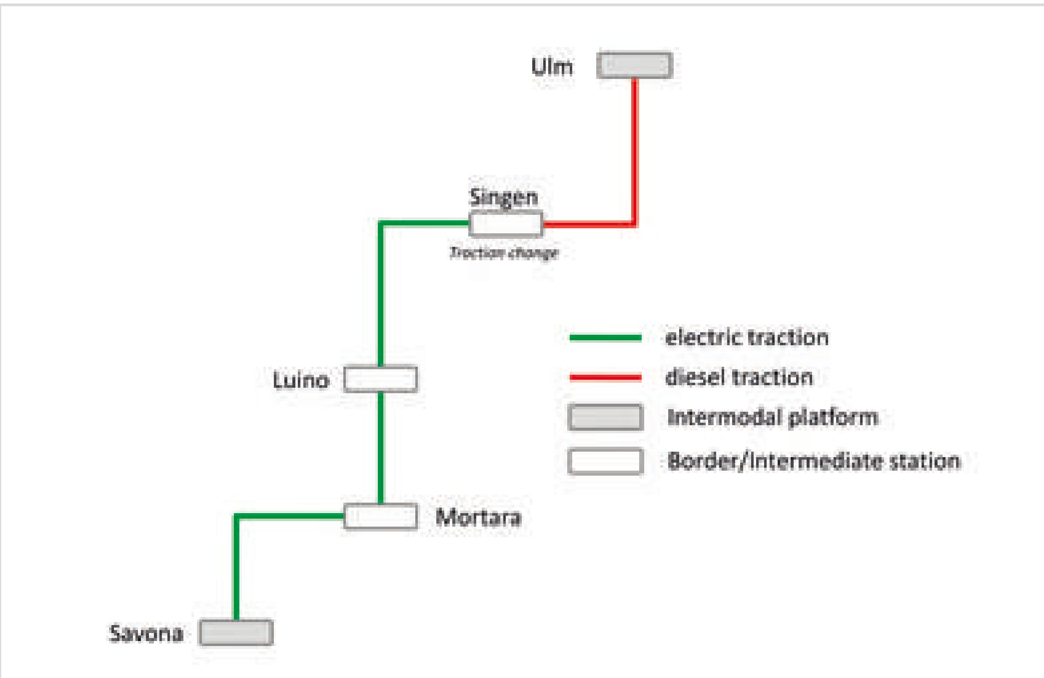
### *commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Luka Koper (owner of terminal and handling operator), adria Kombi/slovenian railways (train operator)* |
| *arrival terminal* | *A terminal in Baden-Wuerttemberg (not defined yet)* |
| Further rail bound connections from and to start respectively end points | Not defined yet |

## 3.4.4 Pilot trains from ligurian Ports via lombardy region to baden-w uerttemberg/bavaria

- ***ulm – savona (rVdi, rl)***

Due to the fact, that the demand structure does not allow a direct maritime connection between Baden-Württemberg/Bavaria and Ligurian Ports, this concept for a connection between Ulm and Savona uses the pilot project Ulm-Mortara (s. a.) as basis and combines it with connections further south. Between Mortara and Savona in late 2011 a new direct intermodal train could be implemented - not least with the help of the project partner Lombardy Region. The test operational phase of the Savona/Vado - Mortara shuttle demonstrated the technical feasibility of the connection. At the port of Savona Vado in 2014 a new deep water container terminal will be opened. Considering this time horizon, the availability of a dry port for container transhipped in Savona will become a key issue. The pilot action has the aim to provide a via-gateway connection between Ligurian Ports and Baden-Württemberg with 24-hours transit time (CT to AT).




**Course of the connection Ulm – Savona.**
Source: own illustration, RVDI

The following charts show the main characteristics of the Savona-Mortara shuttle, connected with the Ulm-Mortara shuttle (s. a.).

### *Physical features:*

| | |
|---|---|
| Departing terminal | Savona Vado Reefer Terminal |
| Arrival terminal | Mortara |
| Distance | 160 km |
| Border crossing(s) | None |
| Track technical information: | |
| *single/Double track* | |
| *Electrified/not electrified* | *Electrified* |
| *Profile* | *P/c 22* |
| *Maximum length* | *550 m* |
| *Maximum weight* | *1,000 t (single loco)*<br>*1,400 t (double loco)* |

### *Main characteristics:*

| | |
|---|---|
| Transit time (T2T) – Closing time – Availability time | CT Savona: 17.00<br>AT Mortara: 23.00<br>CT Mortara: 13.15<br>AT Savona: 16.00 |
| Frequency | 3-5 departures per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | € 390/TEU |
| Train time schedule | 19.30 - 22.30 |
| Possible loading units e.g. ISO-containers, swap-bodies, trailers etc. | Containers (not high cube), swap bodies |
| Freight/goods transported (allowed) | General containerised cargo, chemical |

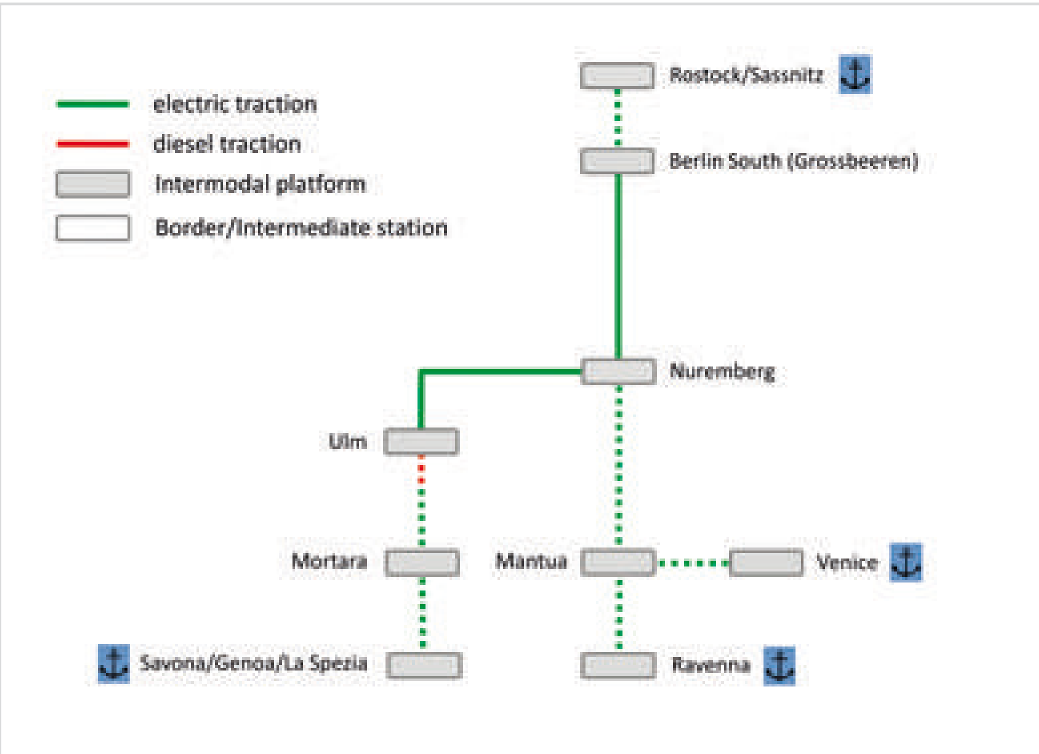
### *commercial features:*

| | |
|---|---|
| Intermodal Service Provider | FERNeT (http://www.fernetsrl.eu) |
| Handling terminal operators: | |
| *Departure terminal* | *Vado Reefer Terminal* |
| *arrival terminal* | *TIMO - Terminal Intermodale di Mortara s.p.a. (http://www.terminalmortara.it/ita/)* |
| Further rail bound connections from and to start respectively end points | In Mortara connections to Rotterdam (5 trains/week) and Krefeld (3, expected 5 trains/week) are currently available. |

- ***berlin-grossbeeren – nuremberg – ulm (gl)***

The Alp-crossing links between Nuremberg and Mantua as well as Ulm and Mortara connect important intermodal nodes, which can act as hub for new services (respectively towards Scandinavia or Northern Germany and the Italian ports or Central and Southern Italy). The freight village Berlin South Grossbeeren is the most important transfer and distribution centre in the metropolitan area of Berlin-Brandenburg.

The new service between Berlin Grossbeeren, Nuremberg and Ulm will increase the service quality between Berlin Grossbeeren and Ulm (minimal 5 departures per week, connected with Mortara service) and the relation Berlin Grossbeeren – Nuremberg - Ulm (minimal 1 departure per week, connection with Mantua service).




**Course of the connection Berlin – Nuremberg – Ulm.**
Source: own illustration, GL

### *Physical features:*

| | |
|---|---|
| Departing terminal | DUSS Terminal at Freight Village Berlin South Grossbeeren |
| Arrival terminal | DUSS Terminal Ulm |
| Distance | 632 km |
| Cross-Border(s) | -- |
| Track technical information: | |
| *single/Double track* | *single track Donauwörth-Neuoffingen;<br>double-track Grossbeeren-Nuremberg, Neuoffingen-Ulm* |
| *Electrified/not electrified* | *Electrified* |
| *Profile* | *D4* |
| *Maximum length* | *600 m* |
| *track speed limits* | *100 km/h for freight traffic* |
| *Maximum weight* | *1,600 t* |

### *Main characteristics:*

| | |
|---|---|
| Frequency | 1-2 departure(s) per week (Grossbeeren-Nuremberg-Ulm) |
| Pricing Estimation of Price for a loading unit (container/swap body) | 22 EUR for container handling<br>1,25 EUR per km for transport (CT wagon) |
| Train time schedule | Departure Berlin-Grossbeeren: 05:30<br>Intermediate station Nuremberg Bayernhafen: 11:10-12:40<br>Arrival Ulm: 15:40<br>Departure Ulm: 05:30<br>Intermediate station Nuremberg Bayernhafen: 08:30-10:00<br>Arrival Berlin-Grossbeeren: 15:40 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Particularly ISO-containers and vehicles (special car transport wagon), others possible (e.g. swap-bodies, trailers) |
| Freight/goods transported (allowed) | Particularly general cargo and cars, no transports of hazardous goods |

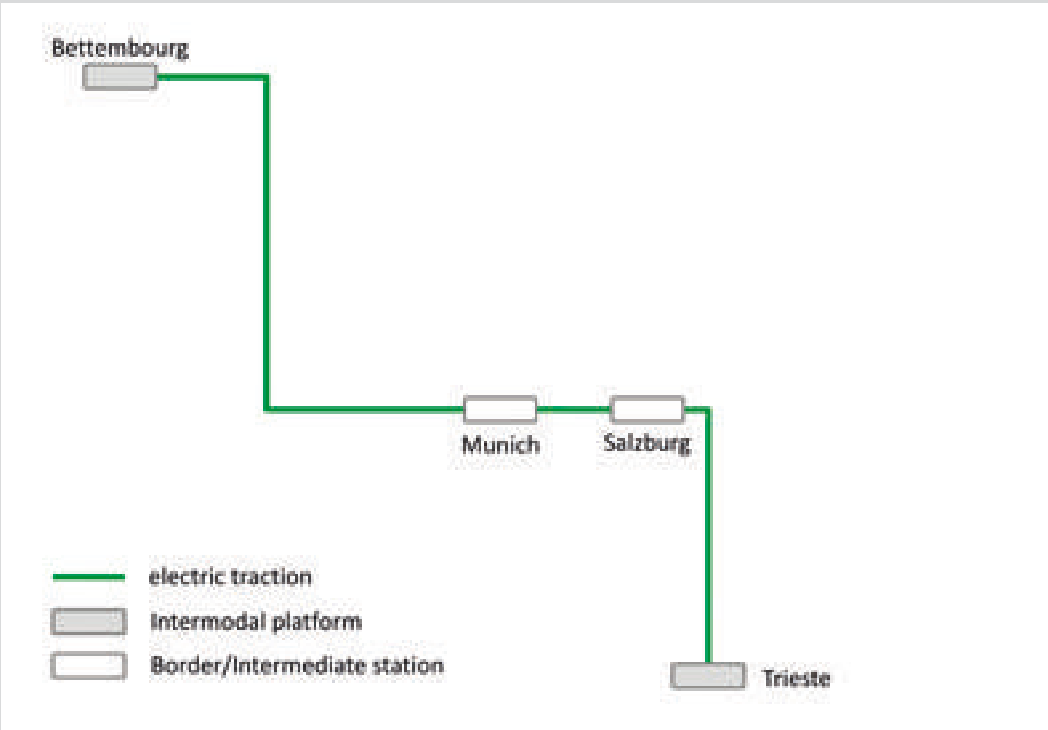
### *commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *DUss Deutsche Umschlaggesellschaft schiene-straß* |
| *arrival terminal* | *DUss Deutsche Umschlaggesellschaft schiene-straße* |
| Further rail bound connections from and to start respectively end points | - FV Berlin South Grossbeeren as hub to Scandinavia, North Sea ports and Eastern Europe<br>- Ulm and Nuremberg as starting points of Alp-crossing services |

## 3.4.5 Pilot trains between friuli-v enezia-giulia region and eastern europe

- *t rieste – munich – bettembourg (lux) (FVg)*

The link between Trieste and Bettembourg via Munich is dedicated to semitrailer traffic mainly originated by Turkey ports via Ro-Ro relations towards Trieste. The transit via Munich will enable an optimization of loads, whether it is to be defined if the relation will have a stop or will be split in two trains. Moreover, since Bettembourg is located in the heart of North-West Europe, the terminal can act as a hub for freight traffic in a broad area.




**Course of the connection Trieste – Munich - Bettembourg.**
Source: own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | Port of Trieste |
| Arrival terminal | Munich, Bettembourg (Lux) |
| Distance | 960 km |
| Border crossing(s) | Tarvisio-Villach (IT-AT)<br>Salzburg (AT-DE)<br>Igel (DE-LUX) |
| Track technical information: | |
| *single/Double track* | *Trieste - Munich double-track* |
| *Electrified/not electrified* | *Electrified* |
| *Profile* | *PC/80* |
| *Maximum length* | |
| *track speed limits* | |
| *Maximum weight* | |

*Main characteristics:*

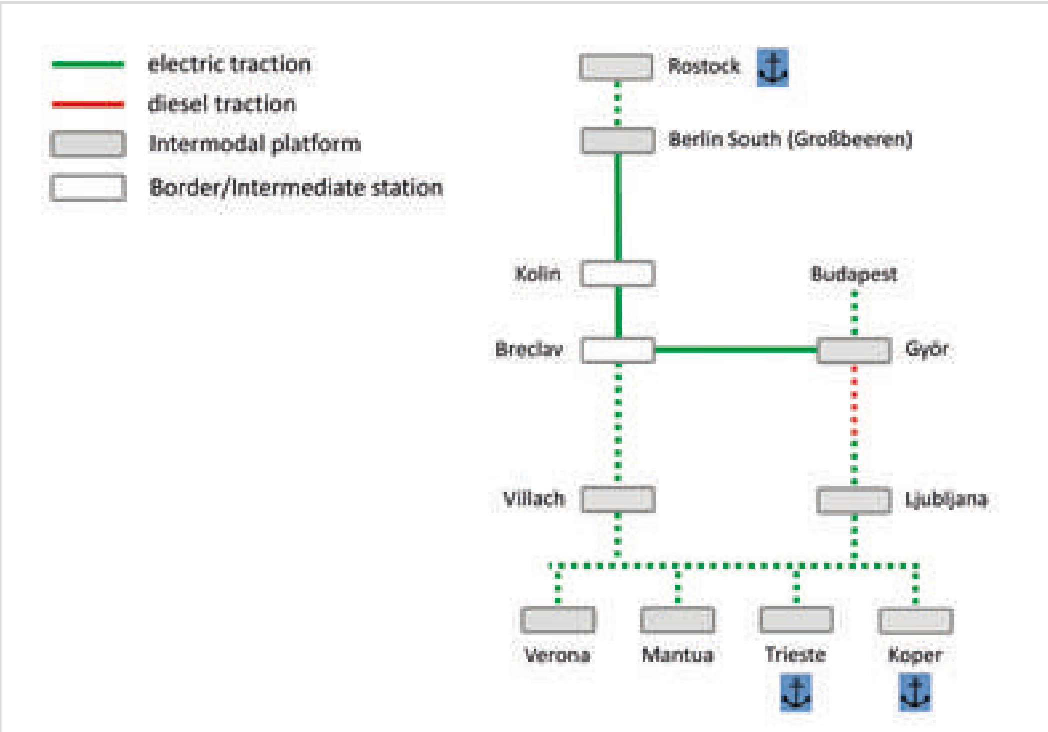
| | |
|---|---|
| Frequency | One departure per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | 15.35 Euro train/km<br>898 Euro/unit (Trieste-Bettembourg)<br>*523* Euro/unit (Trieste-Munich) |
| Train time schedule | Work in progress |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Swap bodies |
| Freight/goods transported (allowed) | |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Parisi* |
| *arrival terminal* | *CFL Multimodal* |
| Further rail bound connections from and to start respectively end points | - From/to Trieste: Turkey, Ro-Ro relations<br>- From/to Munich: hub to northern Germany and northern Europe<br>- From/to Bettembourg: northwestern Europe |

- ***eastern tangential route: györ – breclav – berlin south (gl)***

The designed service from Berlin-Grossbeeren via Kolin and Breclav (as important intermediate stations in Czech Republic) to Györ in North Hungary will represent an effective rail connection between Scandinavia (via Rostock/ Saßnitz), the region of Berlin-Brandenburg and the NAPA ports. Connecting point is the railway junction at Györ, with the TRANSITECTS pilot train Budapest – Mantova created by the partner ALOT. The whole route will act as Eastern tangential route surrounding the high Alps. This attracts important Slovenian combined transports from Koper via Ljubljana to the North. The stop at the Breclav freight yard guarantees the access to the ÖBB Südbahn axis (Wien, Villach, Verona/Trieste/Koper).




**Course of the connection Györ – Breclav – Berlin South.**
Source: own illustration, GL

### *Physical features:*

| | |
|---|---|
| Departing terminal | DUSS Terminal at Freight Village Berlin South Grossbeeren |
| Arrival terminal | Freight yard Györ (respectively CT Terminal Mantua) |
| Distance | 822 km |
| Cross-Border(s) | Germany/Czech Republic (Bad Schandau/Decin)<br>Czech Republic/Slovakia (Lanzhot/Kuty)<br>Slovakia/Hungary (Rusovce/Rajka) |
| Track technical information: | |
| *single/Double track* | *Single-track Bratislava-Hegyeshalom;<br>Double-track Grossbeeren-Bratislava, Hegyeshalom-Györ* |
| *Electrified/not electrified* | *Electrified (different systems, locomotive changing ore multiple-system-locomotive necessary)* |
| *Profile* | *D4* |
| *Maximum length* | *600 m* |
| *track speed limits* | *80-100 km/h for freight traffic* |
| *Maximum weight* | *1,600 t* |

### *Main characteristics:*

| | |
|---|---|
| Frequency | 2 departures per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | 22 EUR for container handling<br>1,25 EUR per km for transport (CT wagon) |
| Train time schedule | Departure Berlin-Grossbeeren: 18:30<br>Arrival Györ: 10:00 (next day)<br>Departure Györ: 18:30<br>Arrival Berlin-Grossbeeren: 10:00 (next day) |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Particularly ISO-containers and vehicles (special car transport wagon), others possible (e.g. swap-bodies, trailers) |
| Freight/goods transported (allowed) | Particularly general cargo and cars, no transport of hazardous goods |

### *commercial features:*

| | |
|---|---|
| Handling terminal operators:<br>*Departure terminal*<br>*arrival terminal* | <br>*DUss Deutsche Umschlaggesellschaft schiene-straße*<br>*MAV Group (Kombiwest, LCH)* |
| Further rail bound connections from and to start respectively end points | - FV Berlin South Grossbeeren as hub to Scandinavia, North Sea ports and Eastern Europe<br>- Györ as connecting point to Budapest-Mantua service and via Breclav-Villach or Györ-Ljubljana to the NAPA ports |


Source: IPG

Contact Chapter 3.4

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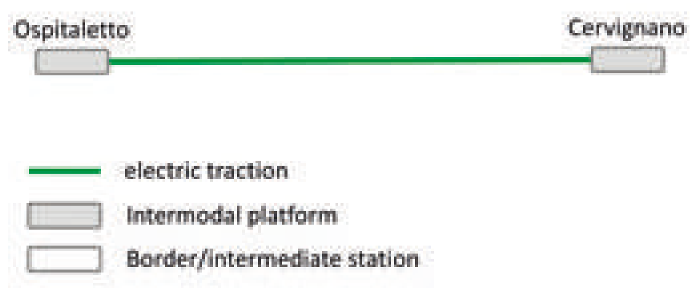
## 3.5 pilot projects – accompanied combined transport

### 3.5.1 Pilot train between lombardy region and austria / eastern europe

- ***ospitaletto - cervignano (alot , FVg)***

Soon on the A4 between Venice and Triest works for the 3rd lane will start. Road traffic will be very difficult. The current situation shows already (some specific days/some peak hours) very critical situations. This is an infrastructure with a high level of pass-through traffic (from Austria and Eastern Europe to Italian destinations and vice versa). This service (even temporary) could be a "reorientation" of transport policy to introduce a new rail cargo service substituting road traffic in a high congested area.




**Course of the connection Ospitaletto - Cervignano.**
Source: own illustration, RVDI

*Physical features:*

| | |
|---|---|
| Departing terminal | Ospitaletto Terminal |
| Arrival terminal | Cervignano Freight Village |
| Distance | 290 km |
| Border crossing(s) | n.a. |
| Track technical information: | |
| *single/Double track* | *Double track* |
| *Electrified/not electrified* | *Electrified* |
| *Profile* | *P/C 45 Ospitaletto-Verona*<br>*P/C 80 Verona-Cervignano del Friuli* |
| *Maximum length* | *700 m* |
| *track speed limits* | |
| *Maximum weight* | |

*Main characteristics:*

| | |
|---|---|
| Frequency | Six departures per day |
| Pricing Estimation of Price for a loading unit (container/swap body) | 17 Euro train/km<br>380 Euro/unit |
| Train time schedule | Starting from Ospitaletto: 8, 10, 12, 14, 16, 18<br>Arrival in Cervignano: 12, 14, 16, 18, 20, 22 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Lorries |
| Freight/goods transported (allowed) | |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Bertani* |
| *arrival terminal* | *interporto di cervignano* |
| Further rail bound connections from and to start respectively end points | Both the terminals could be hubs for long haul trucks who need to avoid the A4 congested motorway or need the mandatory stop-time |

### 3.5.2 Pilot trains between lombardy region and baden-w uerttemberg/bavaria

- ***ospitaletto - singen (alot)***

Freight road transport across the Alps has a huge impact on mountain environment: particularly the passage through Switzerland is more expensive for trucks due to taxation on road transport. Against this background the Association of Road truckers of Brescia searches for an alternative service to avoid passing through Switzerland for their lorries.

*Physical features:*

| | |
|---|---|
| Departing terminal | Ospitaletto (Bertani) Terminal |
| Arrival terminal | Singen |
| Distance | 737 km |
| Border crossingr(s) | Brenner (IT-AT)<br>Scharnitz/ Mittenwald (AT-GER) |
| Track technical information: | |
| *single/Double track* | *Double-track* |
| *Electrified/not electrified* | *Electrified (with electricity changing at Brenner)*<br>*locomotive changing or multiple-system-locomotive* |
| *Profile* | *P/C 80* |
| *Maximum lenght* | *550 m* |
| *track speed limits* | *1,200 t (South to North)* |
| *Maximum weight* | *1,100 t (North to South)* |

*Main characteristics:*

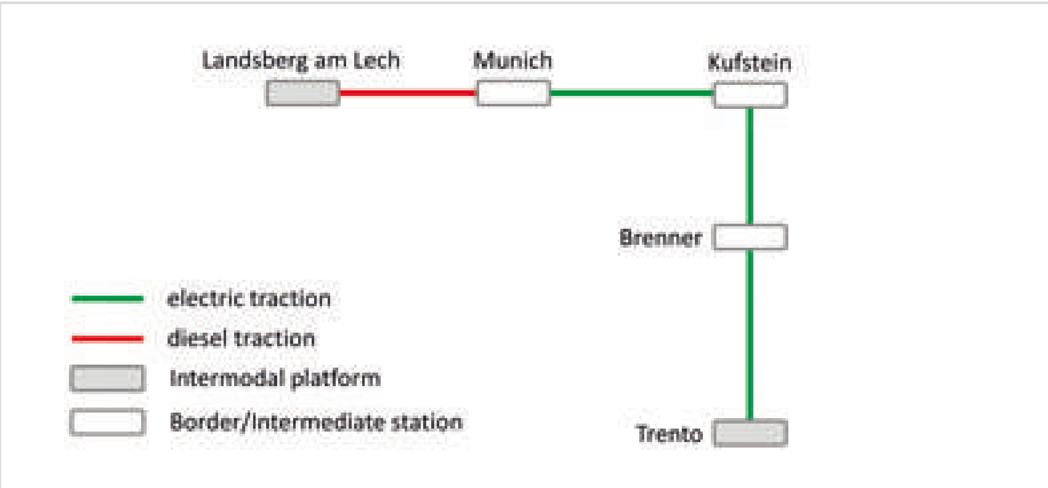
| | |
|---|---|
| Frequency | Five departure per week |
| Pricing Estimation of Price for a loading unit (container/swap body) | 20 Euro train/km<br>890 Euro/unit |
| Train time schedule | Starting from Ospitaletto: 20.00<br>Arrival in Singen: 5.00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Lorries |
| Freight/goods transported (allowed) | |

*commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Bertani* |
| *arrival terminal* | *t.b.d.* |
| Further rail bound connections from and to start respectively end points | |

## • landsberg am lech - t rento (rVdi)

A new attractive RoLa connection from Landsberg am Lech (South Germany) to Trento (North Italy) was developed. The planned pilot train could be a very good alternative to road transport for forwarders, hauliers and loading agencies in the region Baden-Wuerttemberg/ Bavaria and North Italy. From a transport-policy point of view the system is very helpful for small and medium-sized companies. They can shift their goods transports from road to rail without special requirements and investments. The location in Germany is a result of an infrastructure analysis to find a location for a new RoLa service from Bavaria/Baden-Württemberg to Italy. The concept is advanced so far that the RoLa could start after carrying out the required measures in Landsberg am Lech. The final implementation still depends on two open issues: market-oriented pricing with the help of funding and short-term availability of low-floor wagons.




**Course of the connection Landsberg – Trento.**
Source: own illustration, RVDI

### Physical features:

| | |
|---|---|
| Departing terminal | Terminal of a private company in Landsberg am Lech |
| Arrival terminal | RoLa-Terminal Interbrennero S.p.a. in Trento-Roncafort |
| Distance | 400 km (railway), 390 km (road) |
| Border crossing(s) | Kufstein (GER-AT)<br>Brenner (AT-IT) |
| Track technical information: | |
| *single/Double track* | *single track from Landsberg am Lech to Kaufering<br>Double track from Kaufering to Trento via Munich* |
| *Electrified/not electrified* | *Not electrified from Landsberg am Lech to Geltendorf; Electrified from Geltendorf to Trento via Munich (with electricity changing at Brenner), locomotive changing or multiple-system-locomotive* |
| *Profile* | *Line category: D4 Gauge: G1-G2* |
| *Maximum length* | *540m* |
| *track speed limits* | *70-100 km/h* |
| *Maximum weight* | *1,400 tons* |

### Main characteristics:

| | |
|---|---|
| Frequency | Five departures per week in both direction |
| Pricing Estimation of Price for a loading unit (container/swap body) | First indications – not in line with the market |
| Train time schedule | Departure in Landsberg/Lech: about 20:00<br>Arrival in Trento: about 04:00<br><br>Departure in Trento: about 22:00<br>Arrival in Landsberg/Lech: about 06:00 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | 21 trucks with a maximum of 42 tonnes (total weight) per truck |
| Freight/goods transported (allowed) | e.g. paper, foodstuff, timber and all products which were transported by truck with the exception of hazardous goods |

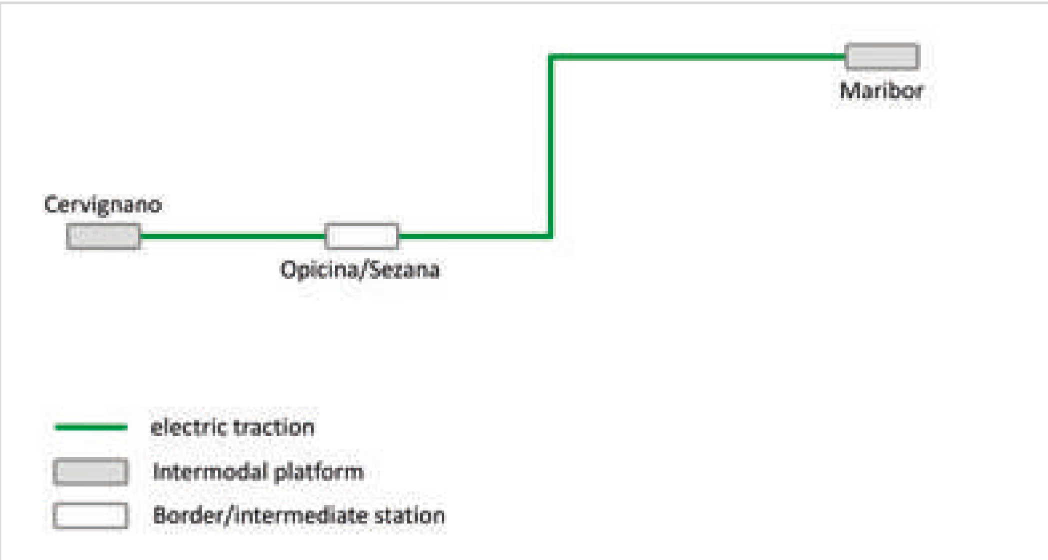
### commercial features:

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *Ilim Timber Bavaria GmbH* |
| *arrival terminal* | *interbrennero s.p.s* |
| Further rail bound connections from and to start respectively end points | |

## 3.5.3 Pilot train between friuli-v enezia-giulia region and eastern europe

- ***cervignano – maribor (FVg, mot)***

The current situation already shows (some specific days/some peak hours) very critical situations on Slovenian motorways in East-West direction. This is an infrastructure with a high level of pass-through traffic (from Eastern Europe to Italian destinations and vice versa). This service could be a "reorientation" of transport policy to introduce a new rail cargo service substituting road traffic in a high congested area.




**Course of the connection Cervignano - Maribor.**
Source: own illustration, RVDI

### *Physical features:*

| | |
|---|---|
| Departing terminal | Cervignano Freight Village |
| Arrival terminal | Maribor Tezno |
| Distance | 290 km |
| Border crossing(s) | Villa Opicina/Sezana (IT-SI) |
| Track technical information: | |
| *single/Double track* | *Double track;* |
| *Electrified/not electrified* | *Electrified* |
| *Profile* | *P/C 80* |
| *Maximum length* | *700 m/550 (Slovenia)* |
| *track speed limits* | *100 km/h (Slovenia)* |
| *Maximum weight* | *1,700 gross tones (in Slovenia, at maximum weight double traction is needed on some sections)* |

### *Main characteristics:*

| | |
|---|---|
| Frequency | One departure per day |
| Pricing Estimation of Price for a loading unit (container/swap body) | 20 Euro train/km<br>890 Euro/unit |
| Train time schedule | Starting from Cervignano: 22<br>Arrival in Maribor: 04 |
| Possible loading units (e.g. ISO-containers, swap-bodies, trailers et.) | Lorries |
| Freight/goods transported (allowed) | Some types of dangerous goods are not allowed (according to ADR) |

### *commercial features:*

| | |
|---|---|
| Handling terminal operators: | |
| *Departure terminal* | *società interporto di cervignano* |
| *arrival terminal* | *slovenian railways (owner of terminal and handling operator), adria Kombi (train operator)* |
| Further rail bound connections from and to start respectively end points | Both the terminals could be hubs for long haul trucks which need to avoid the Slovenian congested motorway or need the mandatory stop-time |


Source: IPG

Contact Chapter 3.5

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Source: Matthias Wagner

# 4 Calculating the Environmental Effects of Pilot Connections: Specific Environmental Model (*)

## 4.1 introduction

Within TRANSITECTS the Italian Ministry of Environment, Sea and Land Protection (MATTM) in collaboration with the European Academy of Bolzano Bozen (EURAC research) elaborated a “Specific Environmental Model”, with the external expertise of Csst – Iveco SpA. The model aims at calculating of the environmental impacts (estimation of emissions) of the new pilot rail connections for Accompanied and Unaccompanied Combined Transport developed within TRANSITECTS.

The benchmark of the environmental estimation are emissions referred to the single moved twenty–foot equivalent unit (TEU), which represents the worldwide standard unit of measurement for containers.

The basic calculation concerns the reduction of emissions of CO2, NOx and PM10 per single TEU by the exercise of the new concept of rail service (pilot project forecasting technical and operative characteristics available to estimate pollutant emissions and greehouse gases), compared to the operational current status, usually transport by road.

In the context of the activities realized for the WP4 (in the frame of a combined and unaccompanied transport - UCT) and WP5 (accompanied - ROLA), the feasibility of new pilot projects for railway facilities was efforded, from a technical, economic and functional point of view.

Specifically, main features have been identified for each pilot project, in terms of:

- routes (origin/destination of new services, involved terminals, passes, distances)
- service data (transit time, frequency, volumes, costs and tariffs) and rail network attributes, as for instance, speed and line limitations and so on.

*Italic*: * *the contents presented in this chapter have been elaborated in work package 6. responsible for contents, illustrations and texts is the TRANSITECTS project partner “Italian Ministry of Environment, Sea and Land Protection.”*

• These parameters were used to achieve the objectives of the WP6 :

- Definition and standardization of the typical technical parameters required to dynamically estimate the environmental effects for each TRANSITECTS pilot project (as developed in work packages 4 and 5.
- Selection of homogeneous parameters such as emission standards (Euro classification of heavy duty vehicles) for the involved vehicles, the typology of rail traction and other specific parameters for each pilot project.
- Functional evaluation of the provisional scenarios for each pilot-project;
- Estimation of benefits in terms of emission reduction for each pilot project, related to the new modal shift for road transport.

For each pilot project the environmental model identifies in WP6 allowed to identify the environmental benefits related to the shift from road to rail.

The pilots projects and their characteristics have been constantly discussed with other project partners (PP) in order to identify the main paramteres of the pilot projects. This refers in particular to the partners of WP4 and WP5 in order to ensure the best environmental performances for the pilot projects, explained more in detail in this chapter.

The activity of emission estimation per single TEU, regarding the comparison between project scenario and current status, it was based on an algoritm calculating emission impacts deriving from freight transport moves.

The "T-Env" Model has been employed in order to check and calculate the air pollutant emissions produced by traffic, according to the different scenarios of intervention defined in the pilot projects. The model is universally recognized as valid in the field of the impacts evaluation of the transport system at a macroscopical level. It is particularly suitable to evaluate effects on transnational and pan-European corridors. It has already been used for other modeling implementations, for example during strategic projects in the framework of the Interreg ETC progrm AlpineSpace, such as AlpCheck and AlpCheck2, as part of the activities assigned to the MATTM, official partner in the project.

## abbreviations

| | |
|---|---|
| WP | Work Package |
| UCT | Unaccompanied combined transport |
| ROLA | Rolling Highway |
| TEU | Twenty-foot Equivalent Unit |
| CO2 | Bioxide of Carbon |
| NOx | Oxide of Azot |
| PM10 | Tiny Particulate |
| O/D | Origin/Destination |
| PP | Pilot Projects |
| UFT (FOT) | Federal Office of Transport |
| CAFI | Franco-Italian Alps Conference Association |
| CAFT | Cross-Alpine Freight Transport (CAFT) |
| RHA | Road Haulage Association |
| MATTM | Italian Ministry for the Environment |
| EURAC | European Academy of Bolzano Bozen |
| CSST | Centro Studi sui Sistemi di Trasporto |
| T-Env | Transport Environment (Emission Model) |
| DSS | Decision Support System |

## 4.2 idea and approach

*this chapter describes the innovative benchmarks of the methodological approach concerning the environment evaluation modelling tool.*

*The T-Env Model is the ultimate step of a system of multi-functional evaluation models. This toolbox is suitable to estimate and evaluate the main efficiency indicators of multimodal freight transport.*

*In the context of Transitects, the specific modelling tool has been implemented. This allows simulating the emission impacts in the alpine space.*

*T-Env Model was used because of the implementation of outcomes is directly linked to the transport modelling allocation. this means that it elaborate emissions estimationf taking into account the effective traffic characteristics (for example, bottleneck, commercial speed, gradient, tunnels, etc).*

*the majority of environmental modelling tool (for example, ecotransit) supplied from the euoropean market, provide outcomes regarding the emissions estimation, simulating a theoretical condition on standard and empty roads.*

*The specific application of the T-Env Model carried out to evaluate the emissions per single TEU moved, on specific modality and on specific rail-road route. It brings into account the actual capacities of rail and road routes and the real exercise characteristics.*

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According to the project idea, the quantification of the environmental impact produced by each PP and the related modal shift are the reference criteria for the sustainability of the pilot projects. This is possible by confrontnig the environmental effects of the different transport modes.

Therefore, starting from the single relation O/D of the freight traffic considered, it is possibile to determine the advantages in terms of environmental benefits of the new connections. This process aims at pursuing the common improvement of the air quality conditions with regard to the freight road transport along the main transborder connections.

The project was implemented through an innovative methodological approach, comparing each single pilot relation (on an identified origin/destination-route) and reporting the emissions for each single modality of transport, expressed by single TEU unit.

The new pilot train connections were developed either for accompanied (e.g. RO-LA) or unaccompanied (UCT) freight transport. The pilot projects have been analysed based on the origin-destination relation as provided by the PP. For each pilot connection, air pollutants emitted by both rail transport and the corresponding emissions by the usual route on the road have been calculated. The confrontation of these values allowed estimating the enviornmental effects of the pilot project.

### 4.2.1 methodology and modelling tool

*this paragraph describes the advantage of the chosen methodological approach. the description refers to the operational relationship between the transport functional modelling assignment and the allocation and the emission evaluation modelling tool.*

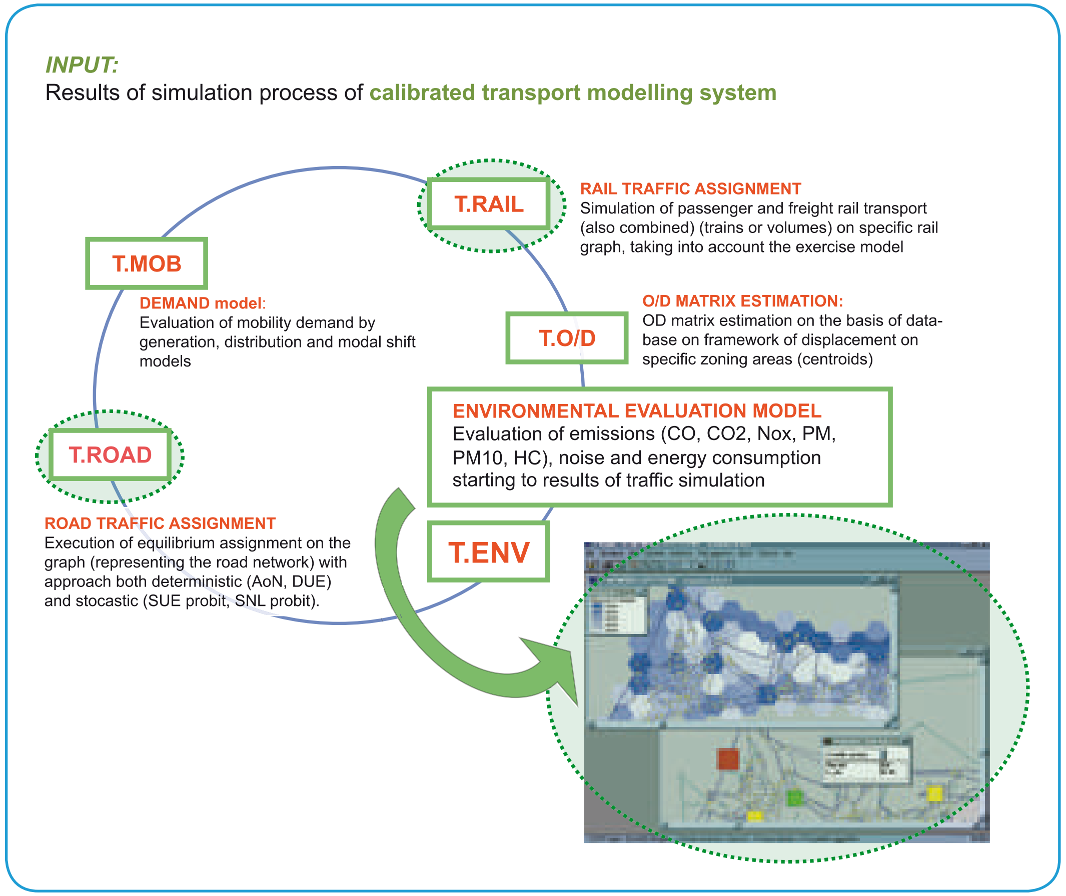
*Outcomes concerning the pollutant emissions and gases are the results deriving from the outcomes concerning the effective operational allocation of traffic on the network..*

The algorythm of the T-ENV Model[1] has been used to evaluate and calculate the polluting emissions for the pilot projects, comparing the trip on the road to the new rail connection. As indicators for the environmental effects $CO_2$, NOx and PM10 have been chosen. For some pilot projects it has also been possibile to measure the average energy consumption per km per transport mode.

1 *Developed by CSST - Centro Studi sui Sistemi di Trasporto, now operational sector for IVECO SpA - Fiat industrial*

The calculation of the itinerary and the air pollutant emissions is based on the bare connection between the involved intermodal platforms. To make the calculations more transparent it has been decided not to consider pre- and on-carriage to/from the intermodal terminals in the calculation.

The T.Env modelling tool allows the evalution of the existing and foreseen road and rail traffic flows (freight and passengers), both in relation to the implementation of new pilot projects and for the considered transport system in different conditions (development scenarios).




**T-ENV-Model – schematic illustration of the functionality.**
Source: own illustration

For this reason. the concrete advantage of the chosen modelling architecture is the strict linkage between the evaluation of the functional effects of transport and its impacts (expressed in terms of estimation of emissions).

The starting point was an estimation of the flows on the network, aiming at defining potential increases and/or decreases of the pollutants produced by the vehicle flows in the road/rail network. This is consistent with what is foreseen by the metodology of the modeling assignment and distribution and also considers the scenarios of reference and simulates the emissions from vehiclae traffic.

Inputs for this emission evaluation model are the results produced by the model of transport simulation, specifically built and implemented for the representation of the road and rail traffic flows (freight and passengers) within the Alpine Space.

The transportation model simulates both private and commercial vehicles. They are implemented by means of road and rail graphs on the existing and the foreseen network. This allows a plausibile analysis of the actual condition on the road and rail network.

In the case of mountainous regions (such as the Alps), T-Env allows evaluating potential benefits on the air quality. This special feature is derived from the shift of road freight traffic to the new rail connections for combined freight transport. Its link to a specific management software facilitating the interaction of the users (interactive graphics) allows evaluating both the functional and environmental performances of the single systems of the transport network including the selected Pilot Project.

Both the present situation and the scenarios of future development made as a reference allow simulating the mobility of freight vehicles within the studied area.

### 4.2.2 Transport modelling system

*In this paragraph, the framework of the multifunctional modelling tool, including the specific t-env model, is described. this is important to underline the technical layout linking the transport functional and the emission evaluating components of the model.*

The transport functional model is integrated into the emission model and evaluates the functional outcomes of long-haul freight transport vehicles (sharing of flows on the network, average speed, modal split, etc.) . This implementation brings into account to the deployment and calibration in the context of several projects carried during the ETC Alpine Space programme, such as Alpencors, Alpfrail and AlpCheck.

The latest implementation of Transitects modelling tool, specifically concerning the road traffic, is based on the first results of the modelling tool of the ETC AlpineSpace project AlpCheck2.

**This modelling system is composed of three elements:**

- **supply model** with the relevant assets for the functioning of the transport network;
- **demand model**, which allows to estimate the demand of transport with the related characteristics (level and distribution per destination and mode of transport) in function of a defined asset of the territory and of the transport supply;
- **interaction demand-supply model** which allows simulating how the supply meets the demand by determining a series of variables relevant for the evaluation phase (e.g. flows, travel times, costs, criticism on links).

The input data for the environmental model is the output of the implemented simulation model for transports, which provides the values influencing flows, consumptions and unit emissions per transport modality

The model of interaction of the transport system simulates the way in which the application uses the system to produce flows on the arcs of the represented networks. In particular, the model of the transport system is characterized by a congestion, with a circular dependance between demand, flows and costs (volume delay functions)[2].

**The main functional elements of the transport model are:**

- The **graph of the transport system**
  The graph is the graphic layout of network, copying the actual transportation network by a georeferenced sequence of links (arcs) and nodes that schematize the selected road/railway/harbours/intermodal platforms network.
- The **characteristics of the transport supply**
  Technical characteristics of selected network expressed in paramters for each element - such as the length (in km) and capacity (in vehicles for a certain time), project speed, route typology, number of lanes / tracks, gradient values, tolls, etc. of each link.
- The **framework for the demand**
  It estimates flows and the volume of traffic, referring to the Origin / Destination matrix, per tipology of user and estimation of the average cost/time estimation.
- The **modal shift**
  Estimation of sharing of transport among modes of transport, with reference to the equivalence values (e. g. concerning the relation truck to rail: tons per vehicle and/or TEU per vehicle).
- The definition of **future scenarios (pilot projects)**
  Identification of network after the implementation of a new rail service, with reference to the schematization of technical characteristics.

The model of interaction of the transport system simulates the mode through which the software application uses the system to allocate traffic flows along the links of the graph.

*2 The transport demand is influenced by the time value (traduced in terms of costs) in the diverse dimensions of the choice (frequency, destination, type of vehicle and route), the flows depend from the demand and from how the network is used and the costs depend from the flows on network arcs in a non linear way, due to congestion (factors).*

## *supply model*

The supply model is a mathematical description of the main elements of the actual system and their interrelations. It is based on a theory of the graphs, on the functions of costs/flows and on the performances (e.g. level of service) of the arcs in the network.

The following paragraph describes the carachteritical sequences when building up the supply model.

The first phase consisted in the delimitation of the study area (the geographic area which encompasses the transport system to be analyzed). In more detailed words the area of interest functionally affected by the by the majority of the effects of the planned interventions Thus, the area outside of the zone of the analysis, is the exterior environment. It is excusively affected by the interconnections with the project system.

In the second phase the study area has been framed in **homogeneous traffic areas** from the point of view of the settlement characteristics and of the transport offer, at a level which is compatible with the thoroughness of the data provided by WP4 and WP5. A point have been associated to each area (centroid node) where the origin and destination matrices are concentrated for the movements regarding the area of interest.

The model foresee the subdivision of the area of study in 1043 homogenous areas (centroid deriving from the Project AlpenCors) where the origins and destinations of the transfers are likely to be located. Fig.

In this specific analysis, the zoning was implemented by the subdivion with more narrow sub-areas referred to zones which are more strategical in view of the functionality of the Alpine network, in particular with respect to those which are considered within the context of the Pilot Projects.

The extraction of the graphs consented the identification of the space-time positions (nodes) and of the connections (arcs), which were considered relevant in view of the representation of the network.

The infrastructures to be included in the model have therefore been identified, included the (fictitious) arcs which link the centroid and the network as well as the characteristic of the elements of the graph.

In particular, the reference network was implemented with the following parameters:

- **basic characteristics** (topological information),
- **infrastructures** (length, width, number of lanes and of rails),
- **quality of the service** (commitment/capacity relationship and basic average speed)
- **cost for the user** (motorway toll differentiated per subject managing in Euro/km, where this is present; cost of the tickets for railway users etc).

The following figures are the exemplary representation of the road and the rail graph with reference to the alpine area considered.

**Road graph and flowgramme – extract.**
Source: own elaboration on the basis of AlpCheck project

**Rail graph – extract.**
Source: own elaboration on the basis of AlpFrail Project

## *demand model*

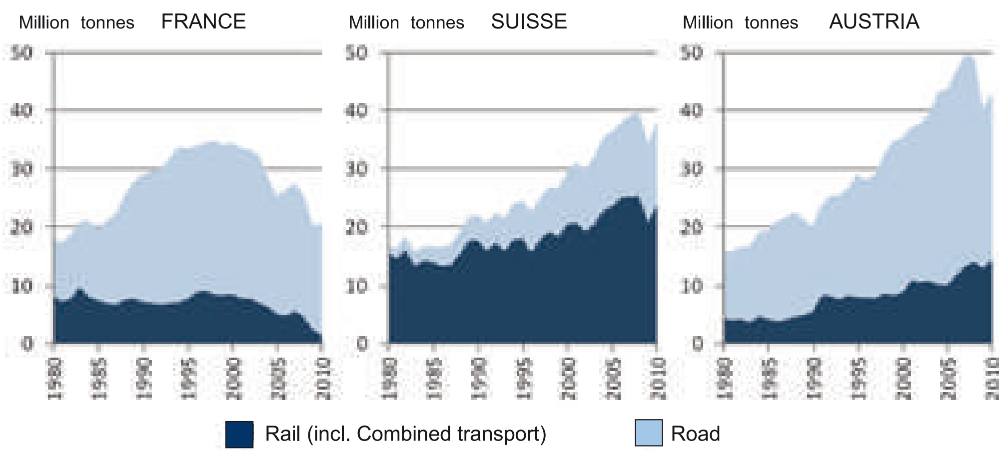
The demand model links the average value of the transport demand for light and freight vehicles to the transport supply. The relevant time horizon is identified as an average weekday in the leading month.

Data from previous Alpine Space Programme Projects (Alpencors, AlpFrail, AlpCheck, with ultimate calibration on the basis of first elaboration of AlpCheck2 modelling tool) has been used to estimate the demand of light and heavy vehicles on the road (integrated by the elements of the flows coming from the marittime traffic).

The parameters necessary to calibrate the modelling tool, above all to define the road-rail modal shift factors, have been completed based on the following databases:

- UFT – Federal office of transport (FOT) – Swiss Confederation - Alpinfo data 2010.
- CAFI (Association of the Conference of the French-Italian Alps; Cross-border observatory of the transalpine freight and passenger traffic 1986 – 2007 (upgrading 2010)

As an example of this basic parameters, the following picture illustrates the modal split for transalpine freight transport country per country (from Alpinfo 2010.




| | FRANCE 2010 | | SUISSE 2010 | | AUSTRIA 2010 |
|---|---|---|---|---|---|
| Road | 92,3% | Road | 37,4% | Road | 66,6% |
| Rail | 7,7% | Rail | 62,6% | Rail | 33,4% |
| Tot | 20,8 million tonnes | Tot | 38,4 million tonnes | Tot | 43,0 million tonnes |

**alpine borders.**
Source: Alpinfo 2010



## *models of interaction demand-supply*

In the WP6 of the project, models of interaction demand-supply are applied for the road transport, because of main outcome concerns the reduction of emissions removing road traffic in favour of new rail services (UCT and RO-LA systems).

**Mathematical models of interactions of the transport system** simulate how the demand makes use of the supply system producing flows along the links of the network represented.

A circular dependency among demand, flows and costs may take place. Specifically, the demand of transport on the road network is influenced mainly by the "time factor", which is translated in costs.

Euro 18 per hour is the average cost for 1 hour assumed to estimate the equivalence time=cost for the freight transport.

The costs of trip depends on the flows along the links of road network in a non-linear way due to the congestion.

In detail, the model used for representing the interaction demand-supply for the road network is based on a process of stochastic equilibrium[3].

The outputs of the road model (vehicle flows) regarding the transfers during weekdays, are divided in:

- **light vehicles** (cars + vans <3.5 ton.)
- **heavy vehicles** (vans > 3.5 ton.+ lorries + articulated lorries + buses);
- **equivalent vehicles** (specifically for determining the relationships committment-capacity and, therefore, the analysis of the criticism)[4].

The modelling allocation of traffic on the graph, representing the road network, is the basis by which to elaborate the consequent emissions, generated from the allocated traffic, by the specific "environmental model"

*3 the basis of the stochastic assignment model is the assumption that users of the road network is not fully aware of the costs of transport. in such a case it can be stated that: the path between a pair O/D used by one or more users is that of minimum cost perceived*

*4 equivalent vehicles stands for the unique measure unit including both light vehicles than heavy vehicles, evaluating these as equivalent to 2,5 light vehicles.*

## 4.2.3 environmental model

*this paragraph explains main functions of the environmental modelling tool ("t-env"), bringing into account to the outcomes of transport functional allocation of traffic and specific calculation parameters needed to estimate emissions by road and rail: framework of truck fleets according to the "euro classes", truck-train loading equivalence, energy mix for rail traction, etc.*
*it is untdertaken the operational relevance of "corinair copert 4 – step 5" elaboration, which is the technical benchmark, used at european level, from which to calculate the unit measurement of emissions per vehicle typologies, average speed and "euro classes".*

The **T. env model** allows to evaluate the relationship between demand and supply of freight transport, considering the effects upon the environment. Specificallly, the model allows the evaluation of the emissions both at a local (single track) and at a wider level (the whole corridor involved from the selected Pilot Project).

In order to meet the project's goals, the level of emissions have been evaluated for each single directional link relation for the emissions of the (main) vehicles responsible of atmospheric pollution (NOx, PM10, ecc) and gases (CO2), transport energy consumptions (fuel, gas oil, GPL).

The **inputs** of the emission model are:

- outcomes of the transport model, in terms of allocation of traffic flows (vehicles/h);
- composition of the vehicles flow (trucks), in Euro classes;
- length of the road and rail involved by the pilot project (km)
- average speed in the road sections involved by the pilot project
- emission factors (expressed in g/lt or g/km or g/Kwh)
- loading factors (average loading rate).

The **outputs** are:

- Evaluation of consumptions and emissions (CO2, NOx, PM10), in the specific matter of Transitects Project the evaluation concerns the single TEU.
- The estimation of emissions and consumptions is done through the algorithm of the model CORINAIR- COPERT IV – step 5

This algorithm consents the estimation of emissions from road transport, in relationship to defined units of measurement, according typologies, load and "euro classes" of vehicle, the average speed and traffic conditions.

In the Transitects Project, the model CORINAIR- COPERT IV – step 5 is applied to define the standard operational activities for heavy vehicles, referring the selected routes, involved by the pilot projects.

The overall emissions are calculated as follows:

$$\mathbf{Eij = \Sigma j\ (FCJ \times EFij)}$$

Where:

**Eij**: the emissions of the pollutant elements "i"
deriving from the category of vehicles "j" (g polluters)

**fC** $_j$: consumptions of the vehicles per category "j" (fuels kg)

**EFij**: the consumption per emissions factor
with respect to the typology of vehicle (g / kg of fuel)

Where I = $\mathbf{Co_2}$, $\mathbf{no_x}$, **Pm10**.

The first input, in particular the activity consisting in the estimation of the "composition of the vehicole fleet", represent a basic parameter for the right calculation of the emissions.


Source: Matthias Wagner



## 4.2.4 Technical parameters

*This paragraph frames the main technical parameters used as basic coefficients of environmental modelling tool. Specifically, there are topics per each mode of transport, referred to the alpine space.*

The used technical reference parameters are related to the following alternative procedures::

- **road transport,** on their own or on behalf of others, considering all the commercial classes vehicle;
- **combined rail,** made with container, swap body or semi-trailers owned by the company or hired, accompanied (**ro-la**) and unaccompanied (**uCT**);
- **combined sea (road + ship)**, made with container, swap body or semi-trailers (specific case of PP3).

Below, the main technical reference parameters used, the related units of measurement and the sources for the individual transport modes are reported.

In particular, transport and logistics related parameters were distinguished from those linked to emissions and peculiar of the specific territories crossed.

Source: IPG

## Freight road transport

### Basic parameters characterizing road freight transport in the Alpine Space

*TRANSPORT AND LOGISTICS PARAMETERS*

| | | |
|---|---|---|
| 1. | Truck types (size and weight) | *ton <7.5, 7.5–12 t, 12–24 t, >24–40 t, >40–60t* |
| 2. | Emission class vehicle | *cat. Euro 0-1-2 -3 – 4-5* |
| 3. | Vehicle fleet composition | *% per euro class* |
| 4. | Load factor | *ton per teU* |
| 5. | Loading rate | *%* |
| 6. | Average weight per TEU | *ton* |
| 7. | Empty weight | *ton* |
| 8. | Average commercial speed | *km/h* |
| 9. | Number of TEU per truck | *unit* |

*TRAFFIC EMISSION MODEL AND COUNTRY PARAMETERS*

| | | |
|---|---|---|
| 10. | Emission factors | *g/km – kg/ton- ton/km per vehicle* |
| 11. | Energy consumption | *MJ/km* |
| 12. | Volume delay function | *dimensionless* |
| 13. | Gradient | *%* |
| 14. | Road category | *Highways, motorways* |
| 15. | Traffic route | *km* |
| 16. | Topography | *road gradient* |

### Main basic parameters for the calculation

| | |
|---|---|
| Truck size | *>24-40 ton* |
| Emission class vehicle fleet | |
| Composition of the transit freight traffic | |
| Through the Alps for emission classes (2009) | *euro 5 – 41.6%*<br>*euro 4 – 16.2%*<br>*euro 3 – 38.8%*<br>*euro 2 – 3.4%* |
| Loading rate (Average transalpine freight traffic[6]) | *60%* |
| Average weight per TEU | *12.5 tonnes* |
| TEU per truck | *2 (2*20' container or 40' box)* |
| Average road commercial speed | *70 km/h (highways) - 50 km/h (motorway)* |

6 *CAFT 2004 - Cross-Alpine Freight Transport (CAFT) Surveys.*

## rail transport

### Basic parameters characterizing rail freight transport in the alpine area

*TRANSPORT AND LOGISTICS PARAMETERS*

| | | |
|---|---|---|
| 1. | Train type | *(roLa- Uct)* |
| 2. | Composition train | *length (m)* |
| 3. | Traction type | *electric - diesel* |
| 4. | Energy consumption | *MJ/km* |
| 5. | Load factor/empty trips | *%* |
| 6. | Average speed | *km/h* |

*EMISSION MODEL AND COUNTRY PARAMETERS*

| | | |
|---|---|---|
| 7. | Emission factors | *g/km – kg/ton- ton/km per vehicle* |
| 8. | Energy consumption | 10 *MJ/km* |
| 9. | Gradient | *%* |
| 10. | Rail category | |
| 11. | Railways network | *km* |
| 12. | Topography | *gradient* |

### Main basic parameters for the calculation

| | |
|---|---|
| Average weight per TEU | *12.5 tonnes* |
| Composition Train | |
| ROLA | *22 trucks per train* |
| UCT | *36 trucks per train* |
| Loading rate | *80%* |
| TEU per train wagon | *2 (2*20' container or 40' box)* |

## maritime transport

### Basic parameters characterizing maritime transport

*TRANSPORT, EMISSIONS AND LOGISTIC PARAMETERS*

| | | |
|---|---|---|
| 1. | Vessel type | *size class* |
| 2. | Ship size | *teU capacity* |
| 3. | Load factor | *teU* |
| 4. | Energy consumption | *MJ/km* |
| 5. | Empty trips | *%* |
| 6. | Average speed | *km/h* |
| 7. | Trip distance | *km* |
| 8. | Payload capacity | *ton* |
| 9. | Speed | *knots* |
| 10. | Emission factors | *g/km – kg/ton- ton/km per vehicle* |
| 11. | Energy consumption | *g/kWh* |

### Main basic parameters for the calculation

| | |
|---|---|
| Vessel Type | *containership (suez trade)* |
| Ship size | *6-8.000 TEU Box Boat* |
| Load factor | *70%* |
| Energy consumption | *190g/kWh (Main), 210g//kWh (Auxiliary)* |

## Fuel consumptions

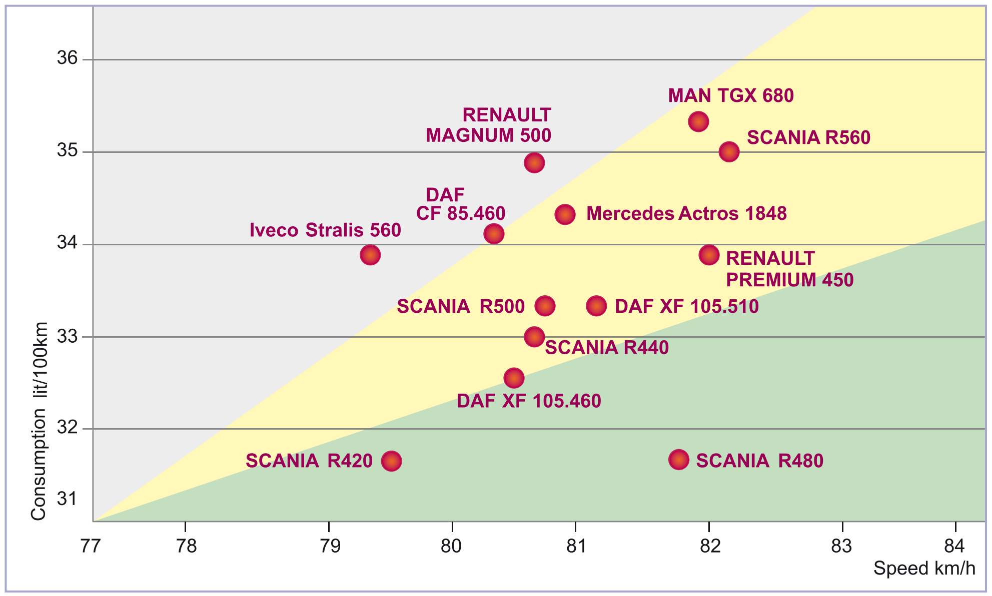
*this paragraph gives insight on the selected parameters about fuel consumption of trucks. it serves as basic input value to estimate the emissions (above all for cO2), by the environmental modelling tool.*

*this selection of parameters on fuel consumption remarked the benchmark about the average values to the standard traffic operational conditions in the primary alpine road network, comparing the main trucks operating to the same alpine network.*

*in stressed condition of exercise (high gradient, bad weather, wet pavement, etc), ratio among consumption of main truck brands shows a very limited range.*

The following scheme shows the comparison of performance on the road with 13 main brands, chosen on the basis of european selling charts (April 2009) from which is possible to estimate that average consumption of current long hauling trucks is included in a range of 3.2-3.6 litres/100 km. This means an existing delta-consumption between the maximum consumption value of 35,4-35,2 litres and minimum consumption value of 31,8-32,0 litres per 100Km.

The analysis shows a very small range of consumption among several main brands.




**Ratio speed/consumption (long hauling trucks).**
Source: based on Tuttotrasporti - April 2009

With reference to the consumption units, it is made to the most recent results from tests carried out on the road by means of different brands, with specific cycles of travel.



Hypothesis assumed in the modelling elaboration is to consider consumption equal to 35 lit/100 km.

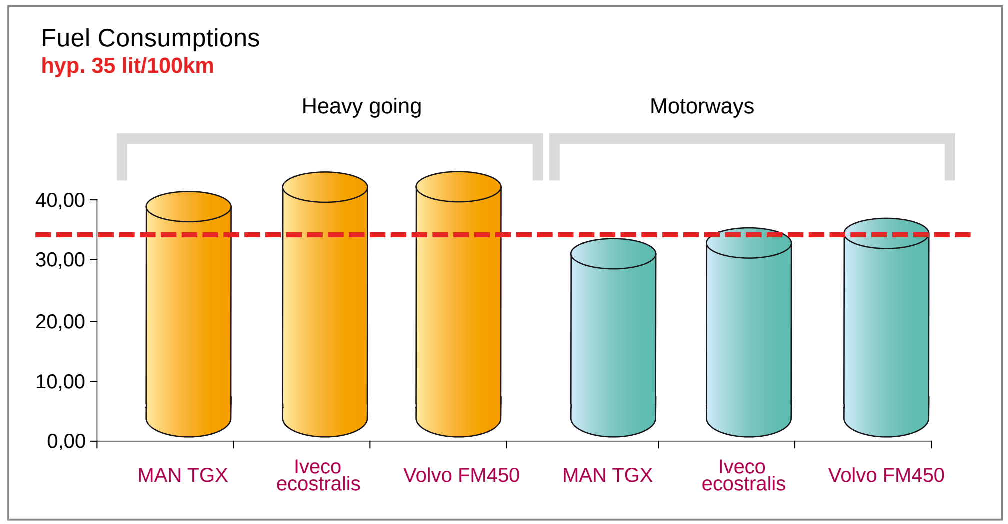
As far as it concerns consumptions, recent results from road tests performed by means of different brands and vehicles' driving cycles made as a reference on this matter.

A short scheme follows:

| Vehicles | | lit/100 km | km/lit |
|---|---|---|---|
| MAN TGX 26.440 | Heavy going | 36,30 | 2,75 |
| Iveco ecostralis | Heavy going | 39,20 | 2,55 |
| Volvo FM450 | Heavy going | 39,20 | 2,55 |
| MAN TGX 26.440 | Motorway | 29,11 | 3,44 |
| Iveco ecostralis | Motorway | 30,55 | 3,27 |
| Volvo FM450 | Motorway | 31,83 | 3,14 |
| | **hyp.** | **35 lit/100km** | |

**Table 1 – Average fuel consumption.** Source: Roadway magazine - RHA - December 2011

The simulations were based on the hypothesis that consumptions were **35 l/100 km**.




**Fuel consumptions**.
Source: own illustration on "table 1" data

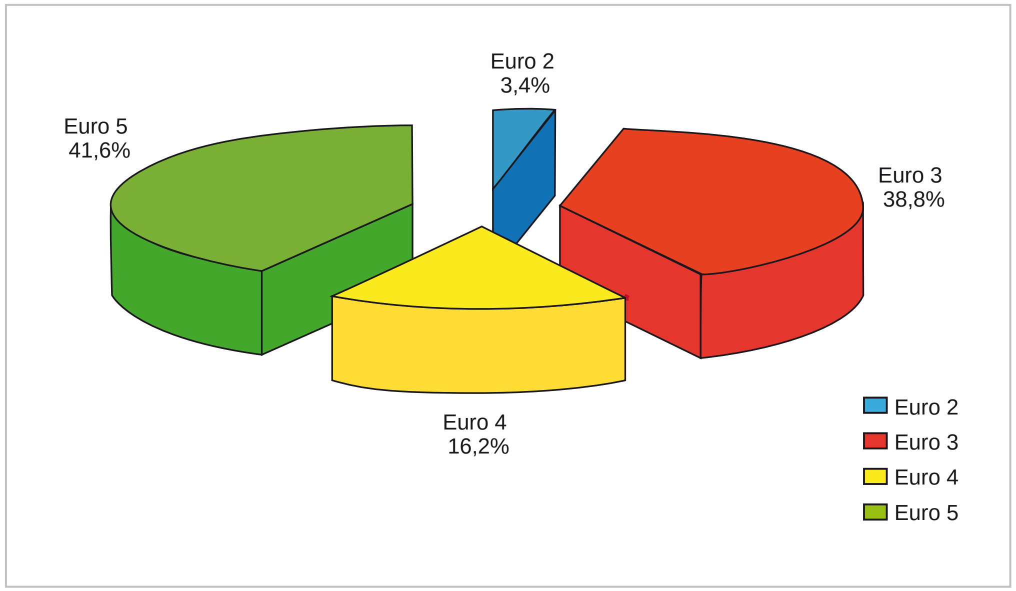
### *Freight vehicles according "euro classes"*

*In this paragraph, the sharing of truck fleet running on the alpine road network is shown, according to the euro classes framework.*

*it deals to a very basic benchmark to the function of corinair – copert 4 – step 5 algoritm, that is a basic input parameter to the functions of the emission modelling tool.*

The analysis of fleet framework in the Alpine network considered the composition of the overall trucks circulating for business purposes within the alpine territory per vehicle emission standard: **euro 0, euro 1, euro 2, euro 3, Euro 4** ed **Euro 5**, as showed in the following figure.

Selected sources to estimate the framework of fleet was the **ufT** - Federal office of transport (FOT) Confederation Suisse - **alpinfo data** (2009), verified on the basis of outcomes of the Alpine Space Programme project AlpCheck.




**Composition of the overall circulating freight vehicles per Euro category.**
Source: own elaboration on Alpinfo data (2009)

It is assumed to use a macro-classification, composed by Euro 2-3 and Euro 4-5 vehicles. This assumption is based on:

- the sharing of truck fleet, according the Euro classes;
- the emission factors per each vehicle category;
- the estimation of emissions per single TEU.



### *energy and electricity mix for railways*

*this paragraph explains the energetic mix. it represents a fundamental parameter when estimating emissions of rail freight transport, its sources from which is generated the electricity suitable to implement the rail transport. it is a relevant factor to correctly estimate the emissions from rail transport, due to its difference of pollution emissions, according the sources of energy.*

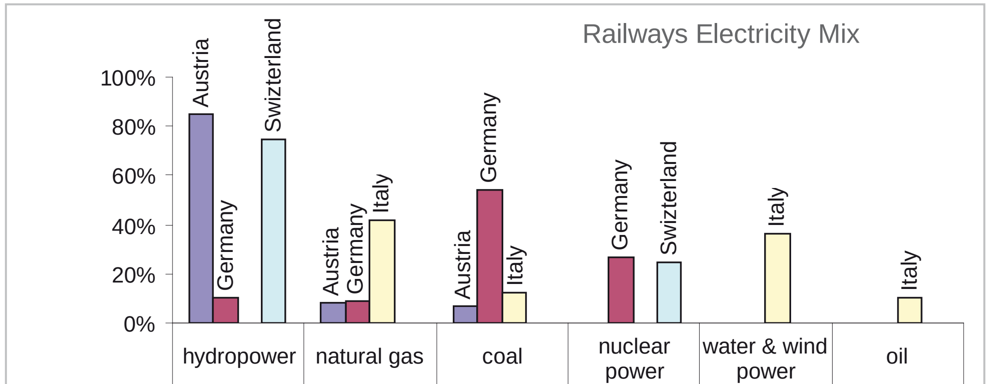
The term *energy mix* is used to define the combination of the sources used to achieve the goal of supply provided. The amount of energy consumed in a given period is defined, for industrialized Countries, as primary energy. In order to reach the share of primary energy required for domestic needs, diverse sources of energy are used such as electricity, heat, renewable sources etc.

The availability of a country's primary energy is guaranteed through their production on National soil and through trade agreements (buy or exchange). Regarding the production of electricity at a European scale, a significant rate is given by nuclear power (approximately 17%).

In particular, the share of consumption from renewable sources in Europe amounts to about 8%, while 13% is provided by nuclear energy. Among Alpine countries, Austria has the largest share of renewable sources (66%), followed by Switzerland (55%), which also registers a high share of nuclear power (41%).

Regarding energy mix on the current consumption of electricity for UE railways, the main benchmark is the UIC (Union Railways International), in the report "Rail Transport and Environment - Facts & Figures" - 2008.

The specific rail electricity mix for alpine countries (Austria, Italy, Germany, Switzerland), is shown in the figure below of, as a source SBB.




| | hydropower | natural gas | coal | nuclear power | water & wind power | oil |
|---|---|---|---|---|---|---|
| Austria | 85% | 8% | 7% | | | |
| Germany | 10% | 9% | 54% | 27% | | |
| Italy | | 42% | 12% | | 36% | 10% |
| Switzerland | 75% | | | 25% | | |

**Railways electricity mix.**
Source: own elaboration based on SBB data

## 4.3 exemplary calculation

*in this chapter, the exemplary modelling outcomes concerning the estimation of emissions (CO2, NOx, PM10) is illustrated, like an extract of the cluster of estimation of emissions concerning six Pilot Projects (see also chapter 4.4):*

- *PP1 – Milan-Ulm (UCT)*
- *PP3 – trieste-Ulm (transhipment + road)*
- *PP4 – Savona-Mortara-Ulm (via Gothard and via Lötschberg) (UCT)*
- *PP6 – Bologna-Munich (UCT)*
- *PP6b – Wolfurt-Verona (UCT)*
- *PP8 – trento-Landsberg (ro-La)*

*in order to show an exemplary calculation like output of modelling environmental tool, it was chosen the strategic PP4 UCT Pilot Project Savona-Mortara-Ulm. It has been developed along two alternative routes: an itinerary via Gotthard or via Lötschberg.*
*this exemplary calculation was chosen with the agreement of lp and partnership, because of significant from the functional point view, being the UCT service suitable to satisfy the main strategic transalpine trade market. For this matter, this PP shows an high possibility to concrete feasibility.*
*in addition, PP4 is the only pilot project showing two alternative routes to be analysed from the environmental benefit, also, in a compared way.*

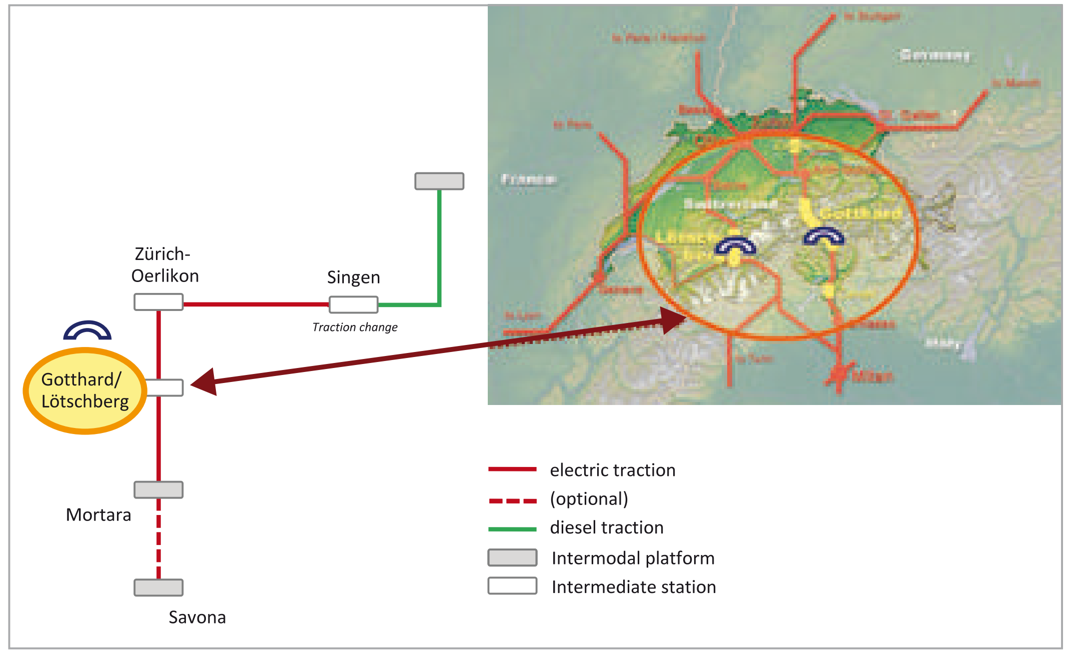
Below, the Pilot Project concerning the proposed report on the cross-border path that connect the Ligurian ports and the German regions of Baden-Württemberg and Bavaria, for combined unaccompanied UCT traffic volumes, it is described. In particular, the connection is between Savona – Ulm, with intermodal platform in Mortara. The connection can be done through two alternative routes which refer to Lötschberg and Gotthard mountain passes.



### 4.3.1 PP 04 - Ulm –Mortara - (Savona) – technical characteristics

*in this section, the technical characteristics of PP4 and related road corridors are schematized, on the basis of schemes developed by WP4.*

The Pilot Project regards a new UCT service linking Ulm and Mortara logistic platforms (via Domodossola-Zurich-Singen), with possible prolongation to Ligurian area, functional to the transhipment intermodal service, at Savona harbour. The operational terminal road section Mortara-Savona runs via Alessandria (Highway A7) or via Acqui Terme (A10). The new UCT Pilot service follows 2 rail alternative routes: via Gotthard or via Lötschberg. Its functional scheme of the railway network, from the traction point of view, is reported in the following figure:



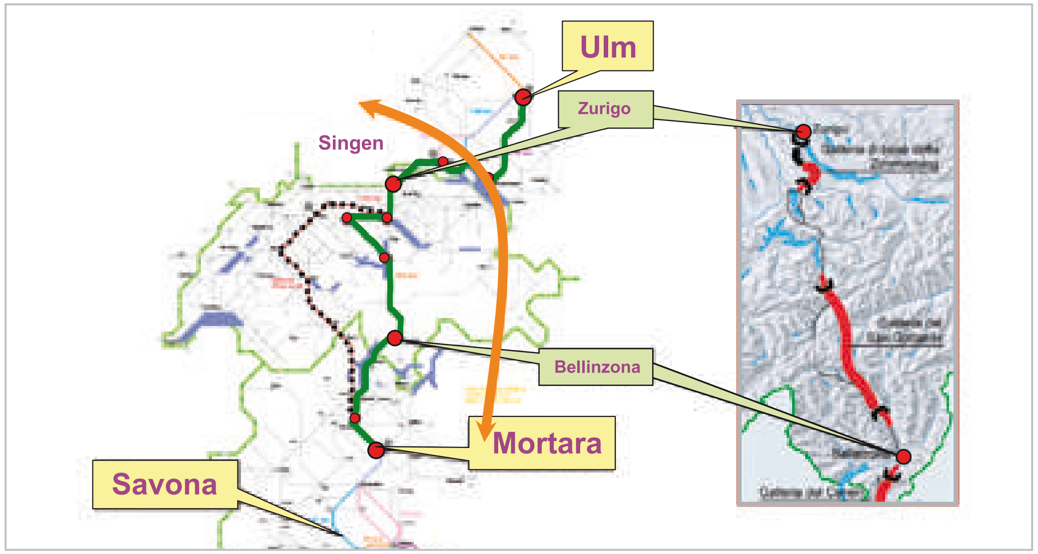

**PP.04 Scheme.**
Source: own illustration on the basis of WP4 scheme

The railway network is electrified from the south terminal of Mortara and Singen, while between Singen and Ulm the traction is diesel-powered.

### *pp4.a – route via gotthard*

The PP4.A forecasts intermediate stages of the Gotthard railway pass, as the following route:

- Terminal Ulm-Nord/Dornstadt
- Ulm
- Friedrichshafen
- Singen
- Zürich-Oerlikon
- Gotthard
- Bellinzona
- Novara
- Mortara Intermodal Terminal

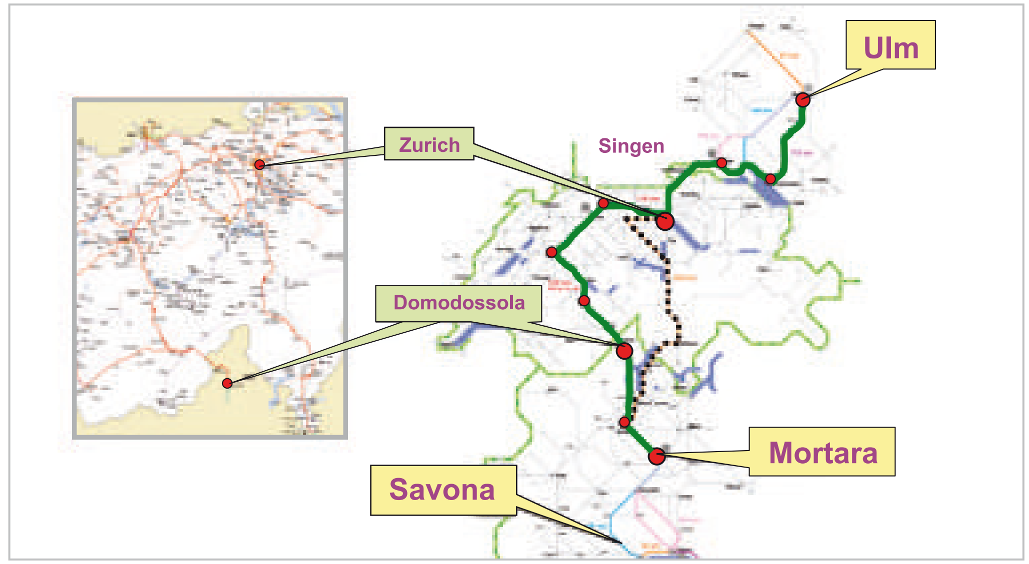



**PP.04.A Scheme.**
Source: own illustration on the basis of work package4 scheme

### *pp4.b - route via lötschberg*

For the routing via Lötscherg the pilot service foresees the following intermediate stages:

- Terminal Ulm-Nord/Dornstadt
- Ulm
- Friedrichshafen
- Singen
- Zürich-Oerlikon
- Aarau
- Olten
- Bern
- Domodossola
- Borgomanero
- Novara
- Mortara Intermodal Terminal




**PP.04.B Scheme.**
Source: own illustration on the basis of WP4 scheme

The road section from which PP4 can remove truck traffic (reducing emissions per single TEU, consequently) thanks to the attraction effect of new UCT rail service, includes the connection between the following main transalpine roads:

- A8 (Germany)
- A7 (Germany)
- A96 (Switzerland)
- Bregenz/Pfändertunnel
- A14 (Switzerland)
- A13/E43
- Chur-San Bernardino-Bellinzona
- E35/A2/A9 (Switzerland / Italy)
- A4-Milano
- A4-Novara

Based on the defined technical parameters, supporting the architecture of the emission modelling tool, it was possible estimating the ratio of pollutant emissions and gases, following the new UCT rail service.

The improvement of environmental performance is underlined in terms of reduction of emissions, compared the road section, thank to the attraction effect from the road by the new UCT rail service, in both alternative routes (PP4.A and PP4.B).

## 4.3.2 PP 04 - Ulm - Mortara - (Savona) - quantitative results

*in this paragraph, the results of emission estimations are shown, taking into account the impact of new Uct rail services, along the two alternative rail routes, and there comparison than the road transport, along the parallel corridor, according two different macro-classification of truck fleet, in terms of "euro classes".*

*Air quality benefits generated from the new UCT rail service are very evident, in both the alternative routes.*

The following are the results of the comparison between PP4.A and PP4.B, with respect to CO2, PM10 and NOx emissions, according the "Euro classes" emission standards for vehicles.

The unit of measurement is the emission per single TEU.

The main benefits for the air quality are the following:

1. both UCT solutions (PP4.A and PP4.B) show the same positive impact in terms of reduction of emissions per single TEU;

2. the compared analysis among road and rail container movements shows an environment efficiency in favour of new UCT service, in terms of reduction of CO2 emissions, estimated about – 80% per single TEU, independently to the "Euro classes" of truck fleet (CO2 emissions directly depends from the fuel consumption, that is more or less the same for all the truck classes);

3. the benefit in terms of reduction of NOx emissions is estimated about -50% per single TEU, comparing the UCT service with the road transport by Euro 4-5 trucks. This benefit increases until to about 75% comparing the UCT service with the road transport by Euro 2-3 trucks;

4. the reduction of PM10 emissions is less evident, above all if the compared analysis concerns the UCT service with respect the road transport by Euro 4-5 trucks, being the efficiency of the last generation fleet very high from the point of view of PM10 emissions: the reduction is about -15% comparing the Euro 4-5 trucks, increasing until 63% comparing the Euro 2-3 trucks;

5. with reference to PM10 emissions, above all, in both alternative routes, the environment efficiency of PP4 is relatively less evident, due to the presence along the rail route of diesel traction track (link Singen-Ulm), with necessary change of traction.

The following tables schematize the modelling outcomes for all the selected solution combinations.

| C02 | | By Road (tonn per 1 TEU) | By Rail (tonn per 1 TEU) | |
|---|---|---|---|---|
| PP.1A Ulm - Mortara (Italy) - (Savona) (via Gotthard) By Road 521 Km By Rail 603 Km | Euro 4-5 | T1 CO2 = 0,43 | T2 C02 = 0,09 | -79% |
| | Euro 2-3 | T1 CO2 = 0,49 | T2 C02 = 0,09 | -81% |
| PP.1B Ulm - Mortara (Italy) - (Savona) (via Lötschberg) By Road 521 Km By Rail 637 Km | Euro 4-5 | T1 CO2 = 0,42 | T2 C02 = 0,10 | -77% |
| | Euro 2-3 | T1 CO2 = 0,47 | T2 C02 = 0,10 | -79% |

PP04- Emissions CO2

| NOx | | By Road (tonn per 1 TEU) | By Rail (tonn per 1 TEU) | |
|---|---|---|---|---|
| PP.4A Ulm - Mortara (Italy) - (Savona) (via Gotthard) By Road 521 Km By Rail 603 Km | Euro 4-5 | T1 NOx = 1,82 | T2 NOx = 0,89 | -51% |
| | Euro 2-3 | T1 NOx = 3,45 | T2 NOx = 0,89 | -74% |
| PP.4B Ulm - Mortara (Italy) - (Savona) (via Lötschberg) By Road 521 Km By Rail 637 Km | Euro 4-5 | T1 NOx = 1,82 | T2 NOx = 0,91 | -50% |
| | Euro 2-3 | T1 NOx = 3,45 | T2 NOx = 0,91 | -74% |

PP04- Emissions NOx

| PM10 | | By Road (tonn per 1 TEU) | By Rail (tonn per 1 TEU) | |
|---|---|---|---|---|
| PP.4A Ulm - Mortara (Italy) - (Savona) (via Gotthard) | Euro 4-5 | T1 PM10 = 44,1 | T2 PM10 = 37,2 | -16% |
| | Euro 2-3 | T1: By Road PM10 = 101,9 | T2: UCT PM10 = 37,2 | -63% |
| PP.4B Ulm - Mortara (Italy) - (Savona) (via Lötschberg) | Euro 4-5 | T1: By Road PM10 = 45,1 | T2: UCT PM10 = 38,4 | -15% |
| | Euro 2-3 | T1: By Road PM10 = 102,0 | T2: UCT PM10 = 38,4 | -62% |

PP04- Emissions PM10

**Pilot project Ulm-Mortara-Savona**. Source: own illustration

## 4.4 accumulated results

*in this chapter, the modelling outcomes are schematized for all the Pilot Projects on which it was elaborate the compared analysis.*
*the results concern the modelling estimation about emissions per teU on rail, with respect to the alternative road transport, along the parallel corridor. the analysed gases and pollutants concern CO2, PM10 and NOx, bringing into account to the selected macro-classification of "Euro classes" truck fleets.*

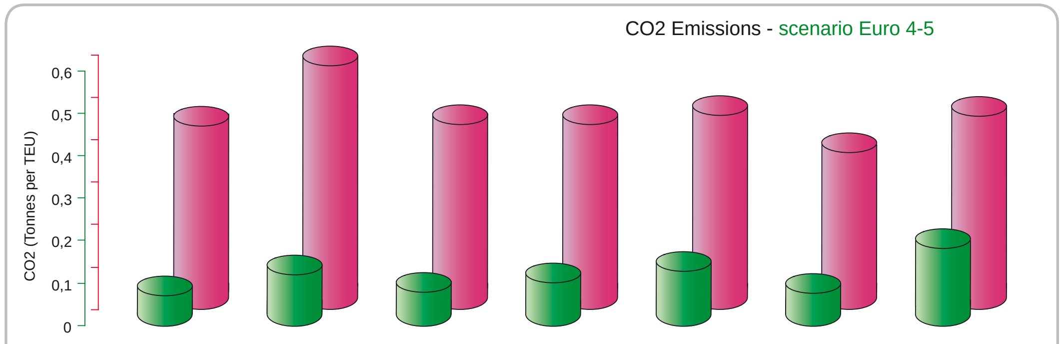
Outcomes of modeling elaboration to estimate the emission efficiency of the Pilot Project are here shown, specifically highlighting through tabular and graphical forms.

The list of Pilot Project on which it was elaborate the modelling compared analysis is the following:

- PP1 – Milan-Ulm (UCT)
- PP3 – Trieste-Ulm (Transhipment + Road)
- PP4A/B – Savona-Mortara-Ulm (via Gotthard and via Lötschberg) (UCT)
- PP6 – Bologna-Munich (UCT)
- PP6B – Wolfurt-Verona (UCT)
- PP8 – Trento-Landsberg (RoLa)

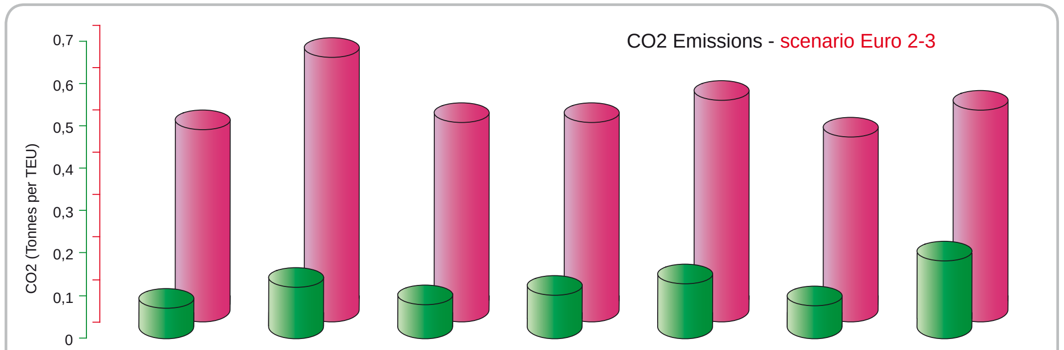
For all the Pilot Projects, the compared analysis concerned the "on rail" solution versus the "on road" solution, with the exception to the PP3, regarding different intermodal transhipment+road routes: Suez-Trieste Harbour - (Ulm) versus Suez-Gibraltar-Hamburg Harbour - (Ulm).

### 4.4.1 Co2-emissions




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| By road | 0,42 | 0,59 | 0,43 | 0,43 | 0,46 | 0,38 | 0,46 |
| By rail | 0,08 | 0,12 | 0,09 | 0,1 | 0,13 | 0,08 | 0,19 |
| Pilot Project | PP01 Milano - Ulm | PP03 A Trieste - Ulm Intermodal | PP04A Savona - Mortara - Ulm (via Gotthard) | PP04A Savona - Mortara - Ulm (via Lotscberg) | PP06A Munich - Bologna | PP06B Wolfurt - Verona | PP08 Trento - Ulm (ROLA) |

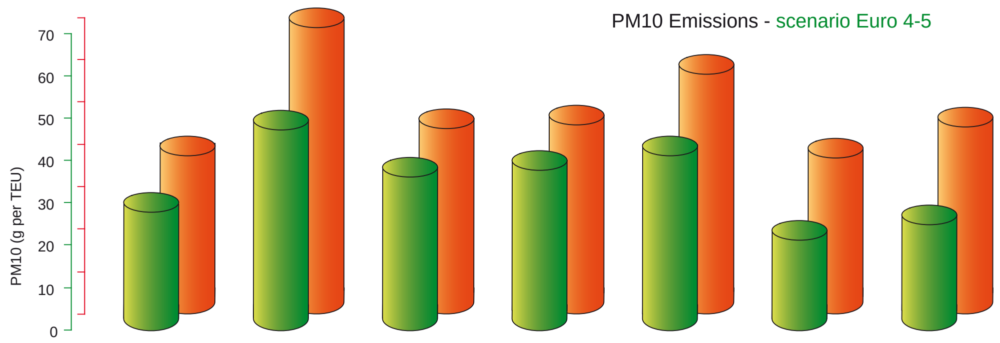
**CO2-emissions (Euro 4-5 trucks).**
Source: own illustration




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| By road | 0,48 | 0,62 | 0,49 | 0,49 | 0,53 | 0,44 | 0,5 |
| By rail | 0,08 | 0,12 | 0,09 | 0,1 | 0,13 | 0,08 | 0,19 |
| Pilot Project | PP01 Milano - Ulm | PP03 A Trieste - Ulm Intermodal | PP04A Savona - Mortara - Ulm (via Gotthard) | PP04A Savona - Mortara - Ulm (via Lotscberg) | PP06A Munich - Bologna | PP06B Wolfurt - Verona | PP08 Trento - Ulm (ROLA) |

**CO2-emissions (Euro 2-3 trucks).**
Source: own illustration

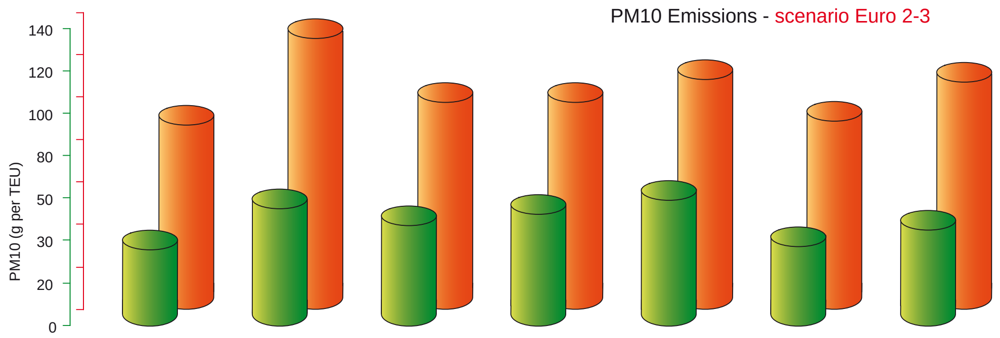
## 4.4.2 Pm10-emissions




| | PP01 Milano - Ulm | PP03 A Trieste - Ulm Intermodal | PP04A Savona - Mortara - Ulm (via Gotthard) | PP04A Savona - Mortara - Ulm (via Lotscberg) | PP06A Munich - Bologna | PP06B Wolfurt - Verona | PP08 Trento - Ulm (ROLA) |
|---|---|---|---|---|---|---|---|
| By road | 40,1 | 68,5 | 44,1 | 45,1 | 58,6 | 38,2 | 45,1 |
| By rail | 30,2 | 48,9 | 37,2 | 38,4 | 40,9 | 30,4 | 35,3 |

**PM10-emissions (Euro 4-5 trucks).**

Source: own illustration

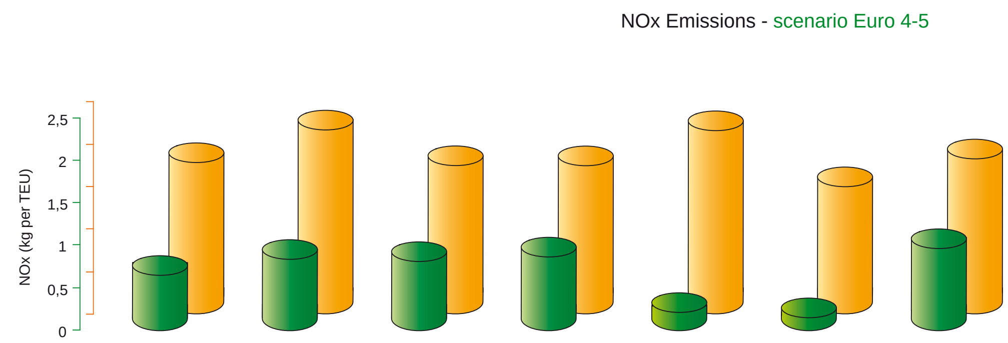



| | PP01 Milano - Ulm | PP03 A Trieste - Ulm Intermodal | PP04A Savona - Mortara - Ulm (via Gotthard) | PP04A Savona - Mortara - Ulm (via Lotscberg) | PP06A Munich - Bologna | PP06B Wolfurt - Verona | PP08 Trento - Ulm (ROLA) |
|---|---|---|---|---|---|---|---|
| By road | 87,3 | 127,1 | 101,9 | 101,9 | 112,1 | 91,1 | 109,8 |
| By rail | 30,2 | 48,9 | 37,2 | 38,4 | 40,9 | 30,4 | 35,3 |

**PM10-emissions (Euro 2-3 trucks).**

Source: own illustration

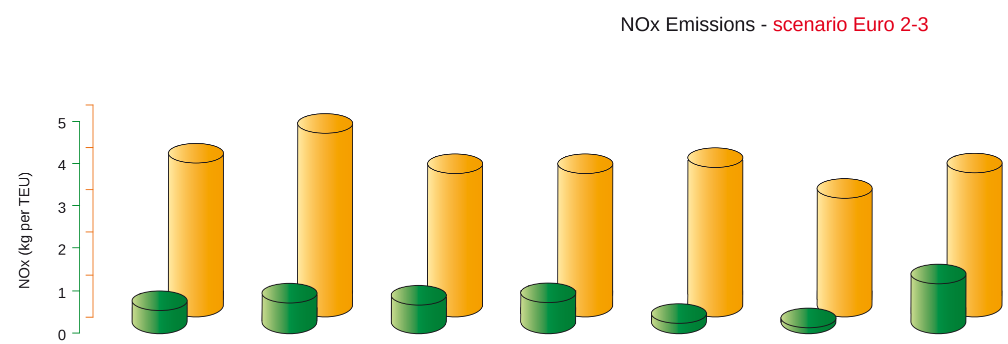
## 4.4.3 nox-emissions




| | PP01 Milano - Ulm | PP03 A Trieste - Ulm Intermodal | PP04A Savona - Mortara - Ulm (via Gotthard) | PP04A Savona - Mortara - Ulm (via Lotscberg) | PP06A Munich - Bologna | PP06B Wolfurt - Verona | PP08 Trento - Ulm (ROLA) |
|---|---|---|---|---|---|---|---|
| By road | 1,79 | 2,27 | 1,82 | 1,82 | 2,21 | 1,59 | 1,9 |
| By rail | 0,74 | 0,96 | 0,89 | 0,91 | 0,22 | 0,14 | 1,12 |

**NOx-emissions (Euro 4-5 trucks).**

Source: own illustration




| | PP01 Milano - Ulm | PP03 A Trieste - Ulm Intermodal | PP04A Savona - Mortara - Ulm (via Gotthard) | PP04A Savona - Mortara - Ulm (via Lotscberg) | PP06A Munich - Bologna | PP06B Wolfurt - Verona | PP08 Trento - Ulm (ROLA) |
|---|---|---|---|---|---|---|---|
| By road | 3,39 | 4,30 | 3,45 | 3,45 | 3,59 | 3,04 | 3,6 |
| By rail | 0,74 | 0,96 | 0,89 | 0,91 | 0,22 | 0,14 | 1,12 |

**NOx-Emissions (Euro 2-3 trucks).**

Source: own illustration

## 4.4.4 emission tables

The “Emission Tables” includes all the main information about the Pilot Project, with reference to the compared analysis relating the emission estimations.

It is a complete overview on the basic input and output concerning all the analysed Pilot Projects and their effect in terms of reduction of emission impacts, for CO2, PM10 and NOx, estimated per single TEU, compared the “on road” solution.

For all the Pilot Projects, the compared analysis concerned the “on rail” solution versus the “on road” solution, with the exception to the PP3, regarding different intermodal transhipment+road routes.

| Id. PP | Combined Transport | flow connection | Terminal 1 | Terminal 2 | alpine Pass | Distances (KM) | | euro class Truck | | | Co2 Tonn per Teu | | | | Pm10 g per Teu | | | | nox kg per Teu | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Track | | | | by road | by rail | | | | Tot (encl. sea track) | by road | by rail | red. (%) rail> road | Tot (encl. sea track) | by road | by rail | red. (%) rail> road | Tot (encl. sea track) | by road | by rail | red. (%) rail> road |
| PP01 | UCT | Flow connection | Lombardy region | Baden Württemberg/Bavaria | gotthard | 449 | 522 | Euro 4-5 | | | | 0,42 | 0,08 | -81% | | 40,1 | 30,2 | -25% | | 1,79 | 0,74 | -59% |
| | | Track | Milano Melzo | ULM | | | | Euro 2-3 | | | | 0,48 | 0,08 | -83% | | 87,3 | 30,2 | -65% | | 3,39 | 0,74 | -78% |
| PP03 | UCT | Flow connection | Middle East/Asia – Ulm | | Tauern Corridor | | | Track 1 > Track 2 | | | | | | | | | | | | | | |
| | | Track 1 | SUEZ Channel - TRIESTE Harbour - by TRANSHIPMENT (“Box Boat”) - via Adriatic Sea TRIESTE Harbour (Italy) - ULM Intermodal Platform (Germany) | | | | | | | | 1,25 | -38% | | | 1.334 | -50% | | | 17,80 | -45% | | |
| | | Track 2 | SUEZ Channel - Hamburg Harbour - by TRANSHIPMENT (“Box Boat”) - via Gibraltar Channel HAMBURG Harbour (Germany) - ULM Int Platform (Germany) | | | | | | | | 2,00 | | | | 2.669 | | | | 32,60 | | | |
| PP03 a | UCT | Flow connection | Adriatic Ports | Baden Württemberg/Bavaria | Tauern Corridor | | Track 1 | Euro 4-5 | | | | 0,59 | 0,12 | -80% | | 68,5 | 48,9 | -29% | | 2,27 | 0,96 | -58% |
| | | Track 1 - Overland route | TRIESTE Harbour (Italy) | ULM Intermodal Platform (Germany) | | | | Euro 2-3 | | | | 0,62 | 0,12 | -81% | | 127,1 | 48,9 | -59% | | 4,30 | 0,96 | -78% |
| PP04 | UCT | Flow connection | Ligurian Ports | Baden Württemberg/Bavaria | gotthard | 521 | 603 | Euro 4-5 | | | | 0,43 | 0,09 | -79% | | 44,1 | 37,2 | -16% | | 1,82 | 0,89 | -51% |
| | | Track | Savona | Ulm | | | | Euro 2-3 | | | | 0,49 | 0,09 | -82% | | 101,9 | 37,2 | -63% | | 3,45 | 0,89 | -74% |
| | | | Mortara | | Lötschberg | 521 | 637 | Euro 4-5 | | | | 0,43 | 0,1 | -77% | | 45,1 | 38,4 | -15% | | 1,82 | 0,91 | -50% |
| | | | | | | | | Euro 2-3 | | | | 0,49 | 0,1 | -80% | | 101,9 | 38,4 | -62% | | 3,45 | 0,91 | -74% |
| PP06 a | UCT | Flow connection | Munich | Bologna | brenner | 556 | 551 | Euro 4-5 | | | | 0,46 | 0,13 | -72% | | 58,6 | 40,9 | -30% | | 2,21 | 0,22 | -90% |
| | | Track | | | | | | Euro 2-3 | | | | 0,53 | 0,13 | -75% | | 112,1 | 40,9 | -64% | | 3,59 | 0,22 | -94% |
| PP06 b | UCT | Flow connection | Wolfurt | Verona | brenner | 410 | 484 | Euro 4-5 | | | | 0,38 | 0,08 | -79% | | 38,2 | 30,4 | -20% | | 1,59 | 0,14 | -91% |
| | | Track | | | | | | Euro 2-3 | | | | 0,44 | 0,08 | -82% | | 91,1 | 30,4 | -67% | | 3,04 | 0,14 | -95% |
| PP08 | ROLA | Flow connection | Lombardy region | Baden Württemberg/Bavaria | brenner | 428 | 446 | Euro 4-5 | | | | 0,46 | 0,19 | -59% | | 45,1 | 35,3 | -22% | | 1,9 | 1,12 | -41% |
| | | Track | Trento | Landsberg | | | | Euro 2-3 | | | | 0,5 | 0,19 | -62% | | 109,8 | 35,3 | -68% | | 3,6 | 1,12 | -69% |

## 4.5 conclusions

The compared analysis about the environmental efficiency of a certain number of Pilot Projects, in terms of rail/road ratio of emissions per single TEU, has allowed to determine quantitatively the effective reduction of greenhouse gases and pollutants on single relationship in the comparison between the different modes of transport.

The analysis has also allowed a general feedback on the effectiveness of environmental improvement. Subject to the assumptions in terms of load factors, filling unit fuel consumption and emission factors, the proposed projects were compared and analyzed to verify some guidelines. The conclusion of analysis undertook that main influencing factors for the outcomes are the following:

- Typology of power railways (electric or diesel)
- Typology of truck fleet brought into account to elaborate the compared rail/road analysis ("Euro Classes", per macro-classification, also)
- Typology of combined rail services (accompanied-RO-LA or unaccompanied-UCT)

The optimal conditions to generate the best added value in terms of benefits for the air quality, that is reduction of emissions per single moved TEU, are the following:

- when the rail route on which the new freight rail service is totally electrified and no changing of rail track is needed;
- when (and if) the container transfer is from Euro 2-3 trucks to the new combined rail services;
- when the new combined rail service is UCT ("unaccompained service").

In fact,

- the typology of power traction is a relevant technical factor: in rail services where changes of energy power are expected from electrical to diesel, they lose some environmental benefits. In addition, there are also negative results in terms of emissions of pollutants ($CO_2$ and $NO_x$, above all) generated by the rail diesel engines;
- the modern Euro5 engines diesel generate about 90% less particulate matter and nitrogen oxides (86% particulate, 98% nitrogen oxides): specifically, the project's results undertook that in comparison to classes per PM10 abatement turns out to be more sensitive the classes 2-3, to a lesser extent the classes 4-5. Modern trucks are excellent in this field, thanks to their efficient kinematic chain, in relation to each moved TEU. Despite the relevant reduction in last generation diesel engines of trucks, there remains a constant demand to curb global emissions of $CO_2$ during transport on the road. About $CO_2$ emissions the pilot projects show no differentiation in relation to a particular class of vehicle considered Euro 4-5 and Euro 2-3, because $CO_2$ emissions are directly related to the consumption of these fuels, and as has been analyzed, they are all quite comparable between different vehicles, in alpine space.
- the analysis for Ro-La Pilot Project (PP8) is the only involving this technical characteristic. Taking into the needed account to the limit of a single analyzed pilot project, it is technically significant that the emission efficiency outcomes confirm trend usually verified in case of RO-LA services. This trend is confirmed in relation to the less capacity of RO-LA trains, compared the UCT trains, generating a less significant attraction effect from road. In addition, the average distance of Ro-La service is lower than UCT, because of it is suitable to better satisfy short section moves, forecasting the transport of the whole truck (road vector and driver(s) included) on the rail convoy.

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# 5 aCCess and ImProve The euroPean TransPorT neTworK (*)

Source: IPG

## 5.1 introduction: taking a VieW beyond the alpine space

The Alps are a transit area and at the same time an obstacle in the European transport network. Capacity bottlenecks become joint problems because flows of traffic across the Alps connect and affect a large number of countries and regions. Therefore, especially with traffic flows becoming increasingly complex, collaboration forms the basis for the development of sustainable transport solutions – both in the Alpine region and in a pan European network.

Aiming at a more efficient, greener and multimodal handling of increasing transport volumes, several project partners commonly developed improvement concepts for important alpine transit routes and traffic hubs. Pilot projects were e. g. dealing with development strategies for the Brenner Pass, the wagonload traffic in Salzburg as well as with the enhancement of cargo transport centres in Villach-Fürnitz, Southern Germany and Veneto region.

In addition to that, the project took a look beyond the Alpine Space. Optimisations of rail bound long-distance transports that cross the Alpine Space have been in the focus of one project partner. Moreover different routing options from Scandinavia via Berlin down to the Adriatic and Ligurian ports have been evaluated.

Against the background that sustainable logistic solutions for transalpine freight traffic have to be embedded in a complex, multidisciplinary European context, TRANSITECTS developed a cooperation platform, bringing together different transport related European projects. In particular close links with SoNorA, SCANDRIA, BATCo – dealing with transport corridors – as well as with AlpCheck2 and iMONITRAF! – aiming at the reduction and reorganisation of alpine road transport – were established. In an intensive exchange process, including e. g. common workshops, actors from administration, politics and economy, discussed and developed ideas to make the European transport network greener and more efficient.

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** the contents presented in this chapter have been elaborated in work package 7. Generally responsible for contents, illustrations and texts is the transitects project partner "German association for Housing, Urban and spatial Development". single sub-chapters have been elaborated by project partners who have been working on the presented activities and concepts. responsible partners are named below the particular paragraphs.*

## 5.2 improVing central intermodal connections: the brenner-axis

Due to its geographical location in the heart of Europe and its unique topographic characteristics, the Alpine region in general and Austria in particular, is affected by major European traffic flows. Therefore the region is confronted with major challenges that must be met in a sustainable, environmentally friendly way. It hence requires long-term solutions that protect the population from the negative effects of road transport, such as pollutants, noise, congestion, etc.

Austria's transport policy is based on a set of measures that particularly foster the shift from road freight transport to more environmentally friendly modes of transport such as rail and intermodal transport.

The Austrian Federal Ministry for Transport, Innovation and Technology (bmvit) and Land of Tyrol engaged Professor Sebastian Kummer, head of Institute for Transport Logistics Management, Vienna University of Economics and Business to carry out an analysis of the feasibility and economic evaluation of transport policy measures to shift goods from road to rail at the Brenner axis.

The first specific goal of this paper is an analysis of the effects of the sectoral driving ban for lorries on the A12 motorway in Tyrol. In the second part of the study, pilot projects for additional intermodal transport across the Brenner and the Arlberg axis are elaborated based on CAFT-data-analyses, definition of catchment areas, axes and terminals and taking into account interviews with enterprises, as well as train logistics and existing offers of combined transport services.

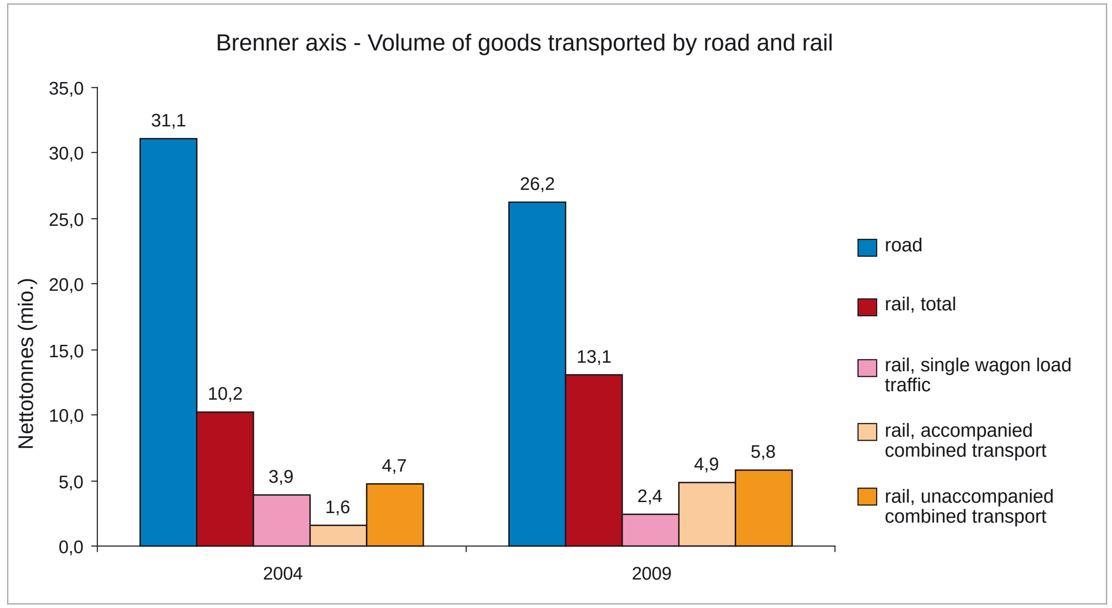
### 5.2.1 Analysis and impacts of the sectoral driving ban

#### *Evaluation of traffic flows*

For this purpose, existing traffic flows on the one hand, qualitative and quantitative surveys with shippers, carriers and freight forwarders on the other hand provided new data.

Based on CAFT –data („Cross Alpine Freight Transport Survey") 2004 and 2009 and due to increasing market demand of the RoLa (rolling road), the effectiveness of the sectoral driving ban could be proved. For goods transported across the Brenner by road, CAFT-data 2009 showed a decrease of 15.9% nettotonnes in comparison to 2004, which was due to the economic crisis. The volume on rolling roads increased from 1.6 to 4.9 mio. nettotonnes during this period (see figure next page).

In the year 2009, 1/3 of the freight transported on this relation by rolling roads was affected by the sectoral driving ban. In 2010, already 38% were affected. Steel was the most important category of goods, followed by waste and motor vehicles. All the other goods transported by RoLa were forwarded for other reasons.




**Brenner Axis – Volume of goods transported by road and rail 2004 and 2009.**

Source: own illustration according to CAFT 2004, CAFT 2009, tyrol and bmvit

#### *empiric outputs*

Qualitative and quantitative surveys indicated the willingness of enterprises to shift goods from road to rail.

Though many of the enterprises interviewed criticised the measure of the sectoral driving ban, most of them were willing to transport their goods by train in the future, provided that railway companies offer attractive and competitive services.

From the point of view of the 92 companies which were questioned in the framework of the quantitative survey, more flexibility would facilitate the transfer from road to rail (51%). Nearly 40% find that costs for rail transport are too high, 29% do not find an adequate rail service for their transport flows. Very few complaints were made with regard to the quality of terminals (6%) and rail infrastructure (12%).

#### *conclusion*

The sectoral driving ban causes a shift from road to rail for many goods. Carriers and freight forwarders are more affected by the regulation than shippers. While the sectoral driving ban has a low impact on the economy as a whole, there is a heavy effect on certain branches and trades like transport of round timber, waste, ceramics and so on.

## 5.2.2 Specific offers for combined transport

### *evaluation of certain relations*

To find the most suitable relation for new combined transport services, an analysis of CAFT-Data was carried out. The most important destinations for alpine crossing traffic were examined and existing terminals were evaluated according to their capacity and attractiveness for a new combined transport offer. Therefore the quality of the equipment of the terminals, already existing destinations, possibilities of further transport as well as the accessibility of the terminals were examined. In terms of the aims of traffic policy to transfer as many goods from road to rail, the study takes into account existing relations – established relations were respected.

## 5.2.3 Pilot projects across the Brenner and the Arlberg

In addition to the criteria listed above, the CAFT-data was used as the main data basis for developing pilot projects for new combined transport services. For the Brenner axis, a regular block train was proposed between Munich and Bologna, with a potential modal shift to rail of approximately 216.000 t per year. As for the Arlberg, half a block train was suggested between Wolfurt and Verona, with shunting in Hall in Tirol and a potential modal shift of approximately 108.000 t per year.

The procedure for developing those pilot projects, as well as their specific characteristics is described in detail in chapter 3.

Source: Matthias Wagner

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## 5.3 improVing releV ant intermodal nodes

Within TRANSITECTS the accessibility and functionality of logistic nodes have been fostered. Innovative approaches which improve the offers of intermodal nodes and which make them accessible for new markets have been developed.

### 5.3.1 Dry Port concept Villach-Fürnitz

#### *project aim*

In the coming years a continuous increase of stock turnover is forecasted for the European ports. Furthermore, the container traffic has even tripled in the last ten years. Consequently, the European ports will soon achieve their limit of space capacity. In order not to endanger the expected economic revival, the overloaded seaports are looking for supporting measures and concepts which make an addition of capacity possible. Therefore, new logistical concepts are necessary. These concepts have to consider the whole transportation network and therefore to integrate the affected ports as well as hinterland connections and logistical services.

That is why the Regional Government of Carinthia authorized the Logistik-Kompetenz-Zentrum (LKZ GmbH) in cooperation with the Fraunhofer IML to develop an innovative concept in the course of the European project TRANSITECTS (Transalpine Transport Activities).

The aim of this project was to develop a strategic recommendation for the Austrian location Villach-Fürnitz with the focus on the implementation of a Dry Port.

#### *background information*

Villach-Fürnitz is located at the south side of the Eastern Alps, has a well developed infrastructure and is connected to the TEN-T (Trans-European Networks Transport) network. Due to this good strategic position, Villach-Fürnitz offers excellent preconditions for the implementation of a Dry Port (see graphic next page).


**Layout of the location Villach-Fürnitz.**
**An intermodal terminal with connected logistic centre is available.**
Source: Entwicklungsagentur Kärnten

Dry Port concepts are innovative approaches which have become increasingly relevant in the last few years. A Dry Port is an intermodal terminal which is located in the hinterland of a seaport. It provides additional storage and handling capacities and additional services for overloaded seaports. Thus a Dry Port contributes to remove bottlenecks and to improve performances and transhipment processes of the seaport. Via high capacity traffic modes goods can be relocated from the port to the Dry Port. Given the fact of an optimized and close collaboration, the Dry Port is no competitor for the port but offers an addition of capacity.

The implementation of a Premium Dry Port in Villach-Fürnitz offers great potential to position the location as a clearinghouse for the Eastern arc of the Alps and as a gateway to new markets. By implementing a shared Dry Port for all NAPA-Seaports, synergy effects for the ports can be achieved and the Villach region can be strengthened economically.

## *project approach*

### *1. Classification and evaluation of existing pre-studies*

The Government of Carinthia already conducted several pre-studies (Alpen-Adria University of Klagenfurt, SoNorA, EAK) concerning the development of the logistical place Villach-Fürnitz. The existing study-results have been taken into account for this project. The five important Adriatic ports (Koper, Ravenna, Rijeka, Trieste and Venice), which are commonly organised in the port association NAPA, offer big potentials for the development of the logistics location of Villach-Fürnitz. They induce tremendous commodity flows which may potentially be directed via and processed in Villach-Fürnitz.

### *2. research on dry port requirements*

After analysing different kinds of logistical solutions for Villach-Fürnitz, finally the Dry Port concept was considered to be most convenient. A Dry Port concept offers following advantages: Firstly, it gives seaports with a lack of areal space the possibility of expansion. Secondly, the capacity and productivity of a port can be increased and many additional services can be offered. Thirdly, the traffic volume in the port area can be reduced by shifting traffic from road to railway. Thereby, not least, environmental benefits can be realised.

### *3. interviews with the north adriatic ports*

To prove if North Adriatic ports are open-minded for a new organisational strategy and for the place Villach-Fürnitz, several interviews with the relevant ports have been arranged. Interview partners have been representatives of the port authorities of Koper and Venice, the container terminal in Trieste and the ports Ravenna and Rijeka. The interviews confirmed a broad acceptance for innovative concepts and the planned role of Villach-Fürnitz.

### *4. development of a strategy*

An individual Dry Port concept for Villach-Fürnitz was developed. It proposes a three-step implementation model which foresees short-term (<3 years), middle-term (<5 years) and long-term (>5 years) aims and measures:

*step 1* proposes the development of the terminal in Villach-Fürnitz to a Premium Dry Port for the seaports Koper and Trieste. Requirements to be implemented therefore are the availability of basic services like customs clearance, container storage and depository for blank containers as well as a regular train shuttle with fixed time schedule between Dry Port and focused sea ports. A kick-off-workshop with relevant actors as well as the submittance of a common letter of intent involving all NAPA-ports and manifesting the final project aim as well as necessary steps have been foreseen.

In *step 2* the former concept shall be extended to a Premium Dry Port approach involving additionally the port of Rijeka. Therefore, more special port services and an additional regular train shuttle with fixed time schedule between Dry Port and Rijeka have to be implemented. A Follow-up workshop with the members of all NAPA-ports is considered to take place.

*step 3* foresees the development of Villach-Fürnitz to a Premium Dry Port for all NAPA-ports (including Venice and Ravenna) and thus to a clearinghouse for the eastern arc of the Alps. All port-specific and additional services shall be offered to all NAPA-ports and regular train shuttles with fixed time schedules shall connect the Dry Port with all NAPA-ports.

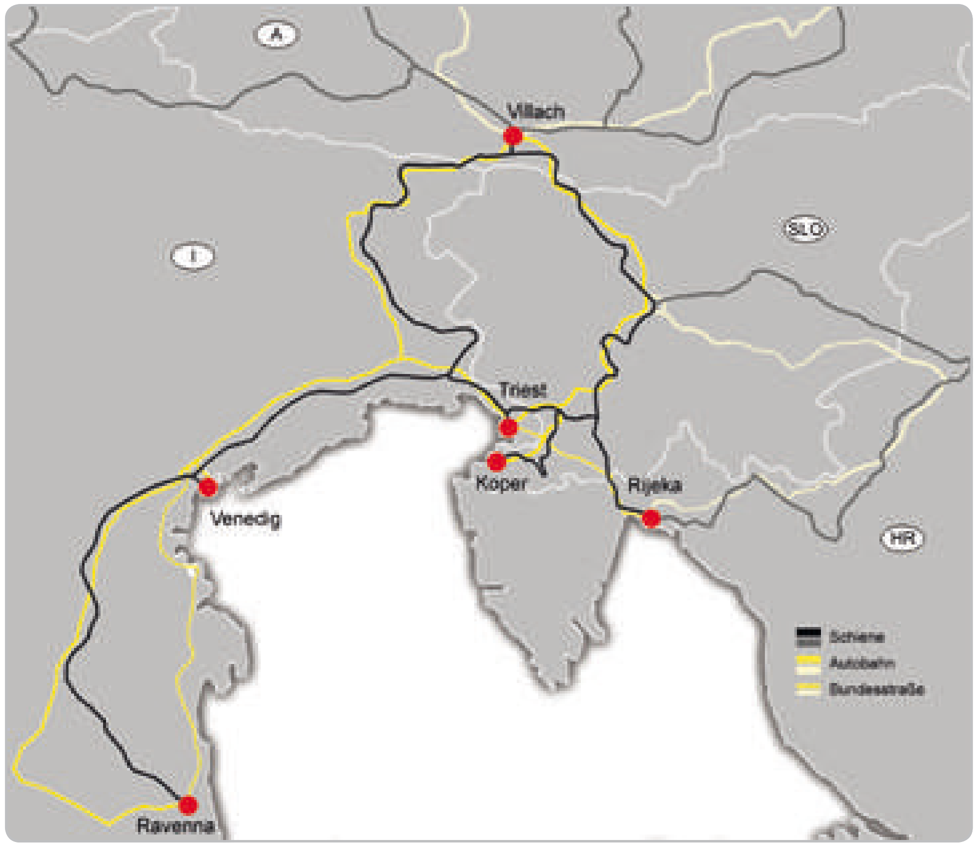
To investigate all strength, weaknesses, opportunities and threats of the Dry Port concept a SWOT-analysis has been conducted.

### *5. Workshop for cooperation agreement*

A final workshop in Klagenfurt intended the signature of a cooperation agreement between all involved representatives of relevant ports and terminals. Therewith the undersigning parties should verify their commitment to support and promote Villach-Fürnitz as a Premium Dry Port and thus as a common terminal for their rail freight transport to the countries along the Baltic Adriatic Axes and the Pan-European Corridor X (transport corridor from Austria to Greece).

## *project results*

Within TRANSITECTS the foreseen Premium Dry Port concept for the location Villach-Fürnitz was developed. It includes five big Adriatic ports, the five stars: Koper, Ravenna, Rijeka, Trieste and Venice (see map and picture).




**The five big Adriatic ports.**
Source: Transitects final presentation. Premium Dry Port Villach-Fürnitz, LKZ GmbH


**The five stars.**
Source: LKZ GmbH

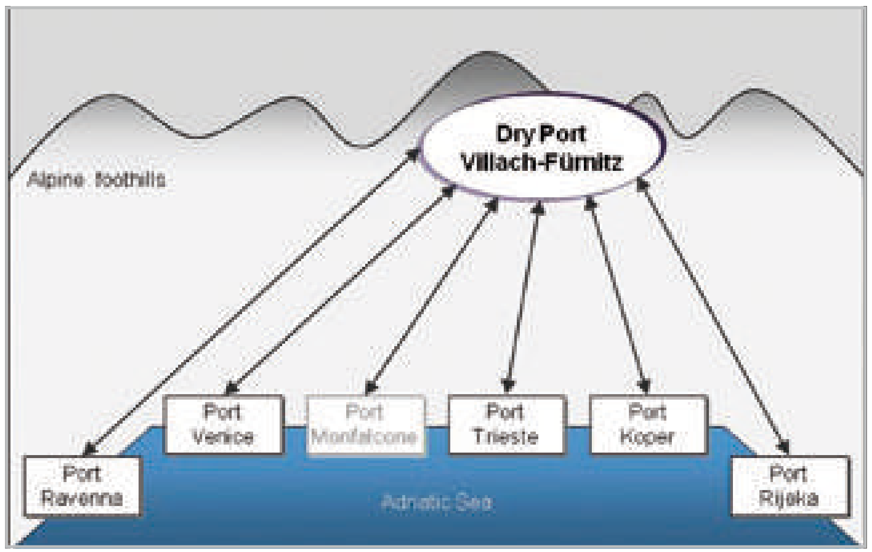
These ports offer their services together in the North Adriatic Ports Association (NAPA) and will commonly use Villach-Fürnitz (Carinthia) as a Premium Dry Port. Thereby they intend to create an attractive supply for customers. Concrete advantages expected are e. g. possible bundling of freight-trains, time savings, clearing in German language and optimized customs handling.

The NAPA-Seaports appreciate the location of Villach-Fürnitz because of its geographical position. Located at the intersection of the Baltic-Adriatic Axis and the Transnational Corridor X, it offers perfect conditions for this innovative project.

During a workshop organized by the Regional Government of Carinthia within TRANSITECTS in November 2011 in Klagenfurt, a cooperation agreement was signed by NAPA, the Government of Carinthia and the Carinthian Development Agency (EAK) (see photograph below).

**The signed cooperation agreement.**
**Image f. l. t. r.:**
**dr. albert Kreiner**
**(Regional Government of Carinthia),**
**Mr. Karl Fischer (LKZ GmbH),**
**Mag. Sabrina Schütz-Oberländer**
**(Managing director EAK),**
**Ph.D. Bojan Hlaca (Vice president of NAPA),**
**DI Hans Schuschnig (Regional Government of Carinthia).**
Source: images LKZ GmbH.

Already now, and thus much earlier than planned, a cooperation agreement between all relevant seaport members has been signed. All five NAPA ports agreed to commonly support the development of the shunting yard in Villach-Fürnitz to their first Hinterland Hub and Dry Port (see graphic below).




**Dry Port Villach-Fürnitz.**
Source: TRANSITECTS final presentation. Premium Dry Port Villach-Fürnitz, LKZ GmbH



Because of its strategically important location, Villach-Fürnitz could rise to the main hub between the NAPA ports and the states along the Baltic-Adriatic Axis, as well as the Transnational Corridor X. Villach-Fürnitz as Premium Dry Port located directly in the hinterland of NAPA ports could improve and simplify many logistical processes and therefore improve intermodal freight transportation on rail- and waterways.

Additionally to the North Adriatic seaports a connection between Villach-Fürnitz and the South Adriatic ports has been build up. This is based on the consideration that the transport connection between Adriatic ports and Austria/Germany as alternative to the transport route via North Sea ports is considered to become more and more interesting for economic and ecologic reasons in future.

A congress on this issue will follow in autumn 2012. Expected participants are representatives of the NAPA ports, Italian and Austrian Ministries of Transport and Chambers of Commerce as well as a delegation from Bavaria.

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## 5.3.2 Improved intermodal nodes in veneto region

### *overview and methodological approach*

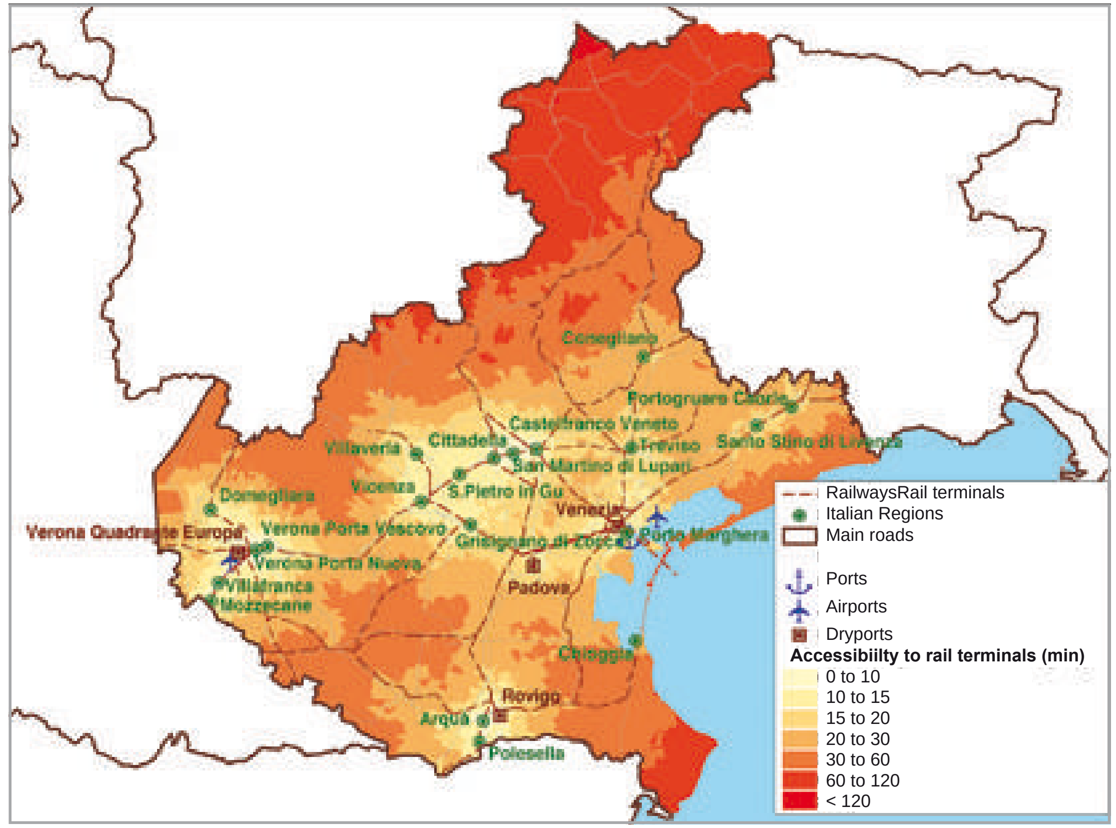
The main aim of Veneto Region's contribution to TRANSITECTS refers to the analysis and the evaluation of the relationships between the "logistics regional platform" – constituted by regional ports, dryports and freight villages in Veneto – on the one hand and the economic-industrial regional pattern on the other hand, both in the current and in future prospective scenarios.

The study of the relationships between the logistics regional platform and the economic-industrial regional pattern is a complex task, involving some relevant areas of investigations to be taken into account: intermodal freight rail transport, real estate logistics market, logistics warehousing, port and dryport facilities, integration within the regional logistics system, the overall logistics labour market in the area. Consistently, analyses have been conducted for both current and perspective scenarios by combining desk activities, a sampling survey and proper quantitative forecasting tools, so as to shed the light on some specific aspects of the industrial regional pattern and on the dynamics of existing/potential interaction with the regional logistics platform.

This allowed for the identification of relevant current and future policy and governance actions to be implemented by Veneto Region so as to enhance the competitiveness of the nodes of the regional logistics system, in compliance with the following governance guideline statements:

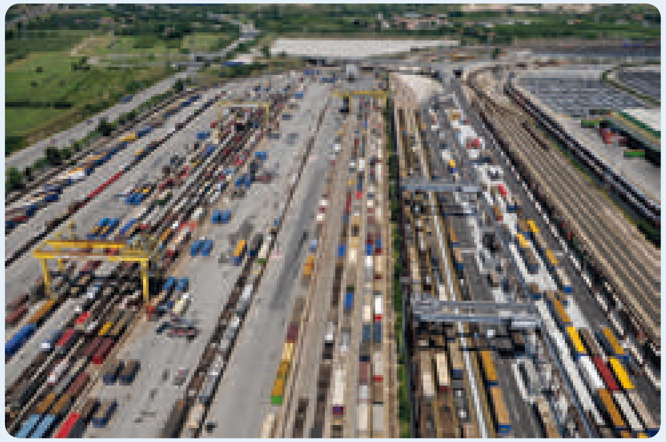
- establish a stronger and more effective co-ordination between ports and dryports/inland terminals;
- integrate into an holistic and comprehensive design both existing and future intermodal platforms/warehouses/inland terminals – public and private – so as to achieve a conscious and effective network design;
- sustain the competitiveness of the port of Venice and of its container terminals;
- match the user needs and fill the gaps with the economic and industrial regional system, so as to enhance its connections with the regional logistics platform and increase its competitiveness in regional, national and possibly international markets;
- make the real estate logistics market and the related labour market more sustainable;
- cope with a future wherein the sustainability concept will be decisive in assessing and pursuing quality and competitiveness in the logistics services.

The current status of the transport accessibility of the regional territory towards the intermodal freight system (ports, dryports, railway terminals) is depicted at a glance in the following thematic map, whilst an overview of the main regional intermodal nodes is represented in the illustrations on the next page.

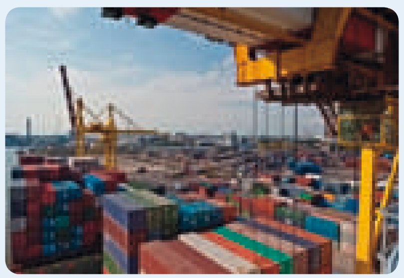



**Transport accessibility of the regional territory towards the intermodal system.**
Source: Own illustration, RV

**main regional intermodal nodes**



**Interporto Quadrante europa in verona.**
Source: quotidiano “L’Arena”, inserto “SPECIALE TRASPORTI” del 29/07/2010 – articolo: Interporto Quadrante Europa sistema integrato al centro del crocevia europeo



**Port of Venice.**
Source: @ANSA

**Interporto of Padova.**
Source: Interporto Padova



## *relevant issues*

The main shortcomings in the relationships between the regional logistics system and the economic/industrial regional pattern are related to two inner levels within the regional logistics system – the former internal to each single component node of the system and the latter in terms of coordination between nodes within the system – and to an outer level between the regional logistics system and the economic/industrial regional pattern.

The evolution of the Italian “logistics district” model towards a system of interconnected logistics networks with international standards, only partially related to the specific characteristics of the territory, has significantly changed the real estate logistics market, nowadays characterized by the significant presence of big players and by a remarkable decrease in rent prices, worsened also by wrong and myopic planning policies from the relevant public bodies. In spite of the setback in the fall of warehouses’ rents, and notwithstanding the tailor-made nature of most of the new investments towards emerging market trends, this led to a risky situation of duplications in the areas of interest of regional dryports, with negative consequences for the profitability of past and future public investments.

At the same time, the intermodal railway market faced an unprecedented downturn: the overall domestic traffic in Italy fell from 36 to 26 million tons/year (-30%) from 2007 to 2009, due to both intrinsic demand reduction and supply shrink. The international railway market is more dynamic, with the majority of routes to/from the Central/Eastern Europe, wherein the presence of major international operators leads to a substantial marginalization of the intermodal nodes south of Verona. The Eastern European market offers interesting perspectives of growth. In any case, half of the overall Italian railway freight (traditional and/or combined) is linked to port traffics, even though in a context often characterized by infrastructural and organizational bottlenecks, which makes railway not competitive with respect to road. However, the traditional (i.e. non containerized) rail traffics to/from the port of Venice are - given the general Italian context - satisfactory, whilst the intermodal rail traffic is very marginal, due to the short distances to/from the final origins/destinations terminal which make road transport much more competitive.

From the port side, the establishment of the NAPA impacts somehow on the planning/governance activities of all the relevant involved public bodies (regions, national governments), which should now account for a wider and more complex coordination in the logistics and freight sectors, e.g. in the process of funding assignment for new infrastructures related to ports and inland connections. Specifically, this implies having a clear overview of the potential basin of the overall NAPA range, in terms of geographical coverage and potentially attracted demand: relevant studies have been already promoted for this aim.

In terms of connections between ports and inland terminals, in the current scenario there are remarkable freight flows between the regional dryports in Veneto and far ports in the Northern Range and into the Tyrrhenian arc: the only effective integration with local ports is related to the repositioning of empty containers in Padova. Nevertheless, the other regional dryports may reveal an effective function of intermodal inland terminals, helping therefore the ports to increase the coverage of their target basin.

On the other hand, the regional dryports have not established yet a significant process of specialization and functional integration within a single "regional dryports" scheme. They have actually started acting together as a system (with a cooperation extended also to the dryport of Bologna in Emilia-Romagna region) mainly in reaction and relation to the activities of NAPA, but not yet leading to a real and tangible value multipliers for the overall system of dryports.

As a consequence of the above mentioned dynamics, the logistics system in Veneto Region is not entirely well integrated with the regional productive structure, which suffers indirectly its structural inefficiencies and planning uncertainties.

## a selection of preliminary outcomes

The overall logistics and freight transport sectors in Veneto region are facing a period of great uncertainty and unclear recovery perspectives. After the slight trade growth observed in late 2010 and in the first half of 2011, a new downturn of export trade and inter-company activities has been taking place since September 2011, with negative impacts on maritime liner trades and no recovery perspectives in the horizon. In particular, the access to bank credits for business transactions is now much more difficult and dramatically limited, an unsustainable condition for several small and medium sized enterprises. On the other hand, based on evidences from the operators, the logistics sector faced a surprising failure in exhibiting any recovery trend during the small reprise of the first half of 2011.

The only direct container service that served the port of Venice will be suspended in 2012 for market reasons, notwithstanding the existence of a high quality terminal both in terms of space utilization and handling equipment, thanks to the remarkable and profitable investments made up by the operating company. The international collapse of freight rates, the substantial network re-design of container liners and the high fuel costs will bring the port of Venice back to a situation in which it will be served just by feeder services through transshipment (towards which the port of Trieste has recently launched an aggressive market strategy). The competition amongst Northern Adriatic ports was further increased and modified by the recent arrival of a very dynamic terminal handling company in the port of Rijeka (which has received financial support from the World Bank for its expansion), and by the announced expansion of the container terminal at the port of Ravenna. However, winds of crisis blow also on the NAPA area, with the difficulties currently affecting the port of Koper and the official stop to the huge Unicredit megaport investment in Monfalcone.

Remarkable attention deserves instead the contribution of the port of Venice to the trade of non containerized general cargo, project cargo and heavy lift, with a primary position in the national context. Further great interest comes from the continuous improvements that the Port Authority of Venice is pursuing for enhancing the efficiency of customs clearances and inspections, so as to make them more responsive to market needs, and potentially leading to competitive advantages much more tangible than those that may result from any infrastructural improvement. Moreover, thanks to the development strategies of the port Presidency, some freight forwarders have started operating jointly in port warehouses for goods handling and processing.

The regional dryports are overcoming the difficulties encountered during the years of the economic downturn, when many players and dryport customers preferred to rent warehouses outside the dryports. Notably, a more conscious and effective pricing policy made it possible to "bring home" many customers and also to enlarge their market penetration. The market is therefore now perceiving again the added value of the dryport structures with respect to standalone private logistics platforms. Another relevant feature shown by dryports as public facilities in recent years is their capability to invest also in periods when individuals operators do not have enough resources.

Finally, looking at the logistics and freight labour market within the region, a first emerging result is the feeling of a very widespread use of event-driven, unstructured work management procedures both in the warehouses and for road carriers. As a result, the overall warehousing and road transport industry lives "on the edge" and cannot offer any quality services: therefore, it is unable to support the establishment of effective port-dryport systems, strictly dependent on road transport as mentioned above.

## preliminary proposed pilot actions/policy initiatives

The main outcome of the TRANSITECTS project for Veneto Region may be identified as a set of policy initiatives, integrated within the wider regional planning and governance strategy for the freight and logistics sectors, aimed at optimizing the overall regional logistics platform.

From a general standpoint, a greater coordination is needed between policy and planning actions at regional and supra-regional levels, together with a renewed awareness of the context in which the new infrastructures will be built, i.e. avoiding dangerous duplications for the territory and for the economy. In general, Veneto Region is active in the process of estimating the target basins and the market catchment of its overall regional logistics platform and of each component node (ports, dryports, inland terminals, and so on). In particular, the built of new facilities for logistics warehousing and for intermodal transport should be carefully evaluated so as to avoid absolutely any overlaps with existing similar infrastructures, in order to minimize the negative effects due to the lack of coordination. Finally, investments in new road and rail infrastructures are going to be carefully assessed in order to be prioritized with respect to their multiplier impact on the overall regional logistics platform.

In this context, regional incentives towards intermodal rail transport could be used for attracting a significant share of freight demand towards rail intermodal transport, provided that they are encompassed in long-term financed programs with certain and clear definition of the entity and of the duration of the contribution. In fact, this may represent an effective motivation able to convince new operators to enter the market. In parallel, the identification of possible sustainable planning actions, devoted to the promotion of intermodal transport through cross-actions on road transport (e.g. improvement in vehicle load factors, reduction of empty trips and miles traveled, prosecuting dumping), is under investigation. Finally, a facilitation process towards a synergic coordination among regional dryports and between them and Veneto Region – aimed to strengthen their key role in the reprise of intermodal rail transport – has been started. One possible option is to support the creation of an equivalent of the NAPA for regional dryports, maybe extended also to relevant analogous facilities in neighboring regions (e.g. Interporto Bologna), so as to promote common synergies joint strategies to face and address the issues described above. This requires a parallel and consistent definition of the relevant business areas for each dryport.

In that respect, dryports oriented to intermodal rail transport should act as a whole, possibly promoting the establishment of new intermodal rail operators so as to create a critical mass for capturing demand segments otherwise inaccessible.

Maritime traffics and dryports should be jointly treated as part of a common system, and therefore promoted and supported in a holistic view. Containerized maritime flows in the Northern Adriatic cluster exhibit remarkable perspectives of growth; however a necessary condition for this aim is the implementation of an adequate and effective network of freight services and connections both on the landside and on the seaside. In that respect, intermodal rail traffic should be encouraged further from regional dryports towards Northern European and Eastern European destinations, so as to enlarge the market view not only in the light of shipping companies, but also towards final customers, which perceive the overall origin-destination cost and not just the maritime rate.

At a glance, therefore, two “policy layers” are being addressed jointly in order to optimize the efficiency and the performances of the regional logistic platform: the former deals with the enhancement of the internal connections, in terms of both physical and service integration between logistics, freight and industrial systems; the latter aims at strengthening the positioning of Veneto Region within the international context. Remarkably, the second objective might be further assessed through specific coordination actions with other international private and public bodies, that is:

- for container flows, gateway port operations in Venice would benefit from specific policy actions promoted by Veneto Region – however in an holistic view within the NAPA –aiming to enforce the intermodal railway connections, towards Central and mainly Eastern Europe;
- however, the network of container liner maritime services will likely preserve a main role for Tyrrhenian ports in supporting the export of Veneto, therefore the importance of their connections with the regional territory should be taken into account as well;
- at the same time, the leading edge position of the port of Venice within the market of some non-containerized maritime traffic should be consolidated further with similar actions, e.g. for the promotion of bulk freight trains;
- regional intermodal nodes, and particularly the regional dryports, are already relevant gateway nodes in between international and national train freight flows: again, the promotion of coordination actions – such as the pilot intermodal trains developed within the TRANSITECTS project – would strengthen their position in the overall European network of freight railway traffics. In that respect, the performances of the Alpine passes should be carefully taken into account (e.g. Brenner versus Villa Opicina and Tarvisio), because a capacity bottleneck would result in significant flow diversions amongst intermodal nodes in the North-East of Italy.

In addition, in coordination and synergy with the above mentioned coordination actions, Veneto Region is implementing effective regional marketing initiatives to promote the coordination and the development of its regional logistics platform.

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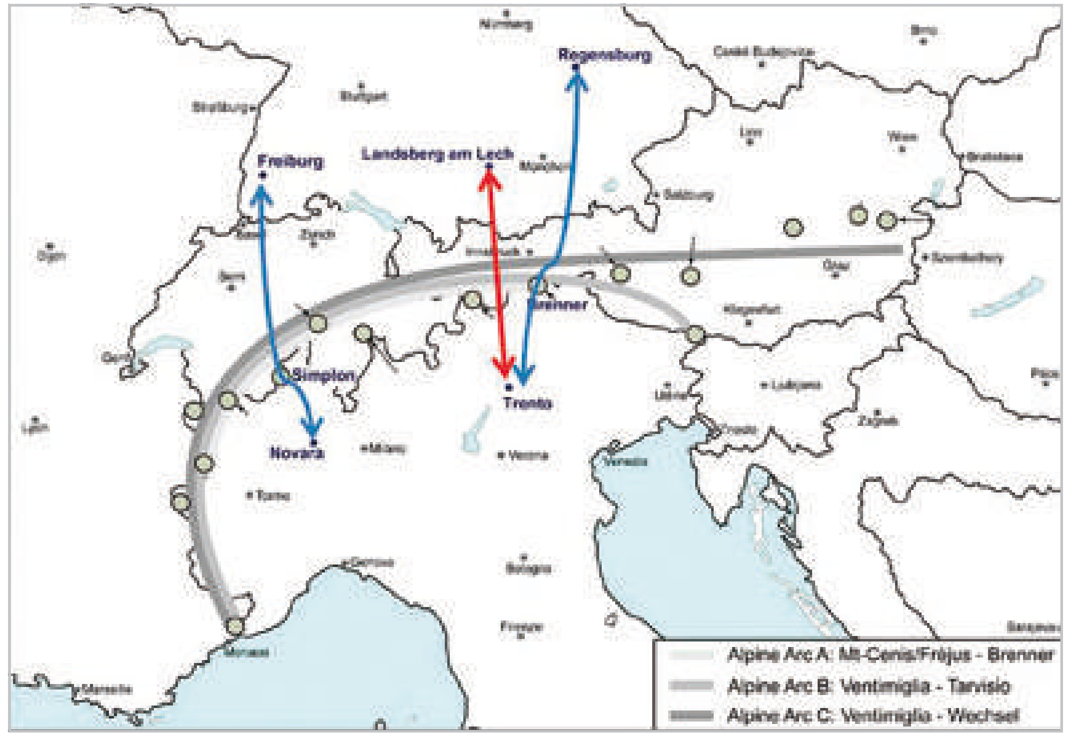
## 5.3.3 Improved intermodal nodes in Bavaria/Baden-Württemberg

Within the frame of TRANSITECTS, the Logistik-Kompetenz-Zentrum (LKZ) Prien on behalf of the Regional Association Donau-Iller searches for traffic solutions to disburden transalpine transport corridors. In this context intermodal shifting potentials of the road transport between the economic region Bavaria/ Baden-Württemberg and Northern Italy were analyzed.

The alpine area can be considered as a transport political specialty in several respects. The decisive factors are the geographical position - right in the heart of Europe, unique topographic conditions, the high sensitivity of the ecosystem as well as the course of very important European transport and development axes. The economic recovery of the German and European market creates enormous growth in freight transport and complicates the goal of shifting traffic, in addition. Only by creating new connections, the transfer of goods from road to rail can be advanced and future growth potentials will be compensated. The key to this process is the initialization of new intermodal nodes. These would allow the access to the high-ranking rail network for small and medium-sized enterprises.

While in conventional combined traffic terminals expensive crane systems are necessary, the rolling road technique offers an uncomplicated alternative. The driver drives the truck himself on a ramp onto special low-floor wagons and goes along with it the whole rail transport in a sleeping wagon. Thus, existing railway sidings can be expanded to fully functional rolling road terminals with relatively little effort. Considering that more than 85% of truck-trailers, superstructures and semi-trailers are not suitable for handling by crane, the rolling road turns additionally out to be a very suitable variant of intermodal transport.

Within the project the rolling road was therefore recognized as a timely actionable opportunity to disburden alpine transport corridors. Accordingly, the creation of a new rolling road link between Bavaria/Baden-Württemberg and Northern Italy was forced. Looking at the two existing transalpine rolling road connections in the western (Freiburg) and eastern part (Regensburg) of Southern Germany a clear gap between Stuttgart and Augsburg arises – in the region of Swabia.

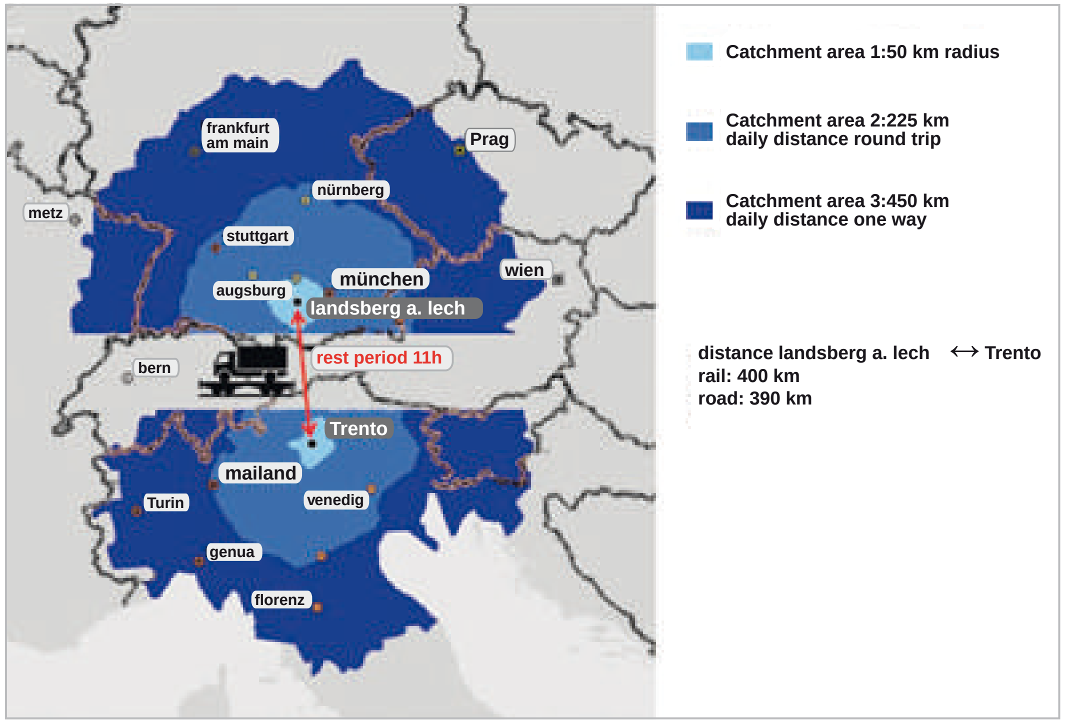



**RoLa-connections between Germany and Italy.**
Source: map based on: http://www.zuerich-prozess.org/fileadmin/data/webcontent/Webcontent/Bilder/Boegen_END.pdf (2008)

Based on the determined shortcomings of the terminal network in the region of Swabia, the Brenner was chosen as Alpine transit route for the new rolling road. In planning optimal intermodal points, the transportation time by rail was especially considered. With a transportation time of eleven hours, the new connection would be considerably longer than the existing rolling road link between Wörgl and Brenner and could be used more economically, mainly by small and medium-sized enterprises. The advantage is that the driver can take his legally required rest period during the train ride.

Already existing German and Italian railway sidings and transfer terminals with a route distance of eleven hours were analyzed based on a specifically created list of requirements. Thereby twelve stations were selected for the short list. These were tested on the basis of criteria, such as the length of the available loading siding, the connection to the high-ranking road and rail network as well as existing parking and traffic areas. In Germany the container terminal Ulm and the private railway siding of a saw mill in Landsberg am Lech were identified as optimal intermodal nodes. Ulm was excluded in the final step due to lack of capacity and embedded rails. In Italy the intermodal terminal Trento was determined as the perfect starting and destination point of the new rolling road.

This analysis suggests a connection between Landsberg am Lech in the Bavarian part of Swabia and Trento in Trentino-South Tyrol. Also the parity of the transport volume between these nodes argues for this transport axis. In the catchment area of Landsberg am Lech three large paper mills can export their goods by rail. Waste paper, for instance, could be transported back on the railway from Italy. These locations are leading to different catchment areas of potential carriers, as can be seen from the following graphic.




**Catchment area of the planned RoLa-connection.**
Source: LKZ Prien GmbH, own illustration

In practical operation five trains per week and direction are planned. The good prospects of implementing are based especially on the existing excellent infrastructure of the railway sidings in Landsberg am Lech and Trento.

The private saw mill railway siding in Landsberg am Lech has both, the necessary rail infrastructure and sufficient parking and traffic areas for at least 21 heavy goods vehicles to its disposal. Sufficient open space for further actions is available as well.

Due to a change in ownership and alternating market conditions the siding is being used well under its capacity limit, resulting in unused potential. The location could function as a rolling road terminal as well as it can be used by the owner itself and other corporations.

In addition to the suitable infrastructure the position itself is another advantage. The terminal siding in Eastern Swabia located south of the area of Augsburg represents the first RoLa handling possibility in this cross-border region in Bavaria and Baden-Württemberg. A direct linkage to the B17 is close to the railway siding which offers direct connection to the high-level road network. The proximity of the A96 motorway provides easy access to the traffic junction in Munich as a well as in the direction of Baden-Württemberg, especially to the region of Ulm.


**Catchment area Landsberg.**
Source: www.openstreetmap.org, www.creativecommons.org

The Italian start and destination terminal Trento features also adequate parking and traffic areas and is already operating as an efficient transshipment node – thus it offers a functional infrastructure. Additional required investments for the sleeping wagon supply unit during the standing time and for the administrative and technical processing of the transports are necessary. Until the start of practical operations, the funding and responsibility for appropriate measures will be cleared in a specific operational concept. An electric traction between Munich and Landsberg am Lech and diesel traction between Trento and Munich is provided in the track planning and network layout design. Within the project the processing of the arriving and departing trains in the terminal at Landsberg am Lech and the smooth integration into the regular company traffic were already simulated and certified.

The concrete implementation is now depending on the price offers of the involved railway undertaking and infrastructure managers. A competitive price compared to the road was fixed as a benchmark by the project team. The approach to this defined price should be affected within the next project steps by negotiations and the examination of financial assistance options.

If this hurdle can be overcome, a new link between two intermodal nodes can disburden the transalpine transport corridors and reduce emissions. The result of performed calculations within the project is a remarkable $CO_2$-reduction of 75 % during a rail transport compared to a Euro 4 or Euro 5 truck. For German logistics companies the new connection might open up an additional way through the Lombardy to the Ligurian ports Genoa, Savona and La Spezia as an alternative to the North Sea Ports.

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Source: Matthias Wagner


**Single wagon traffic.**
Source: ÖBB

## 5.4 Improving regional accessibility of important hubs: Wagonload traffic in Salzburg

### 5.4.1 Missing competition in wagonload traffic

Rail is one of the most efficient means of transport with great competitiveness towards truck transport. This statement refers in particular to block trains on distances of a minimum of 300 kilometers.

In comparison single wagonload traffic is very cost-intensive since much more processes need to be undertaken and fixed costs are high. Consequently, rising competition on the railway market is focusing on block trains, while wagonload traffic is basically offered exclusively by state owned railway companies throughout Europe. Currently, reduced gross margins in the market segment of block trains make it more and more difficult to cover the continuous loss made in the market segment of wagonload traffic.

In addition transport quality (punctuality, availability of wagons, tracing wagons, customer orientation) in wagonload traffic is on a very low level reducing its attractiveness further.


**Single wagon traffic.**
Source: Mag. Friedrich Gitterle

## 5.4.2 Cost cut in wagonload traffic of Rail Cargo Austria

For this reason in autumn 2010 “Rail Cargo Austria” (RCA) – a daughter company of state railway “ÖBB” (Austrian Federal Railways) - decided to start a cost reduction program for wagonload traffic in Austria. The management decided either to stop service completely or to charge an extra fee of at least 600 € per collection (named “B2-Bedienung” by RCA) for shunting wagons in about 25 % of public loading stations and private rail sidings in Austria.

In the state of Salzburg public loading stations and private rail sidings in the below mentioned cities will no longer be served at all by Rail Cargo Austria:

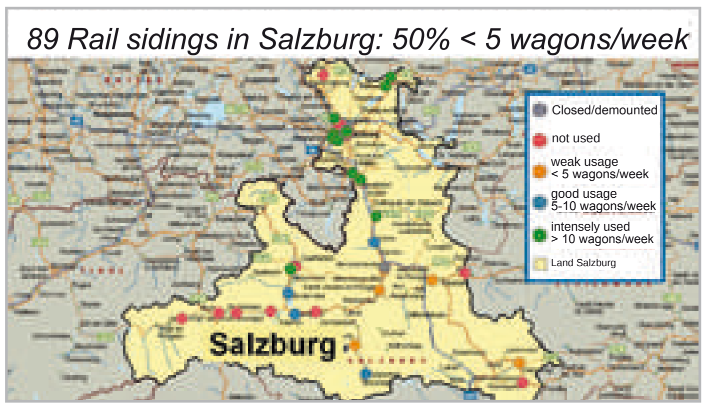
- Seekirchen am Wallersee
- Hallwang-Elixhausen
- Badgastein
- Salzburg-Aigen.

An extra charge of a minimum of 600 € needs to be paid when public loading stations and private rail sidings in these cities want to be served by Rail Cargo Austria:

- Neumarkt-Köstendorf
- Mandling
- Radstadt
- Hüttau
- Lend
- Taxenbach-Rauris
- Bruck-Fusch
- Maishofen-Saalbach.

Decisions were based on the number of wagons that have been shunted into and from the public loading stations and rail sidings: The fewer wagons in the past, the more likely a service will be stopped in the future.

Due to the lack of competition in wagonload traffic the affected companies do not have any alternative to Rail Cargo Austria’s price and service policy, thus they need to shift their transport volume from rail to road.




**Rail sidings in Salzburg – situation 2011.**
Source: Mag. Friedrich Gitterle



## 5.4.3 Trying to leverage synergies

Reacting upon the new situation the department for transport affairs of Land Salzburg invited leading representatives of institutions involved in the transport chain and beyond to a round table in January 2011.

Among others representatives of these institutions have participated:

- Salzburger Lokalbahn (publicly owned Salzburg railway company)
- Rail Cargo Austria (state-owned railway company and only provider of services in wagonload traffic in Austria)
- Wirtschaftskammer Salzburg (Chamber of commerce)
- ProHolz (Association marketing the use of wood in Austria and abroad).

Since a substantial volume of wood is transported very often by wagonload traffic, Salzburg’s wood processing companies have been affected by the RCA-measures in particular and thus participated in the round table.

Its aim was to find solutions to ensure that remaining public loading stations and rail sidings will be served by RCA also in the future.

Since Rail Cargo Austria is still interested in wagonload traffic to generate a profit contribution to cover very large amounts of fixed costs, its management announced to leverage synergies with local service providers.

As a result of the round table a working group was installed, headed by Friedrich Gitterle, a private and independent consultant focusing on rail sidings. Members of the working group are representatives of

- Rail Cargo Austria
- Salzburger Lokalbahn
- Wirtschaftskammer Salzburg (Chamber of commerce)
- Industriellenvereinigung Salzburg (Association of Salzburg’s industry)
- Federal state Land Salzburg (department for transportation planning).

The working group has been checking all rail connected areas in the state of Salzburg step by step in order to find opportunities for leveraging synergies within the crucial “First and last mile” of wagonload traffic.


**Structure of the working group to foster wagonload traffic in Salzburg.**
Source: Land Salzburg

### 5.4.4 Initial success story for the working group

After various meetings during the course of 2011 the working group can refer to an initial success story:

Salzburger Lokalbahn (SLB) and Rail Cargo Austria (RCA) started to cooperate from October 2011 onwards by servicing public loading stations and private rail sidings between the cities of Hallein and Werfen in the south of Salzburg city.


**Kickoff-presentation on Oct. 11th 2011: New RCA/SLB- cooperation for wagonload-service in region Tennengau/Salzburg.**
Source: LPB-Klaus Kogler

Every working day a train starting from Hallein is delivering in average 700 tons to 13 existing RCA-clients. This train is operated by Salzburger Lokalbahn instead of Rail Cargo Austria which in turn leads to substantial synergies and advantages by

- a higher utilization rate of the SLB-locomotive and its driver
- ensuring rail transport service for Salzburg's companies also in the future
- no need to change existing contracts between RCA and their clients since SLB is subcontractor of RCA.

### 5.4.5 future steps

Encouraged by the above described success the working group will continue efforts to find synergies in other parts of the state of Salzburg.

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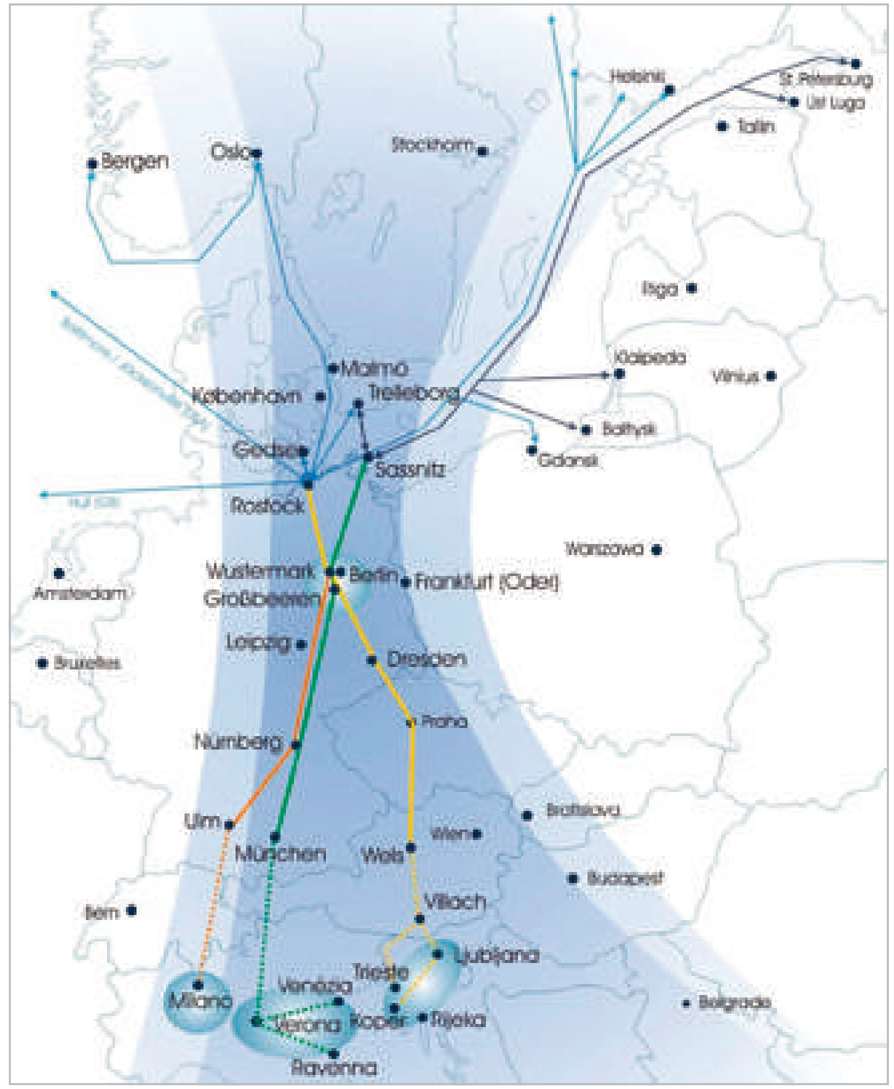
## 5.5 improVing long-distance rail serVices across the alpine region

### 5.5.1 Relevance of optimized transalpine transports – a northern German perspective

Even if not located within the Alpine Space, the Joint State Planning Department of Berlin-Brandenburg (GL) was actively involved in TRANSITECTS. The project partner contributed to studies and concepts supporting sustainable transports and spatial development in a transnational approach. The engagement of this northern German partner exemplarily shows that the improvement of transalpine transports is of high relevance also for actors and regions beyond the Alpine Space.

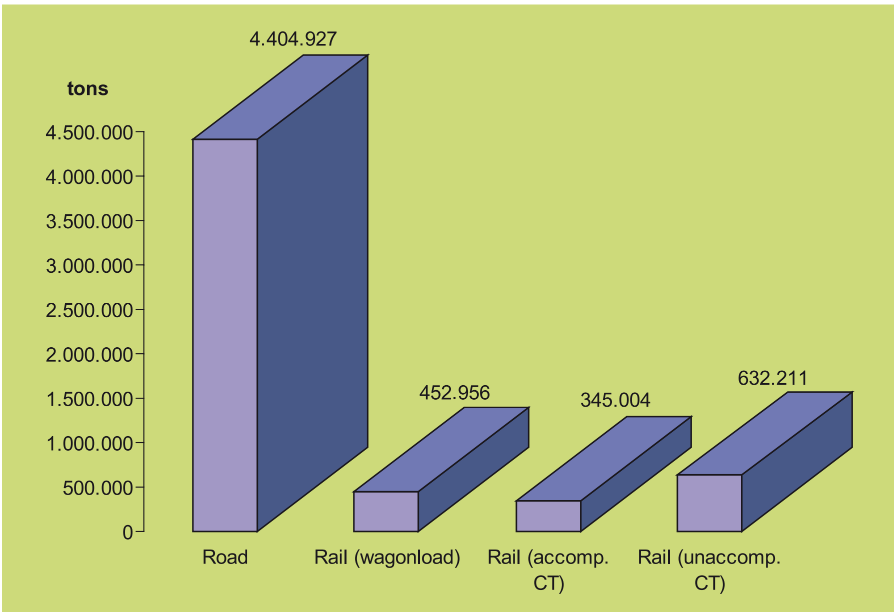
Berlin-Brandenburg joined the project, as important traffic flows from and to the region are crossing respectively can be routed via the Alps. Thereby traffic flows along the Scandinavian-Adriatic Development Corridor play an important role and are intended to be even more important in future. From the view of the metropolitan region Berlin-Brandenburg, this corridor has a high priority within the Trans European Transport Network (TEN-T). The map below shows some potential Alp-crossing railway connections via Berlin-Brandenburg along the corridor.




**Concepts of pilot trains connecting the Berlin-Brandenburg region (developed within SCANDRIA).**
Source: IPG mbH; Ministry of Energy, Infrastructure and State Development Mecklenburg-Vorpommern

## 5.5.2 Transalpine cargo transport between Scandinavia, the Berlin-Brandenburg region and the Adriatic space

To generate environmentally friendly transports, the advancement of combined transports is representing a central task. Several railway lines connect the Baltic Sea Region via Berlin-Brandenburg with the Adriatic space and ports. The aim is to transport cargo on short, innovative and resource efficient routes, intermodal nodes and sustainable networks.

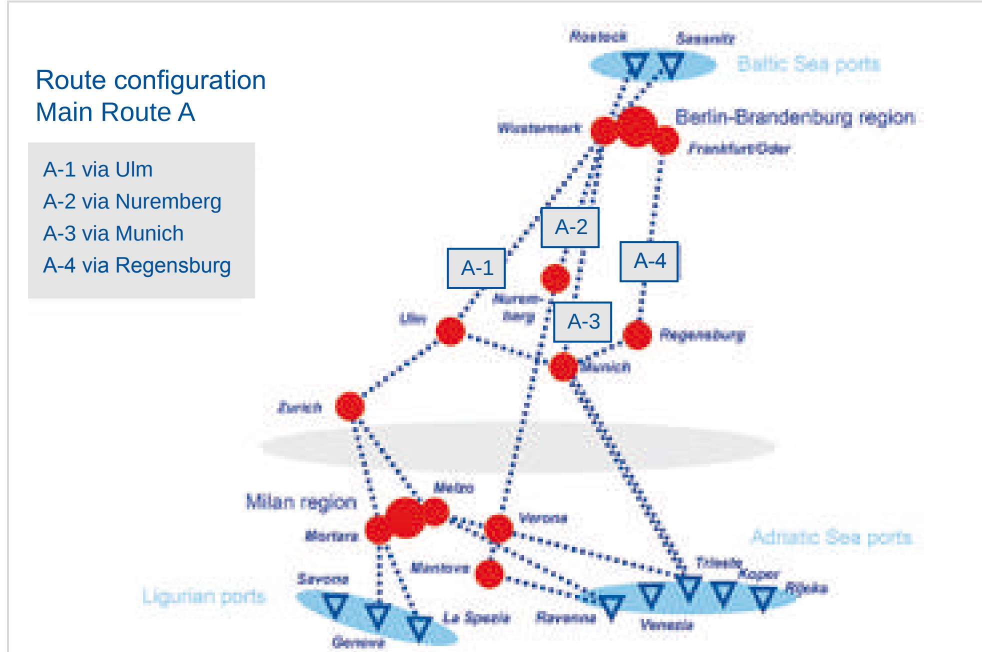


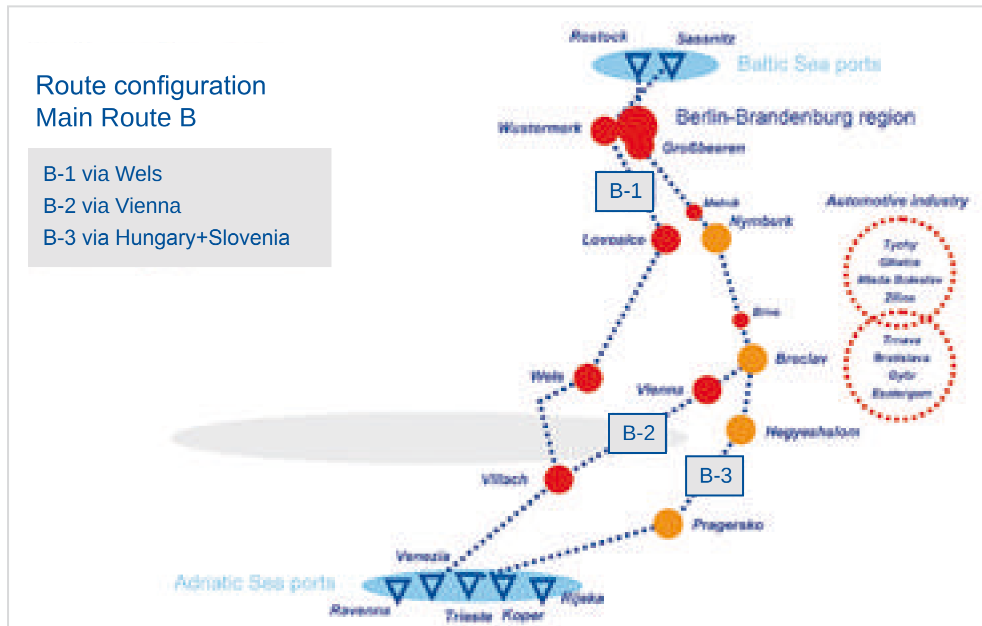

**amount and modal split of transport from/to berlin-brandenburg region and Scandinavia crossing the Alps (in tons per year).**
Source: Joint State Planning Department of Berlin and Brandenburg, based on CAFT data 2009

Within TRANSITECTS two main routes for long-distance north-south transports were identified: the traditional cross Alpine route via Munich, Innsbruck, the Brenner line and Verona as well the alternative route via Prague, Linz, the Tauern axis and Villach. Limited capacities of the classic cross Alpine routes afford further alternative routes via East Austria or Slovakia, West Hungary, as well as via Slovenia to Adriatic ports, to compare challenges and results.

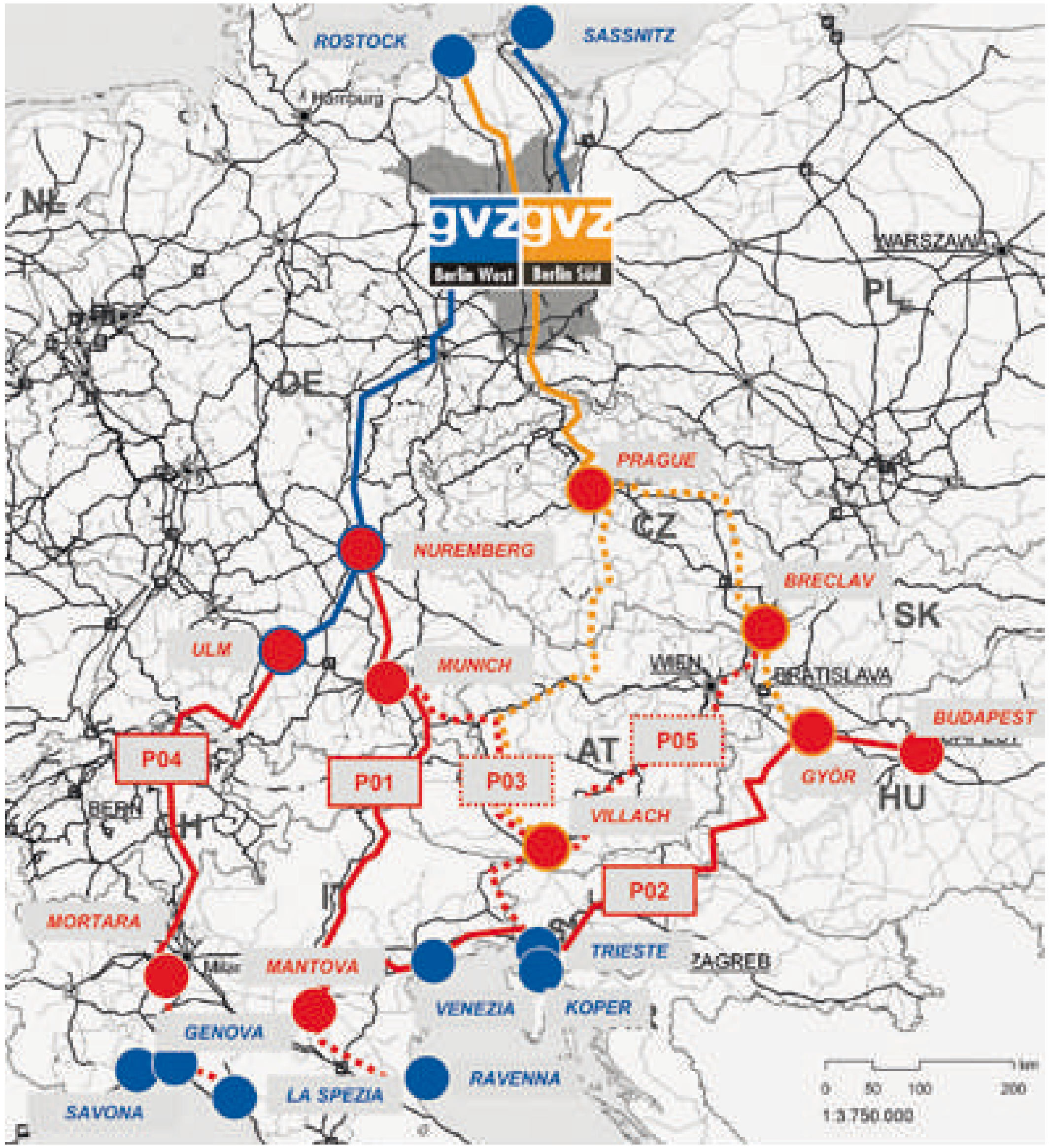
Efficient combinations of transport requests result in new combined transport services in the TEN-T network. Against this background the Joint State Planning Department Berlin-Brandenburg investigated possibilities for block trains, combined transports (CT) and the combination with existing or planned services. These container transports could be connected with general cargo transports and should run, with direct access, between and of the metropolitan regions.

*The following maps summarise some results of the project partner's investigations.*

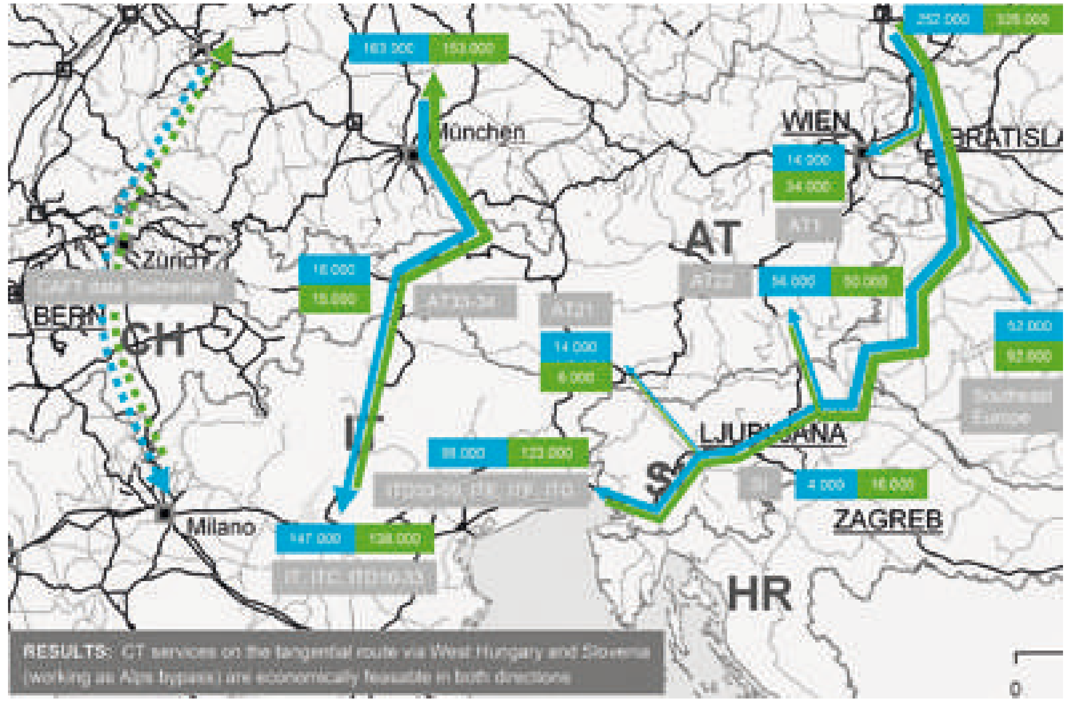



**Variants of route configuration for TRANSITECTS pilot trains.**
Source: Joint State Planning Department of Berlin and Brandenburg




**Concrete route definition of pilot trains from Berlin-Brandenburg to the South.**
Source: Joint State Planning Department of Berlin and Brandenburg




**Potential cargo amount for different routings (Brenner line, A-2 and Tangential route, B-3) in tons per year.**
Source: Joint State Planning Department of Berlin and Brandenburg, based on CAFT data 2009 evaluation

As a result of the investigations carried out it can be concluded that the possibilities of alternative modes of transport can be used more sufficiently. Rail-bound solutions for cargo transports connecting Scandinavia and the Adriatic Sea are very promising to be fixed more user friendly in the TEN-T network as well as in the form of sustainable pilot train projects.

Source: IPG

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## 5.6 coordination & cooperation With eu projects

### 5.6.1 Approach, intention, objective

Which major challenges and requirements can be identified with regard to a greener transport system? Which solutions are suitable and how can they be implemented? Which kind of cooperation is needed to reorganise and green European transports? How can we improve the performance of logistic nodes? And how can we build regional and transnational alliances between different nodes?

These questions are central for TRANSITECTS, but also for some other running European projects. To coordinate different approaches as well as (interim) results, TRANSITECTS offered a cross-project platform. Within round tables and workshops, partners from various projects had the chance to present and discuss their concepts and ideas, to debate about the transferability of approaches or about possible linkages between different strategies. Thus, the TRANSITECTS platform allowed to get feedback from (other) experts and thereby a stimulation for own approaches and furthermore it contributed to formulate concrete demands and need for action to make the European transport network fit for the future.

### 5.6.2 Cooperation projects

TRANSITECTS involves Lead Partners from several transport related European Transnational Cooperation projects. The respective five projects are building the core group of cooperation projects, being:

- SoNorA (South-North Axis), dealing with the improvement of south-north transport infrastructures and services across Central Europe under the lead partnership of Veneto Region (more information: www.sonoraproject.eu);
- SCANDRIA (Scandinavian-Adriatic Corridor for Innovation and Growth), fostering co-modality, rail transport and environmentally friendly solutions in road transport in the Baltic Sea Region under the lead partnership of the Joint Planning Department Berlin and Brandenburg (more information: www.scandriaproject.eu);
- iMonitraf! (Implementing the Monitoring of Road Traffic related Effects and Common Measures), developing common strategies for transalpine traffic and put them into action under the lead partnership of the Central Switzerland Intergovernemental Conference and the Government of Tyrol (more information: http://www.imonitraf.org);
- BatCo (Baltic-Adriatic Transport Cooperation), supporting the further development of the intermodal railway axis which connects the Baltic and the Adriatic sea basins and their relevant ports under the lead partnership of the Government of Carinthia (more information: www.baltic-adriatic.eu);
- AlpCheck 2 (Alpine Mobility Check Step 2), integrating advanced transport and environmental simulation models into classical traffic information systems aiming to provide easy access to a vast set of traffic data under the lead partnership of Veneto Region (more information: www.alpcheck2.eu).

Additional to this core group of projects, further transport related projects and initiatives have been involved in the exchange process; a. o. FLAVIA (www.flavia-online.eu), CODE24 (www.code-24.eu), EWTCII (www.ewtc2.eu) or DRYPORT (www.dryport.org).

### 5.6.3 Key issues of cross fertilization processes

In the frame of several discussions, the following key issues have been identified as possible fields for cooperation approaches:

- Developing methodological approaches in regard to transport monitoring and evaluation; including e. g. traffic flows or environmental impacts.
- Developing and supporting innovative logistic products and services e. g. in regard to requirements of intermodal or green solutions.
- Improving transport infrastructures and their efficiency e. g. in regard to the planning of new infrastructures, the enlargement of existing facilities or the enhancement of capacities.
- Fostering sustainable regional (economic) development, e. g. identifying and supporting cluster development.
- Elaboration of political inputs (e. g. policy papers), political networking.

These issues have – at least partly – been reflected during the cross-fertilization process. Thereby the focus was mainly on the first three issues.

## 5.6.4 Workshops and discussions rounds

In order to encourage and to enable the dialogue between projects, TRANSITECTS organised several workshops and discussion rounds. The most important are summarised below. Furthermore, the project took part in external exchange-events (e. g. in the frame of SoNorA or CODE 24) to bring in experiences and ideas. These events are not included in the summary. Information can be delivered on request.

### *Workshop: innovative (rail) transport solutions*

The workshop "Innovative (rail) transport solutions" on 16th November 2010 in Potsdam discussed future oriented approaches to save the environment. 30 Participants representing the core-group of cooperation projects presented and debated their approaches and ideas in regard to transport models and forecasts, the calculation of environmental benefits and the development of innovative transport solutions.

The discussions identified significant, content related overlaps of the projects. On this basis, cooperation fields could be concretized. It was encouraged to continue cooperation in view to:

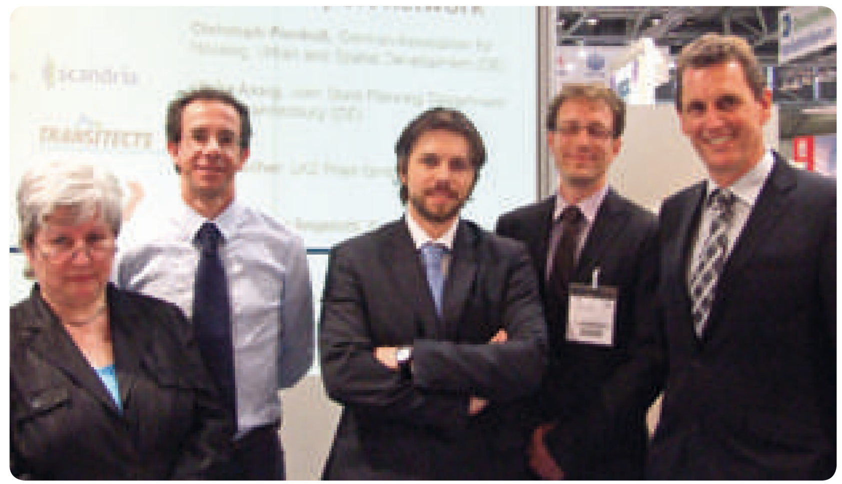
- The development of new train relations, as the projects TRANSITECTS, SoNorA, SCANDRIA and BATCo are explicitly trying to develop and implement new/improved train services.
- The improvement of intermodal nodes, as this is the basis to support the implementation of a functioning multimodal freight transport system and TRANSITECTS, SoNorA, SCANDRIA and BATCo are setting an important focus on it.
- The involvement of economic actors, as this is a starting point for the development of marketable transport solutions and the implementation of new logistic services and TRANSITECTS, SoNorA, SCANDRIA, BATCo and AlpCheck2 aspire to establish a close cooperation with the market.

**speakers of the workshop.**
Source: own photograph, DV



### *discussion Forum: greening the european t ransport network*

Among the title "Greening the European Transport Network" representatives of the European Transnational Cooperation Projects TRANSITECTS, BATCo, SCANDRIA and SoNorA discussed their specific approaches for environmentally friendly transport in a public stand event during the fair "transport logistic 2011" in Munich. Synergies, issues and demands that pave the way to a more efficient, sustainable and greener European Transport Network have been commonly demonstrated. E. g. the necessity of attractive logistic services, optimised transport chains combining different transport carriers or innovative transhipment technologies are central concerns for all of the projects regardless of their geographic focus. All participants of the discussion agreed that existing bottlenecks in the railway system are a substantial challenge to be overcome. Especially the Alpine passes like Brenner, Koralm or Semmering as well as missing links in cross-border freight traffic constitute common problems that afford common approaches. Different states and regions but also existing projects and initiatives have to come together and to build strategic alliances with economy, policy and science.



**Participants of the discussion forum in Munich.**
Source: LKZ Prien GmbH

### *Workshop: Fit for the future*

Logistics nodes, whether they are cities, harbours or logistics platforms, are the multi-modal hubs of the European transport network. Thus, their functionality is decisive for the capacity and efficiency of the whole system. This is one of the reasons why they play an important role in several transport related projects. In the frame of the TRANSITECTS-workshop „Fit for the future – innovative ideas for logistic nodes“ on 29th November 2011 in Berlin, actors from several European projects discussed how to sustainably assure and improve this functionality. It was concluded that - even if it is possible to improve some processes in single transhipment terminals (e. g. via improved technologies, enhanced transparency or additional services) - cooperation of locations (which are potential competitors) will be the decisive approach to respond to future challenges and demands. Thereby regional concepts as dry-ports as well as sub-regional alliances a. o. alongside corridors will play a role. Such cooperation supports the efficient use of existing infrastructures (using potentials of peripheral locations, bundling goods etc.), the development of integrated offers along transport chains and the communication of alternatives – especially to the economy. Furthermore, research and development cooperation allows the harmonisation of technical island solutions.

**Panel discussion during the workshop.**
Source: own photograph, DV

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Source: LKZ

# 6 ProjeCT CommunICaTIon: avaIlable delIverables and furTher InformaTIon (*)

## 6.1 introduction

Aiming to ensure the visibility of the project, its results and recommendations, the TRANSITECTS-team implemented several communication and dissemination activities. Thereby professionals in the logistic sector, political decision takers and other projects have been addressed as main target groups.

In this short chapter you find information about selected communication material and events that exemplarily show which kind of promotion has been carried out. Communication activities resp. outputs have been divided into different groups:

- TRANSITECTS publications -
  like flyers, posters etc. originally edited by the project team;
- TRANSITECTS events,
  meaning events organized by the project team;
- Dissemination and information activities
  meaning the project partners used external media or events to promote the project.

*the contents presented in this chapter have been elaborated in work package 3. Generally responsible for the compilation and illustration of information is the transitects project partner "German association for Housing, Urban and spatial Development". relevant input of all project partners has been taken into account.*

## 6.2 transitects publications

| output | Title / content | Description | lan-guage | resp. PP | info see p.167 |
|---|---|---|---|---|---|
| **banner** [Mai 2010] | TRANSITECTS – Intermodal solutions for transalpine freight traffic | Three different versions; visualising project contents. | EN | DV | *2* |
| **booklet** [April 2011] | "Improving intermodal solutions for transalpine freight traffic" "Soluzioni intermodali per il traffico merci transalpino" | General information about the project, it's approaches and interim results | EN, IT | UCV, RL | *2, 12* |
| **Brochure** | TRANSITECTS | Presentation of TRANSITECTS in Lombardy Region | IT | RL | *11* |
| **flyer** [Mai 2010] | TRANSITECTS – Intermodal solutions for transalpine freight traffic | Flyer informing about general approaches of the project. | DE, EN, IT | DV | *2* |
| **flyer** [July 2011] | Contribution of project partner 12 to the project TRANSITECTS | Portrait of TRANSITECTS project activities carried out by the capital region of Berlin-Brandenburg | DE, EN | GL | *17* |
| **newsletter** | TRANSITECTS – Intermodal solutions for transalpine freight traffic | 1 version from Mai 2011 1 version from March 2012 | EN | DV | *2* |
| **Poster** [Mai 2010] | TRANSITECTS Transalpine Transport Architects | Portrait of TRANSITECTS project activities carried out by Land Tyrol | DE | Tyrol | *1* |
| **Poster** [Mai 2010] | TRANSITECTS – Intermodal solutions for transalpine freight traffic | General project poster | EN | DV | *2* |
| **Poster** [Oct. 2011] | TRANSITECTS - Transalpine Transport Architects - Alpine Space Programme | Portrait of TRANSITECTS project activities carried out by the Austrian project partners | DE | bmvit | *4* |
| **Presentation** [Nov. 2011] | Description of two new unaccompanied-combined transport services for the Brenner- and Arlberg-axis | Presentation by Prof. Kummer (Vienna University of Economics and Business WU) | DE | bmvit, Tyrol | *2* |
| **survey** [finalized in March 2012] | "Definition of new product in Unaccompanied Combined Transport between Ulm and Lombardy" | Infrastructure analysis, Definition of new train, identification of key players, Economic feasibility study, development of marketing structure | DE | RVDI | *13* |
| **survey** | "New technical cargo handling solutions" | Description and comparison of innovative handling solutions for combined transport | EN | ALOT, RVDI | *2* |
| **survey** [March 2010] | "Potenzialaktualisierung" | Update of potentials for a combined train Ulm-Lombardy | DE | RVDI | *13* |



## 6.3 transitects eVents

| output | Title / content | Description | lan-guage | resp. PP | info see p.167 |
|---|---|---|---|---|---|
| **Political Conference** | Project Kick-Off | Moderated discussion with project partners as well as stakeholders from economy and politics on 3rd May 2010 in Prien, Bavaria | EN / DE | RVDI, DV | *2, 8* |
| **midterm Conference** | Innovative logistic solutions for combined transport | Presentation of the project's interim results during "transport logistic 2011", 11th May 2011 | EN | RVDI, UCV, DV | *14, 2* |
| **final Conference** | Conference within congress "Logistik Innovativ 2012" | Presentation of project results on 9th May 2012 | DE | RVDI, DV | *14* |
| **fair stand** | TRANSITECTS-stand at "transport logistic 2011 | Fair stand offering information material (Mai 2011, Munich) | EN, IT | UCV | *2* |
| **delegation and Information journey** | Field trip to Ligurian Ports: Genova, Savona and La Spezia | Field trip esp. for Southern German Stakeholders, November 2010 | EN | WRS, RVDI | *15* |
| **national stakeholder-workshop** | „Verlagerungsmöglichkeiten im Kombinierten Verkehr auf der Brennerachse" "Opportunities for intermodal transport on the Brenner axis" | Workshop on potential unaccompanied-combined transport services following a workshop organised by CombiNet on 8th Nov. 2011 | DE, EN | bmvit, Tyrol | *2* |
| **Public workshop** | "Gateway Pilota" Tra L'Europa e il Mar Ligure | Workshop on 1st April 2011 presenting connections from and to Mortara | IT, EN | RL | *10* |
| **Public workshop** | Progetto europeo TRANSITECTS: lo sviluppo dell'intermodalità merci in Europa e Lombardia | Workshop on 30th January 2012, informing about the project and elaborated concepts for pilot trains | IT, EN | RL | *11* |
| **stakeholder meeting** | Technical Meeting | Technical meeting with stakeholders on 24th November 2011 | IT | RL | *12* |
| **stakeholder meeting** | Information Meeting | Public event to present the project and pilot projects' outputs to regional stakeholders in Region Donau-Iller, 20th March 2012 | DE, EN | RVDI | *13* |
| **stakeholder orientation workshop** | Presentation of pilot projects to stakeholders | Workshop on 26th September 2011. Presentation to introduce the project and its pilots and to seek early stakeholder feedback on ideas, opportunities and issues. | IT ,EN, SLO | FVG, ALOT; MOT | |
| **stakeholder orientation workshop** | Stakeholder Orientation Workshop for selected pilot project in FVG | Presentation of the pilot for getting final inputs/feedback/comments/ suggestions on it; planned for spring 2012 | IT ,EN | FVG | |
| **stakeholder workshops** | Information on pilots-trains Munich-Bologna and Wolfurt-Verona | Objective: foster proposed pilot-trains in the regions concerned in Italy, Germany, Austria and Switzerland; planned for spring/ summer 2012 | DE, EN | bmvit, Tyrol, n. n. | |
| **Promotion event in brussels** | Political discussion about innovative transport solutions and policy options for the Alpine Space | Panel discussion involving European political actors, planned for 26th June in Brussels at the European Parliament | EN | RV, DV | |

## 6.4 dissemination and inFormation

| output | Title / content | Description | lan-guage | resp. PP | *info see p.167* |
|---|---|---|---|---|---|
| **Press article** [VERKEHR, edi-tion 45, on 11th Nov. 2011] | "Chancen für die Brennerachse" "Opportunities for the Brenner-axis" | Description TRANSITECTS, the Austrian contribution and study-results | DE | bmvit | *5* |
| **Press article** [Wirtschaftsblatt; 14th Nov. 2011] | "Schiene läuft Straße den Rang ab- Schiene statt Straße" "Rail rather than road" | Interview with Prof. Kummer, University of Economics (WU) in Vienna | DE | - | *6* |
| **Press article** [Verkehrsrund-schau, 22nd Nov. 2011] | „Studie: Tiroler Fahrverbot bringt RoLa mehr Volumen" „Study: Tyrolean driving ban increases RoLa-volume" | Description of the study-results concerning impact of sectoral driving ban in Tyrol | DE | - | *7* |
| **Article** [Immo-bilienwirtschaft, 9/2010] | „Den Flaschenhals entlasten" „Disburden the bottleneck" | Article about TRANSITECTS approach in regard to the European Transport System | DE | DV | *8* |
| **Article** [Internationales Verkehrswesen 2/2011; Vol. 63] | "Durch Berg und Tal" "Through Mountain and Valley" | Article about TRANSITECTS approaches in regard to combined transport services | DE | RVDI | *14* |
| **Article** [DIFU-Brochure 1/2012] | "TRANSITECTS – Transalpine Transport Architects: Verbesse-rung intermodaler Lösungen für den transalpinen Güterverkehr" „Improvement of intermodal solutions for transalpine freight traffic" | Article in Brochure "Trans-national Perspectives for Mobility and Transport - How Municipalities and Regions may use INTERREG IV B" edited by German Institute for Urbanism (DIFU) | DE | DV | *8* |
| **Article** [Newsletter Bun-desprogramm updated; 5/2011] | "Sustainable growth through in-telligent transport development: challenges, chances, ap-proaches" | Article about TRANSI-TECTS, SoNorA, SCAN-DRIA reporting about recent project activities against the background of transport development in Europe | DE, EN | DV | *2, 8* |
| **Article** [Academia no. 54; 1/2011] | Vom sektoralen Fahrverbot zur Eurovignette „From sectoral driving ban to euro vignette" | Interview | DE | EU-RAC | *9* |
| **Article** [publication of Gov. Dep. for Economy B-W] | "Innovation durch INTERREG/In-novation through INTERREG" | Project description in publication on INTERREG-projects | DE, EN | RVDI | *16* |
| **Project Presentation** | Presentation during meeting of Chamber of Commerce Ulm | Presentation to most important regional logistic stakeholders | DE | RVDI | *12* |
| **Project Presentation** | Talk at Congress "Logistik In-novativ 2010" in Prien, 4th-5th May 2010 | Presenting the project to international stakeholders | DE | RVDI | *14* |
| **Project Presentation** | Short overview on TRANSI-TECTS study results concering pilot-trains Munich-Bologna and Verona- Wolfurt | Presentation held during iMONITRAF! -workshop „Gemeinsame Verkehrsstra-tegie im Alpenraum" Innsbruck 11th Nov. 2011 | DE | Tyrol | *1* |

**Legend (sources for further information)**

1. Governmental Office of the Land of Tyrol, Dept. of traffic engineering; Eduard Wallnöfer Platz 3, A-6020 Innsbruck, verkehrsplanung@tirol.gv.at,
2. Published on TRANSITECTS-website: www.transitects.org
3. www.bmvit.gv.at/verkehr/gesamtverkehr/kombiverkehr/projekte.html
4. http://www.oerok.gv.at/fileadmin/Bilder/4.Reiter-Contact_Point/NCP-NEWS/transnATional_ver-nETZt/2011-10_RaumErreichbarkeit/ETZ_Erreichbarkeiten_VA1011_Projektposter.pdf, page 37
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11. http://www.commercio.regione.lombardia.it/cs/Satellite?c=Redazionale_P&childpagename12=DG_Commercio%2FDetail&cid=1213363352630&packedargs=NoSlotForSitePlan%3Dtrue%26menu-to-render%3D1213363336385&pagename=DG_COMMWrapper
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13. Regional Association Donau-Iller, Hannes.sichert@rvdi.de
14. LKZ (k.fischer@lkz.de) on behalf of Regional Association Donau-Iller (Hannes.sichert@rvdi.de)
15. WRS (holger.bach@region-stuttgart.de) , RVDI (Hannes.sichert@rvdi.de)
16. http://www.interreg-bw.de
17. Joint State Planning Department of Berlin and Brandenburg, michael.kortz@gl.brandenburg.de

Source: IPG

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**TRANSITECTS – facts and figures**

**Partnership**:
16 partners from 4 countries

**duration**:
July 2009 to June 2012 (prolongation until September 2012)

**Project budget**:
EUR 3.2 million, of which 76 % EU funded (ERDF)

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TRANSITECTS
Transalpine Transport Architects

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