FINAL IMPLEMENTATION REPORT (D.T2.5.5)

Czech Republic *31st August 2018*

A. Overall Pilot Aproach

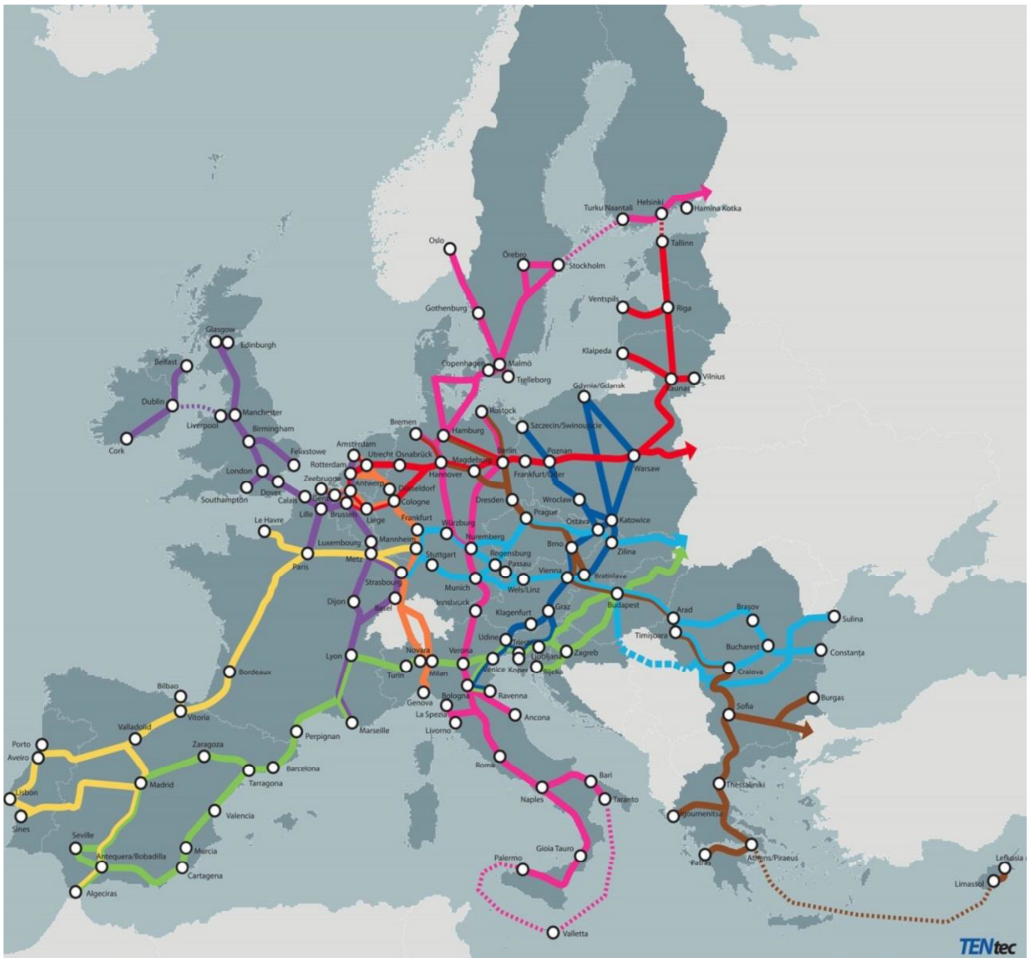
a. Pilot Phase Summary

The following schemes show that conditions for the development of multimodal transport are created at European continental level. Specific shipping routes and commodity streams need to be systematically refined in co-operation with shippers and logistics service providers. We have just worked this close cooperation in addressing the specific tasks and objectives of the ChemMultimodal project. As demonstrated by the analysis, chemical companies and logistics entities are fundamentally involved in this cooperation. In the other parts of the paper, specific cases will be described.

The basic conditions in the Czech Republic, which determine the approach to the issue of combined transport as a whole and their relation to the transport of chemical commodities, are seen in the developed infrastructure - the railway and road network and the number of transhipparts, which have been created in general without state support.

Basic conditions in the Czech Republic, which determine access to combined transport as a whole and their relation to the transport of chemical commodities.

1. **TRANS- EUROPEAN TRANSPORT NETWORK**



Source : European Commission, Mobility and transport, Trans-european transport network, TENtec, Brusel: [cit. 8. 1. 2014]. Dostupné z URL: <http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/site/en/innovation.html>. Ústav územního rozvoje, 2016.

2. PAN - EUROPEAN MULTIMODAL TRANSPORT CORRIDORS

Source" Wikipedia [online]. Helsinky: [URL: Ústav územního rozvoje, 2016<https://sk.wikipedia.org/wiki/Paneur%C3%B3pske_dopravn%C3%A9_koridory>.

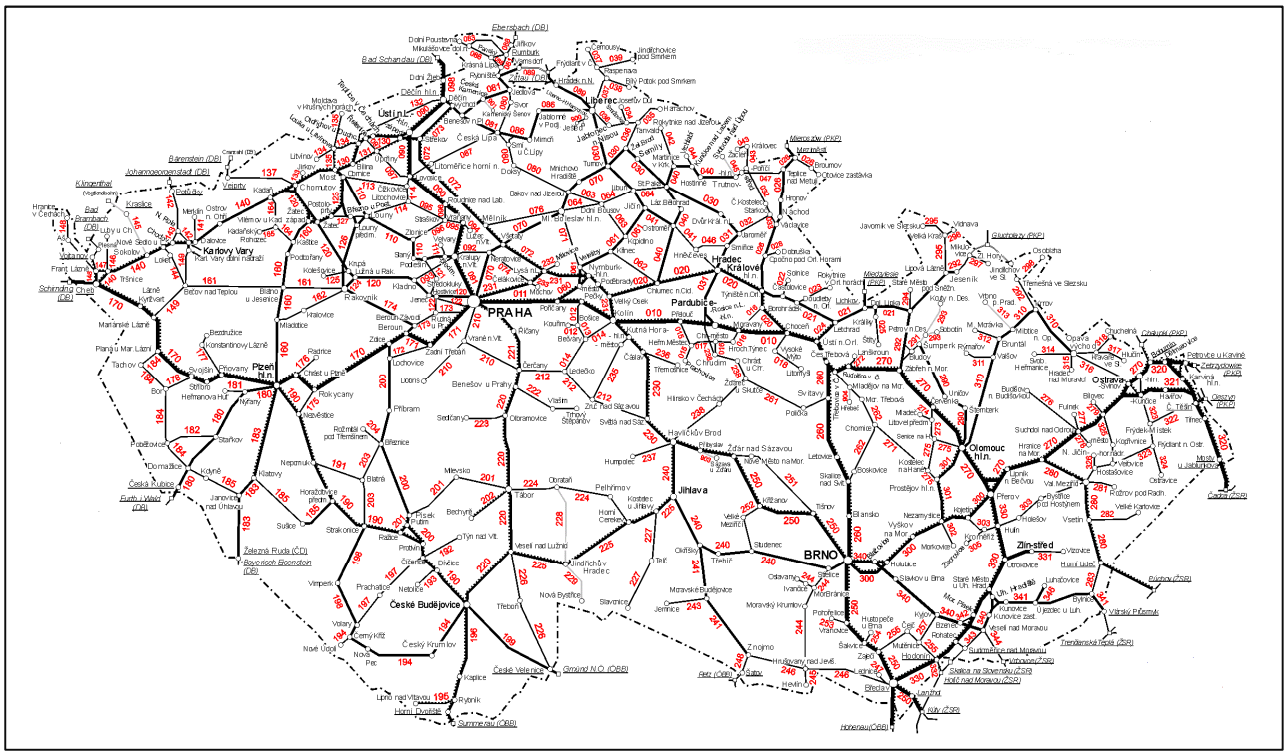
3. MULTIMODAL TEN-T CORRIDORS PASSING THROUGH THE TERRITORY OF THE CZECH REPUBLIC [Regulation (EU) Nr. 1316/2013, Annex I]

Corridor name	Corridor description [Regulation (EU) Nr. 1316/2013, Annex I]
Baltic – Adriatic	Gdynia – Gdańsk – Katowice/Sławków; Gdańsk – Warszawa – Katowice; **Katowice – Ostrava – Brno – Wien; Szczecin/Świnoujście – Poznań – Wrocław – Ostrava;** (Katowice – Žilina – Bratislava – Wien; Wien – Graz – Villach – Udine – Trieste; Udine – Venezia – Padova – Bologna – Ravenna; Graz – Maribor – Ljubljana – Koper/Trieste;

Eastern and eastern Mediterranean	Hamburg – Berlin; Rostock – Berlin – Dresden; **Dresden – Ústí nad Labem – Mělník/Praha – Kolín;** **Kolín – Pardubice – Brno – Wien/Bratislava – Budapest – Arad – Timişoara – Craiova – Calafat – Vidin – Sofia;** Sofia – Plovdiv – Burgas; Plovdiv – Turkish border; Sofia – Thessaloniki – Athína – Piraeus – Lemesos – Lefkosia; Athína – Patras/Igoumenitsa;
Rhine – Danube	Strasbourg – Stuttgart – München – Wels/Linz; Strasbourg – Mannheim – Frankfurt – Würzburg – Nürnberg – Regensburg – Passau – Wels/Linz; **München/Nürnberg – Praha – Ostrava/Přerov – Žilina – Košice – Ukrainian border;** Wels/Linz – Wien – Bratislava – Budapest – Vukovar; Wien/Bratislava – Budapest – Arad – Braşov/Craiova – Bucureşti – Constanţa – Sulina;

Source: EU Commission

4. RAILWAY NETWORK ČD



Source:ČD

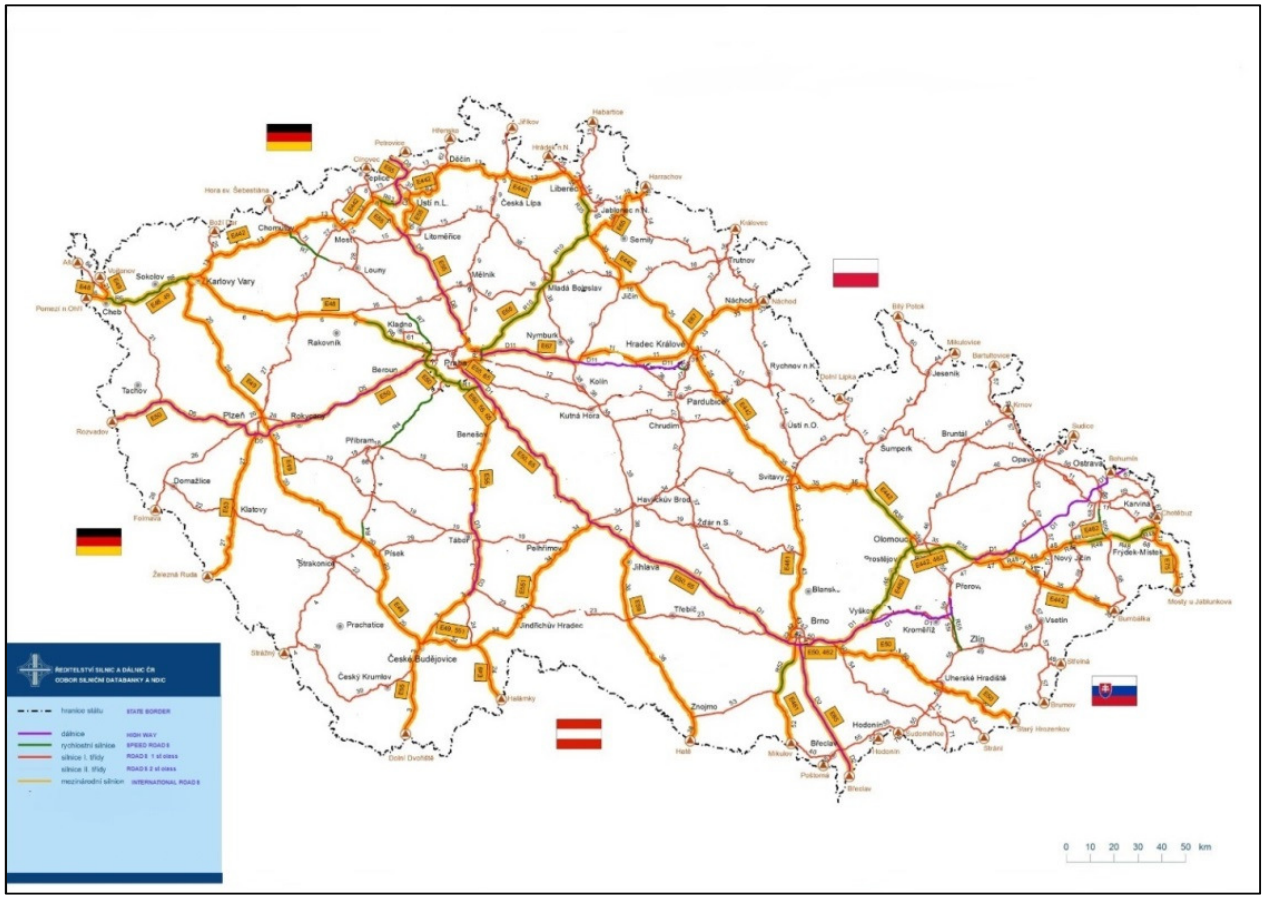
Historically, the Czech railway network is one of the densest in Europe. Virtually every economically usable larger area is connected to this network by its own siding. That is why I practically all the chemical companies have traditionally been oriented and so far focus on rail transport as basic for all suitable commodities. Therefore, despite the massive growth of road transport in the 1990s, railways are used and its use is always considered by the logistics departments of chemical companies (price, transport technology, suitability in terms of physical and chemical parameters of a given commodity)

For most of the mass substrates and other suitable commodities that use private railway wagons, rail transport is the most convenient and traditional mode of transport, so even nowadays the transport security is realized by rail. These transports may be considered to switch to multimodal transport, especially at

- replacing an existing fleet or offering new transport technologies

- Change of storage and handling technologies
- changing national or international shipping regulations

5. HIGHWAY AND ROAD NETWORK



Source:Directorate of Roads and Motorways Czech Republic

A very dense, mostly transit road network, carrier flexibility, relatively simple administrative handling of the transport case by the transport operator and major technical innovation have contributed to the development of road transport in the last quarter of the century and the transfer of traffic flows to this mode. This mode has the greatest potential for shipments to multimodal continental transports.

6. COMPARISON OF GOODS TRANSPORT PERFORMANCE BY MODE

	2010	2015	2016	2017	2017/2010 (%)
Total transport of goods (thous. tonnes)	**451 671**	**549 085**	**539 063**	**570 976**	**126,41**
Rail transport	82 900	97 280	98 034	**96 516**	**116,42**
Road transport	355 911	438 906	431 889	**459 433**	**129,00**
Inland waterway transport	1 642	1 853	1 779	**1 568**	**95,49**
Air transport	14	6	6	**6**	**42,86**
Oil pipeline transport	11 205	11 040	7 356	**13 453**	**120,06**

Source: MD ČR

Only over the period since 2010 the goods have increased by more than a quarter. A faster increase in road transport over rail transport persists. Development of MM transport is not monitored separately.

The ratio of road and rail transport to the overall freight transport performance clearly shows the crucial scope for changing modes of transport - shifting from road to multimodal transport.

7. GOODS TRANSPORT FLOWS FROM / INTO THE CZECH REPUBLIC

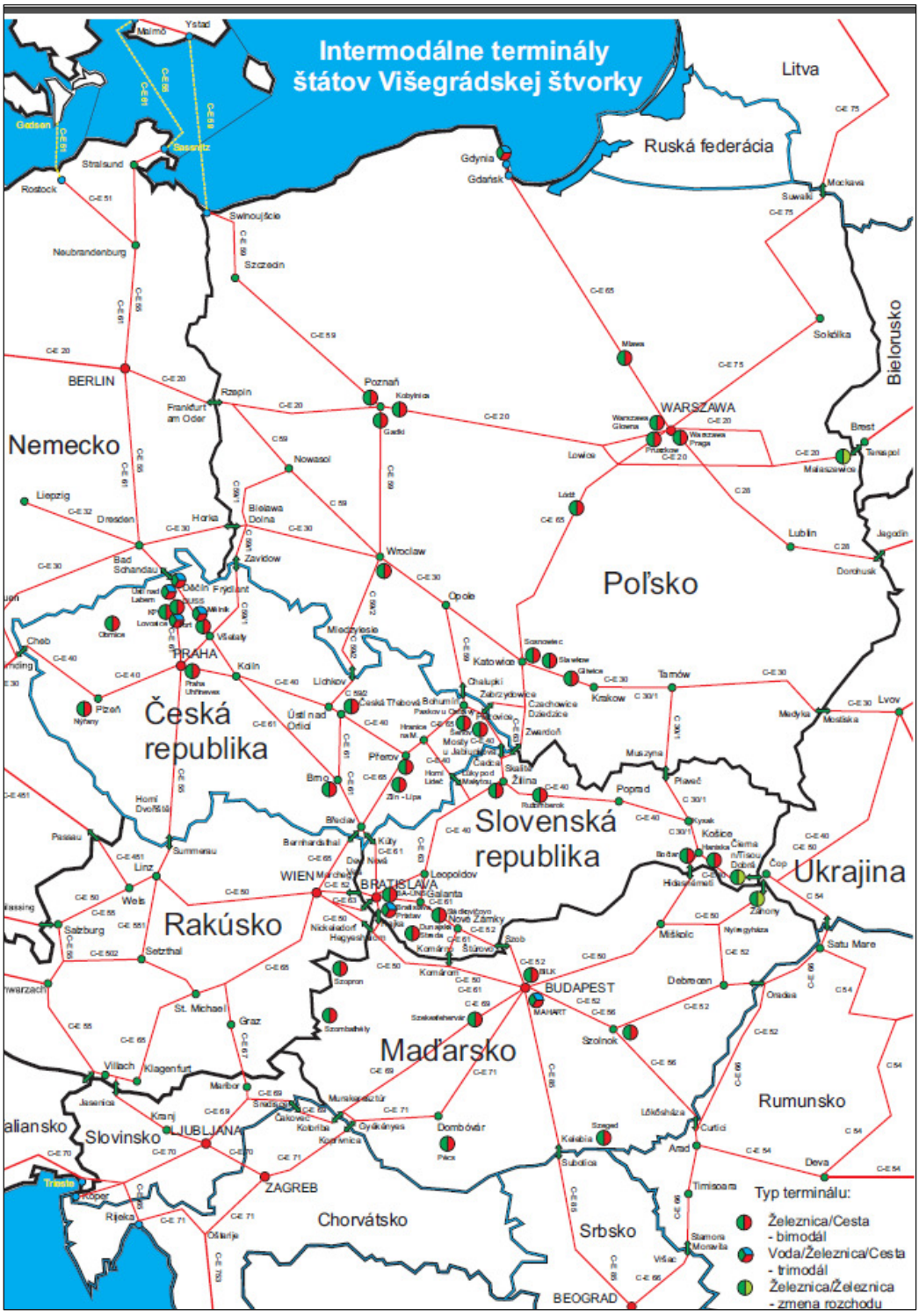
EUROPE	Export		Import	
	2010	2017	2010	2017
Total - Total (thous. tonnes)	***41 041***	***40 324***	***37 662***	***42 630***
selected by countries of loading / unloading with parameter from 50 tons / year				
Belgium	500	357	797	603
Denmark	141	154	99	31
France	960	600	823	411
Croatia	190	117	7	6
Italy	1 745	1 363	1 192	928
Hungary	1 561	1 454	766	966
Germany	14 894	17 558	12 407	15 623
Netherlands	560	1 282	922	1 710
Poland	4 864	3 092	6 438	6 617
Austria	6 148	5 737	2 209	3 891
Romania	241	290	43	194
Greece	40	59	44	69
Slovak Republic	6 446	5 930	10 159	10 277
Slovenia	589	745	203	385
United Kingdom	413	229	234	112
Spain	413	212	416	125
Sweden	279	161	225	111
Total EU	**40 210**	**39 433**	**37 160**	**42 155**
Norway	61	19	26	26
Switzerland	239	145	132	132
Bosnia-Herzegovina	147	118	34	32
Russian Federation	190	232	116	142
Turkey	57	84	44	22
Ukraine	26	31	11	10
Other countries	101	260	139	95

Source: MD ČR

The above table shows that, in addition to traditional overseas destinations, there is a commodity potential for transport on the European continent. In the table, the countries that are the subject of 5 routes of the pilot project are highlighted in blue. The problem is the organization of these shipments to the interests of the continental territoires, operators of integrated trains, suitable containers (containers) and often their complex, especially time and price competitiveness.

Virtually 99% of suitable chemical commodities are from / to overseas by multimodal transport and growth is possible in relation to the increase in exports and imports to / from these territories.

8. INTERMODAL TERMINALS OF THE VISEGRAD GROUP COUNTRIES



Source: MD ČR

9. COMBINED TRANSPORT INFRASTRUCTURE IN CZECH REPUBLIC

	2010	2015	2016	2017
Total number of combined transport transshipment points	***13***	***17***	***17***	***17***
according to types of combined transport				
rail - road[1)]	9	13	13	**13**
rail - road - water[2)]	4	4	4	**4**
by reloading mechanism				
less than 34 tonnes	2	0	0	**0**
over 34 tonnes	11	17	17	**17**
equipped with grappler arms	7	9	9	**14**

Source: MD ČR

Due to the location of the Czech Republic, connections to Europe's transport networks, promising EU programs, the Czech Republic and neighboring countries, the assumption of increasing the share of multimodal transport is quite realistic. This is a long-term and systematically managed process, not just ad-hoc transport, and with this philosophy, SCHP CR I approached the ChemMultimodal project.

To achieve the objectives of the project, it is necessary to approach not only transport security, but also long-term forecasts of production and trade in chemical commodities, to perceive the environmental influences and the social impacts of the complex development of all available transport modes.

Aim – the increase of the multimodal transportation, basic territories must be monitored by the logistic operators. The shuttle network to European ports (Hamburg, Rotterdam, Koper and the river ports on Danube river is the same for all territories to follow the oversea and short sea transportation.

The big HUBs in interior (Duisburg, Magdeburg – combined with the river transportation on European waterways Schwarzheide and terminals on „Silky Road "– north way via Russia). The Silky way has several variants, so this title is possible to use for transportation to China.

10. COMMODITY STRUCTURE OF COMBINED TRANSPORT

The following table shows the current commodity structure of multimodal transport and implies that the chemical industry is not a critical player in the organization of MM transport because its transport needs are minor. Is it clear form this structure, that the increase in the area of chemical multimodal transport is possible regarding to the percentage of the share only in relation with the other non-chemical commodities. It shows the basic role of operators of the multimodal transport in searching the appropriate flows of the goods in all spectrum of the imported and exported commodities and destinations in shuttle network.

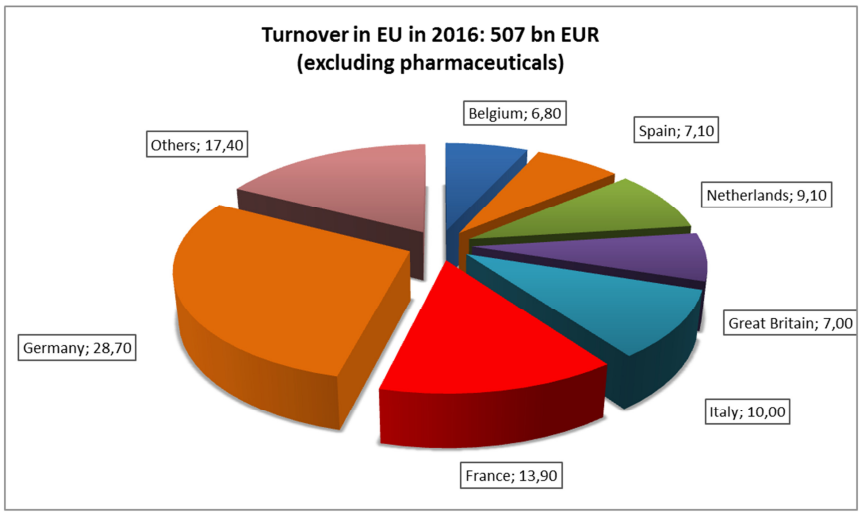

BY SELECTED CZ-CPA DIVISION
2016
EXPORTS
IMPORTS
0
500
1 000
1 500
2 000
2 500
3 000
3 500
CZK bn FOB/CIF
CRUDE PETROLEUM AND NATURAL GAS
CHEMICALS AND CHEMICAL PRODUCTS
ELECTRICAL EQUIPMENT
MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS
FOOD PRODUCTS
COMPUTER, ELECTRONIC AND OPTICAL PRODUCTS
MACHINERY AND EQUIPMENT N.E.C.
OTHERS

Source: MD ČR

b. Pilot Phase Impact

As can be seen from the following tables, the possibility of using multimodal transport in the chemical industry is strongly determined by the size of the industry both in Europe (1,25%) and its share in Czech production and in particular its export.

11. CHEMICALS TURNOVER IN EU IN 2016



Germany remains the largest chemical producer in Europe (sales EUR 145 bn), followed by France(71 bn) , Italy (50 bn) and the Netherlands (46,8 bn). Together, those four countries generate in 2016 61,7 % of the EU chemicals sales (EUR 312,8 bn). When including UK, Spain and Belgium, the share rises to 82,6 % (EUR 419 bn). The other 21 EU countries in 2016 generated 17,4 % of EU chemicals sales, and more than half of which was attributable to five EU countries – Poland, Sweden, Austria, Czech Republic and Finland. Poland and Austria are biggest contributors from the EU member states bloc, the share of Czech Republic was cca 1,25 %.

12. TRANSPORT OF GOODS BY CHEMICAL COMMODITIES

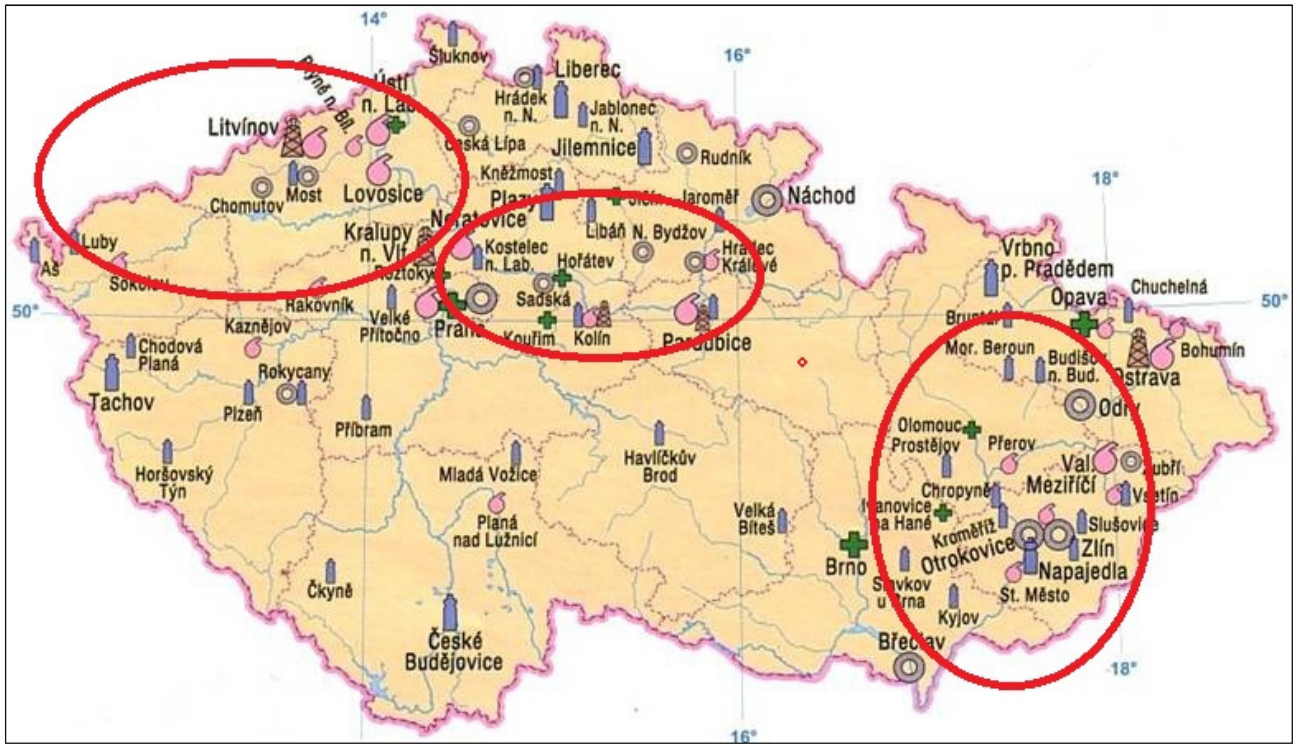
2017	Rail	Road	Rail	Road	Rail	Road
	INLAND		EXPORT		IMPORT	
TOTAL ALL GOODS (thous. tonnes)	**38 440**	**417 972**	**19 661**	**20 601**	**28 319**	**14 282**
Coke and refined petroleum Products	1 487	8 247	1 779	294	2 357	308
Chemicals, chemical product, and man-made fibres; rubber and plastic products; nuclear fuel	1 154	9 498	770	1 342	1 741	993
TOTAL CHEMICAL GOODS	**2 641**	**17 746**	**2 549**	**1 635**	**4 097**	**1 301**
% CHEMICAL GOOTS / ALL GOODS	**7**	**4**	**13**	**8**	**14**	**9**

From the above-mentioned analysis of the transport of chemical commodities, it is clear that inland transport accounts for only 7% of goods transported by rail and 4% of road transport. The share of transport of chemical commodities in foreign transport is about 13-14% in rail transport and 8 - 9% in road transport. Combined transport is not reported separately.

Throughout the pilot phase, we strictly followed the principle of objectively assessing the potential for multi-modal transport growth by and in conjunction with the multi-modal strings involved

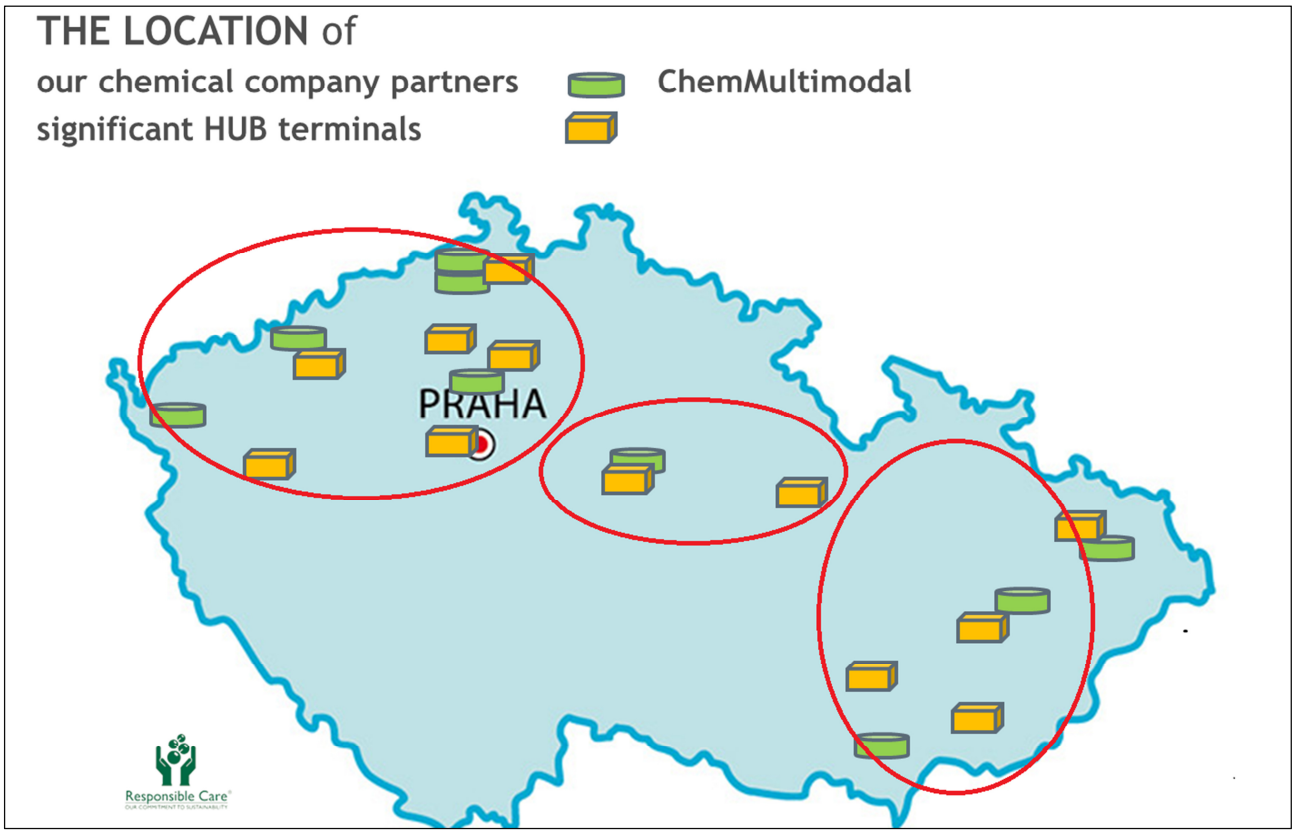
As shown in the sketches below, the chemical industry is deployed in practically several regions of the Czech Republic, with the largest concentration in the Usti Region. The ChemMultimodal project partners were selected to cover the territory of the entire Czech Republic and thus important industrial regions.

13. LOCATION OF THE CHEMICAL INDUSTRY OF THE CZECH REPUBLIC



Source: SCHP ČR

14. LOCATION OF CHEMICALS COMPANY



Source: SCHP ČR

All partners of the ChemMultimodal project are covered by multimodal terminal networks at the optimal driving distance of road / rail trucking. However, the good availability of terminals does not mean optimal access to individual multimodal transport connections. Most of the companies use multiple routes offered by operators and more terminals

As we have identified, the problem is in the offer of the shuttle pallets in Europe, although it densely covers Western Europe, but only some connections reach the terminal in the Czech Republic. For the time being, the shipping lines for the overseas destinations (Hamburg, Rotterdam, Koper) and some inland destinations (Germany, Austria, Hungary and Slovakia) have been fully redeveloped.

The problem is even in the offer of complex services, because most European carriers do not have the classic transport cabinets (20'- 40'), the offer is in special containers (Tank, Silo etc.).

The analysis also showed that in the case of Overseas Export and Import Transfers, virtually 100% multimodal transport is realized, therefore, they can only be increased on the basis of increased trade volumes (market situation). As shown below, we focused on

1. Increase existing or new shipments on existing shuttle services when transporting to the European continent

During the ChemMultimodal project, we informed all partners that the main goals of the project were to contribute to 10% increase in multimodal transport and 5% CO2 reduction.

Based on the discussions, individual partners have used the available information, which shows not only the changes in MM transport, but also the chemical companies and the ratio MM, rail and road transport used in individual companies. The overview is in part B of this material.

2. In close cooperation with chemical companies and operators, propose new options for modifying the mode of transport in destinations of interest. Chemical companies and operators or forwarders have intensively discussed the possibilities of new shuttle routes

An overview of 5 routes is given in separate section C of this final report. This is a selection of solutions for the major claims of chemical companies transport to Italy, Great Britain, Spain and Western France. A specific route is the import of raw materials into Ústí nad Labem.

Note:

Since the beginning of the project, we have advised that we will not get detailed information from individual businesses because they are subject to business secrets, so we supposed to use and aggregate data into the project (there is a transport contract between the carrier and the sender which has always a confidentiality clause). If any specific information on this shipment appears in any other document (e.g. in a project document) (not only the price - generally any data), there is a real possibility of leakage of such information and the possibility that any of the entities the original shipping can turn to a court or arbitrator (according to the contract), even if he loses the competition because he will argue that other parties could take action in the time before the selection procedure to prepare them more effectively. If the transport in question required some investment on the part of the carrier, it may ruin of investment, and this is a much larger problem that the Usti Region (as a body of public law) and/or the SCHP (as a professional association) cannot admit.

B. Participating companies

The final interviews were conducted with 8 participating chemical companies listed in the following table. The top five companies in the above table fall into the Usti region. There are also outputs from 2 multimodal transport operators - Bohemiakombi and Metrans, who have the biggest weight on the market.

This section provides a brief overview of the findings and benefits of each partner organization. Particular attention is paid to the increase in shipments to existing MM connections at chemical plants involved in the ChemMultimodal pilot project.

15. CHEMMULTIMODAL PILOT PARTNERS

Name of company	Profile (products/services)	SME or large enterprise	Location (subject to pilot)
UNIPETROL RPA	See Pilot project description, see www.unipetrol.cz	Large	Litvínov, Kralupy nad Vltavou
Spolchemie	See Pilot project description, see www.spolechemie.cz	Large	Ústí nad Labem
Vodní sklo	See Pilot project description, see www.vodnisklo.cz	SME	Ústí nad Labem
Synthomer	See Pilot project description, see www.synthomer.com	large	Sokolov
Synthos	See Pilot project description, see www.synthosgroup.com	large	Kralupy nad Vltavou
Synthesia	See Pilot project description, see www.synthesia.cz	large	Pardubice
DEZA	See Pilot project description, see www.deza.cz	large	Valašské Meziříčí
Fosfa	See Pilot project description, see www.fosfa.cz	SME	Břeclav

We also provide information from each partner company.

UNIPETROL RPA

In the case of the largest petrochemical producer, who has used the raw materials and products in large measure for pipelines, we have focused on the changes in the export of polyolefins due to the increase in their production and the necessary change in traffic flows.

In this narrow product segment, the use of MM transport increased by 144% in 2017. This, however, represented only 2% of shipments of products. The data are related to 2015, because in 2016 there was a fire of an ethylene unit. In 2018, the trends continue.

	VÝVOZ (tuzemsko + zahraničí) *(tis.tun)*		
YEAR (MONTH)	**2015**	**2017**	**leden - červen 2018**
RAIL	303,645	322,978	125,097
ROAD	490,848	552,620	286,942
COMBINED	7,264	17,724	8,096
CELKEM	**801,757**	**893,322**	**420,135**

The company is actively studying the possibilities of optimizing the use of the nearest terminals. The first major steps for testing the new mode of transport have been made.

Spolchemie

The complete view of the transport of raw materials and products, broken down by the main modes of transport, was provided by Spolchemie, the background is drawn from the public safety advisory reports:

	VÝVOZ (tuzemsko + zahraničí) *(tis.tun)*			**DOVOZ** (tuzemsko + zahraničí) *(tis.tun)*		
YEAR (MONTH)	**2016**	**2017**	**1. pol. 2018**	**2016**	**2017**	**1. pol. 2018**
RAIL	55 169	66 340	48 368	10 410	13 046	5 541
ROAD	129 851	135 202	86 438	109 291	135 495	58951
COMBINED	6 775	8 890	3 504	25 549	32 776	19 366
TOTAL	**191 795**	**210 432**	**138 310**	**145 250**	**181 317**	**83 858**
	Note: raw materials, semi-finished and finished products			*Note: raw materials, semi-finished and finished products*		

By European regulations, the limited rail transport in this company was 28.8% in exports in 2016 and 31.5% a year later and 35% in the first half of 2018. Combined transport grew by 31% and increased from 3.5% and 4.2% of exports. In the first half of 2018, combined transport fell to 2.5%. The main problem is that the company does not have its own containers and tank containers and deliveries of suitable containers for loading are provided by buyers, carriers or forwarders. All this was reflected in the decrease in the use of road transport from 67.7% to 64.2% and in the first half of 2018 to 62.5%.

We obtained similar data from the use of imports. Approximately 7.2% is coming by rail. Combined transport was 17.6% in 2016, 18.1% in 2017 and 23.1% in the first half of 2018, an increase of 31.3%. This positive change was accompanied by a slight decrease in road transport use from 75.2% to 74.7% and 70.28% in the first half of 2018.

The company currently uses four transhipparts - Mělník - Labe, Prague - Uhříněves, Lovosice and Ústí nad Labem for MM transport, which is a transit point that METRANS has provided also in connection with ChemLog projects.

Spolchemie actively monitors the supply of subsidies for the possible establishment of its own transshipment (50% of costs) and its own transport units (31% of costs).

Vodní sklo

It is a small business on the banks of the Elbe, which considered the possibility of setting up a harbor, or trolley in its area. Currently, the company's space is used for loading oversized ship costs.

Negotiations took place between the MM transport operator and the landowners' representatives on the possibility construction of the dock. However, no agreement was reached.

For its own enterprise due to the size of the production, the construction of the dump is not a major need.

This is also documented by the following table, which shows that the possibilities of using containers with the company deals with. More visible results are for imports when no container was used in 2016, but in mid-2018 combined transport was used for 1.7% of raw materials.

It also appears from the table that, while raw materials use all transport options, the transport of products is an irreplaceable option for the use of road transport

	VÝVOZ (tuzemsko + zahraničí) *(tis.tun)*			**DOVOZ** (tuzemsko + zahraničí) *(tis.tun)*		
rok (měsíc)	**2016**	**2017**	**1. pol. 2018**	**2016**	**2017**	**1. pol. 2018**
železnice	0,00	0,00	0,00	16,76	18,08	4,52
silnice	62,17	58,59	29,40	39,19	34,65	21,42
kombinovaná	0,25	0,30	0,30	0,00	0,20	0,46
CELKEM	62,42	58,89	29,70	55,95	52,93	26,40

Synthomer

In the framework of the pilot project, the owner changed his ownership and changed the top management. In view of the importance of implementing the project for the competitiveness of the enterprise, the company remained a partner of the project and also gave summary data, in which the above facts are reflected:

	VÝVOZ (tuzemsko + zahraničí) *(tis.tun)*			**DOVOZ** (tuzemsko + zahraničí) *(tis.tun)*		
rok (měsíc)	**2016**	**2017**	**1. pol. 2018**	**2016**	**2017**	**1. pol. 2018**
železnice	1,00	1,00	1,10	125,35	125,75	61,40
silnice	97,20	97,10	19,80	2,44	4,70	1,46
kombinovaná	6,20	7,40	4,50	2,65	2,85	1,60
CELKEM	104,40	105,50	25,40	130,44	133,30	64,46

Positive trends in combined transport use are obvious. Imports of combined transport use continue to grow and increase from 2% in 2016 to 2.5% of production in the first half of 2018. Even more positive results are achieved in product exports. Combined transport provided 6% of the products in 2016 and in the first half of 2017 it was already 17.7%. There is therefore a demonstrable increase in the use of combined transport by more than 10%.

The decisive share of the provision of rail transport for the import of raw materials and the dominant use of road transport for the distribution of products, whereby the company has to respect the conditions of the

customers, is also evident from the nature of the production.

Synthos

Synthos does not basically disclose partial or total quantitative data on real-world production, trade and shipments (including destinations) because of the sensitivity of business data from management decisions. Despite this known fact, the company was involved as a partner in the ChemMultimodal project due to its quantitative potential, the composition of imported and exported commodities and significant activities in the MM transport market. This project was actively involved with the representatives of the logistics section.

Because of its location, the company has the prerequisites to use MM, and when considering and assessing bids for specific transports, it also requires and, where appropriate, considers all aspects of the use of the MM transport offer.

Synthesia

The company has its own siding and deals with transportation issues in a long-term and systematic way. The railway has an extraordinary position, which is more than 75% in imports of raw materials and in the distribution of products. A further 10% of traffic is provided using MM transport. Only 10% of the expedition and imports of less than 1% of the raw materials are on the road, see the following table.

	EXPORT (domestic + foreign) (thousand tons)			**IMPORT (domestic + foreign) (thousand tons)**		
YEAR (MONTH)	**2016**	**2017**	**1. pol. 2018**	**2016**	**2017**	**1. pol. 2018**
RAIL	66,92	97,88	57,27	40,27	40,96	21,93
ROAD	11,50	11,63	6,37	0,36	0,30	0,19
COMBINED	7,68	7,75	3,49	6,84	6,90	3,11
TOTAL	86,10	117,26	67,13	47,46	48,16	25,23
	Note: raw materials, semi-finished and finished products			*Note: raw materials, semi-finished and finished products*		

The potential for further use of MM transport is very limited. Nevertheless, the possibility for MM shipments to solve the most demanding shipments to West France, Example 1 in Part C of this report was sought. However, the quest failed unsuccessfully.

DEZA

DEZA, a. s. Valašské Meziříčí (člen skupiny Agrofert Holding a.s.) processes coal tar and crude benzole. With an annual processing capacity of 450,000 tons of coal tar and 160,000 tons of crude benzole, the company is among the global leaders in this area

DEZA, as the only chemical company in the Czech Republic, has its own seaport, where it can store and send its own products by sea. At the same time it offers its services to other customers

DEZA Polska Sp. z o.o., which came into existence in 1997, is a company offering services related to handling and storing liquid tar pitch. The Terminal of liquid tar pitch handling belongs to the company and is located at Chemików Quay in OT PORT ŚWINOUJŚCIE Sp. z o.o.; it was designed thanks to top technological achievements in the field of chemical industry installation and was built as non-arduous to the environment.

In 2002 extension of the Terminal began. As a consequence of efficiently conducted investment process, in December 2003 the Terminal extension was completed and in May 2004 the extended Terminal was commissioned for use, its total handling and storing capability was extended by additional two reservoirs (1750 m3 each) to the current 7000 m3 (i.e. roughly 8000 tonnes of cargo). Thanks to the above, the Terminal became more universal. Plus, it can offer three products of various properties for loading.

LIQUID TAR PITCH is the heaviest fraction coming from the process of distillation of tar obtained on the basis of hard coal coking. It can be applied virtually in all industry's disciplines, e.g. pharmacy or heavy industry.

Tar pitch is produced in the Czech Republic. It is transported to the Terminal in Świnoujście by 25-tonne tank trucks, a then reloaded to storage reservoirs and stored at appropriate temperature (190-230 degrees of Celsius). Then it is pumped over with a bulk pump and delivered to a vessel by pipelines.

Currently, the major recipients of liquid pitch from the Terminal in Świnoujście are business partners from Norway.

In the direction of North Moravia - the ports of Szczecin / Swinoujscie unfortunately no one operates with a shuttle connection, due to the necessity to adhere to the thermal regime of transport, the road transport continues to be used, because expeditions in tank containers in groups and trains do not guarantee the transport time and thus the delivery of goods in the temperature to be unloaded (including surcharges for pre-unloading goods).

Fosfa

Life Science. Fosfa is the largest processor of yellow phosphorus in Europe. We export our products to more than 80 countries around the world. We develop and produce our own range of eco-friendly household and cosmetic products Feel Eco.

Fosfa does not basically disclose partial or total quantitative data on real-world production, trade and shipments (including destinations) because of the sensitivity of business data from management decisions. Despite this known fact, the company was involved as a partner in the ChemMultimodal project due to its quantitative potential, the composition of imported and exported commodities and significant activities in the MM transport market. This project was actively involved with the representatives of the logistics section.

Because of its location, the company has the prerequisites to use MM (it can also use trucking to West Slovakia terminals), and when considering and assessing bids for specific transports, it also requires and, where appropriate, considers all aspects of the use of the MM transport offer. Due to the profile of the produced commodities - see https://web.fosfa.cz/en/products/ there is a much better chance for liquid chemicals, where private tank containers are used during transport. According to internal data in the monitored years, the share of MM transports in the order of 3 - up to 10% is increasing year-on-year.

The company has a great experience with the use of transports in such containers, based on information from public sources (E15, ČD Cargo, the yellow phosphorus from Kazakhstan was transported exclusively in containers from the beginning of 2015, virtually the suppliers' tanks were virtually eliminated and these tanks could enter the network ČSD only on the exception of MD ČD, which ended on December 31, 2014. Trains run at intervals of about ten days.

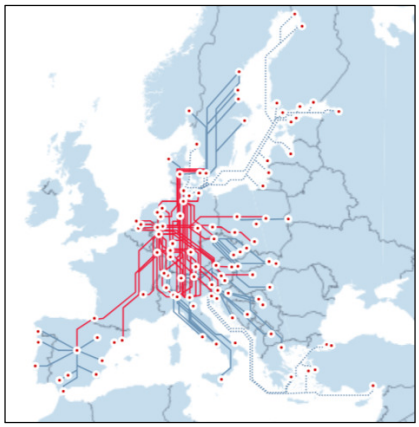
MULTIMODAL OPERATERS

The data obtained from two multimodal transport operators who participated in the implementation of the pilot project consistently shows that the Czech industry is ready to use the containers to a greater extent than the customers of its products.

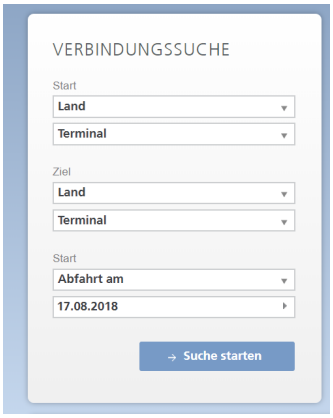
Bohemiakombi

More and more companies **are using combined transport** to export goods to other countries. The carriage of road trailers by rail in Europe is **developing more and more dynamically**. In this regard BOHEMIAKOMBI is a key operator of continental combined transport in the Czech Republic.
Through a system of complete trains and the transport of flatbed semi-trailers, container chassis and tank containers, we offer an alternative to traditional direct road transport around Europe.

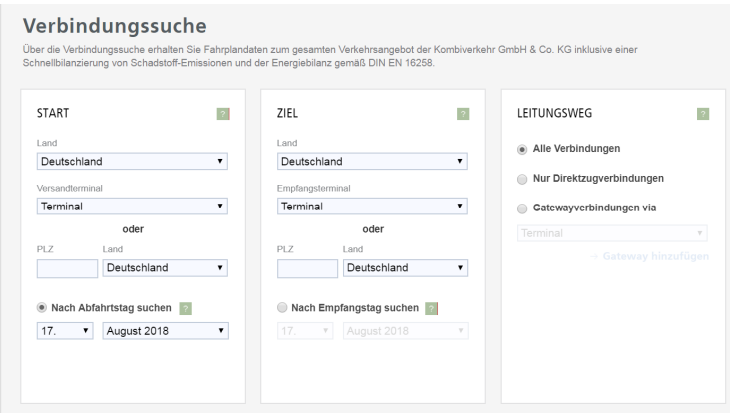
Bohemiakombi is connected to the Kombivehrkehr network of connections and terminals



To communicate about connections and terminals, Kombivehrkehr uses very good on - line tools that are also used by the ChemMultimodal partners.



LOGISTICS SERVICE PROVIDERS



TRANSPORTATION OF CHEMICAL COMMODITIES

	EXPORT (thous. tonnes)			IMPORT (thous. tonnes)		
YEAR (MONTH)	2016	2017	2018 January – May	2016	2017	2018 January - May
COMBINED	128,00	86,00	39,00	178,00	131,00	60,00
	Note: raw materials, semi-finished and finished Products			Note: raw materials, semi-finished and finished products		

Data for 2016 still contain volumes transported on the Brno - Rostock line, but only until 30 June 2016, as from 1.7. The 2016 line was operated only by ČD Cargo without the participation of Bohemiakombi operator.

This explains the decline in transported tonnes in 2017 compared to the previous year, as the change compared to the base in 2016.

On the contrary, the January - May 2018 period shows an increase of about 10% compared to the same period of the previous year.

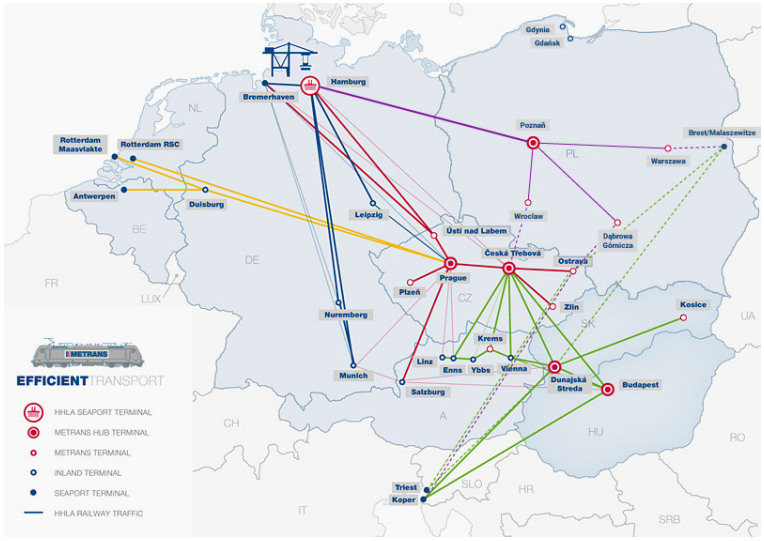
New projects to be prepared in 2018:

The preparation is the transfer of road-to-rail transport along the long-distance route from Brno to Spain, which will be implemented in combination and using the existing products on the Brno-Lovosice-Duisburg route and the newly-built direct train project from Duisburg to Barcelona.

At the stage of market research and the needs of road hauliers, there is also a new train project linking Moravia with the inland terminal in northern Italy. In addition to identifying the potential for transferable traffic from the road to the rail, the survey also aims to optimize the destination terminal in northern Italy, depending on the geographic distribution of landing sites and the loading of goods in Italy. A similar link was already in operation between 2013 and 2015. The use of the link in the opposite direction, which is also discussed in the ChemMultimodal project with partners from northern Italy, has been solved.

Metrans

Provide all-inclusive just-in-time intermodal rail-road transportation services operating own shuttle trains with cargo in maritime - deep sea and short sea, reefer, tank and special containers to / from the Czech Republic, Slovakia, Hungary and new services to German hinterland and Austria, connecting this territory by rail with major European ports, including HAMBURG, BREMERHAVEN, ROTTERDAM and DUISBURG, or southbound rail connection to KOPER, Trieste, Rijeka and new regular shuttle train service to ISTANBUL - with network of own high sophisticated container terminals/depots and modern railway hubs in PRAGUE (CZ), CESKA TREBOVA (CZ), DUNAJSKA STREDA (SK) and BUDAPEST (HU).



TRANSPORTATION OF CHEMICAL COMMODITIES

	EXPORT			IMPORT		
YEAR (MONTH)	**2016**	**2017**	**2018 January - May**	**2016**	**2017**	**2018 January - May**
TANK + BULK CONTAINER (number)	3112	5447	2646	3716	5327	2233
THOUS. TONNES	38,9	68,09	33,08	92,9	133,18	55,83
	Note: raw materials, semi-finished and finished products			*Note: raw materials, semi-finished and finished products*		

It follows from the above that the export of chemicals has doubled since 2016 and their imports by 44%.

The nummbers correspond to the practice where the import of bulk chemical materials within Europe is significantly stronger in the combined transport than exports.

Summary

Although the list of combined transport operators is incomplete, the data show that the increase in MM transport on existing lines far exceeds the required increase in transport by 10%.

This is confirmed by the knowledge gained from individual partners in the chemical industry project.

All of the above companies consider the initiation of further bilateral negotiations as the main contribution of the pilot project. The combination of six workshops of partners in the ChemMultimodal pilot project and bilateral meetings showed that:

1) In the organizations involved, the volume of MM transports grew by more than 10%, which represents a significant decrease in CO2

2) Based on the project, the possibility of creating new routes based on the requirements of the companies, as described in the next chapter.

C. Transport routes addressed

#	GENERAL DATA			BEFORE PILOT LAUNCH			
	Chemical company addressed	Shipped materials or goods	Quantity (estimate; per month)	Logistic service provider(s)	Transport distance and mode(s)	Modal split (in %)	CO2 emitted (per onth; calculated) [2)]
1	Brest (F)	Final products	225 t	LSPs	1 733 km Road	100% Road	24 175.35 kg
2	Szcecin (PL)	Rowmaterial	5 840 t	LSPs	418 km Road	100% Road	151 349,44 kg
3	Barcelona (E)	Chemicals [1)]	1 000 t	LSPs	1 890 km Road	100% Road	117 180,00 kg
4	Velká Británie (GB)	Chemicals [1)]	2000 t	LSPs	1 282 km Road	100% Road	158 968,00 kg
5	Severní Itálie (I) *Date of 2013 before closing the line*	Chemicals [1)]	1 067 t	Bohemiakombi *after closing* -LSPs	1 050 km Road	100% Road	69 461,00 kg

1) quantity is the sum of commodities of several chemical enterprises in the region

2) CO2 calculations made according to the tool: https://ifsl50.mb.uni-magdeburg.de/chemmultimodal/

D. Planned and Realized Multimodal Shifts

#	Number of small face-to-face meetings	Logistic service provider(s)	Transport distance and mode(s)	Modal split (in %)	CO2 emitted (per month; calculated)	CO2 reduction (anticipated or real)
1	6	Bohemiakombi [1)] LSPs [2)]	1 227 km Road 705 km Rail	Road 63.51% Rail 36.49%	20 606.4 kg CO_2	3 568.95 kg CO_2
1	6	Bohemiakombi [1)] Kombiverkehr [1)] LSPs [2)]	1 075 km Road 936 km Rail	Road 53.46% Rail 36.49%	19 629.5 kg CO_2	4 545.85 kg CO_2
1	6	Inter Ferry Boats[1)] Naviland Cargo [1)] LSPs [2)]	784 km Road 1 367 km Rail	Road 36.45% Rail 63.55%	17 703.5 kg CO_2	6 471.90 kg CO_2
2	7	at the stage of complex negotiations with .. 1) + 2) + ports	480 km	Elect.rail 95% 5% truck	59 427,80 kg CO_2	91 921,64 kg CO_2
3	9	Bohemiakombi [1)] Kombiverkehr [1)] LSPs [2)]	1300 km	Elect.rail 90% 10% truck	30 290,00 kg CO_2	86 890.00 kg CO_2
4	8	Metrans[1)] LSPs [2)]	[1)]Rail+truck 1015 km [2)]Short 285 km ∑ 1300 km	[1)]Elect.rail 90% +10% truck [2)] short sea	47 299,00 kg CO_2 [1)] + 9120,00 kg CO_2 [2)] ∑ 56419,00 kg CO_2	102 549,00 kg CO_2
5	5	Bohemiakombi[1)] LSPs [2)]	1 100 km	Elect.rail 90% 10% truck	- 27 347,21kg CO_2	42 113.79 kg CO_2

[1)] *Shuttle operator* [2)] *logistics service provider (all in service)*

Route 1

The company Synthesia, a. s. (hereinafter referred to as Synthesia) chose for the pilot project the transport of the final products to the Brest (France). The company transported approximately 225 tons of the final products per month using different logistics service providers. All shipments were realized only with the use of road transport at the time of the pilot project. The transport time was approximately 45 hours without transhipments and the capacity of transport unit was 34 pallets. Monthly emissions from the shipments were calculated to the value 24 175.35 kg CO2 using the Tool-Box Element "CO2-Calculator".

Three possible multimodal routes were presented as a part of a pilot project.

The first possible route was the following: Pardubice (Czech Republic) – Lovosice (Czech Republic) – Duisburg (Germany) – Brest (France). This solution used intermodal semitrailer with the same capacity (34 pallets) and the transport time was approximately 47 hours with 2 transhipments. Monthly anticipated emissions reduction of this route was 3 568.95 kg CO2.

The second possible route was the following: Pardubice (Czech Republic) – Lovosice (Czech Republic) – Duisburg (Germany) – Antwerpen (Belgium) – Brest (France). This solution used intermodal semitrailer with the same capacity (34 pallets) and the transport time was approximately 86 hours with 3 transhipments. Monthly anticipated emissions reduction of this route was 4 545.85 kg CO2.

The third possible route was the following: Pardubice (Czech Republic) – Lovosice (Czech Republic) - Antwerpen (Belgium) – Paris (France) – Brest (France). This solution used container 1A with the less

capacity (24 pallets) and the transport time was approximately 130 hours with 4 transhipments. Monthly anticipated emissions reduction of this route was 6 471.90 kg CO2.

All proposed transport reorganisation discarded because found solutions are not competitive especially from the perspective of transport time and number of transhipments.

Result of the Pilot (by 31 August 2018)*

☐ proposed transport reorganisation discarded because found solutions are not competitive

☐ ~~proposed transport reorganisation discarded because of lacking logistic service providers or infrastructures~~

☐ ~~proposed transport reorganisation under evaluation by company decision-makers~~

☐ ~~proposed transport reorganisation tested under real-life conditions (__x times)~~

☐ ~~proposed transport reorganisation effectively approved~~

☐ ~~other: _____~~

*) You will have the opportunity to update this table in November 2018.¨

Success Factors

All proposed transport reorganisation discarded because found solutions are not competitive especially from the perspective of transport time and number of transhipments.

Use of Tool-Box

Tool-Box Element	Who used this tool-box element? (project representatives/logistics service provider/chemical company representatives)	How was the element evaluated? (scale: not useful, somewhat useful, very useful, not used)
IT-Visualization	Project representatives	Somewhat useful
Consulting services	Project representatives	Useful
Planning Guideline	Project representatives	Not useful
CO2-Calculator	Project representatives	Very useful

COMMUNICATION

Are involved stakeholders interested to share their pilot experiences for project communication purposes (e.g. video clip, written interview for newsflash, website)? If yes please give the contact information:

No.

Route 2

Spolchemie deals with an alternative supply of membrane electrolysis to soils, from Belarus with a transshipment from a ship in Szczecin (about 70 kt). The aim is to optimize the cost of transport and the smooth supply of production.

The model calculation is based on the use of MM transport from Szczecin for import of KCl, with an estimated import of about 5 840 tonnes of salt per month. Appropriate container hire and an optimal terminal near Ústí nad Labem are being sought, where it is possible to temporarily store the raw material and deliver it to production as needed.

The combination of a ship car is now also used from the Netherlands to Magdeburg and further on the road to Ústí nad Labem. Here, the navigable Elbe is missing, after which Spolchemie was supplied in the past.

Result of the Pilot (by 31 August 2018)*

☐ **proposed transport reorganisation under evaluation by company decision-makers**

*) You will have the opportunity to update this table in November 2018.

Success Factors

Cost-optimal linkages should be achieved by combining optimization of transport and storage of raw material at the carrier. With an emphasis on continuous and reliable production.

Use of Tool-Box

Tool-Box Element	Who used this tool-box element? (project representatives/logistics service provider/chemical company representatives)	How was the element evaluated? (scale: not useful, somewhat useful, very useful, not used)
IT-Visualization	No body	Somewhat useful
Consulting services	Project representatives	**very useful**
Planning Guideline	Project representatives	Not useful
CO2-Calculator	Project representatives	Useful

COMMUNICATION

Are involved stakeholders interested to share their pilot experiences for project communication purposes (e.g. video clip, written interview for newsflash, website)? If yes please give the contact information:

No.

Route 3

Negotiations of the national partners during a seminar in September last year in Hamburg and a meeting of partners in October 2017 strongly supported and accelerated the efforts of combined transport

operators on routes 3, 4 and 5. Chemical companies clearly identified the territories where they met in the long term with implementation problems with the export of road transport and would prefer the varial possibility of multimodal transport.

In the territory of Spain, it appears to be a problem of the seasonality of the offer, where imports of agrarian commodities, in particular, cause fluctuations, instability of free export capacities. Given that chemical commodities are dispatched aliquently over the course of the year, these fluctuations threaten regularity of supply. Moreover, due to the different gaps between Spain and France, the increase in rail transport is problematic (transhipment or overpassing wagon / wagon goods.

Bohemiakombi organizes transport security with the German Kombi vehrkehrem from the Czech Republic via the Duisburg terminal to the terminal in the region of Barcelona. The intended start date was initially set in August 18, due to strikes by railway staff in France (transit) and the selection of the terminal in the Barcelona region was postponed until the end of the III / beginning of the fourth quarter.

When comparing offers of road and combined transport, the economic road is about 11% more advantageous. Still, interested businesses are interested in testing supplies.

Result of the Pilot (by 31 August 2018)*

☐ **other:**

Route organizationally prepared logistics service provider in the stage offers

*) You will have the opportunity to update this table in November 2018.

Success Factors

Pricing comparability, adherence to shipping times or train timetable shuttle trains between destination terminals, quality service at these terminals, focused on specific requirements and characteristics of chemical commodities. Generally known chronic road transport problems contribute to seeking alternative transport solution.

Use of Tool-Box

Tool-Box Element	Who used this tool-box element? (project representatives/logistics service provider/chemical company representatives)	How was the element evaluated? (scale: not useful, somewhat useful, very useful, not used)
IT-Visualization	nobody	Somewhat useful
Consulting services	Project representatives	very useful
Planning Guideline	logistics service provider	Not useful [1)]
CO2-Calculator	Project representatives	very useful

[1)] have their own planning information system

COMMUNICATION

Are involved stakeholders interested to share their pilot experiences for project communication purposes (e.g. video clip, written interview for newsflash, website)? If yes please give the contact information:

No

Route 4

Negotiations of the national partners during a seminar in September last year in Hamburg and a meeting of partners in October 2017 strongly supported and accelerated the efforts of combined transport operators on routes 3, 4 and 5. Chemical companies clearly identified the territories where they met in the long term with implementation problems with the export of road transport and would prefer the varial possibility of multimodal transport.

Due to the volume of export commodity exports to the UK, Metrans has proposed the use of its connection from the Czech Republic to Rotterdam and dale short sea transport to London, where it is possible to connect to a system of container transport across the territory of Great Britain. This problem has also contributed to the problems in transit ports in France associated with the migratory wave of recent years. Road hauliers, in the absence of capacity, focus on offers on less neuralgic routes.

The preparation is at the stage of the frame offers, the operator discusses the obsolete balance of transport flows. The advantage of engaging part of maritime transport is also the offer of classical shipping containers, which is not possible for purely continental transport.

Result of the Pilot (by 31 August 2018)*

☐ **other: :**

Route organizationally prepared logistics service provider in the stage offers _____

*) You will have the opportunity to update this table in November 2018.

Success Factors

Pricing comparability, adherence to shipping times or train timetable shuttle trains between destination terminals, quality service at these terminals, focused on specific requirements and characteristics of chemical commodities. Generally known chronic road transport problems contribute to seeking alternative transport solution.

Use of Tool-Box

Tool-Box Element	Who used this tool-box element? (project representatives/logistics service provider/chemical company representatives)	How was the element evaluated? (scale: not useful, somewhat useful, very useful, not used)
IT-Visualization	nobody	Somewhat useful
Consulting services	Project representatives	very useful
Planning Guideline	logistics service provider	Not useful [1)]
CO2-Calculator	Project representatives	very useful

[2)] have their own planning information system

COMMUNICATION

Are involved stakeholders interested to share their pilot experiences for project communication purposes (e.g. video clip, written interview for newsflash, website)? If yes please give the contact information:

No.

Route 5- NORTHERN ITALY

Negotiations of the national partners during a seminar in September last year in Hamburg and a meeting of partners in October 2017 strongly supported and accelerated the efforts of combined transport operators on routes 3, 4 and 5. Chemical companies clearly identified the territories where they met in the long term with implementation problems with the export of road transport and would prefer the varial possibility of multimodal transport.

This route was completed by Bohemiakombi in 2013. It was closed on the basis of a lack of other non-chemical goods and a problem amongst logistics service providers. After analyzing the Chemmultimodal project, the question of restarting the tension was open. The chemical goods that have been transported through this route are still available and, in the absence of a link, have been retroactively transferred to road transport.

Currently, operators are testing the realities of commodity flows in a given session. In this session, the key issue is the competitiveness of the prices offered, because in the direction considered, "cheap" carriers operate mainly from PL, LT, LV and EST. Due to the proximity of the Silesian industrial region in Poland, the search is also targeted at Polish economic subjects.

Result of the Pilot (by 31 August 2018)*

☐ **other:**

concrete steps resumption of negotiations depends on the service provider with clients not only in the chemical industry

*) You will have the opportunity to update this table in November 2018.

Success Factors

Pricing comparability, adherence to shipping times or train timetable shuttle trains between destination terminals, quality service at these terminals, focused on specific requirements and characteristics of chemical commodities. Generally known chronic road transport problems contribute to seeking alternative transport solution.

Use of Tool-Box

Tool-Box Element	Who used this tool-box element? (project representatives/logistics service provider/chemical company representatives)	How was the element evaluated? (scale: not useful, somewhat useful, very useful, not used)
IT-Visualization	nobody	Somewhat useful
Consulting services	Project representatives	very useful

Planning Guideline	logistics service provider	Not useful [1)]
CO2-Calculator	Project representatives	very useful

[1)] have their own planning information system

COMMUNICATION

Are involved stakeholders interested to share their pilot experiences for project communication purposes (e.g. video clip, written interview for newsflash, website)? If yes please give the contact information:

No.

E. Conclusion and further plans Task of the national project team

The main role of the partner in the successive steps was the coordination of all involved partners. These were logistics staff, logistics service providers, virtually all combined train operators and combined transport terminals. In the pilot phase, seminars were not only essential, but also carried out tasks and lessons learned from the project's current discussions, but more importantly, more and more bilateral negotiations between customers and service providers. The participation of the representatives of the Czech Republic and the association of Czechoslovak drivers was important. It has been shown that all stakeholders and stakeholders have a real interest in enhancing MM transport, not only in the implementation phase, but also in planning and organizing the whole network. The objective fact of not being able to implement complete trains only from chemical commodities has led the provider to other intensive negotiations outside the field of chemistry. Examples are routes to England, Spain, Szczecin and Italy.

a. Sustainabiltity and transferibility

The project was organized organically for about 20 years of activity of the SCCHP CR Logistics Committee. That is why the results, both partial and definitely final, will not implement the problem after the project ends. Neither the project nor the work of the Committee can supplant the activities and core functions of logistics service providers. For the future, we also expect to hold specialized seminars on chemical logistics. These seminars are held at least. 2 times a year, both domestically and abroad - especially in logistically important locations - for example in ports. Of course, we will draw insights from the field of transport planning, generalization to IS systems of chemical companies, and implementation of new knowledge and technologies into the planning and implementation process - for all involved entities.

In all previous projects very close cooperation with Slovak partners was realized, both at the level of seminars and direct cooperation with enterprises. In this project, we have extended our cooperation with a Polish partner. Our cooperation is also significant because the Czech and Polish chemical industries are also interconnected

b. Lessons learned

As the pilot phase of the project took place mainly in the negotiations of all the involved parties, national and international partners could clarify a comprehensive view of MM transport issues. Both the analysis and then the pilot project showed that the focus is not on the chemical project but on the breadth and flexibility of the supply of these shipments. That is why I logistics providers have intensively acted and checked the possibilities of a real supply of these transports for goods transported mainly by road transport.

This project is important also in terms of the capacity of transport routes, especially transit routes in

Central Europe, where the capacity of some connections is 100%, the problem of the network's throughput, the lack of drivers in truck traffic along with the major road traffic conditions, and the reduction in inland waterway volumes leads to the search for alternatives that partially eliminate these problems. More integration of MM transport is one of the starting points.

Based on the preliminary assessment of the results of the ChemMultimodal project, we believe that similar projects will continue in other key economic areas in the next period.

Annexes

Document	Cloud link
Documentation pilot project workshop	https://fmbcloud.ovgu.de/s/vECivs6xxAHmLWq?path=%2F04%20WPT2%20Pilot%20Implementation%2FAustria%2FD.T2.6.2%20Kick-off%2FD.T2.6.2%20Kick-off%20July#pdfviewer https://fmbcloud.ovgu.de/s/vECivs6xxAHmLWq?path=%2F04%20WPT2%20Pilot%20Implementation%2FAustria%2FD.T2.6.2%20Kick-off%2FD.T2.6.2%20Kick-off%20November#pdfviewer
Documentation mid term project workshop	https://fmbcloud.ovgu.de/s/vECivs6xxAHmLWq?path=%2F04%20WPT2%20Pilot%20Implementation%2FAustria%2FD.T2.6.2%20Kick-off%2FD.T2.6.2%20Kick-off%20July#pdfviewer
Documentation final project workshop	https://fmbcloud.ovgu.de/s/vECivs6xxAHmLWq?path=%2F04%20WPT2%20Pilot%20Implementation%2FAustria%2FD.T2.6.2%20Kick-off%2FD.T2.6.2%20Kick-off%20July#pdfviewer