



FINAL IMPLEMENTATION REPORT

(D.T2.4.5)

Poland

31st August 2018

A. Overall Pilot Approach

a. Pilot Phase Summary

We started the pilots' activities in July 2017 by market research for the companies that potentially meets conditions of transport mode shift. The invitations to the meeting were send and the Kick off meeting took place on September 26th 2017. During the meeting the toolbox was presented and explained.

The cooperation with companies was a process and at the beginning it was quite difficult to convince most of the companies to make trial multimodal routes. However not all the companies had the same approach, e.g. due to importance of intermodal transport for COMPANY A, company has joined ChemMultimodal project since the beginning and actively took part in pilot implementation. At the same time this pilot route had the longest distance (2400 km) and the highest volume (22 800 kg) that was a subject of pilots in Poland. This modal shift succeed with total of 1 499,8 t CO₂ emission reduction that is decrease of 44,2% in comparison to road transport on the same distance. Due to this success company is currently working on another routes that potentially suits for modal shift from road to multimodal solution.

Next we started direct cooperation with COMPANY B - in early December 2017, the company chose the route dedicated to the pilots. We managed to cooperate with COMPANIES C and D through their LSP who was helpful with potential multimodal routes identification also based on Intermodal Links platform. The cooperation with the COMPANY E started in February 2018 by phone and e-mails exchange. During the phone conversation, the objectives of the project as well as the functionality of the toolbox elements in the pilot stage were discussed in detail with the company's representative. In early February 2018, the company chose the route dedicated to the pilots.

Currently new routes shifted to multimodal transport are developed in COMPANY E. We also started new cooperation with COMPANY F which expressed its interest in multimodal activities.

b. Pilot Phase Impact

Stakeholders meeting, Pilots workshops and our daily cooperation with chemical companies and LSP impacted on raised awareness of companies' transport management activates on environment. This is mainly due to the fact that based on Intermodal Links they are able to check new possibilities for transport modes on the same distances and next based on ChemMultimodal CO₂ emission calculator they



are able to calculate real, high level changes in decreasing emissions during transport operations. Impact can be noticed by managers' engagement in further operations on modal shifts in other routes (or new routes developed e.g. when they stating cooperation with new customers). Even if Intermodal Links is not yet covering all the potential routes companies might be looking for, they know their real impact on environment and therefore also on companies' CSR implementation in other areas than only production. That is an important step to change managers' habits in the future.

B. Participating companies

Name of company	Profile (products/services)	SME or large enterprise	Location (subject to pilot)
COMPANY A	COMPANY A is one of the largest manufacturers of chemical raw materials in Poland. The company is the first European manufacturer of emulsion rubbers and the biggest European manufacturer of expandable polystyrene.	Large	Oświęcim
COMPANY B	COMPANY B is one the leading producers of surfactants and industrial formulations in the European market.	Large	Brzeg Dolny
COMPANY C	COMPANY C manufactures high-quality basic and aluminosilicate refractory materials that make indispensable elements of furnaces and devices operated at high temperatures.	Large	Ropczyce
COMPANY D	COMPANY D is a distributor of raw materials and products for many industries: rubber, plastics, coatings, building, cosmetics, nutrition, lubricants, composites. They also offer laboratory equipment and production machines for rubber and plastic industries.	Medium	Aleksandrów Łódzki
COMPANY E	COMPANY E is a distributor of the so-called full-line, the company specializing in the distribution of the full range of chemical raw materials for all industries. It also deals with the production of mixtures with parameters specified by the customer or developed by the research laboratories of the distributor.	Large	Kędzierzyn-Koźle
COMPANY F	During those 60 years of effective operations, COMPANY F has proved to be a reliable manufacturer and distributor of 250 products successfully used by other trades such as manufacturers of plastics, cosmetics, domestic and industrial detergents, construction materials and textiles.	Large	Brzeg Dolny



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 month; calculated)
1	COMPANY A	Plastic & rubber	22 800 t		Oświęcim (PL) - Bilbao (ES) / road transport / 2400 km	Road transport (100%)	3 392,6 t
2	COMPANY B	Raw materials	125 t		Rotterdam (NED)-Płock (PL)/road transport/1172,5 km	Road transport (100%)	9 t
3	COMPANY C	Raw materials	900 t		Gdynia (PL) - Ropczyce (PL) / road transport / 651 km	Road transport (100%)	36,3 t CO2
4	COMPANY D	Raw materials	100 t		Gdynia (PL) - Aleksandrów Łódzki (PL) / road transport / 349 km	Road transport (100%)	2,2 t CO2
5	COMPANY E	Raw materials	360 t		Runcorn (GBR) - Kędzierzyn Koźle (PL)/ road transport/ 1 842 km	Road transport (100%)	41,1 t CO2
6	COMPANY F	Finished products	24 t		Brzeg Dolny (PL) - Dublin (IRL) / road transport/ 2000 km road	Road transport (100%)	2,98 t CO2

D. Planned and Realized Multimodal Shifts

#	Number of small face-to-face meetings	ANTICIPATED OR REAL SITUATION AFTER PILOT PHASE				CHANGE
		Logistic service provider(s)	Transport distance and mode(s)	Modal split (in %)	CO2 emitted (per month; calculated)	CO2 reduction (anticipated or real)
1	Ongoing		Oświęcim (PL) -	Road (1%)	1 892,8 t	1 499,8 t



	process		Sławków (PL) - Gdańsk (PL) - Hamburg (DE) - Bilbao (ES) /multimodal road-rail-short sea	Rail (12%) Short sea (87%)		(44,2%)
2	1, telephone conversations and e-mails		Rotterdam (NED)- Kutno (PL) - Płock (PL)/multimodal road-rail-road transport	Road (6,5%) Rail (93,5%)	3 t	5 t (59,7%)
3	1, telephone conversations and e-mails		Gdynia (PL) - Kutno (PL) - Kolbuszowa (PL) - Ropczyce (PL) / multimodal rail-road	Rail (59%) Road (41%)	22,3 t	14,1 t (38,7%)
4	1, telephone conversations and e-mails		Gdynia (PL) - Kutno (PL) - Aleksandrów Łódzki (PL) / multimodal rail- road	Rail (83%) Road (17%)	0,99 t	1,2 t (53,9%)
5	Telephone conversations and e-mails		Runcorn (GBR) - Dover (GBR) - Rotterdam (NED)/Gliwice (PL)/ Kędzierzyn Koźle/multimodal	Road (28%) Short-sea (6%) Rail (66%)	21 t	20 t (48,9%)
6	Telephone conversations and e-mails		Brzeg Dolny (PL) - Dublin (IRL) Multimodal short- sea/rail/short- sea	Rail (47,4%) Short sea (52,6%)	0,96 t	2,02 t (67,8%)

Route 1

Due to importance of intermodal transport for COMPANY A, company has joined Chemmultimodal project since the beginning. Within pilot phase route to Bilbao was approved as possible to switch from road transport. Original distance of 2400 km was extended up to approximately 4800 km, while CO2 emission was reduced from over 3300 t to 1900 t. Only one element from toolbox CO2 calculator was found out useful to make general awareness, other elements as planning guidelines and intermodal link web site were not sufficient enough, although with great potential if sustained and developed in the future. Company decided not to rely fully on multimodal transport mainly because of amount of extra 16 days of transit. Nevertheless applied synchro modality solutions in which routes are partly executed by road and



intermodal transport. Due to the fact of serious cost reduction business decided that new routes to Italy, Turkey and Grate Britain will be assigned for tests and are currently under evaluation process.

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

X 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

The key factor is a sustainable transport corridor on the way to particular place of destination with reliable LSPs. Having those organization would be eager to step into multimodal on structural basis

The main arguments against multimodal transport are not reliable LSPs, not sustainable transport corridors, no possibility to establish comprehensive ETA, missing equipment prepared to move chemical products (containers)

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	Chemical company, LSP	Not useful due to very limited database but with a great potential if database would be extended
Consulting services	Chemical company, LSP	Useful to exchange knowledge with project participants
Planning Guideline	Chemical company, LSP	Not useful, both parties use their own planning methods
CO2-Calculator	Chemical company, LSP	Not useful, to general calculation, in current legislations parties are not obliged to make CO2 calculations. It was used to make awareness



COMMUNICATION

Company is involved in project since beginning all forms of communication are ongoing.

Route 2

COMPANY B realized the modal shift from road to intermodal transport on the international route from Rotterdam (NED) to Płock (PL) on the supply side of its value chain. The volume of 25 tons of raw materials was transported from the supplier facility in the Netherlands to the COMPANY B production plant in Poland. Total distance amounts to 1 172.5 km by road and 1 192.7 km by intermodal. In the multimodal transport scenario, road transport distance amounts to 77.7 km, including on the average the pre-haulage distance 27.7 km from the supplier's facility to the Rotterdam (NED) terminal and the end haulage distance 50 km from the Kutno (PL) terminal to the COMPANY B production plant in Płock (PL). Additionally, rail transport distance from the terminal in Rotterdam (NED) to the terminal in Kutno (PL) amounts to 1 115 km. The CO₂ emitted in road transport is 119.35 kg (596.75 kg/per month) and in rail transport accordingly, 613.25 kg (3 066.25 kg/per month). Altogether in the intermodal scenario, the CO₂ emissions level amounts to 732.6 kg (3 663 kg/per month). In contrast, the CO₂ emission level because of road transport on the reported distance amounts to 1 816.60 kg (9 083 kg/per month). As a comparison, the CO₂ emission was reduced by 1 084 kg (5 420 kg/per month) - 59,7% because of this modal shift.

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 (3 x times)**
- proposed transport reorganisation effectively approved
- other: _____

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

Success Factors

Factors will be decisive for an effective transport reorganisation:

- Transport managers' skills in multimodal transport management
- Transport managers' or decision makers' awareness on transport management impact on CO₂ emission level
- Access to the knowledge (platform) on available transport space on 'real-time' basis on different international routes
- Increase of quality of the rail transport operators' service in terms of speed, punctuality and reliability



- Costs decreasing (in term of costs effectiveness)
- Customers' expectations in terms of usage of eco-friendly transport solutions

The main arguments against a more multimodal transport organisation:

- Lack of punctuality of rail transport
- Uncertainty in the accuracy of multimodal transport time
- Complexity of multimodal transport organization
- Lack of intermodal terminals dedicated to dangers goods reloading on the particular routes

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	chemical company representatives logistics service provider	somewhat useful
Consulting services		
Planning Guideline		
CO2-Calculator	chemical company representatives and logistics service provider in cooperation with SGH team	somewhat useful/ not useful

COMMUNICATION

We asked for the possibilities to publish the results of transport mode shift, the request was send to PR department, but with no reply up till now.

Route 3

The route is 651 km long. COMPANY C uses it on regular bases to transport chemical raw materials on the supply side of their supply chain. On average COMPANY C transported six trucks of the raw materials (25 t each) six times per month what makes 900 kg per month in total. In general, the route was performed by road. However there are rail terminals Kutno (PL) and Kolbuszowa (PL) available on the way, and part of the journey could be performed by rail. During consulting services with the help of Intermodal Link Planner another connection was developed: Gdynia (PL) - Kutno (PL) - Kolbuszowa (PL) - Ropczyce (PL), and suggested to COMPANY C and SDB for pilots. The first leg of a new route (236 km) is done by road, the second (378 km) by rail, and the final one (29,5 km) by road. The total distance of the new multimodal route amounts for 643,5 km and is eventually shorter by 7,5 km. COMPANY C and SDB have decided to



reduce the number of deliveries and organize three deliveries (300 kg each) per month. Afterwards, CO2 emissions were calculated, using the ChemMultimodal CO2 Emission Calculator, and reported by SGH team. According to CO2 Emission Calculator within pilot tests of the new multimodal route, COMPANY C was responsible for 22,27 t of CO2 emissions per month (i.e. 14,06 t/month less than before what amounts for 38,7% reduction). The result consists of 14,79 t/month of road CO2 emissions (pre- and post haulage distance: 236 km + 29,5 km = 265,5 km) and 7,48 t/per month of rail CO2 emissions (on the distance of 378 km).

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 (3 x times)
- proposed transport reorganisation effectively approved
- other: _____

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

Success Factors

See Route 2

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	logistics service provider	somewhat useful/ very useful
Consulting services		
Planning Guideline		
CO2-Calculator	logistics service provider in cooperation with SGH team	somewhat useful/ not useful



COMMUNICATION

Not interested

Route 4

The route is 349 km long. COMPANY D uses it on regular bases to transport chemical raw materials on the supply side of their supply chain. On average COMPANY D transports by road one truck (25 t) of the chemical raw materials four times per month. During consulting services with the help of Intermodal Link Planner, COMPANY D and its LSP were suggested to shift significant part of the selected route to rail. The new multimodal route for pilots is following: Gdynia (PL) - Kutno (PL) - Aleksandrów Łódzki (PL). The first leg of a new multimodal route (292 km) is done by rail, when the second (57 km) by road. The total distance of the new multimodal route has not change. It still amounts for 349 km. When using multimodal transport COMPANY D decided to transport bigger volumes (i.e. 300 kg per transport three times per month). However, to be able to compare the results of CO2 emission calculation, we decided to divide it by 9. According to ChemMultimodal CO2 Emission Calculator, during pilot tests of the new multimodal route, COMPANY D was responsible for 8,96 t of CO2 emissions per month divided by 9 makes 0,99 t/month (i.e. 1,16 t/month less than before what amounts for 53,9% reduction in comparison to road transport).

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 (3 x times)
- proposed transport reorganisation effectively approved
- other: _____

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

Success Factors

See Route 2

Use of Tool-Box

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

COMMUNICATION

Not interested

Route 5

In early February 2018, the company chose the route dedicated to the pilots. COMPANY E realized the modal shift from road to intermodal transport on the international route from Runcorn (GBR) to Kędzierzyn Koźle (PL) on the supply side of its value chain. The average volume of 24 tons of raw materials was transported from the supplier facility in Runcorn (GBR), through Dover (GBR), Rotterdam (NED) and Gliwice (PL) to the COMPANY E production plant in Kędzierzyn Koźle (PL). Total distance amounts to 1 842 km by road and 1 770 km by intermodal. In the multimodal transport scenario, road transport distance amounts to 500 km, including the pre-haulage distance 455 km from the supplier's facility to the Dover (GBR) terminal and end haulage distance 45 km from the Gliwice (PL) terminal to the COMPANY E production plant in Kędzierzyn Koźle (PL). Additionally, short sea transport distance from the terminal in Dover (GBR) to the terminal in Rotterdam (NED) amounts to 100 km. Next, the rail transport distance from the Rotterdam terminal to the Gliwice terminal amounts to 1 170 km. The CO2 emitted because of road transport is 744 kg (11 160 kg/per month), short sea transport 38.40 kg (576 kg/per month), rail transport accordingly, 617.76 kg (9 266.4 kg/per month). Altogether in the intermodal scenario, the CO2 emissions level amounts to 1 400.16 kg (21 002.4 kg/per month). In comparison, the CO2 emission level because of road transport on the reported distance amounts to 2 740.9 kg (41 113.5 kg/per month). The CO2 emission was reduced by 1 340.74 kg (20 111.1 kg/per month) - 48,9%.

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 (3_x times)
- proposed transport reorganisation effectively approved
- other: _____



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

Success Factors

See Route 2

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	chemical company representatives logistics service provider	somewhat useful
Consulting services		
Planning Guideline		
CO2-Calculator	chemical company representatives and logistics service provider in cooperation with SGH team	somewhat useful/ not useful

COMMUNICATION

We will ask for possibilities to publish the results of transport mode shift in the next weeks.

Route 6

This is a new route that was tested for the first time in July 2018. Multimodal route covered destination from Brzeg Dolny in Poland to Dublin in Ireland. All together there are 2110 km, including: 10 km by short-sea, than 1 000 km by rail and 1100 km by short-sea. The preliminary results are very promising, however company is planning to use it only once a month.

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

See route 2.

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		
Consulting services		
Planning Guideline		
CO2-Calculator		

COMMUNICATION

We will ask for possibilities to publish the results of transport mode shift in the next weeks whenever the COMPANY will repeat the proposed multimodal route and we will get results on a similar level to the first time.

E. Conclusion and further plans

a. Task of the national project team

Partner 1: Polish Chamber of Chemical Industry (PIPC)

Partner 2: Warsaw School of Economics (SGH 14)

Main tasks:

- Market research and companies' evaluation in terms of fulfilment of the pilots' condition (road routes distance, frequencies of transport, willingness to cooperate, etc.)
- Preparation of electronic form (survey) for road and multimodal routes description by companies
- Elaboration of survey results concerning routes travelled by companies (after each route described by each company)



- Presentation of pilots' conditions and assumptions during stakeholders meeting
- Direct cooperation with companies B, C, D and E during pilots' implementation and development on daily-basis (meetings, phone calls, mailings, Skype calls)
- Presentation of the development of project's activities and pilots' results during Kick-off Pilot Workshop and Mid-term Pilot workshop
- Face-to-face meeting with company B and its logistics service provider to evaluate pilot progress, discuss bottle-necks and possible further steps
- Face-to-face meeting with logistics service provider of company C and company D to evaluate pilot progress, discuss bottle-necks and possible further steps
- Cooperation with company E on a daily basis during the pilot implantation
- Development of possible new route to be tested as pilot activity by company B in the next weeks
- Development of possible new route to be tested as pilot activity by company E in the next weeks
- Cooperation development with new company F - potentially interested in cooperation on pilot's implantation in the next weeks
- Collaboration on CO2 emissions' calculation for road and multimodal routes travelled by the companies
- Reporting of pilots implementations
- Monitoring of toolbox usage by companies
- Interviewing companies on toolbox elements evaluation

Approximate project resources spent for local pilot (including personnel):

- 90% of 1 full time person per month engaged in T2 during IV period of the Project.

b. Sustainability and transferability

Impact can be noticed by managers' engagement in further operations on modal shifts in other routes. The awareness have been risen and it is an important step to change managers' habits in their daily operations now and in the future. Toolbox elements will stay available for them after project's end and it can easily adopted to companies CSR activities covering not only production processes, but also logistics.

c. Lessons learned

Multimodal solution is not new. However, during the course of the pilots phase we could find out that it is not that easy for transport and logistics managers. First, that they are not obligate to look for low-emission transport even if they represent companies that introduced CSR strategy. Second, it requires higher knowledge, experience and skills to manage complex multimodal solution - so it is more difficult. Third, there are not too many external solutions (multimodal platforms for exchanging data) that would help them to make objective multimodal choices. Pilot actions and close cooperation with the companies and LSPs during this phase of the project helped to solve at least part of those challenges. Sharing information between partners on transnational level helped us to realise that problems of multimodal supply chains cover more than a region, but are international or even global aspect. Therefore this cooperation should cover improving close relationships between chemical companies and LSPs - what was one of the projects' goal - but also engage members on institutional level supporting availability to



intermodal platforms where more parties would be able to cooperate and share information on multimodal resources on transnational level.

Annexes

Document	Cloud link