

# OUTPUT FACT SHEET

## Pilot actions (including investment, if applicable)

Version 2

<b>Project index number and acronym</b>	CE1044 - TalkNET
<b>Lead partner</b>	NORTH ADRIATIC SEA PORT AUTHORITY
<b>Output number and title</b>	Output O.T. 3.9 PA for ECO-innovations on LNG deployment as alternative fuels: FS for LNG investments.
<b>Investment number and title (if applicable)</b>	//
<b>Responsible partner (PP name and number)</b>	PP15 - Codognotto Polska
<b>Project website</b>	<a href="https://www.interreg-central.eu/Content.Node/TalkNET.html">https://www.interreg-central.eu/Content.Node/TalkNET.html</a>
<b>Delivery date</b>	May 2020

Summary description of the pilot action (including investment, if applicable) explaining its experimental nature and demonstration character

For green logistics, natural gas currently represents a perfect transition fuel until complete "vehicle decarbonization" is achieved through the use of bio-LNG, electric or hydrogen vehicles from renewable sources. With this pilot, Codognotto Polska sp. Z o.o. aimed to study and verify the possibility to use EURO VI LNG HVI for its road transport fluxes, carrying out the tests from Poland (PL) to United Kingdom (UK) via Germany and Benelux. The two demonstrative international transport pilots implemented have been planned in agreement with the shippers and the Original equipment manufacturer (OEMs) involved in the pilot, such as IVECO and SCANIA.

Back in 2017/2018, for road haulage in the Central Europe macro-area, this attempt represented a challenge based on the following reasons:

- The alternative fuels market was still quite immobile due to the lack of technological and commercial development, the lack of acceptance by consumers and the lack of adequate infrastructures
- The differences in the distribution and availability related to infrastructure (compressed natural gas (CNG) and liquefied natural gas (LNG) fuel stations) impacting on operability
- The higher costs of a modern EURO VI LNG HDV compared to a standard EURO VI Diesel truck available on the market (an EURO VI LNG HDV truck usually costs 60% more than an EURO VI Diesel truck)

Especially in Poland, OEMs were looking for the possibility to have an important use case of CNG/LNG where the market on alternative fuel was blocked by the reticence of the operators that were reluctant in approaching such massive change. In this framework, Codognotto Polska decided to perform the first pilot testing CNG/LNG in Poland.



As mentioned, the two demonstrative tests were both carried from PL to UK via Germany and Benelux:



During the pilots, all relevant data in terms of fuel consumption and pollutant emissions (air and soil pollutants) were collected through Portable emissions measurement system (PEMS) installed onboard to the vehicles. At the end of the pilots, data collected were analysed in collaboration with OEMs, in order to compare CNG/LNG with data deriving from standard EURO VI diesel trucks selected as benchmarks. Relevant Parameters to be considered have been agreed duly in advance with OEMs:

Quantitative criteria:

- Average fuel consumption [l/100 km]
- Average fuel gross costs in test [€/100 km]
- Average fuel net costs in test [€/100 km]
- Km with 1 unit of fuel
- Average CO2 emissions [kg/km]

Qualitative criteria: drivers' feedback in terms of positive/negative remarks compared to their expertise.

Remarks can be related to:

- Overall driving impression
- Driving comfort
- Towing capability of the engine
- Handling of refuelling operations
- Handling of embarkment/disembarkation operations on ferry.

The table here below shows the data collected from the average of results of two different tests performed in order to achieve the goals of the pilot:

TEST RESULTS	LNG	DIESEL	LNG vs DIESEL
Average fuel consumption [/100 km]	24,39 kg	31,5 L	//
Average fuel gross cost in test [100 km]	25.09 EUR	38,56 EUR	13,47 EUR
Average fuel net cost in test [/100 km]	20,93 EUR	32,13 EUR	11,20 EUR
Km with 1 unit of fuel	4,11 km/kg	3,2 km/L	+ 0,91 Km
Average CO2 emissions (kg/km)	0,700 kg/km	0,827 kg/km	15,35%

The above-mentioned considerations showed how the LNG is preferable in terms of environmental impact compared to the Diesel standards solutions. These results were confirmed in both the demonstrative international transport pilots performed:

#### Test with IVECO truck

Km travelled	5401
Total fuel consumption (LNG)	1374,99 Kg
Average weight on rear axis	7800 kg

#### **Historical diesel parameters for comparison**

Km/lit	3,226
Lt/100 Km	31
Standard consumption for 5401 km	1674,31 lt

#### Test with SCANIA truck

Km travelled	7308
Total fuel consumption (LNG)	1703,59 Kg
Average weight on rear axis	7800 kg

Considering Piloting test A, carried out with IVECO EURO VI LNG trucks, the total fuel consumption is equal to 1.374,99 kg while, for a similar path with a EURO VI equivalent Diesel HDV truck, the consumption for the mileage is equal to 1.674,31 L. This means a relevant reduction in fuel consumption of abt. 299,32 Kg, positively impacting on the environment.

Considering Piloting test B, carried out with SCANIA EURO VI LNG trucks, the total fuel consumption is equal to 1.703,59 kg while, for a similar path with a EURO VI equivalent Diesel HDV truck, the consumption for the mileage is equal to 2.265,48 L. This means a relevant reduction in fuel consumption of abt. 561.89 Kg, positively impacting on the environment.

In addition, after the test implementation, drivers provided the following feedback:

POSITIVE	NEGATIVE
The motor is quieter	The stations are not open 24 h
Refuelling is easy and fast	There must be a booking before first refuelling
	We need to refuel more often than diesel
	We should be couple of hours before our ferry in the port because LNG trucks should stay on open-air deck
	Special equipment and driver course are needed
	Not many refuelling

At the conclusion of the pilot, the test was conducted successfully from the operational point of view and TalkNET represented the first project in testing alternative fuels for long haul transport in Poland and Germany. The most relevant result given was that LNG showed its operational usability: the use of LNG vehicles is certainly possible on the Central Europe macro-area, but not without careful planning of the route due to the limited refueling stations. As a consequence, this implies more time for logistics operators but overall, the logistical commitment is rewarded from an environmental point of view thanks to the reduction of CO2 and fuel costs.

### NUTS region(s) concerned by the pilot action (relevant NUTS level)

The pilot covered the following area:

Fuel stations used:

- Śrem (PL41)
- Grünheide (DE40C)
- Nieuwegein (NL31)
- Rotterdam (NL33)
- Delfgauw (NL33)
- Kilsby (UKF25)
- Alconbury (UKH12)

Departure/loading/unloading/arrival:

- Bydgoszcz (PL85)
- Deeside (UKL23)
- Beccles (UKH14)
- Doncaster (UKE31)
- Milton Keynes (UKJ13)

### Investment costs (EUR), if applicable

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### Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)

The main important scope of the pilot was to demonstrate in practice that a concrete and real alternative to diesel was available. Poland was still stressing the need to speed up the conversion to EURO6 trucks and not ready yet to an alternative to diesel. In the programme area, the only country that was already investing in LNG with a mix of private and public initiatives was Italy. Today, Germany is planning to build an efficient network, while other countries are still far from this vision.

The pilot showed an interesting decreasing of emission in agreement with the criteria of Ecoinvent database.

		Diesel	LNG	Diesel	LNG	Diesel	LNG
	Loading Lodz - Leipzig	[KgCO2 eq]	[KgCO2 eq]	[Kg CH4]	[Kg CH4]	[Kg N2O]	[Kg N2O]
543 Km	FULL ROAD	1733,256	1539,405	26,064	22,263	39,096	33,123

The pilot showed also a potential impact concerning environmentally hazardous emissions, e.g., greenhouse gas emissions, with a decrease of KgCO2 eq equal to almost 12%. Despite this, the impact of the pilot could had also a wider scope, which was demonstrated by the actions taken in the following years: Germany started a strong investment in LNG refuelling station, while Polish operators began to build their own refuelling stations in cooperation with OEMs.

The results of the current pilot can be capitalized to strength the cooperation among freight transport stakeholders and policy actors that will support measurable investments to keep up the diffusion of alternative fuels and energy efficient vehicles utilization in the intermodal sector of Central Europe Area.

The pilot raised awareness among other logistic operators, vehicle manufacturers, fuel suppliers, as well as public authorities. This influenced an overall movement towards renewable energies in general and towards LNG in particular. Thanks to better conditions in terms of LNG supply at European level, Codognotto has planned to buy in 2021 circa 25 new LNG/CNG vehicles (ca €120.000 each) for a total investment of €3.000.000 approximately.

## Sustainability of the pilot action results and transferability to other territories and stakeholders.

Some aspects determined the lack of an immediate sustainability of the pilot:

- Lack of refueling stations: in the Programme area, the only area fully covered by refueling stations was the North of Italy. This determined the difficulty to consider a possible fleet conversion by big operators such as Codognotto Poland.
- Cost saving coming from LNG usage does not cover the gap between the price of LNG trucks and Diesel trucks. The lack of OEMs producing these types of vehicles and the related technology needed, increased costs to €40k.
- lack of availability of shippers to recognize to their transport operators a price increase for the use of the more sustainable transport solution.

The main important stakeholders involved were IVECO, SCANIA and UNILEVER. The OEMs were looking for the possibility to have an important use case of LNG in Poland where the market on alternative fuel was blocked by the reticence of the operators that were reluctant in approaching such massive change. Since UNILEVER is one of the major worldwide well-known company, with a high and recognized rating on social and environmental responsibility, its experience was shared with other shippers, Codognotto included. Acquired knowledge was crucial for Codognotto Group in order to assess a potential deployment in other geographical areas and to increase Codognotto POL alternative fuel fleet.

Since the pilot was performed 3 years ago, the transferability is already taking place. The test contributed in strengthening UNILEVER awareness about alternative fuel, while SCANIA and IVECO exploited the promotion of the use case to open new market perspectives. Additionally, Polish companies exploited COD POL example and have overcome the problems highlighted by creating with OEMs their own refuelling station.

Lessons learned and added value of transnational cooperation of the pilot action implementation (including investment, if applicable)

In the last years, Central Europe area has represented a crucial area for the deployment of LNG as well of BIO-LNG. Most of the European fleets involved in the international transport come from Eastern European countries, especially from Central Europe area. The pilot provided a potential alternative to Diesel to be applied in Central Europe.

As the map below shows, LNG refueling stations increased considerably since 2017. This demonstrates the importance of the transnational cooperation in the Programme area in order to allow the usage of LNG trucks across the countries.



Conclusions about added value of transnational cooperation have been gathered during meeting of the working groups for the pilot project assessment held on 27th-28th May 2020. The results of the pilot action carried out by Codognotto Polska have been assessed and the following results can be highlighted in relation to mutual learning among project partners:

Identified strengths of the pilot action are:

- Demonstrate the full usability of the trucks
- Decrease of CO2 emissions and particulate
- High level of interest of key players
- Attraction for companies aware of the importance of environmental sustainability (competitive advantage for hubs)
- Capitalisation already ongoing
- Transferability ongoing
- Operational similar to Diesel

Potential deployment of the tested innovation:

- Capitalisation supported by CEF and TEN-T projects
- Positive attitude of the market

The critical issues that could be taken into consideration are mainly the higher cost for truck purchasing and the lack of coordinated policies in Central Europe for LNG enhancing.

**Contribution to/ compliance with:**

- relevant regulatory requirements
- sustainable development - environmental effects. In case of risk of negative effects, mitigation measures introduced
- horizontal principles such as equal opportunities and non-discrimination

The pilot was implemented in compliance with the so called AFI Directive (Alternative Fuels Infrastructure) adopted by the European Parliament and the Council on 29 September 2014 following the inter-institutional negotiations. It requires Member States to develop national policy frameworks for the development of alternative fuels market and their infrastructure and paves the way for the creation of adequate consumer information on alternative fuels, including a clear price comparison methodology.

**References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links**

**If applicable, additional documentation, pictures or images to be provided as annex**

D.T3.1.1 Meetings to involve key players of freight transport

D.T3.2.9 PA for eco-innovations on LNG deployment as alternative fuels: logistics model for LNG