EUROPEAN COMMISSION

DG MOVE

SEVENTH FRAMEWORK PROGRAMME

GC.SST.2012.2-3 GA No. 321592

WP 8 Dissemination and exploitation

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Deliverable No.	8.7	
Deliverable Title	Statistics monitoring	
Dissemination level	Public	
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Approved by	Javier Lebrato (IDIADA)	
Issue date	23/04/2018	

Executive Summary

Today in the world there are in circulation about 25 Million NGVs, fuelled by a bit more than 30,000 CNG refuelling stations. The global LNG fleet is made by about 245,000 vehicles; all of them are HD, i.e. mostly trucks and buses. They are fuelled by about 1,240 LNG refuelling stations. The large majority of the LNG fleet is in China: 240,000 LNG vehicles (trucks and buses), refuelled with 1,000 LNG refuelling stations. A smaller but growing fleet is in operation since quite long now in North America: about 3,600 LNG HD vehicles, and about 120 LNG refuelling stations. More recently a fleet of LNG vehicles started building up also in Europe, where now there are about 2,840 LNG HD vehicles, and about 110-130 LNG refuelling stations. No figures are reported yet for, South America, Middle East, and Africa, even if probably some initiatives are taking pace also in some of those areas. The rough estimate of the total monthly CNG consumption of the global LD and HD NGV fleet is about 2.5 Billion cubic metres. No global figure is available yet for the LNG consumed by the HD LNG vehicles. keeping reliable and dependable statistics in the global and European NGV market is still quite challenging, due to the difficulty to get information and the quickly changing figures in some parts of the world. An attempt has been made.

Revision History and Statement Of Originality

Revision History

Rev	Date	Author	Organization	Description
1.0	02/04/2018	Flavio Mariani	NGVA	Initial version

Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Contents

1. Introduction

1.1 LNG Blue Corridors project

The LNG Blue Corridors project's aim is to establish LNG as a real alternative for medium- and long-distance transport—first as a complementary fuel and later as an adequate substitute for diesel. Up to now the common use of gas as fuel has been for heavy vehicles running on natural gas (NG) only for municipal use, such as urban buses and garbage collection trucks. In both types of application, engine performance and autonomy are good with present technologies, as they are well adapted to this alternative cleaner fuel.

However, analyzing the consumption data, the equivalence in autonomy of 1 liter of diesel oil is 5 liters of CNG (Compressed Natural Gas), compressed to 200 bar. Five times more volume of fuel prevents the use of CNG in heavy road transport, because its volume and weight would be too great for a long-distance truck. This opens the way for LNG (Liquefied Natural Gas), which is the way natural gas is transported by ship to any point of the globe. NG liquefies at 162º C below zero, and the cost in energy is only 5% of the original gas. This state of NG gives LNG the advantage of very high energy content. Only 1,8 liters of LNG are needed to meet the equivalent autonomy of using 1 liter of diesel oil. A 40-ton road tractor in Europe needs a tank of 400 to 500 liters for a 1.000 km trip; its equivalent volume with liquid gas would be 700 to 900 liters of LNG, a tank dimension that could easily be fitted to the side of the truck chassis. LNG therefore opens the way to the use of NG for medium- and long-distance road transport.

LNG has huge potential for contributing to achieving Europe's policy objectives, such as the Commission's targets for greenhouse gas reduction, air quality targets, while at the same time reducing dependency on crude oil and guaranteeing supply security. Natural gas heavy-duty vehicles already comply with Euro V emission standards and have enormous potential to reach future Euro VI emission standards, some without complex exhaust gas after-treatment technologies, which have increased procurement and maintenance costs.

To meet the objectives, a series of LNG refueling points have been defined along the four corridors covering the Atlantic area (green line), the Mediterranean region (red line) and connecting Europe's South with the North (blue line) and its West and East (yellow line) accordingly. In order to implement a sustainable transport network for Europe, the project has set the goal to build approximately 14 new LNG stations, both permanent and mobile, on critical locations along the Blue Corridors whilst building up a fleet of approximately 100 Heavy-Duty Vehicles powered by LNG.

This European project is financed by the Seventh Framework Programme (FP7), with the amount of 7.96 M€ (total investments amounting to 14.33 M€), involving 27 partners from 11 countries.

This document corresponds to the 7 deliverable within work package 8. It is a document describing the LNG statistics in Europe and globally. This document will be available at the project website: http://www.lngbluecorridors.eu/.

2. Global statistics vehicles and refuelling stations

The activity to keep updated statistics in the NGV market, and in particular in the LNG sector is facing some challenges. As new CNG and LNG vehicle models hit the market, NGV fleets keep increasing constantly. New stations are built and opened every month. Not always the relevant information is circulated timely enough, or in some case it isn't at all. For some geographic areas it is not always easy to get proven information. The table 2-1 is summarizing, to the best of the Project partners knowledge, the different figures of vehicles and refueling stations around the world, in the case of CNG and of LNG. There are various and different sources of information anyway, which are of help to make this effort as effective as possible, so to provide reliable and credible information, which is useful to evaluate the success of the initiatives aimed at the development of this sector. Table 2-1 was done mainly taking profit of statistics published by NGVA Europe, NGV Global and NGV Journal.

area	CNG vehicles	CNG refuelling stations	LNG vehicles	LNG refuelling stations	Monthly sales average Nm3/month
North America	183,815	1,925	3,600	123	78,895,000
South America	5,509,946	5,454	0	0	487,343,325
EU-28	1,366,971	3,456	1,617	114	267,039,200
Other Europe Countries	250,600	806	0	0	85,750,000
Asia/Oceania	9,294,640	11,897	240,000	1,000	547,790,000
Middle East	8,226,027	6,473	0	0	911,200,000
Africa	216,858	204	0	0	47,090,000
TOTAL	25,048,857	30,215	245,217	1,237	2,425,107,525

Tab 2-1 NGV in the world by area (source:NGVA Europe; NGV Global; NGV Journal)

During the Project deployment the automotive LNG market has increased remarkably worldwide, especially in Asia (China, Japan) and North America. China had already in 2013 a national fleet of 18,000 LNG buses and 45,000 LNG trucks, fueled by about 1,000 LNG stations. At end 2014 the CHINA LNG GROUP expressed intent for direct investment in a minimum 100,000 LNG-fuelled trucks and indirect-investment in 200,000 LNG-fuelled trucks by 2020. In 2017, the LNG trucks account for about 4% of the more than 6 million HD vehicles able to haul 40 to 49 tons of goods that are on China's roads. Global statistics report 240,000 LNG HD vehicles in that country. The national demand for LNG

trucks is soaring as companies and manufacturers shift to vehicles that run on the gas that China's Government sees as a key part of its war against ambient air pollution. Sales of LNG heavy trucks surged by 540% to nearly 39,000 in the first seven months of 2017 [Source Cassie Liu, a truck analyst with the IHS Markit consultancy]. That was partly stimulated by a ban in 2017 on the use of diesel trucks to transport coal at northern ports in provinces like Hebei and Shandong, and in the city of Tianjin. A far smaller but growing LNG HD vehicle fleet is in North America and Europe. No figures are reported instead from the other areas of the world.

3. European statistics vehicles and refuelling stations

In the case of Europe, to keep updated statistics in the NGV market, and in particular in the LNG sector is still rather challenging, but to a lesser extent compared to the rest of the world. Also in Europe the NGV market is developing, and new CNG and LNG vehicle models hit the market, NGV fleets keep increasing constantly. And as a consequence, also in Europe new stations are built and opened every month. Many stations (i.e. about 50-60) are successful also thanks to the financial support from the EC, through projects similar to the LNG BC Project. But the number is increasing of stations that are financially self-standing. Again, not always the relevant information is circulated timely enough, but there is a reasonable and acceptable level of uncertainty. The table 2-2 is summarizing, to the best of the Project partners knowledge, the different figures of vehicles and refueling stations in Europe, in the case of CNG and of LNG. In some cases the figure is not reliable to the proper extent. In such cases, no figures have been reported. So when a row or cell is empty, that means either no data available, or the available data is not proven sufficiently. The table 2-2 was edited using official statistics from the web site (member area) of NGVA Europe.

The automotive LNG market is increasing in Europe, especially in Spain, The Netherlands, Italy and the United Kingdom. Spain has many (now 7) well located LNG terminals. The Netherlands allocates public funding at very high levels (50% of the LNG stations). The routes in the country are not very long, and are flat, so that lower-powered trucks are suitable for this country. UK started very early with developing the LNG mobility. In UK, the Government increased with incentives the number of low carbon trucks and refuelling stations. It is set to deploy around 350 gas trucks and 28 refuelling stations. Italy still has the greatest CNG market in Europe. In Italy there are now about 1,000,000 CNG vehicles, served by about 1,200 CNG stations, selling about 1 billion Sm3 of CNG per year. Italy has also become one of the champions in Europe of the LNG automotive market. The operators of this sector estimate a grown demand for LNG in the automotive market to more than 15,000 ton in 2017 (LNG + L-CNG), i.e. two times as much as in 2016. The total number of LNG stations has grown to 15 in 2017, compared to 6 in 2016. The LNG truck national fleet amounts in 2017 to 400 dedicated vehicles, plus 100 dual fuel, LNG/diesel.

Country	CNG Vehicles	CNG Infrastructure	LNG vehicles	LNG Infrastructure
Austria	7,472	162	0	1
Belgium	7,777	94	55	3
Bulgaria	69,820	105	3	0
Croatia	329	2	0	0
Cyprus	0	0	0	0
Czech Republic	18,028	167	0	0
Denmark	344	17	0	0
Estonia	1,504	10	0	0
Finland	2,786	39	2	6
France	13,928	66	120	13

Germany	97,160	863	0	3
Greece	2,572	11	0	0
Hungary	6,319	12	0	0
Ireland	8		0	0
Italy	1,034,350	1,199	110	15
Latvia	0		0	0
Lithuania	343	3	0	0
Luxembourg	306	6	0	0
Malta	0		0	0
Netherlands	11,472	180	400	22
Poland	3,510	29	52	2
Portugal	577	9	18	7
Romania	1,390	2	0	0
Slovakia	2,006	11	0	0
Slovenia	381	5	0	1
Spain	7,028	58	347	28
Sweden	58,254	175	60	7
UK	310	14	450	18
EFTA Iceland	1,236	5	0	0
EFTA Norway	785	18	0	0
EFTA Switzerland	13,637	146	0	1
EU28	1,347,974	3,239	1,617	126
EU28+EFTA	1,363,632	3408	1,617	127

Tab 3-1 NGV in Europe (source: NGVA Europe)

Some relevant text was collected from the deliverable D 7.6 of this Project, as useful comment of NGV statistics. As an example, the figures for the LNG stations country by country in Europe available on the web site of NGVA Europe tend to be conservative. From other sources larger figures are available, as can be seen from table 3-2, which is an abstract from the Project document D 7.6. The last column shows the target for LNG stations development per member states according to received National Policy Frameworks for the implementation of the AFI Directive. According to these NPF most countries are in line or go beyond the targets, such as Spain, France and Italy. Other countries have set a target that is below the minimum required target such as Denmark, Bulgaria and Sweden. A graphical representation can be found in figure 3.1

The estimated total number of public and private LNG stations in Europe is in excess of 130 as of mid-2018. An average sale rate for them can be expected at 1,000 ton/y as starting point, leading to an initial LNG automotive market in Europe of 130,000 ton/y, as conservative estimate.

country	Public + private LNG stations (2017)	Public CNG stations, including L-CNG stations (2016)	Private CNG stations	DAFI LNG stations target 2025 National policy Frameworks for

				DAFI
Austria	1	161	5	1-2
Belgium	3	94	2	2-14
Bulgaria	0	102	2	4
Croatia	0	2	3	2
Cyprus	0	0	0	0
Czech Republic	0	168	41	5
Denmark	0	17	1	0
Estonia	0	10	0	1
Finland	4	27	0	11
France	16	56	150	25-40
Germany	3	883	67	9
Greece	0	11	2	No NPF
Hungary	0	12	16	83
Ireland	0	1	2	0
Italy	16	1,203	45	80
Latvia	0	0	1	0
Lithuania	0	3	6	1
Luxemburg	0	6	0	0
Netherlands	23	169	15	28
Norway	0	18	3	-
Poland	4	27	4	14
Portugal	6	9	1	11
Romania	0	2	0	No NPF

Serbia	0	15	5	-
Slovak Republic	0	11	0	2
Slovenia	1	4	0	No NPF
Spain	29	50	0	44
Sweden	6	175	60	0
Switzerland	1	146	5	-
UK	13	2	8	20-48
TOTAL	128	3,389	444	343-399

Table 3-2. The European LNG infrastructure as of October 2017 (NGVA Europe's estimate, based on available information; some of the listed L-CNG stations also sell LNG in liquid form; some other don't)

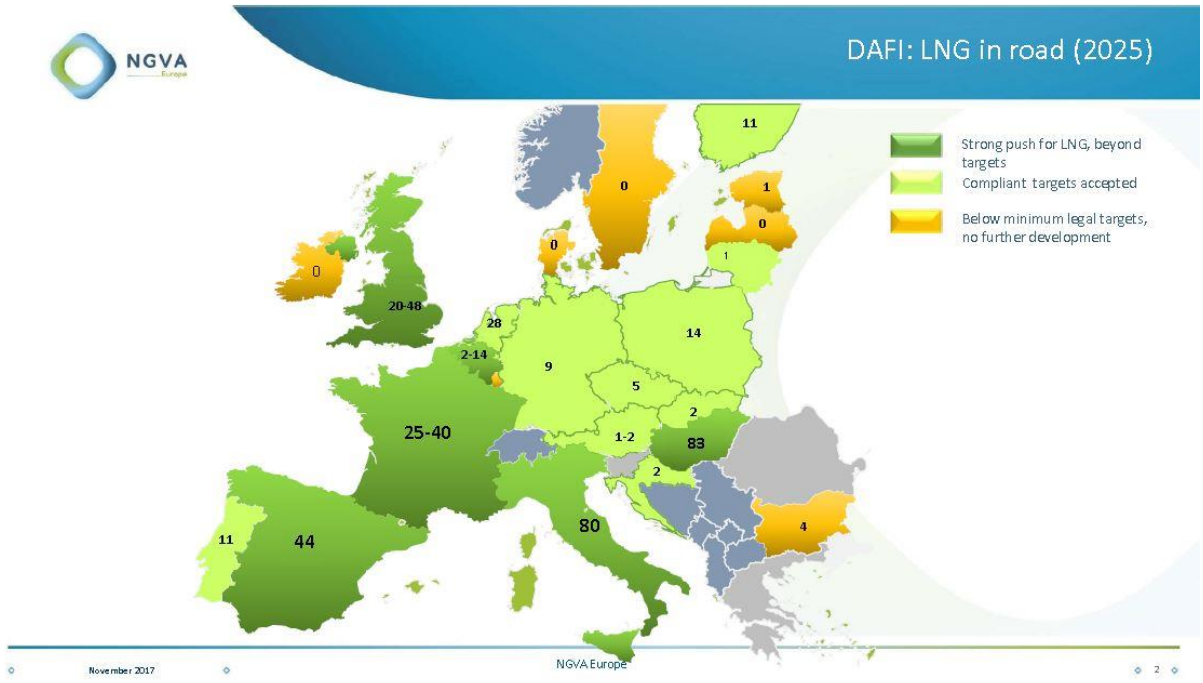


Fig 3-1 LNG Stations target 2025 according to NPF in Europe (source: NGVA).

NGVA Europe has collected statistics and data on natural gas vehicles annually since 2010. Key statistical data includes: the number of natural gas vehicles; the number of public and private refuelling stations (CNG, L-CNG and LNG) and market analysis. In 2016, the total number of natural gas vehicles (NGVs) on European roads amounted to 1,316,000. This was a rise of 3% compared to 2015. The largest increase in market development on that year was in the number of trucks at 15%. Since 2011, the statistics in Europe have pointed to a steady increase in market share for NGV.

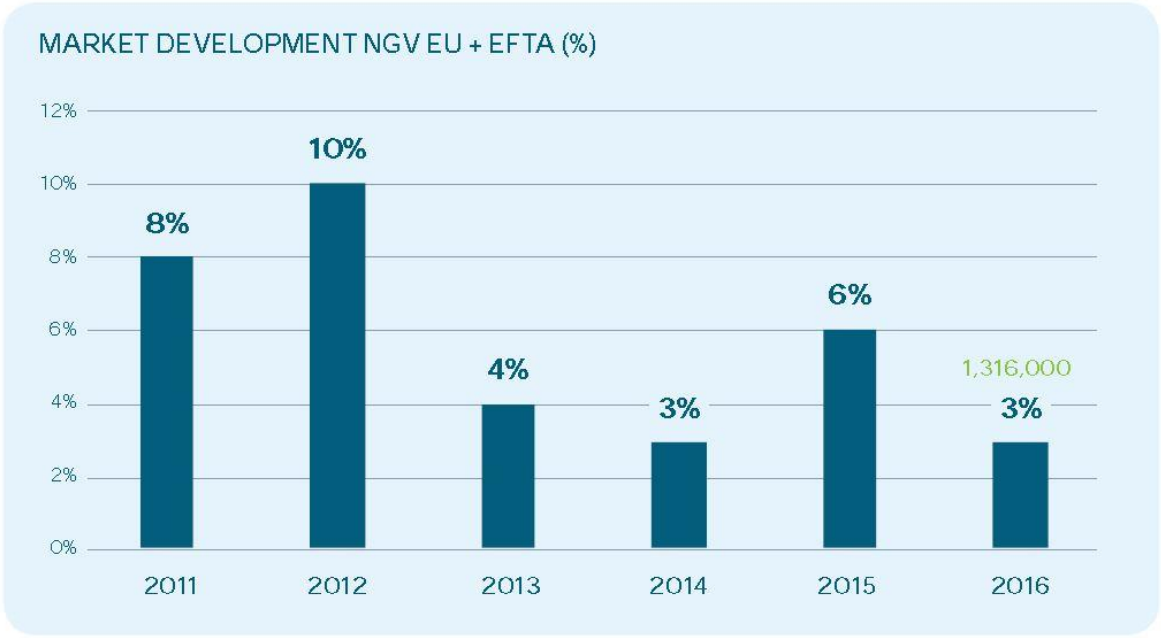


Fig 3-2 NGV market development in Europe (source: NGVA Europe - Statistical report 2017)

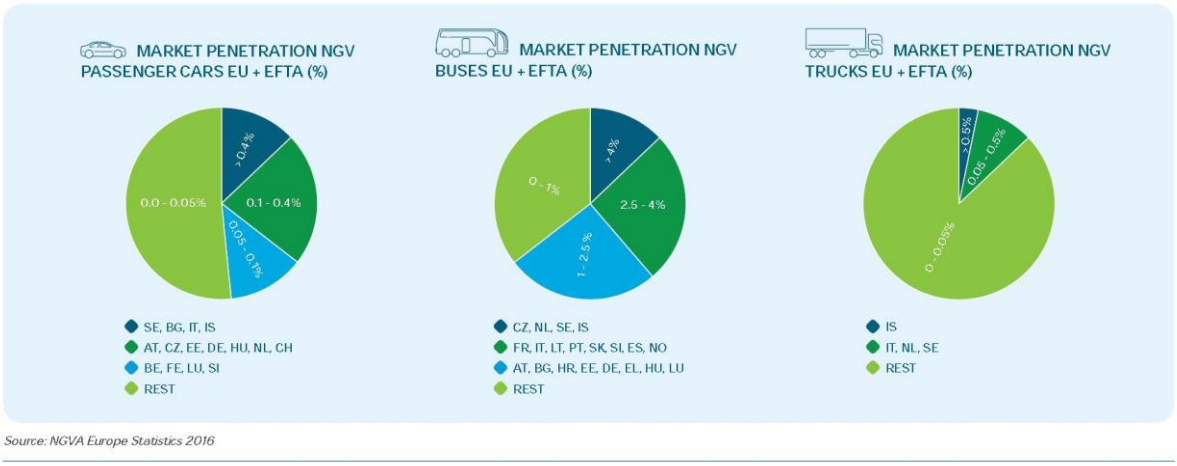
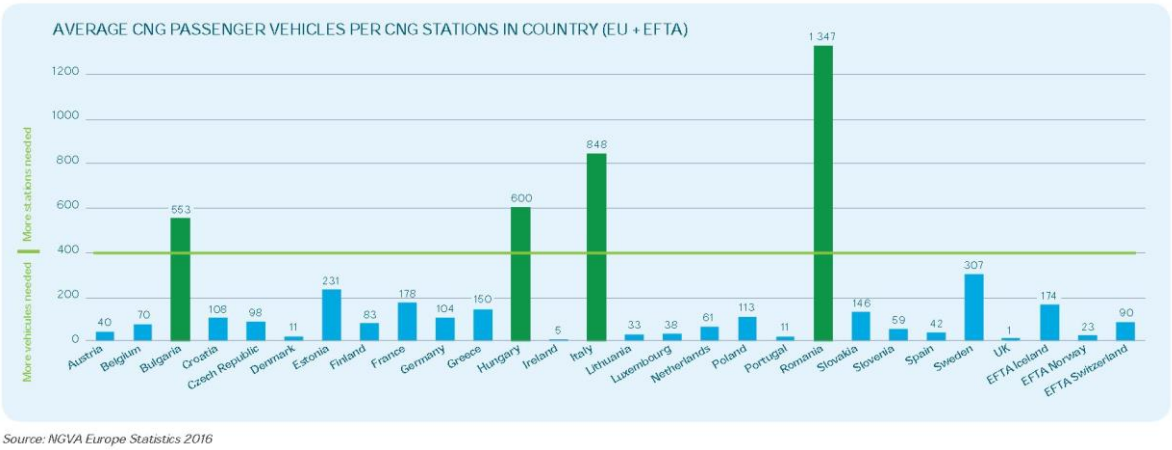


Fig 3-3 NGV market penetration in Europe (source: NGVA Europe - Statistical report 2017).

The market penetration for cars in 2016 was the highest in Sweden, Bulgaria, Italy and Iceland, with a share above 0.4%. Sweden outperformed all other countries on the bus market share with 16%, other well performing countries were Czech Republic, the Netherlands and Iceland. For trucks, Iceland holds the highest market penetration, with more than 0.5%. In Iceland despite the high penetration, the total vehicle market is very small in comparison with other EU countries. Nevertheless, considering the fact that Iceland is remotely situated country and running on 100% bio-methane, the market uptake is strong. Sweden, which performs best in bus market, also has strong HD and passenger car markets.

There is an urgent need for more trucks running on gas in all other countries to go along with the fast development of the refuelling infrastructure.



Source: NGVA Europe Statistics 2016

Fig 3-4 Relation between CNG vehicles and CNG refuelling stations in Europe (source: NGVA Europe - Statistical report 2017).

Looking at the relation between CNG vehicles and refuelling stations (Fig 3-4), there are four countries that outperform the rest of Europe in terms of CNG vehicles per station: Bulgaria, Hungary, Italy and Romania. When there are few vehicles per station, this suggests that the infrastructure is already developed and ready to be used. The way to develop forward would be to promote the uptake of more NGVs and therefore achieve better station utilisation.

In 2016 there were 101 LNG refuelling stations in Europe, meaning a 348% increase compared to 2013. There are at present forecasts of 400,000 LNG trucks in 2030.

4. Prices and price trends of LNG in Europe

This section is edited by means of collecting part of content from the project documents D 7.6 Market development, and D 6.3 Quantitative assessment of the Project.

In general, the LNG fuel prices at pump have kept quite constant over the start-up period so far in Europe, similar to the case of CNG, which price trends show more stability over time compared to gasoline, diesel and even LPG. Further to this, the national strategies of LNG fuel retail prices at pump have been mainly oriented to the market development and promotion, and still are today. So the price of LNG tends to be set to a very similar level to that of CNG, or even the same price is adopted for both, in terms of €/kg. In future the industrial part of LNG price, when the market will be more mature, might face some slight increase, if the operators will resolve to change their strategy, and will apply some premium to LNG over CNG, in consideration of its value and advantage for the long haul transport operators; but this can happen only in case of higher prices of diesel. At present in most of the countries the operators still seem quite cautious on this item, as they perfectly know that the differential in prices between diesel and LNG directly affects the propensity of HD vehicle fleet owners to go for the new pathway.

The LNG pump price at the 12 Project stations can be taken as reference or an indication of the average LNG prices in the relevant countries. There is little harmonization across Europe on this, as the price evolution differs greatly between the stations (see Figure 4-1). The highest variation (and the lowest public price) can be found in the Barcelona station: the lowest price (March 2016) was 66% of the highest price (December 2014). Örebro and Piacenza have the lowest variation in public price, and the French and Spanish the highest (see Figure 4-5). Several station operators indicated that customers with a significant amount of LNG consumption, can benefit from lower prices than the public price. (from D 6.3).

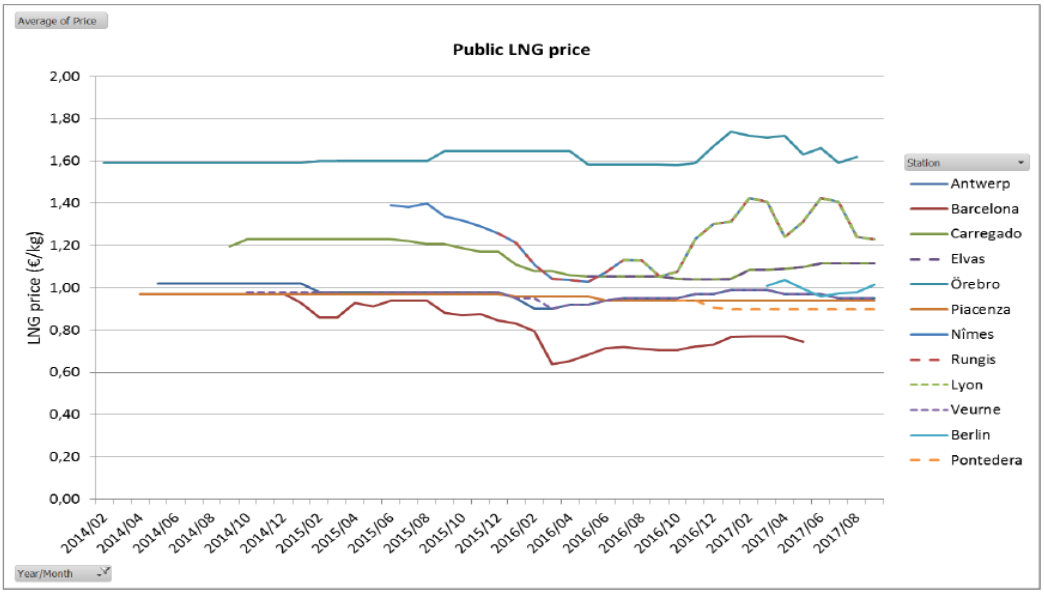


Fig 4-1 price trend of the 12 Project stations (source: D 6.3)

Some information on fuels prices, excluding LNG (table 4-1), is also available from the web site of the public electronic magazine NGV Journal, but in this case the available figures are not very up to date, as they come from mid-2010. The data from diesel, gasoline are from April 2018, source: globalpetrolprice.com . The date for European CNG prices are from April 2018 source:gibgas.de

Apr-18					
Country	Super 95 €/l	Diesel €/l	CNG €/kg	CNG savings Gasoline	CNG savings Diesel
Afganistan	0.63	0.48	0.89	8%	-3%
Argentina	1.38	0.96	0.46	78%	114%
Australia	1.10	0.89	1.20	29%	1%
Austria	1.18	1.16	0.99	45%	18%
Bangladesh	1.06	0.63	0.29	82%	189%
Belgium	1.46	1.42	0.90	60%	36%
Brasil	1.23	0.81	1.27	33%	-3%
Bulgaria	1.08	1.10	0.66	60%	52%
Canada	1.17	0.81	1.04	42%	4%
China	1.16	0.84	0.78	56%	24%
Colombia	0.83	0.62	0.35	72%	121%
Croatia	1.31	1.23	1.34	33%	6%
Czech	1.19	1.14	0.96	47%	20%
Denmark	1.45	1.22	1.60	28%	1%
Egypt	0.37	0.17	0.08	87%	777%
Estonia	1.34	1.29	0.73	64%	53%
Finland	1.47	1.32	1.31	42%	9%
France	1.49	1.40	1.26	45%	13%
Germany	1.37	1.19	1.08	48%	16%
Great Britain	1.36	1.39	1.17	44%	15%
Greece	1.55	1.32	0.87	63%	39%
Hungary	1.19	1.19	1.10	40%	12%
Iceland	1.73	1.67	1.31	50%	17%
India	1.18	0.84	0.91	49%	12%
Iran	0.29	0.06	0.04	91%	1323%
Ireland	1.38	1.29	1.19	44%	13%
Italy	1.56	1.43	0.99	58%	30%
Japan	1.30	0.89	1.63	18%	-3%
Lithuania	1.20	1.13	0.94	49%	21%
Luxembourg	1.18	1.04	0.68	62%	49%
Mexico	1.10	0.85	0.33	80%	177%
Netherlands	1.69	1.38	1.08	58%	24%
New Zealand	1.60	0.86	0.62	75%	59%
Nigeria	0.45	0.46	0.42	39%	33%
Norway	1.63	1.53	1.70	32%	4%
Pakistan	0.74	0.68	0.68	40%	16%
Poland	1.11	1.09	0.78	54%	34%

Portugal	1.60	1.36	1.07	56%	23%
Romania	1.10	1.11	0.72	57%	43%
Russia	0.67	0.53	0.37	64%	89%
Slovakia	1.34	1.20	0.99	52%	22%
Slovenia	1.30	1.23	0.94	53%	26%
South Africa	1.18	0.97	1.15	36%	5%
Spain	1.25	1.15	0.92	52%	24%
Sweden	1.47	1.45	1.78	21%	1%
Switzerland	1.28	1.35	1.12	43%	16%
Thailand	1.13	0.71	0.30	82%	189%
United States	0.79	0.64	0.48	60%	58%

Table 4-1 worldwide fuel prices (source: NGV Journal, globalpetrolprice, gibgas.de)

Fuel price difference

The average price for CNG and LNG in Europe is 0.99 €/kg, which is 48% lower than petrol and 31% lower than diesel, making it an economic fuel for transport (Fig 4-2). Even though NGVs are, on average, more expensive to purchase than conventionally-fuelled vehicles, the initial cost is offset by the lower price of NG. In Belgium and Czech Republic, the highest CNG/LNG price difference between petrol and diesel respectively can be found (65% and 55%), while the lowest CNG/LNG price difference for both fuels are in Sweden (16% and 0%).

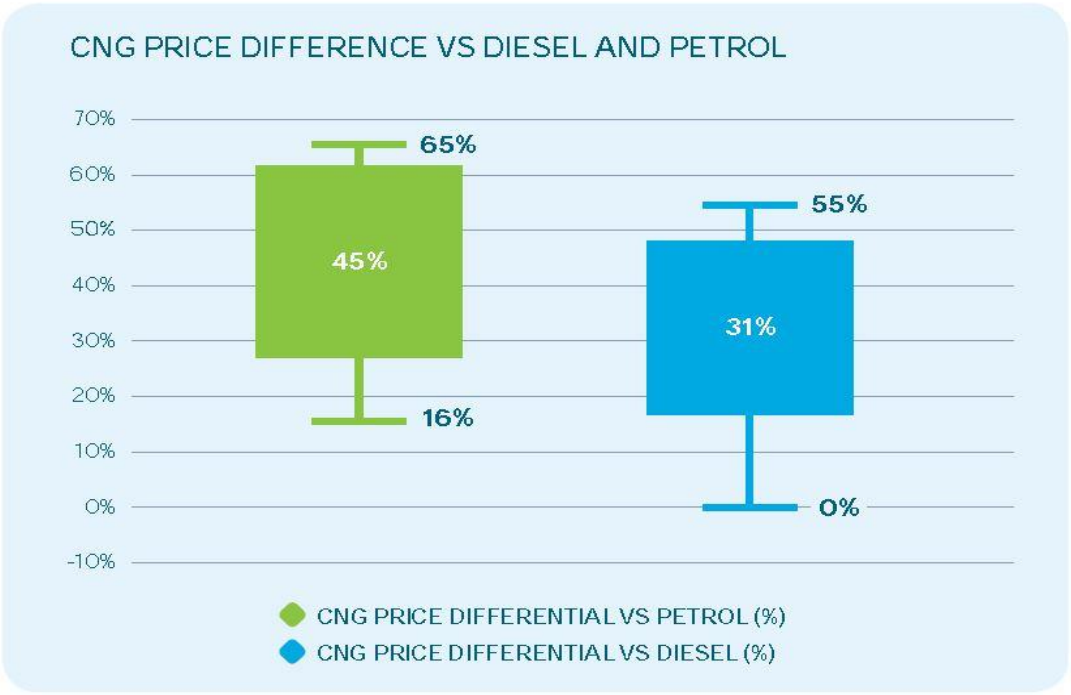
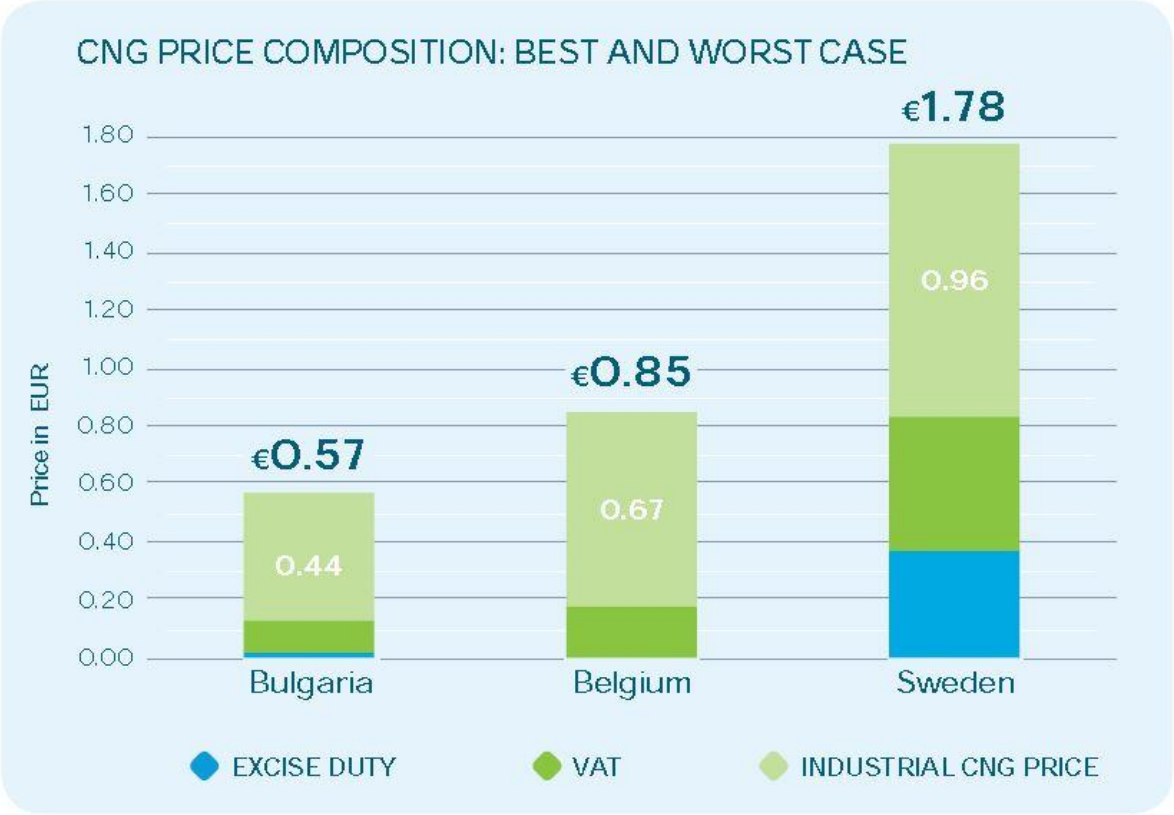


Fig 4-2 CNG/LNG price difference with gasoline and diesel (source: NGVA Europe - Statistical report 2017)

Fuel price composition

The price of CNG/LNG differs throughout the EU due to the variable industrial CNG/LNG price, VAT and excise duty. Three different examples (Bulgaria, Belgium and Sweden) can demonstrate this variability and are shown on the graph of Fig 4.3. The lowest average CNG/LNG price can be found in Bulgaria at 0.57 €/kg. The reason is that the industrial CNG price is amongst the lowest in EU of 0.44 €/kg, to be compared to that of 0.67 €/kg in Belgium or 0.96 €/kg in Sweden. In Belgium, there is no excise duty for CNG/LNG, meaning that drivers can save 0.12 €/kg on average, in comparison with other countries. In Sweden, despite the CNG/LNG price being the highest in the EU, the market share of NGVs is still above the EU average, which proves the viability of NG as automotive fuel.



Source: NGVA Europe Statistics 2016

Fig 4-3 CNG/LNG fuel price composition (source: NGVA Europe - Statistical report 2017)

5. Operators of the LNG market

The content for this section is entirely collected from the Project document D 7.6 Market development. The group of operators of the international and European LNG market is inherently small; but its commitment to this market is in constant growth. The following list of operators tries to be as comprehensive as possible, anyway it is not necessarily exhaustive of the whole LNG sector. The manufacturers and operators of which the Project partners are aware of were included in it. (taken from D 7.6)

	Address	
AGT AMERICAN GAS & TECHNOLOGY	1695 S. Seventh street - San Jose, CA 95112 T: +1 (408) 292 6487 f: +1 (408) 292 7143	LNG infrastructure
AIR LIQUIDE	www.airliquideadvancedtechnologies.com	LNG infrastructure
AXEGAZ	120 Rue Jean Jaurès 92300 Levallois-Perret France Alfonso Morrielo T: +33 630 491 809 alfonso.morriello@axegaz.com http://www.axegaz.com	LNG infrastructure
BOHLEN & DOYEN GmbH SAG Group	Hauptstraße 248 26639 Wiesmoor Bjørn Hinrichs T: +49 4944 301 194 F +49 4944 301 423 M +49 175 724 108493 E bjoern.Hinrichs@spie.com I www.bohlen-doyen.com	LNG infrastructure
BRN BERNARDINI	operative headquartes Via G. Galilei 35, Faenza, Italy Legal heaquarters and Call Center: Via Finlandia 70, Modena, Aldo Bernardini T+39 335 – 7194094 / +39 0546 - 62 67 13 Fax: +39 0546 - 62 67 41 aldo.bernardini@bernardininet.com http:// www.bernardininet.com	LNG infrastructure
CHART FEROX a.s.	Ustrecka 30 CZ-405 30 Decin - Czech Republic Mr. Vaclav Chrz Vaclav.chrz@chart-ind.com Josef Semeràd Josef.semerad@chart-ind.com T: +420 412 507 349 f: +420 412 507 297 FEROX GmbH - Brosshauser Strasse, 20 D-42697 Solingen Germany T: +49 (0) 212 700 570 f: +49 (0) 212 700 578 sales@chart-ferox.com http://www.chart-ferox.com	LNG components
CRYOMEC	Binningerstrasse, 85 - CH – 4123 Allschwil 1 - Switzerland T: +41 61 487 3300 f: +41 61 487 3399 Service.commercial@cryomec.com www.cryomec.com	LNG components
CRYONORM SYSTEMS BV	Koperweg 3 2401 LH Alphen aan den Rijn The Netherlands Office: +31 172 41.80.80 Fax: +31 172 43.88.19	LNG infrastructure and cryogenic vaporisers
CRYOSTAR SAS	2 rue de l'Industrie - ZI BP 48 - 68220 Hesingue (F) T: +33 389 702727 f: +33 389 702777 Josef pozivil T +33 (0) 3 89 70 29 11 F +33 (0) 3 89 70 29 00 info@cryostar.com www.cryostar.com	LNG components
CRYOVAC GMBH & CO KG	Heuserweg 14 D-53842 Troisdorf Phone: +49 (0) 2241 84673-0 Fax: +49 (0) 2241 84 673-29 info@cryovac.de	Cryogenic tanks
DRIVE SYSTEMS NV	Leeuwerikweg 8 B-3300 Tienen Belgium Philippe Desrumaux T: +32 494 89 69 96 philippe@drivesystems.be	LNG infrastructure

	http://www.drivesystems.be	
ENERGOCRYO	Hauptstrasse, 49 CH 4422 Arisdorf T: +41 61 811 2386 f: +41 61 811 4358 Je.tornare@eblcom.ch	
ENGIE LNG Solutions BV GDF Suez LNG Solutions BV	Grote Voort 291 8041 BL Zwolle The Netherlands Jan Joris Van Dÿk	LNGas infrastructure
ENN	Business Park "de Bedrijvige Bij" Lagendijk 1-3 Suit C148 | 1541 KA Koog aan de Zaan |the Netherlands Joost Jansen Business Development Manager T +31 (0) 207470178 O +31 (0)207470178 M +31 (0)622912499 E-mail joost.jansen@enncleanfuels.com www.enneu.com www.enn.cn	LNG infrastructure
ENOS LNG	d.o.o. C. Zelezarjev 8 SI-4270 Jesenice Slovenia Andrej Stušek T: + 386 4 581 0240 andrej.stusek@enos.si http://www.enoslng.si	LNG infrastructure
FLUXYS Belgium	Av. Les Arts, 31 1040 Brussels Belgium Vincent Malisoux T: +32 2 282 72 55 vincent.malisoux@fluxys.com http://www.fluxys.com	LNG supplier; LNG terminal operator
GALILEO	Av. General Paz 265 Sàenz Pena Buenos Aires B1674A Argentina Osvaldo Del Campo T +54 11 4712 8002 F +54 11 4712 6003 info@galileoar.com www.galileoar.com	LNG components/infrastructure/s s liquefaction
GAS AND HEAT SPA	Livorno	Cryogenic tanks
GAS FIN	62, Rue des Romains LU-8061, Strassen Luxembourg http://www.gas-fin.com	Liquefied Natural Gas (LNG) infrastructure
GNL ITALIA S.p.A.	Sede legale: Piazza S. Barbara, 7 - 20097 San Donato Milanese (MI) - Tel. 02 520.1 - Sede operativa: Località Panigaglia - 19020 Fezzano (SP) Tel. 0187 790046 - Giuseppe Vareschi 0187 794325 giuseppe.vareschi@gnlitalia.it www.snamretegas.it	LNG supplier; LNG terminal operator
GOLDENGAS	Viale Giordano Bruno, 20/4 - 60019 Senigallia (AN) Italy tel. 071 791091, 800 700300 fax. 071 7925130 www.goldengas.it info @goldengas.it	
GTT	Gaztransport & Technigaz 1, route de Versailles 78470 Saint-Rémy-lès-Chevreuse France T: +33 (0)1 30 234 789 commercial@gtt.fr	LNG tanks
HAM CRIOGENICA	Polígono Industrial Sant Ermegol P.11 08630 Abrera Spain Jaume Suriol T: +34 93 7704 760 ham@ham.es http://www.ham.es	LNG infrastructure/LNG transport/supply
JC CARTER LLC	World Headquarters 26451 Curtiss Wright Pkwy, Suite 106 Cleveland, Ohio 44143 1-440-569-1818 JCCarterCares@jccarternozzles.com	LNG connector/receptacle
INDOX - ROS ROCA INDOX CRYOENERGY	Industrial la Serra s/n 25320 Anglesola (Lleida) Miquel Fontova Cemeli Tel: 639392193 Email: mfontova@indox.com	LNG infrastructure
LINDE BoC	Priestley Centre Surrey Research Park GU2 7XY Surrey UK Linde AG Seitnerstraße 70 82049 Pullach Germany Mark Lowe (UK) - Olof Kallgren (Germany) http://www.linde.com	LNG components/liquefaction
LIQUAL	Heilaar Noordweg 2 4814 RR Breda The Netherlands Phone +31 (0)85 4861 000 Mail address: P.O. box 9407 4801 LK Breda The	LNG infrastructure

	Netherlands Email info@LIQAL.com	
LIQUIGAS	via Giovanni Antonio Amadeo, 59, 20134 Milano Andrea Arzà https://www.liquigas.it/imprese/gnl-liquigas/	LNG infrastructure
LIQUIMET S.p.A	viale Montegrappa 18/a Treviso – Italia Antonio Nicotra Presidente Antonio.Nicotra@liquimet.it www.liquimet.it	LNG infrastructure
MARITIME LNG PLATFORM e.V.	Esplanade 23 20354 Hamburg Germany Georg Ehrmann	
MOLGAS ENERGÍA S.A.U	Avenida Astronomía, 41 28830 San Fernando de Henares Madrid Tel: +34 916601662 info.madrid@molgas.es	
NATIONAL GRID-GRAIN LNG Grain	LNG Terminal Isle of Grain Rochester Kent ME3 0AB Paul Ocholla T: +44 1634 273173 Paul.Ocholla@nationalgrid.com https://www.nationalgrid.com/uk/grainlng	LNG infrastructure/LNG terminal operator
NEXGEN FUELING	3505 County Road 42 West - Burnsville, MN 55306-3803 T: +1 800 838 0856 f: 952 882 5172 www.nexgenfueling.com	
PARKER HANNIFIN	Racor Filter Division Europe Shawcross Business Park Dewsbury WF12 7RD United Kingdom Steven Wilson T: +44 (0)1924 487000 filtrationinfo@parker.com http://www.parker.com	LNG connector/receptacle
PIT POINT	Gelderlandhaven 4 3433 PG Nieuwegein The Netherlands Kim Bentum T: +31 30 410 08 00 kim.bentum@pitpoint.nl http://www.pitpoint.nl/#1	LNG infrastructure
POLARGAS S.r.l.	via Avv. Giovanni Agnelli, 10 - 12033 Moretta (CN) t: 0172 915811 f: 0172 915822 ing. Diego Pegorari cel. 334 60 5066 – e-mail: pegorari@polargas.it	LNG transport by tanker truck
PRF	PRCF Gás, Tecnologia e Construção, S.A. E.N. 356/1- Km 5,8 Alcogulhe 2400-821 Azoia Leiria Portugal Joao Pedro Cordeiro Ferreira T: +351 914933358 joaopedro@prf.pt http://www.prf.pt	
PRIMA LNG N.V.	Uitbreidingstraat 2-8, 2600 Berchem, Antwerpen, Belgium Peter Frühwirth info@primalng.com http://www.primalng.com	LNG infrastructure
RAG ROHÖL-AUFSUCHUNGS AKTIENGESELLSCHAFT	SCHWARZENBERGPLATZ 16, 1015 Vienna Austria Georg Dorfleutner T +43 (0)50 724, http://www.rag-austria.at erdgas.mobil@rag-austria.at	LNG tanks
REGO GMBH	Industriestrasse 9 D - 35075 Gladenbach Germany Freddy Deyk T: +49 6462 91470 info@rego-europe.de http://www.rego-europe.de MACRO TECH connector	LNG infrastructure/LNG connector/receptacle
ROLANDE LNG	Postbus 61 4286 ZH Almkerk The Netherlands Peter Hendrickx T: +31 183 583 446 P.Hendrickx@Rolandelng.n http://www.rolandelng.nl/en/home.htm	LNG infrastructure
ROSETTI MARINO	SpA via Trieste, 230 - 48122 Ravenna Italy Marino Rosetti T 0544 878 111 F 0544 878 188 rosetti@rosetti.it www.rosetti.it	LNG infrastructure
ROS ROCA Indox Cryo Energy S.L.	Pol. Ind. La Serra s/n – 25320 Angesola (Lleida) Spain Ismael Callejon Agramunt T +34 973 308 530 F +34 973 308 528 M +34	LNG infrastructure

	661 888 041 jcallejon@indox.com www.indox.com	
SAPIO S.r.l.	v. Silvio Pellico, 48 – 20052 Monza (MI) Italy Sergio De Sanctis t.: +39 039 83981 f.: +39 039 836068 e-mail: gruppo@sapio.it www.grupposapio.it	Technical gas supplier
STIRLING CRYOGENICS & REFRIGERATION BV	P:O: Box 218, Building AQ – 5600 MD, Eindhoven (NL) T: +31 40 2766522 f: +31 40 2766144	LNG components
TECNOCRYO	via Ugo Foscolo, 820060 Basiano (MI) Italy T: +39 02 95764120 f: +39 02 95764120 www.tecnocryo.com tecnocryo@tecnocryo.com Marcello Riva t 02.95764120 f. 02.95764102 m. 335.6020781 m.riva@tecnocryo.it	LNG components
TERMINALE GNL ADRIATICO Srl	p.za della Repubblica, 14/16 – 20124 Milano Italy t. 02 636 981 f 02 636 98222 via Canalini, 2 – 45100 Rovigo t 0425 421035 f 0425 460095	LNG storage & supply
UNIPER	Technologies GmbH Alexander-von-Humboldt-Strasse 1, 45896 Gelsenkirken Cliff Muller-Trimbusch Project Manager Cooperation & Business Development T +49 2 09-6 01 32 06 M +49 1 72-2 64 74 69 Cliff.mueller-trimbusch@uniper.energy www.uniper.energy	LNG infrastructure
VANZETTI ENGINEERING Srl	Via Avv. Giovanni Agnelli, 10 - 12033 Moretta (CN) Italy t. 0172 91 5811 f. 0172 91 5822 - info@vanzettiengineering.com zurletti@vanzettiengineering.com	LNG infrastructure/components
VRV S.p.A	Via Burago, 24 20060 Ornago (MI) Italy Massimiliano Spada T: +39 039 6025 1 f: +39 039 6025 499 www.vrv.it vrvspa@vrv.it	LNG tanks
VCT Vogel GmbH (CHART)		

Table 5-1. Operators of the LNG sector

6. Source of information for statistics

A number of organisations are collecting and publishing statistics of some relevance to the NGV and LNG sector. In the following some examples are offered

LNG Blue Corridors Project – publishes a map of LNG refueling stations in Europe (http://lngbc.eu/)

METANO AUTO – publishes a detailed list and map of CNG, L-CNG and LNG refueling stations in Europe (http://www.metanoauto.com/modules.php?name=Distributori)

NGVA Europe – publishes up to date NGV statistics for Europe, updated regularly on annual basis, available in the member area; so the information is available only to the members of the association (about 140 in 2018). Publishes also, on the section open to public, a map of CNG and LNG refueling stations. (http://www.ngva.eu/). Published a Statistical report 2017 (https://www.ngva.eu/downloads/NGVA_Europe_Statistical_Report-2017.pdf)

NGV Global – published mainly information on standards (http://www.ngvglobal.org/)

NGV Journal – publishes NGV statistics of all countries in the world (http://www.ngvjournal.com/ngv-statistics-2/)

NGV Global ex IANGV - publishes NGV statistics of all countries in the world; growth trend charts; growth trend from 1996 to 2018 (http://www.iangv.org/current-ngv-stats/)

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7. Conclusions

The LNG BC Project has risen some interest among the operators of the NGV market and the general public. The periodic Newsletter was at end of Project sent to a listo fo about 7,120 recipients mainly, but not only, in Europe.