



LNG AS THE FUEL OF CHOICE FOR ROAD AND MARINE TRANSPORTATION:
The case for (small-scale) LNG in Europe



Small-scale LNG

Small-scale LNG continues to develop as a reliable and effective solution as the fuel of choice for clean road and maritime transportation. The decision of the International Maritime Organization to limit sulphur content of ship fuel from 1 January 2020 to 0.5% worldwide and the recently adopted ambition to reduce greenhouse gas (GHG) emission by 50% within 2050 will be a strong driver for the deployment of LNG.

What is Liquefied Natural Gas (LNG)?

LNG is a clear, colorless and non-toxic liquid which forms when natural gas is cooled to -162°C . The cooling process shrinks the volume of the gas 600 times, making it easier and safer to store and ship.

What is small-scale LNG?

Small-scale LNG keeps the gas in liquid form for use as a fuel, sometimes in off-grid locations. The relevant market is in transport, meaning shipping and heavy road transport, where it competes with traditional fuels like diesel and heavy fuel oil.

LNG contributes to the decarbonization of road and maritime transportation:

> The use of LNG as a fuel eliminates the emission of sulphur oxides (SOx), hardly any particle matter (PM) emissions, and reduces by an order of magnitude emissions of nitrogen oxides (NOx) compared to diesel, marine gas oil (MGO) or heavy fuel oil (HFO).

It improves air quality, especially in ports. The external costs of NOx, SOx, and PM emissions for 50 largest ports in the OECD are almost EUR 12 Billion annually¹ (Box 1).

> Natural gas has a 15-25% GHG emissions-reduction potential for heavy-duty vehicles and shipping.

The transport sector amounts to almost one quarter of GHG emissions in the European Union (EU).

> The technology of gas engines is mature and supported by major industry players.

While conventional oil-based fuels will likely remain the main fuel option for most existing vessels in the near future, the commercial opportunities of LNG are interesting especially for newbuild projects.

> Biomethane and bioLNG offer almost 100% GHG emissions reduction.

BioLNG offers a compatible mix with, or in some cases a replacement to, LNG and may exhibit in excellent environmental credentials (Box 2).

Box 1

Improving air quality in harbors/ports

Most of the cruise ships directly enter the city harbors, e.g. in Hamburg cruise ships are responsible for about 38% of the city's NOx emissions² and are a major source of fine particles emissions as engines keep running even when at berth to produce power. LNG is a solution, and this is increasingly being recognized by the industry. As an example, the world's first liquefied natural gas (LNG) powered cruise ship Aida (Image 1) was "christened" in autumn 2018³.



Image 1. LNG fueled cruise ship Aida
Source: www.aida.de

Box 2

Progress is being made in Norway BioLNG plant produces renewable natural gas for public transport

The world's largest bioLNG plant has been installed at the Norske Skog Skogn paper mill. The plant will convert the cleaned biogas from fishery waste and residual paper mill slurry into liquid bioLNG fuel⁴.





GLE welcomes the initiatives undertaken to support the use of LNG as an alternative fuel for transport:

- the **EMSA guidance on LNG in bunkering**⁵ prepared in close cooperation with the European Commission, member states and industry within the context of the European Sustainable Shipping Forum;
- Commission's efforts to have **harmonised EU standards** at national levels;
- a **stable regulatory framework** for LNG within the internal energy market;
- the Commission's initiative on the **alternative fuels for sustainable mobility** in Europe (DAFI);
- the current existence of **financial instruments** (i.e. TEN-T or the lending of the European Investment Bank).

GLE asks for further measures that accelerate the use of LNG as an alternative fuel for transport. GLE commits to work with EU policy makers to enable:

- the **proper implementation of DAFI** as a key element of LNG uptake;
- the **extension of the Sulphur Emission Control Areas (SECA)** zone to whole European coastline;
- a **stable regulatory framework** for LNG within the internal energy market.
- the **financial support** to encourage the transition of LNG as a transportation fuel and the classification of small-scale LNG infrastructure projects as sustainable;
- The **recognition of bio LNG** as part of the circular economy;

- A **strengthening of the emissions controls and of the sanctions** in case of breach;
- A framework ensuring that **emission issues are not transferred from air to sea water** (cf. open loop scrubbers).

1 IGU, Enabling clean marine transport, March 2017, https://www.igu.org/sites/default/files/IGU_AA_CleanMarineTransport_Final%20Online%20version.pdf

2 Sebastian Timmerberg, Martin Kaltschmitt, Umwelt- und Klimabilanz von LNG in der Schifffahrt, Technische Universität Hamburg

3 https://www.lngworldshipping.com/news/view,cruise-ships-add-new-dimension-to-lng-passenger-fleet_51765.htm

4 NGV Global, Huge BioLNG plant produces RNG for Norwegian public transport, <http://www.ngvglobal.com/blog/huge-biolng-plant-produces-rng-for-norwegian-public-transport-0903#more-55185>

5 EMSA guidance on LNG Bunkering, <http://www.emsa.europa.eu/news-a-press-centre/external-news/item/3207-guidance-on-lng-bunkering-to-port-authorities-and-administrations.html>



Small-scale LNG infrastructure state of the art

> Truck loading facilities increased by 37% compared to 2016, according to the GLE small-scale LNG Database (Figure 1).

The use of LNG as a cleaner fuel is also highlighted by the increase in number of the LNG stations across Europe as observed in the 2018 GIE SSLNG database and map.

> The fact that the number of bunkership needed to supply LNG powered ships doubled compared to 2017 demonstrate that the marine use of LNG is becoming increasingly popular (Figure 1).

And this is gaining more and more consideration as many experts recognize its superior performance compared to other types of fuel when faced with increasingly stringent environmental regulatory requirements (SOx, NOx, PM, CO2).

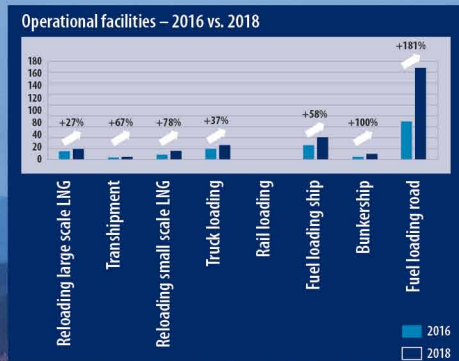


Figure 1: Operational facilities (2016 vs 2018), GLE small-scale LNG Database
Source: GIE small-scale LNG database 2018 (GIE SSLNG database)

> Small-scale LNG infrastructure is more developed in the regions where large-scale LNG import terminals are used.

As of June 2018, 70% of operational small-scale LNG infrastructures were located in Western Europe. Spain, United Kingdom, Norway, Netherlands and France have been driving the growth in small-scale LNG infrastructure of 182% over 2016-2018.

Among the different types of infrastructure, LNG fueling stations for trucks using gas engines have witnessed the strongest growth over 2016-2018: the number of operational stations have more than doubled from 73 to 156 (Table 1).

Operational fuel loading road Number of installations (Top 10)

COUNTRY	2016	2018
France	1	21
UK	20	38
Spain	23	37
Netherlands	17	23
Italy	0	13
Portugal	2	9
Germany	0	2
Sweden	6	7
Finland	1	4
Belgium	3	2

Table 1: Operational fuel loading road number of installations (Top 10)
Source: GIE



About GIE

Gas Infrastructure Europe (GIE) is the association representing the interests of European natural gas infrastructure operators active in natural gas transmission, gas storage and Liquefied Natural Gas (LNG) regasification. GIE is a trusted partner of European institutions, regulatory bodies and industry stakeholders. It is based in Brussels, the heart of European policymaking.

GIE currently represents **70 member companies from 26 European countries**. Its internal structure has three columns corresponding to the three types of infrastructure activities represented: Gas Transmission Europe (GTE), Gas Storage Europe (GSE) and Gas LNG Europe (GLE), who cooperate under the umbrella of GIE. This structure allows member companies to speak with one voice on gas infrastructure topics as well as to build positions on column-specific issues.

15 European LNG terminal operators from 9 countries, operating around 90% of the existing LNG import capacity in the European Union are members of GIE.

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