

Still a strong case for small scale LNG



Good availability of ssLNG in North and West Europe

In 2013 Poyry published a Point of View highlighting a promising potential for small scale LNG (ssLNG) in the European market. At the time small-scale was considered new and exotic, with only a few early-established players having practical market experience. Driven by stricter emission regulations in the shipping sector and falling gas demand, the market showed potential for an attractive business case. The key challenge was to overcome the “chicken and egg” issue, which was omnipresent in any discussion about the future and potential of small scale LNG given the need for up-front investment in costly infrastructure.

Today we are facing a somewhat different environment: over a year after the SECA regulations came in force we are seeing established value chains in some areas, but the expected pickup in demand has yet to materialise. The commodities slump has raised additional concerns for the sellers' business cases, while potential buyers are wondering whether the entire ssLNG endeavour is worth the hassle. It seems like a large number of players are willing to watch the market passively and wait, since the margins are low and investments budgets are tight.

Despite the increased uncertainty, Pöyry maintains that ssLNG presents interesting opportunities for diverse energy players. With the right business model it is possible to assemble an attractive business case.

AVAILABILITY OF SMALL SCALE LNG IS INCREASING

This view is supported by the many positive developments we have seen in recent years, especially on the supply side:

Firstly, the availability of ssLNG has increased significantly. From being a niche product in pockets like Spain and Norway, the development of infrastructure for ssLNG supply either by ship or truck at the large scale import terminals means that the product now is available in most North West European markets.

Secondly, the fall in demand (and willingness to pay) in traditional gas markets has encouraged large scale gas sellers to look for new growth opportunities. Two of the pioneers of ssLNG in NW Europe – the Norwegian Gasnor and Skangass – have been bought by Shell and Gasum respectively,

and are forming an integral part of expansive growth strategies. Shell is developing bunkering services in the ARA region as well as in North Germany, while Gasum is focusing on expansion in the Nordics, investing heavily in reloading/storage facilities in Sweden and Finland. France's Engie is investing in ssLNG bunkering infrastructure in ARA, while Russia's Gazprom is engaging in several development projects, including a planned reloading/storage facility in the Port of Rostock, where Gazprom Germania performed its first bunkering operation in March 2016. With the gas majors' pockets being significantly deeper than those of the niche players that initiated the markets and a recognition of first mover advantage, the “chicken-and-egg” problem caused by the need for large up-front investments in infrastructure has become less of an obstacle.

LNG accessibility and SSLNG infrastructure

- High accessibility to LNG
- Medium accessibility to LNG
- No accessibility to LNG

Large scale terminals

- Existing/under construction
 - Planned
- With Smaller scale LNG services:*
Y=existing / P=planned / N=no

Smaller scale LNG terminals

- ★ Existing or under construction
- ★ Planned

★ Liquefaction



IT TAKES LONGER THAN EXPECTED, BUT DEMAND IS GROWING

LNG for industry or communities in areas off the gas grid may currently be interesting in some regions (e.g. Spain and the Nordics), but is seen as having a major growth potential in Greece and the Balkans, where industry and power generation could benefit significantly from switching from oil.

Elsewhere, Pöyry is convinced that the highest growth potential comes from using ssLNG as a fuel in sea, river and road transport. Given the size of the fuel markets, the share of conversion need not be very large for it to have a significant effect on global LNG demand. The current marine bunker fuel consumption (mainly high sulphur fuel oil) in the European SECA is 20 million tonnes per year¹. This is around 15.5 million tonnes of LNG, which equals around 40% of 2015 European LNG

imports. The road transport fuel market is even larger. Pöyry has estimated that the diesel oil consumed by heavy duty trucks in Germany alone is equivalent to more than 7.5 million tonnes of LNG.

¹ Source: Fuels Europe (<https://www.fuelseurope.eu/knowledge/refining-in-europe/fuelling-the-eu/transport-2/maritime-transport>)

“Liquefied Natural Gas and gas storage will boost EU’s energy security”

-European commission

Significant growth potential in fuel for transport

MARINE SECTOR

The bunkering market has so far received most of the public attention. Marine emission regulations and high overall market size make it an attractive target for anyone aiming to sell ssLNG. It may have taken longer than initially expected, but the market has shown a real progress, with over 150 LNG-fuelled ships in operation and on order as of October 2015. In North West Europe, infrastructure projects have been initiated in a number of ports, often with EU funding, and most of the existing LNG-fuelled ships can be found here. The potential of the Mediterranean region has been slowed by a lack of regulatory incentives – in particular, sulphur emission restrictions on fuel – despite the abundant availability of LNG in the area.

The global LNG bunkering market has been quite slow compared to Europe, mainly due to a lack of emission control regulation (Asia) or funding programmes (North America). A number of US companies (e.g. LNG America, Plum LNG) have been actively seeking to build infrastructure for their LNG distribution business and grow the market. Singapore has announced ambitious plans to position itself as a major LNG bunkering hub, while Chinese market players have struggled to compete with subsidised diesel. However, the situation looks promising in China, after it has announced recently sulphur requirements in 11 major ports effective from 2017 and in an extended area from 2019². The global future for LNG bunkering looks promising.

ROAD TRANSPORT

While the marine market has received a lot of attention, the potential in road transport has been somewhat overlooked – mainly due to the more complex logistics. LNG is well suited for long distance heavy duty trucks (HDT) that cover hundreds of thousands of kilometres per year and have a replacement period of just 3-5 years. The main drivers of growth in this market will be strong tax advantages compared to traditional fuels combined with infrastructure investment subsidies. The low noise pollution of LNG engines may also be an incentive for trucks operating in urban areas.

Several transportation companies with large fleets – such as Tesco, DHL, Vos Logistics, UPS, Waste Management, etc. – have seen

²Source: <http://shipandbunker.com/news/apac/991308-update-china-to-implement-ecas-from-2019-at-berth-regs-from-2017>



the advantages and operate a significant number of LNG-fuelled trucks. They have also taken the first steps and developed their own LNG filling stations, and network operators such as Gasrec in the UK are expanding their business.

The LNG Blue Corridors (<http://lngbc.eu/>) that bring together the European Commission and a number of partners in a project aimed on promoting the idea of creating pan-European networks of LNG fuelling stations already in April 2016 have close to 100 LNG stations in Europe, with UK and Spain having the highest penetration and Netherlands growing rapidly. Another 30 or so stations are already planned.



Source: NGVA Europe (<http://www.ngva.eu/lng-blue-corridor>)

EMISSION REGULATION IN SHIPPING (MARPOL ANNEX VI)

SOX REGULATION:

SECA Areas: Legal requirement reducing the maximum allowed content of sulphur in marine fuels from 1% to 0.1% came into force from 1 January 2015 in Emission Control Areas (ECA), which includes North Europe, Baltic Sea, North Sea, English Channel and US & Canadian shores. Ships operating in these areas have to either use low sulphur fuels (MGO, MDO), limit sulphur emissions by installing a scrubber, or use alternative fuels (LNG, methanol, electricity etc) in order to comply.

GLOBALLY:

The IMO will enforce a global sulphur cap of 0.5% for all ships by 1 January 2020. A review in 2018 will decide if the cap is to be postponed to 2025.

NOX REGULATION (TIER III):

IMO has introduced NOx requirements in the North American and US Caribbean ECAs for vessels with keel-laying date after January 1st 2016 and engine output of $\geq 130\text{kW}$. NOx emissions must be reduced by approximately 75%, which is very challenging for the traditional oil engines. Introduction of Tier III requirements is also under discussion for European ECAs.

REGULATIONS IN ROAD TRANSPORT

GENERAL EUROPEAN EMISSION CONTROL INITIATIVES

There are a number of European initiatives indirectly motivating the use of LNG in road transport, such as the EC Clean Air Policy Package and the Fuel Quality Directive, which sets targets for emissions of CO₂ and other air pollutants. The EU has also implemented the Euro VI norm for diesel cars, which sets a cap on NOx emissions of 0.08%. This is very demanding for heavy duty trucks, making them very expensive.

THERE ARE ALSO EUROPEAN INITIATIVES DIRECTLY TARGETING LNG:

Clean Power for Transport directive: Aims to support the market development of alternative fuels by mandating the construction of SSLNG terminals and refuelling stations in key ports and main transport corridors by 2020/2025

Blue Corridors: Roadmap of the establishment of LNG refuelling points for road vehicles along four transport corridors

The outlook is still positive

PRICING TODAY MIGHT LOOK UNATTRACTIVE, BUT THE FUTURE IS WHAT REALLY MATTERS

One of the largest unknowns to potential buyers is the pricing of ssLNG relative to the alternative fuels. Gas and LNG prices have fallen to new lows, maintaining a price discount to oil products. However, the future price level is what really matters. Forward prices of oil products at the time of writing are in a strong contango, with the market expecting a recovery in the mid to long term. Some effects of this are seen for gas and LNG as well, but in a lesser degree, as represented by the TTF price.

While it is relatively easy to find price information for wholesale LNG, for end-users what premium to expect on top of the wholesale price is the most difficult element to estimate and depends heavily on logistical variables. It can be argued that this is one of the main barriers to demand growth, as this represents a significant risk for potential future LNG consumers. These costs mean retail LNG and oil product prices are very close together at the moment. However, they are expected to decrease with more investments, competition and market maturity, so the cost advantage of LNG should increase in the future, bringing greater demand from the transport sectors in particular.

A BUSINESS MODEL WITH RISK SHARING

One of the key challenges when building a new market is the need for coordinated investments and risk allocation throughout the value chain. Generally, market participants prefer to only be exposed to the risks they are familiar with in terms of pricing and contracting terms.

- The typical infrastructure developer prefers long term contracts to underwrite its investments.
- The LNG seller would also prefer long-term agreements, but is becoming used to a shorter term trading and selling on an opportunistic basis.

FIGURE 2
THE SUPPLY CHAIN IS MORE COMPLEX AND EXPENSIVE THAN FOR COMPETING FUELS

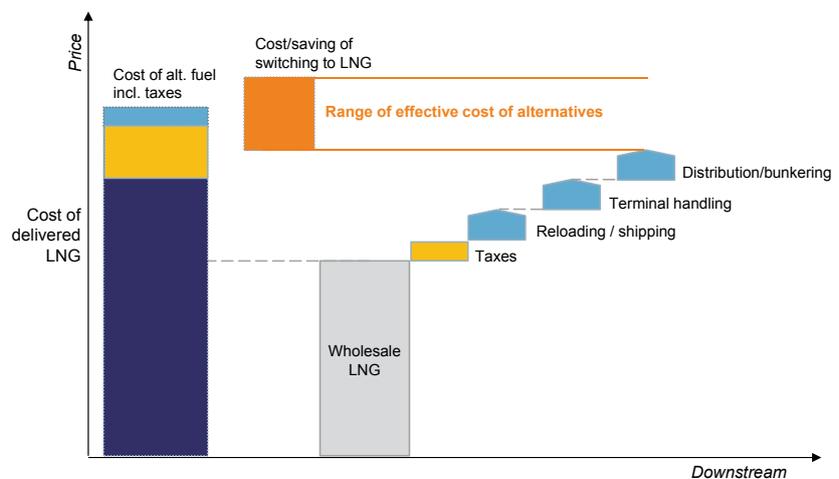
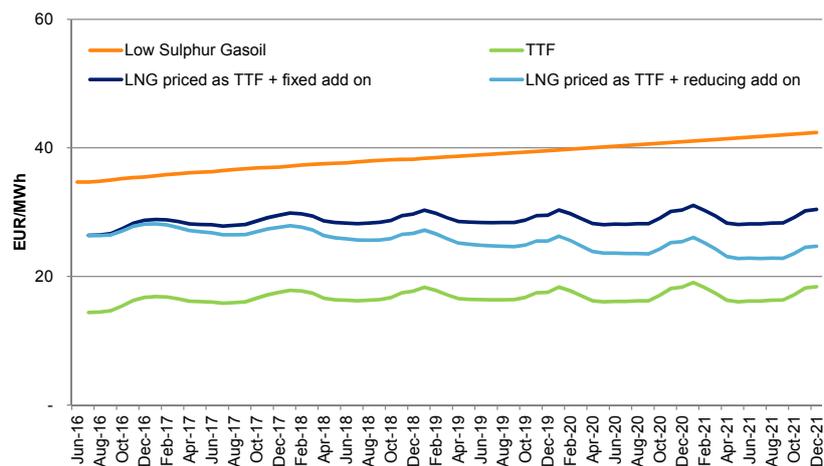


FIGURE 3
SIGNIFICANT SPREAD BETWEEN LOW SULPHUR GASOIL AND GAS PRICES



Source for price data: ICE/Montel

- The ship owner considering LNG engines for his next ship wants a purchasing process similar to that of oil products, with the ability to purchase in any port at a transparent and predictable price without need for long term commitment.
- A truck fleet operator requires a reliable network of filling stations otherwise its range is limited.

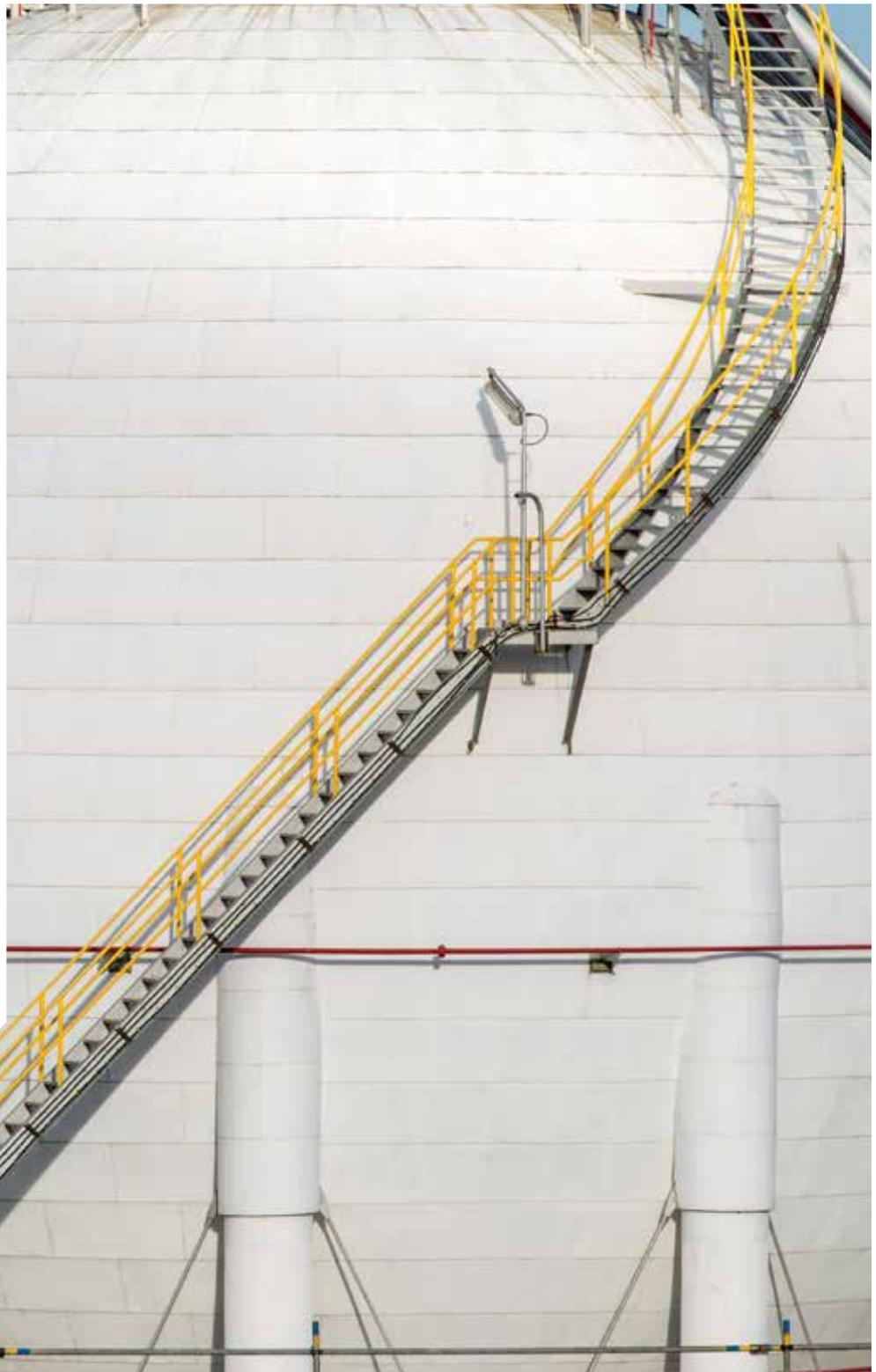
These diametrically opposed expectations create a gap between the producer and the consumer that could hinder market development. Unless you rely on players with integrated business models covering the entire value chain, an appropriate model of risk sharing between stakeholders is crucial for growth. That would require cooperation between parties — especially in the early stages when existing infrastructure is scarce.

TO SUM UP...

The small scale LNG market is still immature with large differences by region. However, it is moving in the right direction, with an increasing number of players taking an interest. The potential complexity of the value chain and lack of transparency in price levels and models pose considerable risk, and means that different entities that have not worked together before will need to come together and deliver mutually beneficial business models.

Still, the underlying trend in small scale LNG is positive, with a number of new projects being developed both on the supply and consumer side. Regulatory incentives aimed at reducing local emissions of SO_x and NO_x from transport favour LNG, and unit costs are coming down as volumes increase. We therefore continue to consider the growth potential of ssLNG to be significant.

Pöyry has in recent years assisted a number of players in different parts of the value chain, from technical feasibility studies for physical facilities through market analysis and business strategy to due diligence on potential take overs. Please contact us to see how we can help you.



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