

Small-scale LNG – an opportunity for Romanian transportation

Dragoş Tâlvescu

Oslo, 12 October 2014

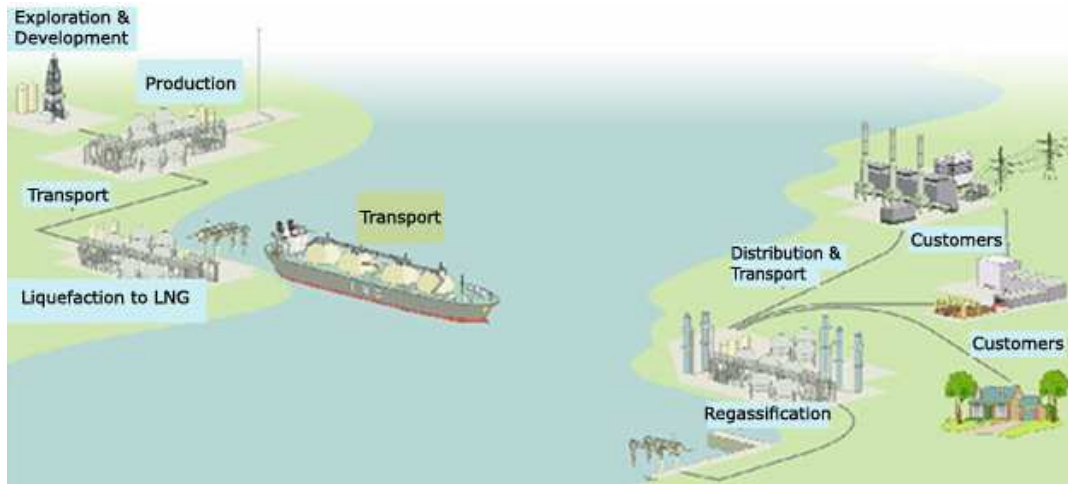
Compared to oil products, natural gas is clean burning, with virtually no particle and sulphur emissions, close to no NO_x emissions, and lower CO₂ emissions. Increasingly, it is also more affordable, despite higher logistics costs. Romania should follow the lead of many other countries around the world, and consider incentives for ship and truck owners to switch to natural gas.

What is LNG and what role does it play in the global gas market?

Liquefied natural gas (LNG) has recently marked its 50th anniversary, having become a key way to transport natural gas across large distances, in a flexible manner, where pipeline alternatives are not feasible. The solution is simple: cool down processed natural gas (methane and some ethane, after impurities are removed) to -162°C, until it becomes liquid. This reduces its size more than 600 times without requiring high pressures, and makes it easier to store/ transport in a tank, instead of using a traditional underground storage solution/ pipeline.

The key advantage is flexibility for both buyer and seller. LNG increases their bargaining power, since they are not stuck at either end of a pipeline, and can choose to enter into contracts with any other party who has LNG facilities. On the downside, cooling down natural gas to the required temperature, and holding it cool for a long time is energy intensive, hence expensive.

Figure 1 – Traditional LNG value chain



Source: Oman LNG, 2014

Due to high cost intensity, LNG has generally been seen as a solution of last resort (when pipelines are not an option), to transport large volumes of natural gas over long distances, linking large sellers with stranded gas assets to large buyers with a supply deficit and willingness to pay for security of supply/ diversification of gas imports.

Typically, large producers with excess natural gas invest in a natural gas processing and liquefaction plant, based on long-term contracts with large buyers. They also charter LNG tankers, which transport the LNG to the buyers' receiving terminals and unload the LNG in storage tanks. From here, the buyers "regasify" the LNG (bring it to normal temperature and pressure) and inject it in the national natural gas pipeline system.

Over the decades, LNG facilities have increased tremendously in both number and size, and so have LNG flows. More than 10% of total global gas consumption has been at some stage transported as LNG, and the share keeps rising. In 2013, 17 countries produced LNG, and 29 had facilities to receive it.

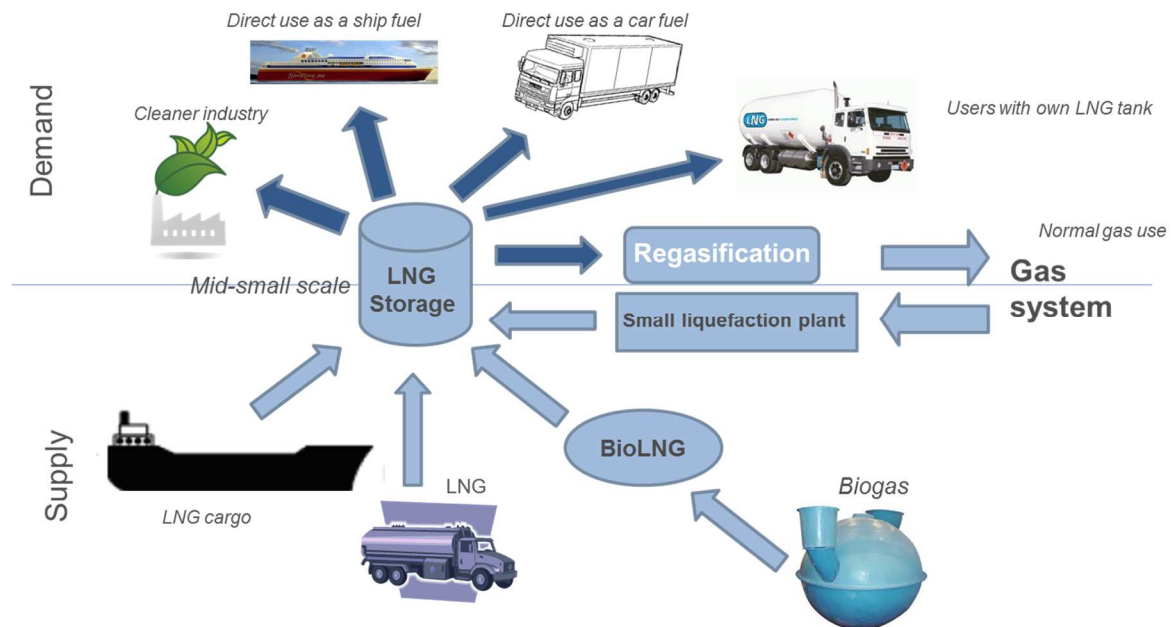
A liquid LNG market is emerging, not unlike the global oil market, unlocking previously stranded gas reserves, improving diversification and security of supply for gas importers, and gradually bringing (still very different) regional global gas prices closer together.

Small-scale LNG – the democratisation of natural gas

In parallel with expanding large-scale, capital intensive, LNG infrastructure, a more recent trend has been the flourishing of more nimble, small-scale LNG solutions. The technology is well known, safe, affordable, and makes it now possible for smaller producers/ users who are not connected to a natural gas grid to sell/ buy natural gas.

In fact, with small-scale LNG, natural gas is almost as easy to transport as oil products (e.g. LPG). Despite the higher cost of LNG logistics, high oil prices and relatively lower natural gas prices often give small-scale LNG a total cost advantage against oil products used in “large” quantities – e.g. smaller industry, ships and truck fleets. China, the USA, Norway, Brazil, Argentina, the Netherlands and other countries are quickly expanding small-scale LNG infrastructure, incentivised by the lower cost compared to oil product alternatives. Romania, with higher import dependence for oil than for natural gas, a mature natural gas market and prospects for gas self-sufficiency, should do the same.

Figure 2 – Small-scale LNG value chain



Source: Sund Energy, 2014

LNG opens up plenty of opportunities for natural gas, liberating it from the constraints of pipeline politics and economics. Small-scale LNG fulfils the democratisation of natural gas, by making LNG available also for small users, regardless of how remotely they may be located from the natural gas pipeline system. Indeed, LNG is already transported by truck in large quantities (several bcm of natural gas, or tens of TWh of energy), over more than 500 km, from small producers to small users in Norway, Brazil, and China. For good reason, small-scale LNG is often described as “virtual pipelines”, connecting new small areas of supply and demand.

Instead of producing several million tons of LNG per year in one large facility, small-scale liquefaction plants may produce as little as 5 000 tons per year (the equivalent of ca. 63 GWh, i.e. 6 million m³ natural gas), are often modular and easily scalable – despite low scale economies. If no longer needed, small-scale liquefaction units are also rather easy to move elsewhere. This makes it easier to reach investment decisions, shortening lead times to commissioning a project. In short, small-scale LNG brings smaller stranded assets to market, such as shale gas fields that are remotely located from the available pipeline infrastructure and may have short production lifetimes.

Despite its high cost and higher environmental impact, oil is still the most realistic fuel alternative for many users. Geographically, this is particularly true for Africa, remote communities (in Siberia, China, USA, Canada, Patagonia, Brazil etc.) and small islands. On a global basis, the transportation sector is still almost entirely dependent on oil products. Small-scale LNG opens up new opportunities for all these categories of users, who have now the option to replace expensive diesel with clean burning natural gas, at the same cost or cheaper. Despite an extensive natural gas network, many Romanian households still rely instead on LPG (liquefied petroleum gas) for cooking. Even more importantly, transporters – ships, diesel trains, trucks, buses, taxis – are by their very nature not able to use pipeline natural gas or electricity and instead rely on expensive, polluting, imported oil.

Romania relies on imports for about 50% of its oil demand, whereas gas import dependence is below 25%. Oil demand comes predominantly from the growing transport sector, particularly road traffic, and finding domestic alternatives to fuel this demand would have clear benefits. At the same time, new gas finds – in the Black Sea, but also onshore, conventional and unconventional – and increased recovery from existing fields is likely to

turn the trend of falling domestic gas production. These gas reserves may all be large enough or close enough to the existing natural gas pipeline system, so small-scale LNG liquefaction may not be required to ensure their monetisation. What is important here though, is that Romania may achieve natural gas self-sufficiency over the next decade and become a net gas exporter. There is a clear case for using natural gas/ LNG in the Romanian transportation sector, strengthened by the fuel's wide availability and the (still) relatively low retail price of natural gas compared to many other markets (in Europe and abroad).

Romania should incentivise ship, truck and bus fleet owners to switch to natural gas in the transport sector, whether it is compressed natural gas (CNG) or LNG. This could take the form of lower energy taxes for natural gas as fuel – compared to the level of excises for oil-based fuels – and tax deductions for investments in the fuelling infrastructure, as part of a clear package of stable incentives to support both building up the needed infrastructure, and switching to natural gas as transport fuel. The European Commission will co-finance small-scale LNG infrastructure along the core pan-European transport infrastructure networks. Romania should seize the opportunity and make good use of the funds.

The next article on this topic will discuss in more detail the technical and economic potential of small-scale LNG as transportation fuel in Romania.

Dragoş Tâlvescu is an EPG affiliate expert

Copyright © 2014 Energy Policy Group

Str. Buzeşti 75-77

011013 Bucharest

www.enpg.ro

office@enpg.ro