



## Bylined Article

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### Small but mighty

#### **Massimo Pardocchi, Bilfinger EMS GmbH, Germany, explains how small scale LNG plants could open up new markets**

Small scale, modular liquefaction plants enable a reliable and uninterrupted supply chain from the natural gas source to the end consumer. The supply of LNG is gaining in importance in a variety of industrial and commercial sectors as this fuel emits fewer pollutants as compared to diesel or heavy oil. LNG is being touted as the fuel of the future for freight transport by land and by sea. Plants producing LNG in smaller amounts are able to supply the fuel on-demand and accordingly are playing an increasingly important role. The growing demand for LNG follows a widely scattered geographic pattern; in many cases, the fuel is needed in places that are nowhere near a major import terminal. Accordingly, it could become increasingly important to produce LNG locally and in smaller volumes. Given this situation, industry vendors have made it their goal to offer users an end-to-end solution in terms of small scale LNG equipment.

In collaboration with technology partners, Bilfinger has developed a concept for the treatment of small quantities of gas to be liquefied. This encompasses the treatment of gas from a variety of sources, liquefaction technology, as well as loading and refuelling stations equipment.

#### **The decisive step before liquefaction**

Natural gas must be properly treated prior to liquefaction. Independently of whether the source is biogas, landfill gas, various qualities of field or sales gas, it is fundamental to select the ideal combination of the most efficient and economical treatment technologies. The processing of the gas may include the removal of water, mercury, hydrogen sulfide, carbon dioxide, ammonia, and other components. The processing technologies that may be applied to this end include various types of filtration and separation processes, such as scrubber units to absorb impurities, or adsorption technologies, such as molecular sieves. This range of methods reflects the fact that the composition of natural gas often differs widely depending on its source. The purpose of processing the feed gas is to convert it into a gas of a quality suitable for subsequent liquefaction.



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### **Technologies know how and plant engineering experience**

The centerpiece of the actual liquefaction process is an equipment that generates high pressure and low temperatures. It is then made available to end consumers at vehicle LNG refuelling stations or truck loading facilities, which may or may not be located on the small scale liquefaction plant's compound.

Bilfinger joined forces in a strategic partnership for both the liquefaction of the gas and the distribution of the LNG in order to combine the cryogenic technologies know-how with Bilfinger's plant engineering expertise. Major aspects of this effort were questions of efficiently combining the process technologies, pre-determining process packages in order to reduce installation times on site, and the ability to offer proper maintenance of such systems.

The plant concept allows significant flexibility in terms of capacity, expandability, and process requirements entailed by the different gas sources. The liquefaction units are available in different standard capacity configurations, which allows an existing plant to be expanded subsequently without any technical problems. All modules of the system are dimensioned such that they can be transported by lorry. For the fuelling stations, depending on the end user's requirements, the LNG is either pumped directly in liquid form or evaporated locally. This gives the operator the option to also sell both LNG and CNG at the same refuelling station.

### **Small scale LNG plants: a market segment with growth potential**

The international market's interest in small plants serving the liquefaction of natural gas has been growing in recent years. Small scale LNG plants give investors the option of purchasing a single plant covering all the relevant process stages in the production and distribution of LNG to end users, regardless of the source of the gas. The operators of such a plant also benefit from a high availability of LNG at commercially favourable terms, which is an advantage at locations lacking a connection to the infrastructure of available LNG terminals.

In many Eastern European countries, LNG terminals for loading trucks with large quantities for resale are not common. Dealers are therefore faced with the choice of either covering long distances at high cost in order to reach existing loading stations, or of entering into the promotion, production and distribution of LNG themselves. This is exactly where small scale LNG comes in.

### **Pioneering new trend**

The importance of fuels for the mobility and transport sectors is changing. Increasingly, the trend is to develop alternatives to petrol and diesel. This re-orientation is being further



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accelerated by legislation such as the Bundesfernstrassenmautgesetz (BFStrMG, Act on Toll Collection on Federal Trunk Roads), which was adopted by the German Bundestag in October 2018. The law exempts lorries running on LNG from the obligation to pay tolls and thereby creates considerable cost-savings potentials for the logistics sector. As a result, major automakers have already seen a significant rise in orders for LNG-fuelled lorries.

Another key factor is CO<sub>2</sub> emissions. It is safe to assume that the trend towards natural gas propulsion will gain further momentum once mandatory emissions limits are introduced across the board. Several pioneering projects in the small scale LNG segment for road traffic are in the pipeline. Thus far, the focus has been on liquefying network gas and on distributing it via a network of filling stations. A similar development is currently emerging in shipping: the emissions from ferries and cruise ships during their stay in port are increasingly being restricted, a fact encouraging operators to reconsider the fuels they are using in favour of cleaner energy sources such as LNG. In Northern Europe, a number of pilot projects in which LNG is used as marine fuel for ferries have been successfully implemented.

### **Conclusion**

Alternative fuels such as LNG offer a promising technological basis for reducing the dependency on oil where mobility and transport are concerned, while concomitantly reducing greenhouse gas emissions. Natural gas is one of the most promising alternative fuels for transport by land and by sea. The technology is mature, readily available, and just as powerful as petrol or diesel, but emits fewer pollutants. In addition, the transport of LNG can be organised more flexibly. With the right technological and strategic approach, it is now even possible to produce LNG locally, wherever the fuel is actually needed. In the future, this could offer the possibility to decentralise the energy supply in many regions at low cost.

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The company delivers its services in two service lines: Technologies and Engineering & Maintenance. Bilfinger is primarily active in the regions Continental Europe, Northwest Europe, North America and the Middle East. Process industry customers come from sectors that include chemicals & petrochemicals, energy & utilities, oil & gas, pharma & biopharma, metallurgy and cement. With its 36,000 employees, Bilfinger upholds the highest standards of safety and quality and generated revenue of €4.153 billion in financial year 2018.



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