The image indicates the connection pipe for the FSRU in Wilhelmshaven. FSRU is a "Floating Storage and Re-gasification Unit", with regard to tanker ships or stationary floating LNG terminals with re-gasification facilities.
Author: Jost Listemann/Future Gas

LNG for the ever-increasing energy hunger

LNG has never been as valuable as it is today – because liquefied natural gas is now helping to close the gap which has been created by Russia's failure to supply gas volume. And time is running out: In order to satisfy the increasing hunger for energy, the countries of Europe are now increasing the pressure when creating an LNG infrastructure, for which valves are also essential.

In view of the altered geo-politic and energy policy framework conditions, an energy supply which could dry up must be prevented at all costs. An important mosaic stone for this is the forced usage of LNG. Liquefied natural gas terminals are therefore now springing up like mushrooms. There are currently 45 LNG terminals located throughout

Europe – and over 40 are under construction or in the planning stage. The consequence: The European Council now states that the EU is the world's largest importer of LNG.

LNG demand remains on course for growth

Most of the liquefied natural gas which lands here comes from the USA, which has massively expanded its export capacities and is continuing to do so currently, as well as deliveries arriving from Qatar, African countries such as Nigeria, Algeria, Egypt, Angola and Mozambique and Norway. “Overall, the LNG import terminals which are presently available in the EU can cover about 40 percent of Europe's natural gas demand. By 2030, the available capacities should be increased from 252 billion m³ to 406 billion m³”, reports the German Maritime Platform e.V. Promising prospects for the LNG industry and its suppliers.

The growth in LNG demand is also largely influenced by China. The country plans to “reduce CO2 emissions in the industrial sector by switching from coal to gas,” explains the LNG Outlook 2024 from Shell. Considering that China's coal-based steel sector produces more emissions than the entire industry of the UK, Germany and Turkey combined, it is clear that gas “plays an essential role in tackling one of the world's largest sources of CO2 emissions and local air pollution.” According to experts, India is also increasingly relying on LNG and gas instead of coal.

Systems and plants for production, storage and transport

Due to the development which has occurred in recent years, LNG plants are experiencing great demand – for production, storage and transport. Liquefied natural gas must be brought on shore, re-gasified and forwarded on. The technology for this has long been available and

has proven itself. For example, müller quadax has developed the QUADAX Top Entry butterfly valve especially for LNG applications. “In order to keep the gas liquefied, the pipelines and storage tanks must be able to withstand a temperature of -162°C and be appropriately insulated. Before delivery to the supply network, the liquefied gas is subsequently heated evenly and thereby becomes gaseous again,” explains the company. Top-entry valves are utilised for these applications. Advantages are, for example, that the central upper flange can be taken off and all internal components can be easily removed from the housing.

Vanessa™ automated valves from Emerson are designed for cryogenic applications. They are intended to ensure safe, leak-free shut-off during demanding unloading processes. Source: Emerson

Valves affect safety and efficiency

Emerson is also aware of the challenges created by LNG. Natural gas must be constantly brought to low temperature for transport in liquid state, and many safety factors have to be implemented in many areas. “As global demand grows, complexity and risk increase, while speed and reliability become more important than ever,” the company

explains. The selection process for valve technology can be a major influence on system safety, efficiency, reliability and therefore cost-effectiveness. Emerson has therefore developed specific solutions for the LNG sector.

Emerson has, for example, developed automated valves for cryogenic use “which can provide safe, leak-free shut-off during demanding unloading operations, including isolation, flow control and emergency shut-off”. The company develops valves which protect the compressor from damaging excess pressure incidents. A desuperheater in turn enables accurate gas temperature control under cryogenic conditions. In order to prevent any excess pressure damage to the LNG tanks, as well as to reduce the loss of natural gas and maintenance costs, Emerson has suitable safety valves available in its portfolio. The use of digitalisation also supports processes in the LNG sector: An Emerson-designed digital valve regulator enables more precise control.

LNG supports the achievement of climate targets

But LNG is more than just a gap filler and is not only able to secure the energy supply. Rather more, liquefied natural gas contributes to the achievement of climate goals to a certain extent by releasing significantly less greenhouse gases when burning gas when compared to other fossil fuels. The possibilities of this energy source are not yet fully developed. For example, Bio-LNG, which is produced synthetically via power-to-gas processes from renewable energies, water and CO_2, is considered to be almost CO_2-neutral. Another option is the liquefaction of biomethane to Bio-LNG. It is therefore foreseeable that these developments will also provide an impetus for the development of suitable technologies.

Ecological transformation for shipping

LNG also enables shipping to undergo the much-needed ecological transformation. Because propulsion with liquefied natural gas is much more climate-friendly than with diesel. Herose has already pioneered and supplied valves for the world's first cruise ship which is now powered entirely by LNG for AIDAnova. The valves are equipped with a fire-safe approval and can be operated manually or pneumatically. In addition, there are valves which can regulate the required amount of gas via actuators.

But here, too, the following applies: Fossil LNG can only be a transitional solution, albeit a significant one, which can be made increasingly climate-neutral with the help of blends of Bio-LNG and synthetic LNG. “This means that LNG will always remain an important fuel for climate-neutral shipping even in ten years' time, but with a significantly reduced greenhouse gas intensity,” emphasises the Maritime Platform e.V.

LNG moves Germany: A floating LNG landing terminal – “Floating Storage and Re-gasification Unit” (FSRU), as planned for Wilhelmshaven, is the most economical and quickest way to implement from the point of view of LNG Terminal Wilhelmshaven GmbH. Source: LNG Terminal Wilhelmshaven GmbH

LNG terminals must be H2 ready

So the prospects for LNG remain favourable: Global trade in LNG reached 404 million tons in 2023, compared to 397 million tons in the previous year. LNG demand will reach approximately 625-685 million tons annually in 2040, according to the latest industry estimates from Shell's LNG Outlook 2024.

And for the time when less LNG is needed, provisions have already been implemented. Because LNG terminals must always be "H2-ready" or "ammonia-ready". This will make them an import hub for hydrogen and hydrogen derivatives in the future. Investments in LNG terminals are thereby also investments in the energy transition. The valve industry has also long been ready for handling hydrogen. So the future can quickly become the new present...

Trends and highlights from the valve industry can be experienced at VALVE WORLD EXPO from 3 to 5 December 2024 in Düsseldorf. Current industry and product information can be found on the internet portal at www.valveworldexpo.com.

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