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Going the LNG Way

For the liquefied natural gas (LNG) industry, which has witnessed healthy growth and large project investments over the last few years, Asia is right at the center of the action. G Venkatesh reports.

Whenever any sector booms in the economy, as is the case with the liquefied natural gas (LNG) production-transport-gasification-distribution network the world over, there is a concomitant growth in the demand for automation solutions. That is exactly what has been happening in the last decade or so, and is likely to keep happening for many more years to come.

Furthermore, in this era, when natural gas is scarce and demand for the same has increased all over the world, every cubic meter of the fuel is precious, and investments in automation to reduce losses along the supply chain are totally justified, just as safeguarding against spills and explosions which impact the environment and human lives adversely, is.

Gauging from the threefold rise in traded LNG volumes in 20 years, it seems that natural gas will increasingly be sold and purchased in this fashion. And with this, the need for automating the liquefaction and gasification terminals and equipping more and more tankers with controls will become starker.

LNG is simply a mode for trading natural gas over long distances, in the absence of pipelines. The sea/ocean route is a given in this case. While natural gas would possibly need to be compressed to force it through pipelines over long distances, it needs to be liquefied and then regasified when it is traded as LNG. There is also energy required to transport it by tankers. At the receiving end, it is compressed and channelized through pipelines to the end-use destinations. It follows thus that natural gas trade, be it via pipelines as a gas or via tankers as a liquid, consumes a good deal of energy.

Asia at the epicenter

The phenomenal growth in LNG trade is exemplified by the fact that in 1964, it was only Algeria which was exporting LNG – to the UK and France. In 1969, the US entered the fray, followed soon by Libya. In 1972, Brunei became the first Asian country to liquefy and export LNG. The UAE and Indonesia joined in a few years later, to be followed in the 1980s by Malaysia and the 1990s by Qatar.

Examining the shares of LNG exporting and importing countries for 2007, Qatar, Malaysia and Indonesia together accounted for over 45 percent of LNG exports (the total amounting to around 160 million metric tonnes), while among the importers, Japan and South Korea accounted for nearly 60 percent of the total.

Currently, there are 12 liquefaction terminals in Asia: three in Qatar, two each in Indonesia and India, and one each in Malaysia, Brunei, Oman and Yemen. As far as gasification terminals are concerned (on the import side), there are 24 in Japan, four in South Korea, and two each in China and India. Mention should be made of proposed liquefaction terminals at Port Moresby in Papua New Guinea (with ExxonMobil as the largest stakeholder), and Sakhalin in Russia; and proposed gasification (receiving) terminals – two in Singapore, and three on the west coast of India.

One of the three Indian projects would be an offshoot of an integrated power project undertaken by what was formerly Dabhol Corporation and is
now Ratnagiri Gas and Power. Part of the LNG which is imported would be used as fuel to generate electricity, while the remainder would be gasified and distributed to potential end-users within the country.

Meanwhile, the Jurong Island regasification project in Singapore (final proposed capacity of six million tonnes per annum), which may be completed before the end of 2009, is reportedly part of a strategy by the Singapore government to minimize the dependence on piped natural gas from neighbours Malaysia and Indonesia.

In total, in 2009, an annual capacity of about 39 million tonnes of LNG is likely to come onstream – 60 percent of that in Qatar alone. While global demand is set to rise, a slight drop in Asian demand has been forecast, with Japan, Taiwan and South Korea likely to import less LNG than in year 2008. However, China and India are all set to spruce up their infrastructure to increase LNG imports. Vietnam is likely to set up an offshore regasification terminal after 2010, with its domestic production expected to fall short of the rising demand.

Liquefaction capacity is predicted to increase by 25 percent by 2010 and 35 percent by 2012. This would mean that there would be need for more automation and controls not just at the train of processes at the liquefaction and loading terminals, but also in transit in the tankers and at the gasification and distribution terminals.

Automation experiences
Digital technology which connects measurement devices and host control equipment, enables the monitoring of critical LNG processes – all across the process chain. This pre-empts and averts shutdowns, improves plant availability and throughput while reducing the costs in the long run.

According to Yuko Iizuka, senior general manager of the Projects Development Department at Yokogawa Electric Corporation, the Japanese process automation company has over 80 LNG projects worldwide under its belt; over half of these (41) are in Asia. On a value-basis, the liquefaction stage of LNG dominates over the transport and regasification stages, he says.

Yokogawa was hired by the Malaysia International Shipping Corporation (MISC) to install an integrated automation system to control and monitor the safe loading and transit of LNG from its shores. On the back of this success, Yokogawa has gone on to bag orders for control systems for carriers delivering LNG from Australia to receiving terminals in Asian countries – especially South Korea, Japan and Taiwan. It is also installing safety systems at the LNG terminal on the Australian coast to secure the operation of the boiler at the LNG plant.

PT Badak in Indonesia got integrated eight LNG trains into one single control system by Yokogawa, and benefited thereby by way of increased steam production from its boilers. At home in Japan, Yokogawa assisted the Saibu Gas Co (one of the major importers of LNG) to automate its receiving terminals.
Not to be left behind, most of the other automation majors have also been associated in some way or the other with LNG activities in Asia. For instance, ABB’s lifecycle simulator products were used to test applications before commissioning in some of the regasification terminals in Japan, while the liquefaction and loading terminals at Sakhalin in Russia have benefited from the company’s integrated communications package and power distribution system. The company’s safety systems have reportedly ensured accident-free, uninterrupted operations at several LNG plants across the world – both liquefaction and regasification.

While Invensys was associated with the first phase of the RasGas Project undertaken by Qatargas, Emerson Process Management was contracted by the company to equip the second phase of the project with automated controls (PlantWeb digital architecture).

Emerson has also been active in China’s LNG, having been contracted by CNOOC recently to equip its receiving terminal at Fujian with Daniel flowmeters.

As for Honeywell, in Asia, the company has had a role to play in practically all the major exporting and importing countries – Japan, Qatar, Australia, Malaysia and Indonesia. John Colpo, co-leader, Marketing and Strategy, Oil and Gas, Honeywell Process Solutions, informs CE Asia that a small compounded annual growth rate for oil and gas would translate to a much higher CAGR for LNG in the years to come, resulting in a growing market for automation in this sub-sector. The company has experience of having automated LNG carriers, liquefaction plants and regasification terminals in the past, and is keen on boosting the innovativeness of the LNG sector.

‘We aim to achieve orders worth US$100 million by 2011’

Yuko Iizuka, senior general manager, Projects Development Department, Yokogawa, talks to CE Asia about the company’s business prospects in the LNG sector.

Q: How significant is the LNG sector to Yokogawa?
A: In our industrial automation and control business, for the fiscal year 2008, the oil and gas sector (including LNG), contributed approximately 25 percent of the total sales. This is likely to increase annually into the foreseeable future. It would be difficult to state what fraction of the total is accounted for by LNG. We currently have over 80 LNG projects worldwide under our belt, and over half of these – 41 projects – are in Asia.

Q: Which of the nodes in the LNG process chain is the most attractive for automation?
A: It can be said that nearly 70 percent of the total cost is spent on the liquefaction stage (upstream) in the chain. According to our recent market survey, the company has supplied distributed control systems (DCS) to 22 percent of the liquefaction plants worldwide and to 42 LNG tankers. To date, we have also automated several receiving terminals (downstream of the chain) in Japan, which is the leading importer of LNG and is equipped with several regasifying terminals all along its coastline.

Q: LNG liquefaction capacity is expected to increase by 35 percent by 2012. Do you anticipate good growth in this area?
A: We aim to achieve orders worth US$100 million by 2011 from the LNG sector and this includes the entire process chain – LNG liquefaction plants, LNG carriers and LNG receiving terminals.

On the strength of the company’s experience with many such projects in the past, including offshore production systems, it can be said that the confidence to implement and adopt emerging technologies – Floating Production Storage Units and Floating Storage Regasification Units – is very high.

Yuko Iizuka, Yokogawa.