# Solutions from **the cloud**

**Magnus Ulseth, Quorum Software, Norway,** outlines how to maximise the value of LNG import terminals through the use of cloud-based solutions.

The drive towards cleaner fossil fuels is not just about shifting the feed stock mix; there is also a tremendous global push towards reducing the carbon footprint of existing operations through practices such as LNG.

Over the past six decades, LNG has revolutionised the energy industry and the connectivity of natural gas supply chains, emerging as the cleaner, cheaper, and safer fuel alternative within the industrial, road transport, and marine sectors. Designed to streamline transportation of natural gas from origin to endpoint, the LNG process liquifies gas through a complex cooling process, making it approximately 1/600$^{th}$ of its original volume. This reduction allows gas to be transported more safely than traditional methods aboard specially engineered LNG shipping vessels. The rise of LNG has also made energy transportation far more efficient and sustainable, unifying cross-market pipelines while releasing 30% less $CO_2$ than fuel oil. For newer entrants to the oil and gas market, there is much more attention on the ESG aspect of the business, requiring that LNG be a core part of their long-term strategy.

While the number of LNG terminals and their respective regasification capacity has steadily increased over the last 50 years, with a very sharp increase in just the last decade, processes have not evolved at scale. This has created massive disconnects at critical junctures in the LNG supply chain. As the energy transition pushes stakeholders across the industry to invest in more sustainable energy operations, growth is projected to boom again in the next five years, with the vast majority of that growth taking place at up-and-coming LNG terminals, such as those in the Asia-Pacific (AP) region.

## An increasingly fragmented system

Approaching a complex problem, such as this one, requires a deep understanding of the evolving LNG landscape and the unique challenges faced by oil and gas stakeholders in the AP region.

The rise and success of LNG usage has ushered in increased regulation, driven by the desire to improve infrastructure utilisation and maximise limited resources. While natural gas

does have an environmental footprint, the implementation of LNG has been instrumental in lowered emissions and improved air quality. Increased use of natural gas and LNG have also contributed to reduced carbon emissions and have provided reliable support for renewable energy. For government stakeholders, environmental activists, and energy companies alike, LNG is a huge step in the journey to replacing traditional fuels and producing more sustainable energy; across the globe, there has been a collective push for policies that help to maximise LNG's growing capacity.

Amidst this push, governments in many of the world's dominant markets now require third-party access (TPA) agreements to help ensure that terminals are utilised at full capacity at all times, rather than competing with one another, but progress has been slow. Several countries in Southeast Asia have already developed well-functioning, collaborative TPA agreements among major market players, with Singapore, Malaysia, and Thailand leading the charge. Agreements in countries such as South Korea and Japan, on the other hand, have had limited commercial impact due to dominant market players and fragmented distribution pipelines, both of which significantly curb the value provided to third-parties and hinder widespread adoption.

Additionally, the commercial terminal services are often lacking fundamental software connectivity, slowing LNG growth in new and up-and-coming markets. Traditional spreadsheets and localised digital solutions cannot scale to the growing needs of TPA arrangements. LNG terminals must be organised for collaborative workflows to make global adoption a reality which, in turn, requires the implementation of robust and accessible digital solutions.

In the AP region, in particular, the adoption of modern LNG technology has lagged. More terminals are aspiring to become regional trading hubs for LNG, but their trucking and marine vessel bunkering services are not as developed as the European and North American markets, limiting the global connectedness of LNG-powered fleets. As Pacific marine trade evolves and markets continue to shift in favour of inter-company collaboration, the need for cross-company operational control will continue to grow, and the transition to modern technology solutions must be accelerated.

## The future of the cloud

This increasing commercial complexity, in addition to the push for aggressive ESG goals, is driving a global need to have more controlled, connected software solutions that generate attractive options for third-party customers. Adoption of integrated systems designed for seamless collaboration will be a key success factor in determining whether key markets, such as the AP market, are able to reach their maximum utilisation and fully embrace sustainable energy transportation.

With this in mind, oil and gas companies are making significant investments in the application of digital technology to improve decision making and reduce risk. There has been an increasing deployment of remote measurement and monitoring to identify fugitive emissions, adoption of digital twin and augmented/virtual reality technologies to support remote operations and workforce safety, and predictive analytics to identify potential problems in time to take corrective action.

As the energy industry becomes increasingly global and dynamic, the need for collaborative software that provides immediate access to information and insight has never been greater. Combined with its cost-saving efficiencies, the benefits of the cloud for this application are plain.

Cloud-based solutions, such as Quorum's Energy Components (EC), provide end-to-end hydrocarbon accounting solutions that track volumes, ownership, quality, commercial agreements, and sales associated with the production of oil and gas. The highly customisable modules are designed to maximise shared resource operations, allowing processes to scale economically and swiftly even in fluctuating market conditions. This interconnectivity also enables company-wide collaboration by providing cross-department access to centralised information, breaking down operational silos, and empowering users to make informed decisions without interruption. In a nutshell, the EC software suite supports its customers in making all of their operational decisions, with a resulting increase in production, profitability, and operational excellence.

## Integrated solutions for a more sustainable future

For LNG import terminals in the AP region, software solutions such as EC make a strong case for increasing business value, empowering providers to increase control over their operations while offering their customers a greater range of services. EC is currently in use on all continents, making it easy to import counterparts and for those who need a software solution that can support the LNG value chain from reservoir to customer. In fact, Quorum's complete transportation and storage solution has been field-proven across more than 350 midstream assets in North America, 50 000 miles of interstate and intrastate pipeline in the US, and 75% of North American LNG exporters. EC's contract management functionality can streamline the clunky process of tracking terminal use agreements, inter-company documentation, SPAs for purchase of LNGs, and other legal processes that have curbed collaboration and slowed growth of LNG in the region.

EC's ability to accurately track hydrocarbon transportation for better operations planning, contract management, and forecasting will also be vital for long-term adoption and success of LNG in the AP region. With advanced data-capture and management, LNG terminals can glean deeper insights from flow measurement and optimise their robust cargo plans to increase profitability, minimising the need for third-party cargoes, vessel chartering, and more.

Additionally, comprehensive solutions to optimise asset modelling will be crucial for regulatory compliance as both governments and consumers look to LNG to lead the way in sustainable oil and gas. Automated, data-driven analysis will make it easy to monitor, report, and reduce emissions as regulatory requirements increase and companies aim to further reduce their carbon footprint.

After 20 years ingrained in the LNG industry, Quorum knows what it takes to keep LNG operations running. As the LNG market continues to shift from rigid, end-to-end trading into a globalised commodity, the migration to integrated technologies that close operational gaps and fuel sustainable practices will be integral to the industry's collective success. Products such as EC and other cloud-based software solutions are powering a revolution in hydrocarbon management that will streamline the global energy supply chain and pave the way for a cleaner and more sustainable future for decades to come. **LNG**