THE OFFICIAL LNG2026 SHOW DAILY

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- China's Evolving Gas Demand
- The LNG Demand Bottleneck
- Bridging the Regasification Gap
- Europe's LNG Rethink

Atlas Copco welcomes you to ***LNG 2026***

At Atlas Copco, we bring together decades of LNG experience, a strong global presence, and the flexibility to support projects across every stage of the natural gas value chain. From liquefaction and storage to transport and regasification, our compression and expansion technologies are designed to deliver reliable performance in the most demanding LNG environments.

Booth No. **9110** | 2nd - 5th February

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Atlas Copco
Gas and Process

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Event Overview:

Celebrate, Connect and Close

The final day of LNG2026 is here. We hope you've enjoyed an inspiring week full of insights, connections and innovations.
A big thank you to all attendees, speakers, sponsors and partners for making this event a success.
There's still plenty to explore today from Plenary, Spotlight and Technical Sessions across the Conference and Auditorium Halls to engaging discussions on the exhibition floor. Don't miss the Closing Ceremony, where we celebrate the week's achievements and look ahead to LNG2029 in Australia.
Recharge and connect over lunch, continue visiting the exhibition and make the most of the last opportunities to network, exchange ideas and gain fresh insights before you depart from the QNCC. We look forward to seeing you in Australia!

REGISTRATION ONSITE AND BADGE PICK UP

Registration Opening Times:
Location 1: QNCC, Conference Side, Main Car Park Entrance
Location 2: QNCC, Exhibition Side, Hall 6 Registration Desk

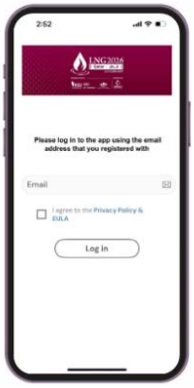
5 February
Locations 1 and 2 8:00 – 15:00

Every time an attendee enters LNG2026 they will be asked to present government issued photo ID. This can be a valid passport or a Qatar ID (QID) for residents.
All attendees are required to wear their badge AT ALL TIMES during LNG2026, and this includes networking functions.
Attendees will only be able to access the areas of the event included in their registration.
We look forward to seeing you at the Qatar National Convention Centre (QNCC) today. •

LNG2026 Event App

The LNG2026 Event App, brought to you by Shell, will be an essential tool to help you navigate the event.
The Event App contains the programme for the week, speaker profiles, exhibition layout, exhibiting company profiles, details of networking functions and much more.

How to Download the Event App



Download the LNG2026 App

Download the LNG2026 Event App to your phone from Play Store or App Store, or use the QR code below:

Download on the App Store
GET IT ON Google Play

How to Access the Event App

1. Open the Event App and search for LNG2026
2. Log in using your email address you used to register for the event
3. To verify your account, you will need to enter a code sent to your email (please check your spam folder) or mobile.

Once Logged In

Depending on your registration type you will have access to different features e.g. floor plans, full programme, speaker profiles, exhibitor list as well as creating your own personalised schedule for the event.

Features Available to All Attendees:

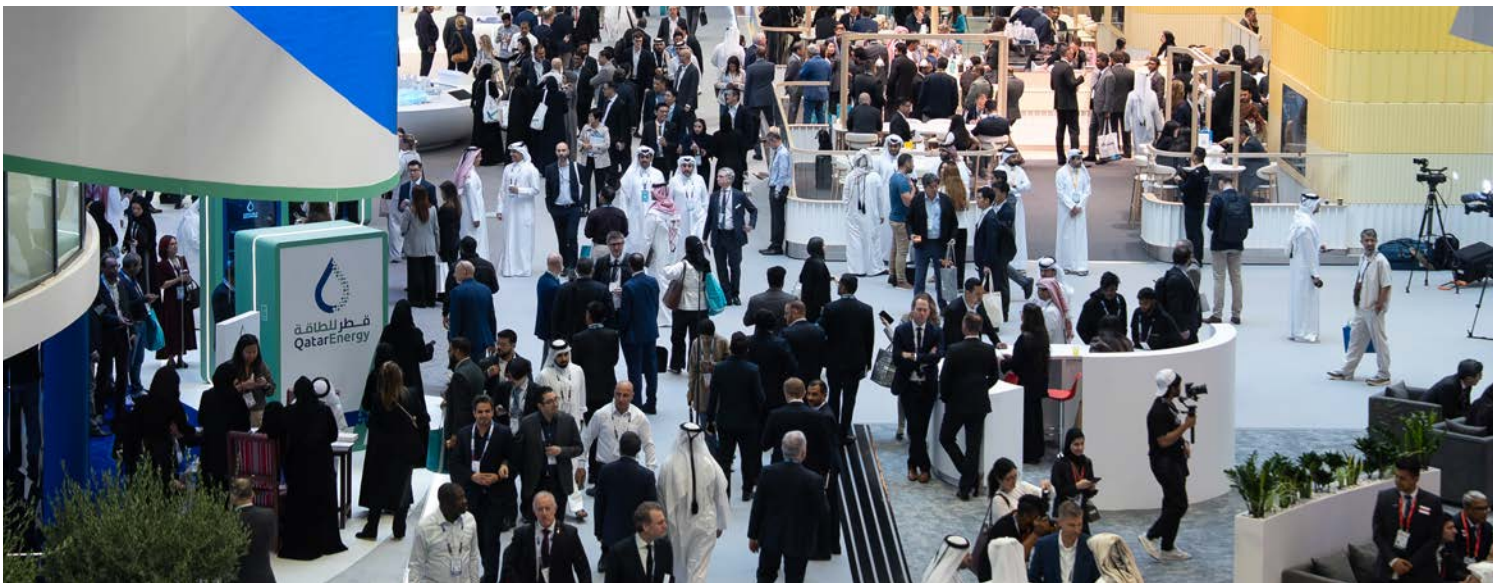
- Event information
- LNG2026 Show Daily

Benefits for Conference Delegates:

- View attendee list
- Schedule meetings
- Manage your schedule
- View speaker profiles, papers, and posters

Event App Helpdesk

If you require help or advice with regards to the Event App, please speak to our staff at the Event App Support Desks located in the Spider Area, Level 1 and Exhibition Foyer, Ground Level or email support@allintheloop.com •



Thursday's Programme

EXECUTIVE PROGRAMME: Plenary Sessions

The Future of LNG: Insights and Outlook from LNG2026

As LNG2026 concludes, make sure to join us as industry leaders reflect on key insights from the conference and explore how technology is shaping a more affordable, sustainable and resilient LNG value chain.

11:00 I Conference Hall

EXECUTIVE PROGRAMME: Spotlight Sessions

The Catalyst for Hydrogen and Ammonia

The panel explores how LNG can support the introduction of hydrogen and ammonia, from enabling lower-carbon production with CCS to deploying existing technologies, adapting LNG infrastructure and applying LNG industry lessons to develop new uses and markets for hydrogen and ammonia.

9:45 I Auditorium 2

Digital Transformation in the LNG Industry

The panel explores how LNG can support the introduction of hydrogen and ammonia, from enabling lower-carbon production with CCS to deploying existing technologies, adapting LNG infrastructure and applying LNG industry lessons to develop new uses and markets for hydrogen and ammonia.

9:45 I Auditorium 1

TECHNICAL PROGRAMME: Paper Presentations and Panel Discussions on Commercial Topics

Operations and Equipment Technology

Discover how innovations in LNG processes and equipment boost efficiency, cut costs and reduce environmental impact.

9:30 I Technical Programme Hall C

EXHIBITION HIGHLIGHTS

Explore cutting-edge technologies, live demonstrations and interactive displays.

Exhibition Opening Hours 9:00 – 15:00

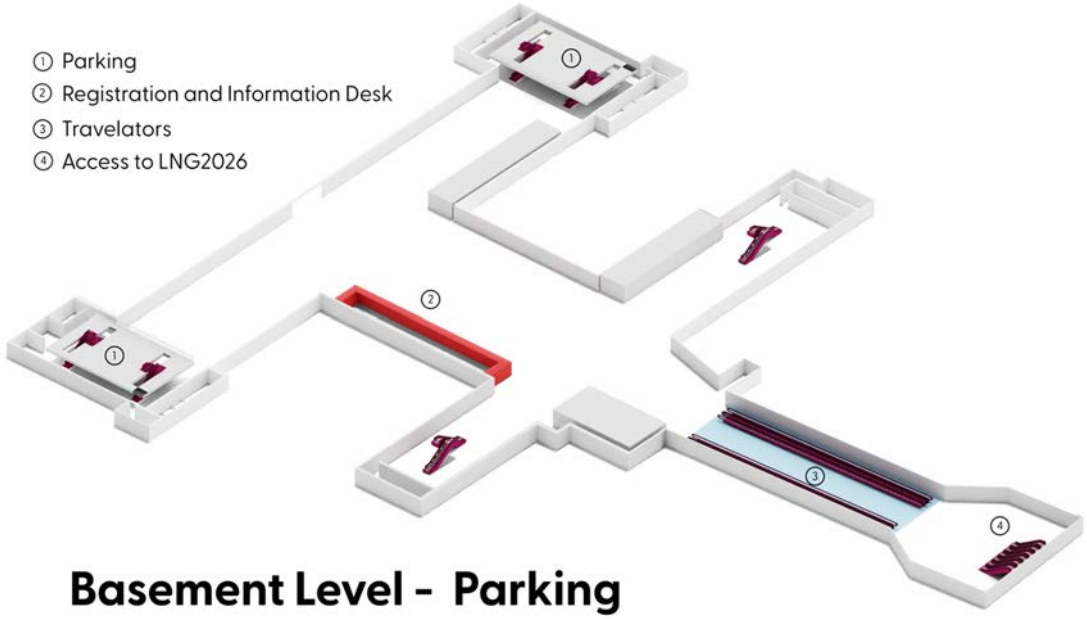
For the full programme, remember to download the LNG2026 Event App and manage your programme schedule through the app. •

Thursday's Programme at a Glance

For the full up-to-date programme, remember to download the LNG2026 Event App and view the latest programme schedule.

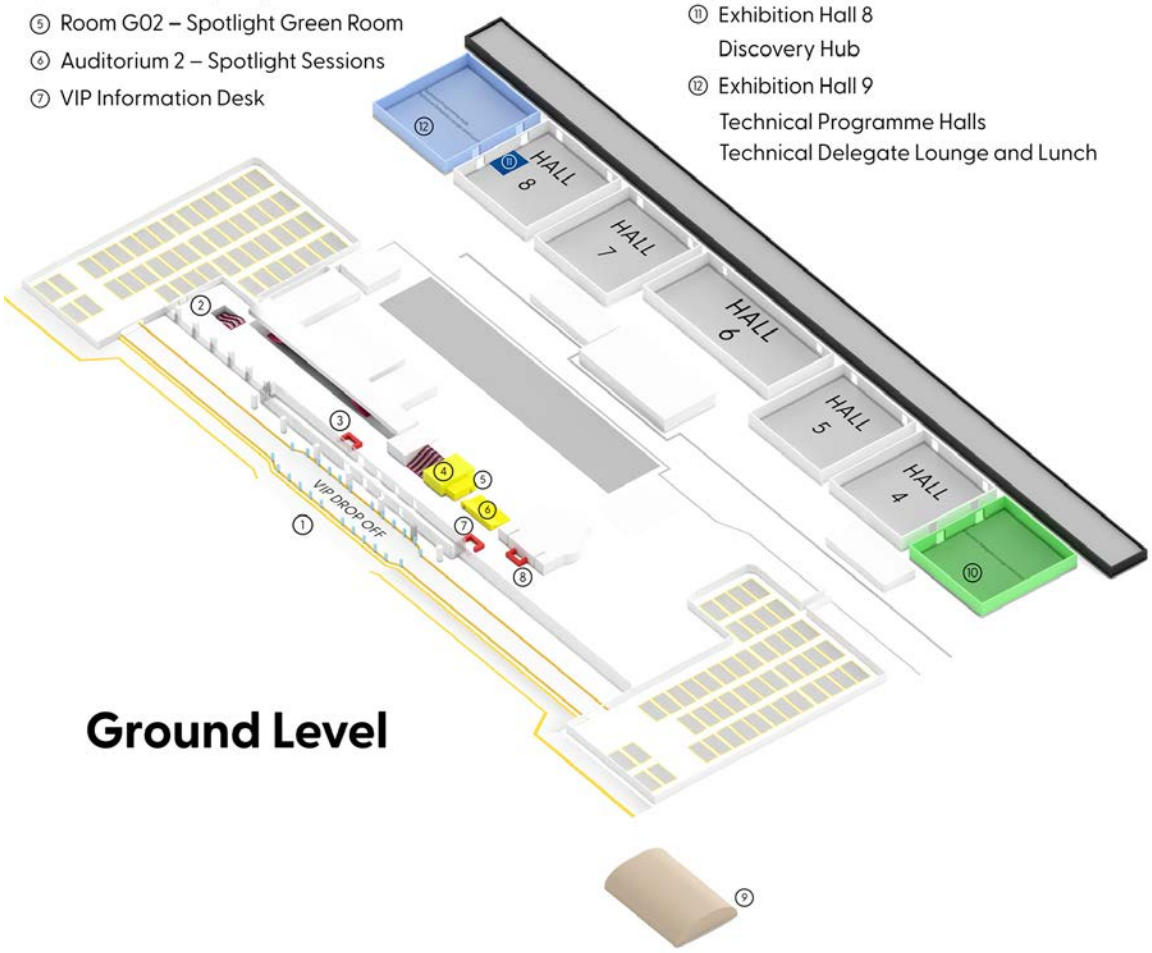
9:45 - 10:45	SP11 - The Catalyst for Hydrogen and Ammonia	Auditorium 2
	SP12 - Digital Transformation in the LNG Industry	Auditorium 1
9:30 - 11:00	TP16 - Contracts and Commercial Trends in an Evolving Market	Technical Programme Hall A
	TP17 - Improving Environmental Performance across the LNG Value Chain – Measurement and Policy	Technical Programme Hall B
	TP18 - Operations and Equipment Technology	Technical Programme Hall C
10:45 - 11:00	Break	
11:45 - 12:15	PL07 - The Future of LNG: Insights and Outlook from LNG2026	Conference Hall
11:45 - 12:15	Closing Ceremony	Conference Hall
12:15 - 13:30	Lunch	

LNG2026 Floorplan



Basement Level - Parking

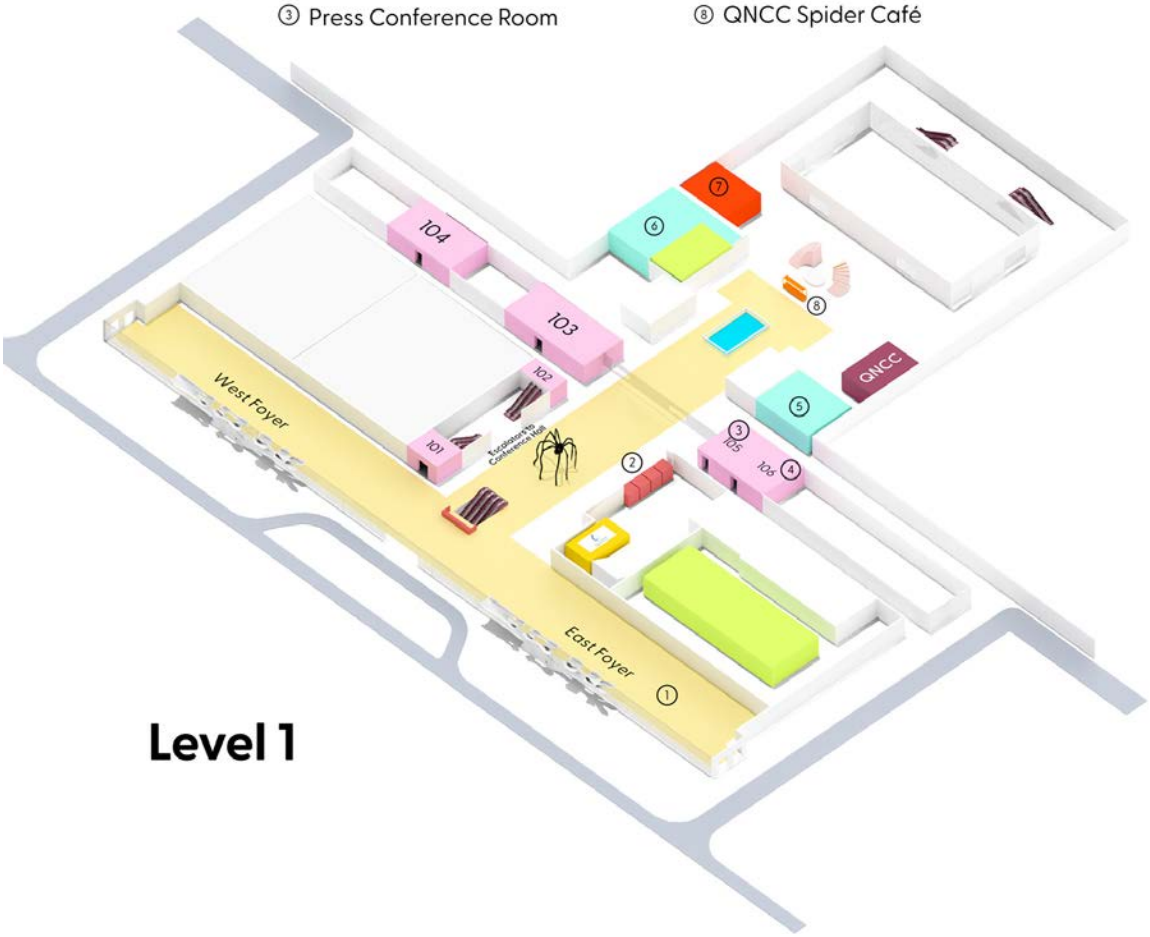
① VIP Entrance
② Access to Parking
③ Cloakroom/Lost and Found
④ Auditorium 1 – Spotlight Sessions
⑤ Room G02 – Spotlight Green Room
⑥ Auditorium 2 – Spotlight Sessions
⑦ VIP Information Desk
⑧ Delegate Bag Collection Desk
⑨ Qatar National Library Station
⑩ Exhibition Hall 3
Executive Delegate Lounge and Lunch
⑪ Exhibition Hall 8
Discovery Hub
⑫ Exhibition Hall 9
Technical Programme Halls
Technical Delegate Lounge and Lunch



Ground Level

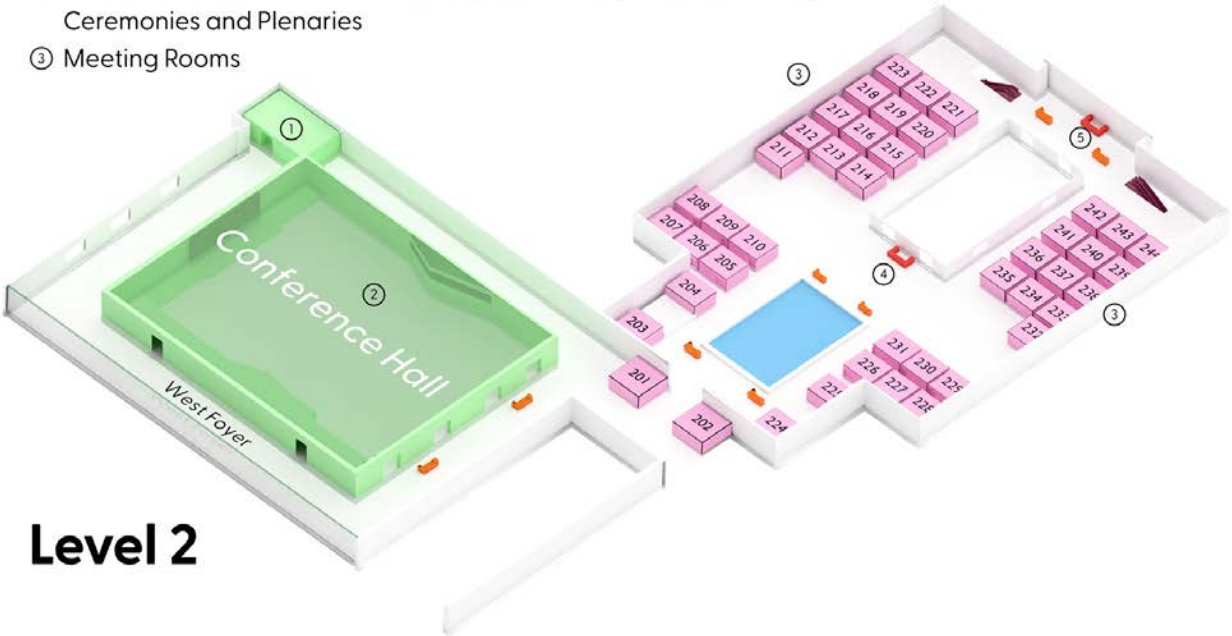
LNG2026 Floorplan

① Networking Reception (Day 3)
② Media Information Desk
Information Desk
Event App Support
③ Press Conference Room
④ Media Centre
⑤ Male Prayer Room
⑥ Female Prayer Room
⑦ Medical Centre
⑧ QNCC Spider Café



Level 1

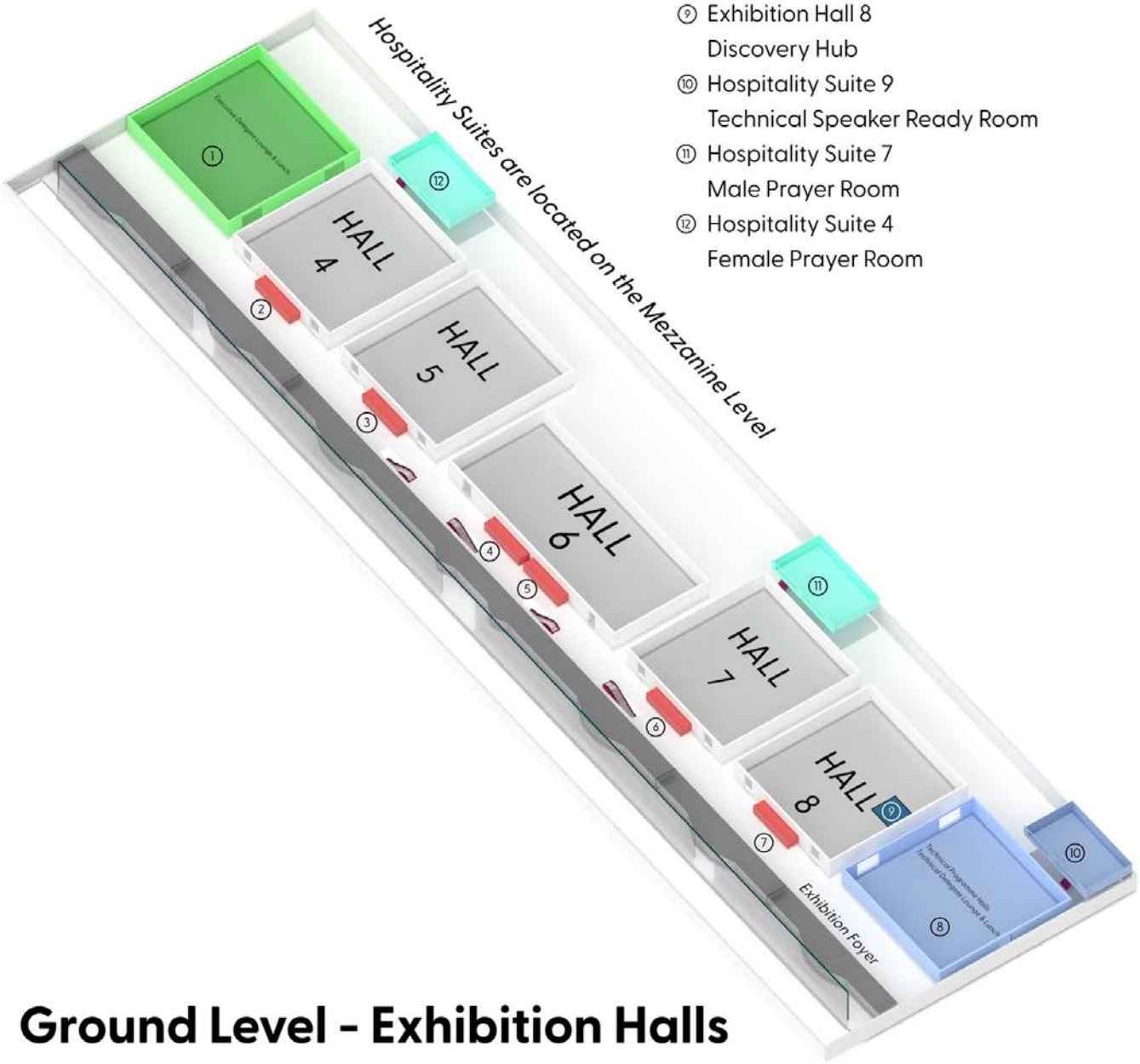
① Plenary Green Room
② Conference Hall - Ceremonies and Plenaries
③ Meeting Rooms
④+⑤ Meeting Rooms Information Desk
Executive Delegate Coffee Break



Level 2

LNG2026 Floorplan

① Exhibition Hall 3
Executive Delegate Lounge and Lunch
② Trade Visitor Registration Desk
③ Trade Visitor Registration Desk
④ Conference and Exhibition Accreditation
⑤ Information Desk/Event App Support
⑥ Trade Visitor Registration Desk
⑦ Cloakroom
⑧ Exhibition Hall 9
Technical Programme Halls
Technical Delegate Lounge and Lunch
⑨ Exhibition Hall 8
Discovery Hub
⑩ Hospitality Suite 9
Technical Speaker Ready Room
⑪ Hospitality Suite 7
Male Prayer Room
⑫ Hospitality Suite 4
Female Prayer Room



Ground Level - Exhibition Halls

Wednesday's Highlights

From inspiration to conversation, Wednesday at LNG2026 had it all. Catch the energy, connections and moments that made the day memorable. •

Discover Qatar

Cultural and Heritage

If you are here over the weekend, why not try something different? Step off the conference floor and explore the country's rich culture and heritage. From museums and historic districts to vibrant cultural hubs, there's plenty to discover beyond the conference programme.

Msheireb Museums

Located in the heart of downtown Doha, Msheireb Museums comprise four beautifully restored heritage houses. Through immersive storytelling and interactive displays, they offer insights into Qatari social history, traditional family life, the development of Doha and the country's journey from pearling to modernity.

msheirebmuseums.com/en/

Katara Cultural Village

Katara is Doha's cultural hub, bringing together art galleries, performance venues, theatres and exhibition spaces. Delegates can explore public art, cultural exhibitions and architectural landmarks while experiencing a blend of Qatari and international cultures in a scenic waterfront setting.

www.katara.net/en/

Souq Waqif

One of Doha's most iconic destinations, Souq Waqif is a historic market district offering a glimpse into traditional Qatari life. Wander through narrow alleyways lined with shops selling spices, textiles, handicrafts and souvenirs, and enjoy a wide selection of local and international dining options.

visitqatar.com/intl-en/things-to-do/shopping/souqs/souq-waqif

We hope you've had a wonderful time in Doha, Qatar, and also had the chance to explore the vibrant city of Doha over the week. •

Europe's LNG Rethink

Europe's focus has shifted from pipeline dependence to price discipline, with the new-found flexibility and greater security coming at a higher cost | **Paul Hickin**, Editor-in-Chief and Chief Economist, *Petroleum Economist*

Europe's energy crisis may no longer dominate headlines, but its structural consequences are still unfolding, panellists said at LNG2026 in Doha.

What began in 2022 as a scramble to replace lost pipeline gas has evolved into a fundamental rethink of how the continent secures its energy supply—and what price it is willing to pay for security, the panellists highlighted at a session called 'Exploring Europe's Gas Future'. LNG is now front and centre of that thinking, according to a range of experts that included Dr. Egbert Laege, CEO at SEFE, Huibert Vigeveno, group CEO at MET, and Richard Holtum, CEO at Trafigura.

The distinction between pipeline gas and LNG has rarely been more consequential. Pipelines tie suppliers and consumers together in fixed, bilateral relationships. LNG, by contrast, is mobile, global and flexible: cargoes can be redirected across oceans in response to price signals. That flexibility proved decisive when geopolitical shocks disrupted Europe's traditional supply routes.

"If you look at the role of LNG, it probably will continue to grow in Europe as I see the economy in Europe growing and the likelihood of pipe gas not being there for the foreseeable future. What LNG has also shown is its flexibility, not only in supply points, but in basically landing in Europe in different locations," noted Vigeveno.

In the wake of the Ukraine war and the collapse of Russian pipeline deliveries, LNG emerged as the lynchpin of Europe's supply diversification strategy. Volumes surged. Portfolio players dramatically increased cargoes into Europe, in some cases more than doubling pre-crisis activity. LNG did not merely replace molecules—it replaced an entire system logic.

The outlook is that LNG's role in Europe will continue to grow, particularly given expectations of modest economic recovery and the enduring absence of reliable pipeline gas from the east. While Northwest Europe remains the most liquid and visible LNG market, the most significant opportunities may lie further south and east. Central and Eastern Europe, with high gas penetration and fewer legacy supply options, is increasingly reliant

on LNG-backed diversification.

Critically, this was not just a story about supply. It was a story about infrastructure.

"What we could see in Europe when the crisis started in 2022 was another element that's associated to the LNG value chain. So while the molecules have been there on the global markets, the real price increase in Europe was because of lack of infrastructure. Because the regasification units were not there," Vigeveno added.

When prices rocketed in 2022, it was not because the world had 'run out' of gas. LNG molecules were available globally. What Europe lacked—at least initially—was sufficient regasification capacity and pipeline systems capable of moving gas from west to east.

That bottleneck proved costly. It also reshaped investment priorities. Floating storage and regasification units (FSRUs) became a fast and flexible solution, with Germany's rapid deployment marking a pivotal moment. The new infrastructure allowed LNG to land at multiple entry points, easing congestion and restoring confidence in security of supply.

Yet infrastructure investment is often judged harshly once prices stabilise. Utilisation rates fall. Political attention drifts. This framing, industry voices argue, is flawed. LNG terminals and regasification capacity function like insurance. Their value is not measured by constant use but by availability when conditions tighten—as they inevitably do during cold winters or supply shocks.

Now Europe has built that [LNG] infrastructure, Europe has solved its security of supply issue, but it has swapped it for a price issue – Holtum, Trafigura

Before the crisis, Europe's overreliance on pipeline gas effectively outsourced its energy security to external actors. The danger was binary: gas flowed—or it didn't. LNG infrastructure changed that equation.

Today, Europe can attract the LNG it needs in almost any market condition. The risk it now faces is not physical shortage, but price volatility. This shift matters. In 2022 and 2023, Europe avoided blackouts not by creating new supply, but by outbidding others. LNG was diverted from less affluent regions to Europe, underscoring the continent's financial strength—and the uncomfortable reality that security was purchased at others' expense.

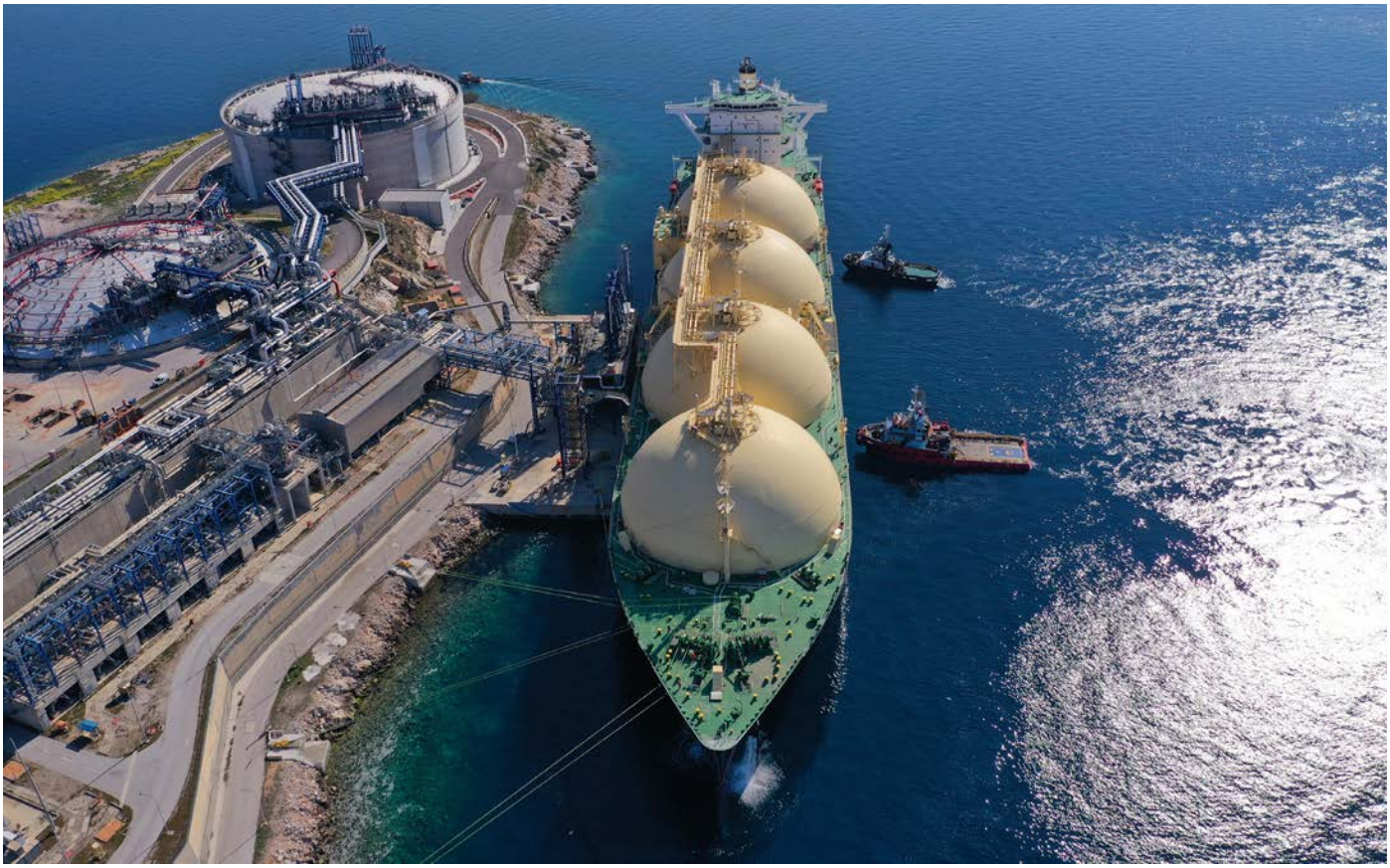
This is not an ideal outcome, but it is widely regarded as preferable. Budget pressure and high consumer prices are politically painful, yet they are less destabilising than widespread power shortages.

"LNG will never compete on a cost basis with pipeline natural gas, but from a security [point of view]... it depends on what value you put on that security of supply. Now Europe has built that infrastructure, Europe has solved its security of supply issue, but it has swapped it for a price issue," Holtum pointed out.

"Europe today will always be able to attract the LNG it needs, just at a price. If we look at what happened in 2022 and 2023, as the LNG infrastructure was built out and the price went up significantly in Europe, we didn't have blackouts. Europe actually exported those blackouts to countries less able to pay," said Holtum.

The crisis also exposed Europe's heavy reliance on spot LNG. In contrast to many Asian buyers, European utilities entered the crisis with limited long-term contract coverage, amplifying price volatility.

Long-term contracts offer supply certainty, but they come with trade-offs. Contracts indexed to Europe's TTF benchmark provide security of delivery but no price insulation. Contracts linked to US Henry Hub pricing introduce a different problem: they expose European consumers to a gas market with little direct relationship



to European fundamentals, creating an unhedgeable basis risk, panellists warned.

As Europe's spot market has grown more liquid, some argue long-term contracts indexed to European prices no longer deliver meaningful advantages. Instead, the burden of risk management increasingly falls to portfolio players and traders, who can aggregate supplies from multiple regions and absorb price and volume volatility on behalf of consumers.

Upstream LNG financing remains rooted in a utility-style model: banks demand 80–90% of volumes sold on 20–25 year contracts before committing capital. This structure increasingly clashes with decarbonisation commitments made by governments and utilities alike.

The contrast with oil is stark. Oil projects are often financed based on long-term price assumptions rather than contract coverage. Many in the LNG industry expected a similar evolution—but it has yet to materialise.

Without innovation in how LNG projects are financed, buyers face a dilemma: commit to long-term contracts that may outlast climate targets or rely on shorter-term arrangements that leave future supply uncertain. The question of who delivers Europe's 'last molecule' of gas—particularly post 2040—remains unresolved.

Roughly three-quarters of Europe's LNG imports now originate from the US. On the surface, this appears to replace one dependency with another, panellists said, but they argued the picture is more nuanced than that.

Most US LNG contracts are free-on-board, meaning cargoes are not destination bound. Europe is not dependent on US gas in a strategic sense; it is dependent on LNG as a system. If price dynamics shift, Europe could just as readily attract cargoes from Qatar, Nigeria, Malaysia or Australia.

The real risk lies not in geography but in concentration—single projects, single contracts or single counterparties. Operational failures or contractual disputes at one facility can reverberate quickly, as seen during the energy crisis. Portfolio diversification, whether by utilities themselves or through traders, is therefore central to resilience.

The expert consensus converged on an important principle: diversification. Across supply sources, geographies, contract tenures and infrastructure types, diversification remains the most effective risk management tool.

Europe has made enormous progress since 2022. It has built infrastructure, reshaped markets and proven its ability to secure supply under extreme conditions. The challenge now is to avoid complacency. Energy security is cyclical. Investment decisions made during calm periods determine outcomes during the next crisis.

If there is a lasting lesson from Europe's LNG reckoning, it is that security has a cost—but the cost of insecurity is far higher.•

Reshaping the Way LNG Is Traded

Panellists discuss the way LNG is marketed and traded, and their own strategies for success | **Joseph Murphy,** Senior Gas Analyst, *Petroleum Economist*

The rapid globalisation of LNG trade, the rise of portfolio players, and a series of geopolitical and weather-driven shocks have fundamentally reshaped how LNG is marketed and traded, panellists said during an LNG2026 discussion.

Executives from utilities, major energy companies and trading houses described a market that has become far more interconnected, asset-intensive and financially complex, where flexibility and risk management increasingly determine who can operate successfully. The strategies the industry uses to move molecules profitably, reliably and flexibly have evolved sharply over the past two decades, particularly in the aftermath of the COVID-19 pandemic and the onset of the Russia-Ukraine conflict.

Blurred lines

Tom Summers, executive vice president of LNG marketing and trading at Shell, said LNG was once largely a business-development-driven industry that required massive capital deployment to create both upstream supply and downstream demand.

"You needed this to not only place your product on the market but create that market—somewhere to bring your LNG in," he said.

Over time, confidence has been instilled in the industry to make those investments across the value chain, encouraging record FIDs and drawing new players in the market. That growth, he added, has enabled improved trading, logistics and efficiency, lowering the end-cost of products to customers.

Pablo Galante Escobar, head of LNG at Vitol, said the market has moved far beyond a simple segmentation between producers, utilities and traders. Vitol itself now combines trading with upstream production, refining, storage and power generation assets, blurring those traditional boundaries. For example, the commodities trader has oil and gas production in West Africa and the US, as well as power plants in the UK and Ireland.

Shell and other majors have expanded their trading portfolios in recent years, with the UK major boasting the largest LNG trading portfolio for LNG in the world. National oil companies such as QatarEnergy have also shifted into trading, with the company targeting 30–40mt of annual non-Qatari LNG trade by 2030.

Asset-backed trading

Jonathan Westby, senior vice president LNG at JERA, said his company benefited from an "asset-backed trading model", anchored in its large physical demand base in Japan.

"We handle 30–35mt/yr for Japan," Westby said. "That gives us tremendous flow—approximately 400–500 cargoes a year."

JERA has worked backwards from that demand position to build shipping, supply and flexible procurement capabilities.

"We've increasingly directed our portfolio towards free-on-board, flexible supply," he said. "We've sort of gone from our distinct character, which is utility buyer. We've moved backwards up the value chain to explore all the different areas and try and add value with the purpose of stable supply and making it affordable for our end-user."

Westby said utilities have also had to rethink their approach to risk.

"We've had to spend time thinking about how we develop an approach to risk, a tolerance of risk, an understanding of risk, a willingness to deploy capital in the markets," he said. "To achieve the optimisation gains that we want to do, we need to take some risk."

Patrick Dugas, vice president LNG trading at TotalEnergies, said TotalEnergies follows a similar asset-based

trading strategy, underpinned by scale and optionality.

"In our portfolio, more than 40mt/yr worldwide, we have a lot of regasification, close to 20mt/yr. We have a fleet, and we have spot purchase or sales," Dugas said. "All of those operations have flexibility, which we can share with producers or with end users… this creates a resilient portfolio and a position to cope with any uncertainties."

Managing volatility beyond price

Speakers repeatedly stressed that volatility is no longer just about commodity prices.

Summers said recent shocks—COVID-19, the Russia-Ukraine conflict and extreme weather events—have demonstrated LNG's resilience but also exposed new dimensions of risk.

"Volatility is not just about price," he said. "There are many more things in this energy system that are making the market far more unpredictable—geopolitical issues, logistical challenges, stresses in individual or regional markets."

Patrick Dugas highlighted margin risk as a lesson from Europe's 2021–23 gas price crisis.

"A lot of the companies which were hedging, thinking they were taking risk out, found themselves in a very stranded cash position because the margin calls which were going to the exchanges were significant," he said.

He added that an unprecedented wave of new LNG supply—more than 200mt between 2024 and 2030—will likely create additional financial stress.

Galante Escobar said Vitol's core differentiator is managing multiple types of risk. Traders are traditionally seen as having greater risk appetite than IOCs.

It's not only price risk, but also performance risk and payment risk – Galante Escobar, Vitol

"It's not only price risk, but also performance risk and payment risk," he said.

Europe's rise to LNG prominence

Summers said Europe has shifted from being a flexible balancing market to a structural demand centre.

"Historically, Europe used to provide a bit of flexibility to the markets," he said. "Now that Europe's become a major demand centre in its own right, it doesn't have the flexibility that it used to."

This previously flexibility was based on the continent's substantial imports of Russian gas, which have now been scaled back significantly, and the ability of power generators to switch back and forth between gas and coal depending on price, but many coal plants have been closed.

As a result, the industry must find new sources of flexibility.

One major change, Summers said, has been the emergence of US LNG as a globally available swing supply.

"Ten years ago, we had no US LNG exports," he said. "Now we see the US as the largest exporter of LNG in the world, and it's become available to really anyone that wants to sign up, so long as the creditworthiness and the performance capabilities are there."

China, meanwhile, is increasingly acting as a balancing market within Asia, managing domestic production, pipeline imports and LNG regasification capacity.

Effective risk management is your licence to operate – Summers, Shell

Value chain integration

For Shell, Summers said integration is central to managing this complexity.

"Our division is called Integrated Gas," he said. "It's about making sure that, right away from the wellhead, through the pipeline, through the processing plants, through the vessels to the import terminals… we are consciously trying to optimise that whole chain."

He said Shell regularly reconfigures its portfolio in response to sudden changes, such as cold weather spikes in the US that force cargo diversions, while still meeting contractual obligations elsewhere.

"That's not just the story of what we do," Summers said. "It's the inherent flexibility and benefits of LNG."

Continuity amid volatility

Despite profound changes in market and geopolitical conditions, panellists said some principles still hold: understanding competitive advantage, building resilient portfolios and maintaining strong risk controls.

"Effective risk management is your licence to operate," Summers said.

Westby added that asset base, competitive advantage and culture remain foundational.

"Asset base, competitive advantage and getting the right culture," he said. "Those things still matter, even though the market around us has transformed."•

Predictability Key to LNG Project Financing

Coherence and conviction through trusted partnerships seen as underpinning risk management in order to spur further LNG growth | **Paul Hickin**

LNG projects need a framework of stability and certainty to ensure successful outcomes across the value chain, panellists at LNG2026 said.

"The financing world, in particular, loves boring and predictable. Boring as in as much as you don't need a whole bunch of excitement and things swinging around crazily," said Paul Marsden, president, energy, at Bechtel at a panel titled 'Fuelling the Future: Navigating the Evolving Landscape of LNG Project Financing'.

Marsden said predictability across everything underscores all finance wins. "That predictability on dates when things are going to come online and that predictability on performance," he noted.

He also added that affordability is key, so "regardless of how a project is financed, the cost of EPC is borne by the rate that's in the purchase agreement".

"During execution, people get really nervous," Marsden added, so that certainty and confidence is of the upmost importance.

"When we're working with our customers, we're very selective about what it is that we can take on, what we have the capacity for, to be able to lead and deliver it, and on how deep our relationships with supply chains are," Marsden said.

Tatsushi Amano, global head of energy & natural resources finance group at JBIC, noted 'policy coherence' is also very important, giving the example of the US, where the administration accelerated the licensing process of all the export capacity available and also strongly encouraged international financial institutions such as the World Bank to expand their financing to developing countries. "That is a good aspect," he said, before taking fire with the tariff policy, which he called "a problem".

Ryosuke Tsugaru, chief low carbon fuel officer at JERA, talked up the importance of trusted reliable partnerships, such as the agreement between JERA and QatarEnergy that commits the latter to deliver 3mt/yr of LNG to JERA over 27 years. Tsugaru hailed alignment in strategy and a 'shared vision' as crucial in uncertain times.

Tsugaru added that diversification is also an important tenet for JERA, not just in terms of geographical exposure but also in terms of pricing risk and what price mechanism is used for a project.

Mark Abbotsford, executive vice president and chief commercial officer at Woodside Energy, pointed out the "serendipitous" fortune of being on a panel made up entirely of speakers with whom the Australian LNG producer works closely. He said it's Woodside's commitment to LNG not just in the near or medium term, but also in the long term, that helps provide a coherence and certainty to financing projects.

Abbotsford highlighted "the collective journey" where "we get the chance to flush out with all that uncertainty and then translate that into execution plans and estimates", adding the crucial role of knowing all the parties involved when tough decisions on value have to be made.

The panellists argued the importance of being clear on plans given the sums and supply chain linkages involved, as unwelcome "surprises" can have knock on effects for a whole project.•

QatarEnergy and Petronas in Historic Deal

The Middle Eastern gas giant and Asian energy heavyweight ink a 20-year landmark LNG agreement in a significant step towards strengthening global energy partnerships | **Paul Hickin**

QatarEnergy and Petronas have signed a landmark 20 year sales and purchase agreement (SPA) for the supply of LNG to Malaysia. The agreement, announced during a special ceremony in Doha on the sidelines of LNG2026, marks the first long term LNG deal between the two energy powerhouses.

Under the terms of the SPA, QatarEnergy will deliver 2mt/yr of LNG to Malaysia beginning in 2028. The deal was formalised by His Excellency Saad Sherida Al-Kaabi, Minister of State for Energy Affairs, and President and CEO of QatarEnergy, with Petronas President and Group CEO Tengku Muhammad Taufik.

This deal represents more than just a commercial transaction; it underscores the deepening relationship between Qatar and Malaysia in the energy sector. For Malaysia, securing a long term supply of LNG is vital to meeting its growing domestic energy demand and supporting its industrial development. For Qatar, the deal reinforces its position as a reliable global supplier of LNG and highlights its commitment to expanding partnerships in Asia, one of the fastest growing energy markets in the world.

H.E. Minister Al-Kaabi emphasised the strategic importance of the agreement, stating: "QatarEnergy is pleased to enter into this new LNG SPA with Petronas, which highlights our continued commitment to support the growing energy needs of Malaysia as well as our customers across the globe." His remarks reflected QatarEnergy's broader vision of promoting cleaner secure energy solutions and contributing to sustainable economic growth worldwide.

For Petronas, Malaysia's national oil and gas company, the agreement aligns with its long term strategy to secure diversified and sustainable energy sources. As Malaysia continues to expand its industrial base and urban infrastructure, LNG will play a crucial role in ensuring energy security while supporting the country's aims of using cleaner fuels.

Petronas has long been recognised as a major player in the global LNG market, with operations spanning production, shipping and regasification. By partnering with QatarEnergy, Petronas not only strengthens its supply portfolio but also enhances its ability to meet the demands of both domestic and international customers.

The deal also highlights the growing importance of LNG in the global energy mix. Natural gas remains a critical component due to its lower carbon footprint compared with coal and oil. LNG, in particular, offers flexibility in transportation and storage, making it an attractive option for countries seeking to balance energy security, reliability, and affordability and reduce their carbon footprint.

QatarEnergy has consistently positioned itself as a leader in this space, investing heavily in LNG infrastructure and expanding its production capacity. The agreement with Petronas reflects QatarEnergy's strategy of forging long term partnerships.

The agreement also carries significant economic and strategic implications. For Malaysia, the guaranteed supply of LNG will support industrial growth, attract foreign investment and enhance the competitiveness of its manufacturing and export sectors. For Qatar, the deal strengthens its economic ties with Southeast Asia, a region that is increasingly central to global trade and energy flows.

The timing of the agreement is also notable. As the world grapples with energy market volatility and geopolitical uncertainties, long term contracts such as this provide stability and predictability for both suppliers and consumers. By committing to a 20 year partnership, QatarEnergy and Petronas are sending a strong signal of confidence in the resilience of the LNG market and the enduring importance of energy cooperation.

The QatarEnergy Petronas deal is more than a supply arrangement; it is a strategic cooperation that reflects shared values and mutual trust. It demonstrates how energy companies can work together to address global challenges.

With this agreement, QatarEnergy and Petronas have positioned themselves as leading the energy evolution. •

Bridging the Regasification Gap

As LNG supply growth outpaces regasification capacity, Excelerate Energy CEO Steven Kobos argues that rapidly deployable, scalable regasification solutions are critical to overcoming infrastructure constraints and unlocking demand in both emerging and developed markets | **Joseph Murphy**

How does Excelerate Energy assess the outlook for LNG demand over the next decade?

Kobos: The global LNG market is entering a new phase of accelerated growth. After a modest supply expansion over the past three years, approximately 200mt/yr of incremental LNG supply will come online between now and the end of the decade, driving global LNG supply from roughly 430mt/yr in 2025 to more than 600mt/yr by 2030.

As this surge unfolds, the ratio of global regasification capacity to supply will tighten significantly, making the development of new regasification infrastructure increasingly critical to access this affordable and abundant fuel. This imbalance is structural—not theoretical. Many emerging markets lack financing, permitting frameworks or the time required to build large-scale onshore terminals. Even in developed markets, infrastructure timelines often lag need and commercial opportunities.

Excelerate Energy is purpose-built to solve this challenge. We offer a range of scalable regasification solutions—from FSRUs to converted LNG carriers, to integrated downstream infrastructure—that can be deployed rapidly, adapt to local conditions and unlock demand where gas was previously unavailable or uneconomic.

More affordable LNG pricing will drive incremental demand for natural gas. Affordability will drive demand for LNG into every corner of the globe. That demand will require more regasification infrastructure, not less. As we look ahead, Excelerate is preparing to meet the demands of this next wave of LNG growth. With our newest vessel, Hull 3407, now committed to the Iraq project, we are advancing plans to convert LNG carriers into FSRUs. Engineering work is already underway, and procurement of long-lead items has begun to compress timelines and accelerate deployment.

These steps reflect our continued focus on scalable, capital-efficient infrastructure that can be delivered where and when it's needed most—ensuring Excelerate remains at the forefront of global LNG growth.

In recent years, FSRUs have been central to Europe's response to gas supply disruptions; with many of those units already installed, where do you see further growth prospects for the FSRU market?

Kobos: Europe's rapid deployment of FSRUs during recent gas supply disruptions highlighted their strategic importance. With many units now installed, the next wave of growth will come from markets lacking onshore infrastructure and requiring accelerated timelines. South Asia, the Middle East and Latin America are key regions where Excelerate is actively engaged. Our projects in Iraq and the Caribbean illustrate how floating infrastructure can deliver energy security quickly and cost-effectively. We also see growing demand for LNG and associated infrastructure in Southeast Asia and Africa.

What differentiates Excelerate's FSRUs from the competition?

Kobos: Excelerate Energy's leadership in the FSRU and downstream LNG infrastructure sectors is built on decades of experience and a proven track record as an operator. Sovereigns know they can count on us to keep the lights on.

Pioneering FSRU technology: Excelerate was the first to develop and commercialise FSRUs, establishing them as a sustainable, long-term solution for LNG import infrastructure. This pioneering role has positioned us as the industry benchmark for innovation and reliability.

Global reach and diverse projects: Over the years, we have developed and operated 16 LNG terminals across ten countries, demonstrating our ability to manage complex projects in diverse environments. This global footprint enables us to tailor solutions to the unique

Excelerate Shenandoah in Kingston

needs of each market while maintaining consistent operational excellence.

Operational excellence: With more than 3,800 ship-to-ship transfers and over 400mcm of LNG transferred, Excelerate has set the standard for safety, reliability and efficiency. Our commitment to high availability and uptime ensures that customers can depend on us for critical energy delivery. We recently saw operational uptime of 99.9% across our floating assets.

By leveraging this extensive industry experience, innovative solutions and unwavering focus on operational excellence, Excelerate is uniquely positioned to compete for new opportunities and maintain its leadership in the LNG value chain.

Wilhelmshaven 2 in Germany was delivered under intense time pressure and heightened political and regulatory scrutiny. What made this project such a significant undertaking for Excelerate Energy, and what do you see as the company's key achievements in bringing the terminal into operation?

Kobos: Excelerate's role in Wilhelmshaven was focused on the FSRU Excelsior, which underwent significant technical upgrades to meet Germany's stringent requirements. These enhancements included integrating advanced emissions control systems and modifying onboard systems for compatibility with local grid specifications. Completing these complex retrofits under compressed timelines demonstrated our engineering expertise and ability to execute under pressure—reinforcing Excelerate's reputation for delivering critical energy infrastructure when it matters most. The Wilhelmshaven 2 terminal had a utilisation rate of around 65%, more than ten percentage points above the European average in 2025, according to our partner Deutsche Energy Terminal. The terminal serves as a key entry point for US LNG cargoes to bolster transatlantic energy security and trade cooperation with Germany and the EU.

In the Caribbean, Excelerate recently expanded its footprint through the acquisition of an LNG and power platform in Jamaica. How does this asset fit into your broader integrated gas-to-power strategy?

Kobos: The Jamaica acquisition represents a strategic evolution for Excelerate, transforming us into a fully integrated LNG and power infrastructure company. By combining regasification assets with power generation capabilities, we can deliver end-to-end energy solutions that enhance reliability and affordability. In the Caribbean, where many islands rely heavily on liquid fuels for power and transport, introducing LNG can have significant benefits for electricity generation, marine bunkering and industrial use. Our position in Jamaica can serve as an excellent hub for distribution of the abundant US LNG coming online. This platform not only strengthens our presence in the Caribbean but also serves as a blueprint for similar integrated models in other emerging markets.

Following Hurricane Melissa, what operational challenges did Excelerate face in Jamaica?

Kobos: Hurricane Melissa tested the resilience of our assets and operations, and we rose to the challenge. De-

Excelsior at Wilhelmshaven 2

spite severe weather impacts from the Category 5 storm and thanks to the dedication of our local team, Excelerate restored full LNG services rapidly across the island, minimising disruptions to customers. Lessons learned from this event are informing future investments in infrastructure-hardening and emergency response protocols.

Beyond the operational response, Excelerate worked closely with local and international partners to mobilise more than $1m in critical aid and resources to help accelerate Jamaica's relief and recovery efforts. We also deployed our LNG carrier, the Shenandoah, supported by a dedicated crew, to transport humanitarian aid from Cristobal, Panama to Kingston, Jamaica.

Looking to the Middle East, what are the key technical, commercial and regulatory hurdles in executing contracts to develop Iraq's first LNG import terminal, and how is Excelerate positioning itself to navigate them?

Kobos: The recent announcement regarding Iraq is a powerful example of how Excelerate's integrated model creates differentiated value in high-priority markets where energy infrastructure is urgently needed. In October 2025, we executed a definitive agreement with a subsidiary of Iraq's ministry of electricity to develop the country's first LNG import terminal at the Port of Khor Al Zubair.

Our integrated solution offers a fast-track path to energy security and reliability, and we are working closely with Iraq's government to deliver an LNG solution that meets the country's critical demand needs. Excelerate will deliver a turnkey package that includes an FSRU, fixed terminal assets, LNG supply and operational support. To de-risk the project, we have secured a take-or-pay contract structure, credit support, insurance and strong backing from the US government—all measures that enhance certainty and create a strong foundation for successful execution. We intend to offer the same reliable access to LNG that we do to all the other sovereigns that rely on us.

Walk us through why this is a significant project for Iraq?

Kobos: This project is transformative for Iraq. It will provide the country with its first direct access to global LNG markets, diversifying fuel supply and reducing reliance on pipeline imports. This agreement builds on years of engagement with the Iraqi government to shape a reliable solution that addresses chronic power shortages and unreliable gas supply from neighbouring countries—issues that have led to persistent blackouts.

Under the agreement, Excelerate will construct and operate the floating LNG import terminal, designed to accommodate up to 500mcf/d of regasification capacity. We will repurpose an existing jetty at Khor Al Zubair port and deploy Hull 3407—our newest FSRU—equipped with best-in-class boil-off gas management and advanced design features for operational efficiency and reliability.

Looking ahead, what are Excelerate Energy's growth priorities over the next several years?

Kobos: Excelerate Energy is a global leader in integrated LNG solutions, and our strategy is built on disciplined growth and operational excellence. Our growth priorities are clear:

Expand the terminals business: We are focused on developing new floating LNG terminals in strategic markets, including Iraq and South Asia, where regasification infrastructure is urgently needed. These projects will leverage our proven FSRU technology and integrated model to deliver energy security quickly and efficiently.

Scale our Caribbean platform: The Jamaica acquisition is a cornerstone of our regional strategy. We plan to build on this foundation by expanding LNG-to-power capabilities across the Caribbean, creating a network of assets that deliver reliable, affordable energy to underserved markets. The Caribbean will also enhance our small-scale hub-and-spoke model, which we plan to replicate elsewhere in the world.

Integrating supply with LNG: We will continue to simplify our customers' access to what they want: affordable and reliable regasified LNG. We will be a one-stop shop. •

Next Wave of Floating LNG Growth in Developing Markets

After Europe's rapid buildout of floating LNG import capacity, Exmar CEO Carl-Antoine Saverys says future growth in floating gas infrastructure will increasingly be driven by developing markets as lower prices, rising energy demand and the need to replace coal unlock new opportunities for unconventional and tailor-made solutions | **Joseph Murphy**

Europe's rush to expand LNG import capacity in the wake of the global energy crisis established the continent as the world's largest market for floating storage and re-gasification units (FSRUs) over the past three years. But Belgium-based Exmar believes the future of growth in floating LNG infrastructure is shifting away from Europe and towards developing markets, where lower LNG prices and rising energy demand over the coming years will open up new opportunities.

"Europe has been a big driver of demand for downstream floating solutions," Exmar CEO Carl-Antoine Saverys said in an interview. "But with LNG prices relatively stable and all this new LNG supply coming onto the market, we believe there will be downward pressure on prices. That will unlock a lot of potential projects in price sensitive regions we haven't really tapped into yet in recent years."

Exmar, which has more than two decades of experience in floating gas infrastructure, has deliberately positioned itself away from the most commoditised end of the FSRU market, Saverys said. Rather than competing head-on in the standard newbuild 170,000–174,000cm FSRU segment, where dozens of owners offer similar vessels, the company focuses on "unconventional, niche, tailor-made" cost effective floating solutions, also with smaller capacities.

"In the conventional newbuild 170,000–174,000cm FSRU space it's difficult to create value, with everyone offering the same thing," Saverys said. "That's not where we want to be."

Instead, Exmar builds on a combination of in-house engineering, shipping heritage and operational feedback from its fleet and roughly 1,500 seafarers to design bespoke projects, including FSRUs and floating LNG (FLNG) terminals.

Europe has been a big driver of demand for downstream floating solutions. But with LNG prices relatively stable and all this new LNG supply coming onto the market, we believe there will be downward pressure on prices. That will unlock a lot of potential projects in price sensitive regions we haven't really tapped into yet in recent years

New opportunities

That positioning, Saverys said, aligns closely with the next phase of the LNG market's evolution. A wave of new liquefaction capacity, led by the US and Qatar, is expected to enter service between now and 2030, loosening the global balance after several years of tight supply. Lower prices, he argued, will be particularly important for emerging economies that were priced out of LNG markets during the 2022–23 energy crisis.

"You saw a lot of countries that were active in LNG move back to coal or other cheaper solutions when prices were high," Saverys said. "With lower prices and the need to reduce emissions, LNG will once again be able to play a major role."

South America and parts of Africa stand out as growth markets, he added, alongside other regions in the southern hemisphere where power demand is rising quickly but infrastructure remains limited.

One example is Exmar's recently announced project in Colombia, which departs from the traditional FSRU-plus-pipeline model. Instead of delivering LNG to a coastal terminal and regasifying into a national grid, the

project will import LNG and distribute it inland using ISO containers loaded onto trucks, supplying customers that lack pipeline access.

"That's exactly the type of project we like," Saverys said. "We don't try to push a standard solution. We listen to what our customers need and design accordingly."

Exmar expects the Colombian project to be implemented in around ten months from contract signature to start-up, reflecting the company's emphasis on fast-track delivery.

Upstream, Exmar has also expanded its footprint through the Congo FLNG project, where it is providing a turnkey floating liquefaction solution offshore Congo-Brazzaville. The FLNG unit, originally constructed for a different project with smaller storage capacity, is being adapted and supplemented with a floating storage unit (FSU) and a full mooring system, allowing Exmar to offer an integrated export terminal.

"That was a big achievement for us," Saverys said. "We were able to provide the full package as a turnkey solution."

In Europe, Exmar was among the first movers after the Russia-Ukraine conflict triggered a scramble for alternative gas supplies. The company signed and delivered the first new floating import terminal contracted in response to the crisis, helping governments secure rapid access to LNG. Exmar modified, mobilised and installed an FSRU within six months at the Eemshaven terminal in the Netherlands, inaugurating the facility in September of that year.

The success of that project has since led to an extension of Exmar's contract and a request from the terminal operator to add a second FSRU, replacing an existing unit and expanding combined regasification capacity.

"We've been recognised for our efforts and for the quality we offer," Saverys said, noting that operating two FSRUs at one terminal created greater efficiency.

Although Europe's immediate need for emergency import capacity has eased, Saverys said the company's European projects continue to provide a strong reference base as it pursues opportunities elsewhere.

Shipping DNA

Speed of execution is central to Exmar's strategy. Saverys attributed this to what he described as a "shipping DNA" that distinguishes Exmar from companies that approach floating gas projects primarily from an offshore engineering mindset.

"In our DNA, we are a shipping company," he said. "When people hear the word 'offshore', they immediately think of extra complexity, extra cost, extra time. We always tackle these projects from a shipping perspective, considering what is really necessary."

That approach, he said, allows Exmar to strip out unnecessary layers of specification while remaining fully compliant with safety and regulatory standards. The company has executed vessel conversions and modifications in shipyards around the world, including in Spain, Dubai and Asia, giving it flexibility to choose the most suitable yard and schedule.

Long-lead equipment remains the biggest constraint on timelines, Saverys said, particularly for specialised components. But long-standing relationships with suppliers help mitigate some of that risk.

Market outlook

The global LNG market has seen extreme volatility in recent years. Saverys believes the industry's cyclical nature will ultimately temper today's rapid buildout of liquefaction capacity. Higher prices have spurred the growth in US LNG supply, "but some of those new developments will slow down or stop if the prices no longer make sense. The market will balance itself."

While floating liquefaction was widely touted as the next major growth area, Saverys said today's environment has temporarily shifted the focus back towards downstream import solutions. Even so, he continues to see strong long-term potential for FLNG, particularly for monetising smaller or stranded gas resources and reducing flaring.

"When you look at some onshore LNG projects today, capital costs can be around $1,000/t of capacity," he said. "For FLNGs, we're close to half of that. We're able to offer this value proposition towards the market, which is extremely competitive."

Reducing emissions

Exmar is also working to reduce the emissions footprint of its existing assets. At some terminals, units are connected to onshore power grids, allowing regasification to be driven by externally supplied electricity rather than onboard fuel. Where fuel is used, the company is also pursuing efficiency improvements.

But Saverys emphasised that the biggest near-term climate impact comes from fuel switching.

"If you start by replacing coal, we already will have made a big improvement," he said. "Reducing even a fraction of coal-fired power generation and replacing it with LNG makes a big difference."

When you look at some onshore LNG projects today, capital costs can be around $1,000/t of capacity. For FLNGs, we're close to half of that. We're able to offer this value proposition towards the market, which is extremely competitive

Exmar's activities extend beyond LNG. The company is a major transporter of LPG and one of the world's largest independent carriers of ammonia, primarily for the fertiliser industry. It has also ordered dual-fuel ammonia-capable engines, positioning its fleet to handle ammonia as a future energy carrier and potential hydrogen vector.

Carbon capture, storage and handling is another area of interest, he added, including not only transport but potentially reinjection of CO_2.

Momentum behind some low-carbon technologies has slowed, particularly in Europe, where ambitious plans to develop lower-carbon energy have collided with high costs and industrial competitiveness concerns.

"Reality has kicked in," Saverys said. "For industry, you need cheap energy and cheap labour. Europe is starting to realise that we are damaging our industrial base."

Against that backdrop, Exmar is sticking to what it sees as its core strength: niche floating solutions that can be deployed quickly, competitively and at scale.

"We're not the largest player in floating infrastructure," Saverys said. "But we have 50 years of LNG experience and 20 years of floating LNG terminal experience. We were the first to pioneer FSRUs in 2005, and we keep building on that." •

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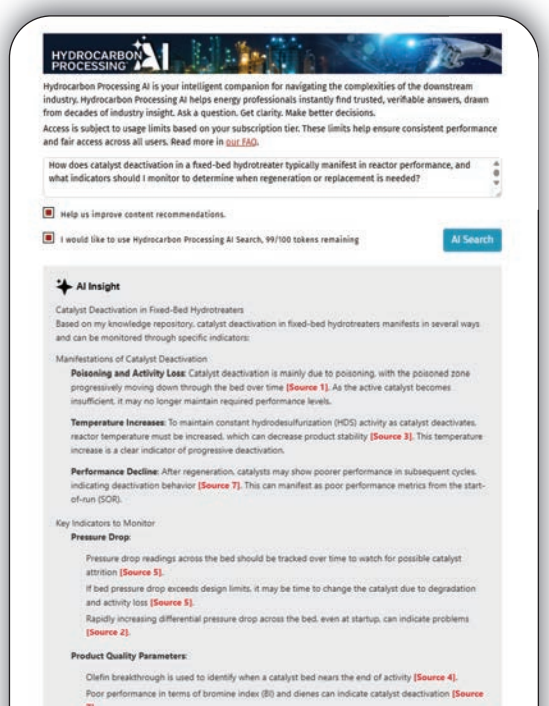

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Pragmatic Pathways to Curb Shipping Emissions

Rostom Merzouki, vice president of global sustainability at classification society ABS, discusses pragmatic design strategies for reducing emissions in shipping | **Joseph Murphy**

As the shipping industry accelerates its search for credible decarbonisation pathways, LNG continues to occupy a contested position: widely adopted, technically mature, but under increasing scrutiny over methane emissions and long-term compatibility with the energy transition.

For Rostom Merzouki, vice president of global sustainability at classification society ABS, the design of LNG carriers and other types of ships is primarily influenced by cost.

"Design today is still largely driven by cost," Merzouki told Petroleum Economist. "LNG project developers define a generic specification with shipyards and then bid with the shipowners at shipyards. The pressure is primarily on capex and opex, not on sustainability.

ABS has been assisting project developers and charterers to embed sustainability considerations from the earliest design stage, rather than retrofitting environmental performance later. That shift, Merzouki argues, begins with a simple principle: dramatically improving energy efficiency by reducing waste.

Capturing energy that is lost

Modern LNG carriers typically convert only half of the energy they consume into useful propulsion.

"Roughly more than 50% of the energy you input into a ship today is lost, either to air or to sea," Merzouki said. "For every heat calorie you burn, you use at best half of it. The rest disappears."

Rather than focusing solely on new fuels, ABS is working with owners on how to recover and reuse that wasted energy. One major opportunity lies in capturing waste heat from combustion and redeploying it elsewhere. Another largely untapped resource is cold energy from the LNG cargo itself. LNG must be warmed and vaporised before being sent to engines, and today that cold energy is typically dissipated into seawater via heat exchangers. Instead, that cold energy can be used to cool the engine, for air conditioning or other purposes.

Design today is still largely driven by cost. The pressure is primarily on capex and opex, not on sustainability

This approach to system-level optimisation, he said, will define efficiency improvements for at least the next 15–20 years.

Designing for future fuels

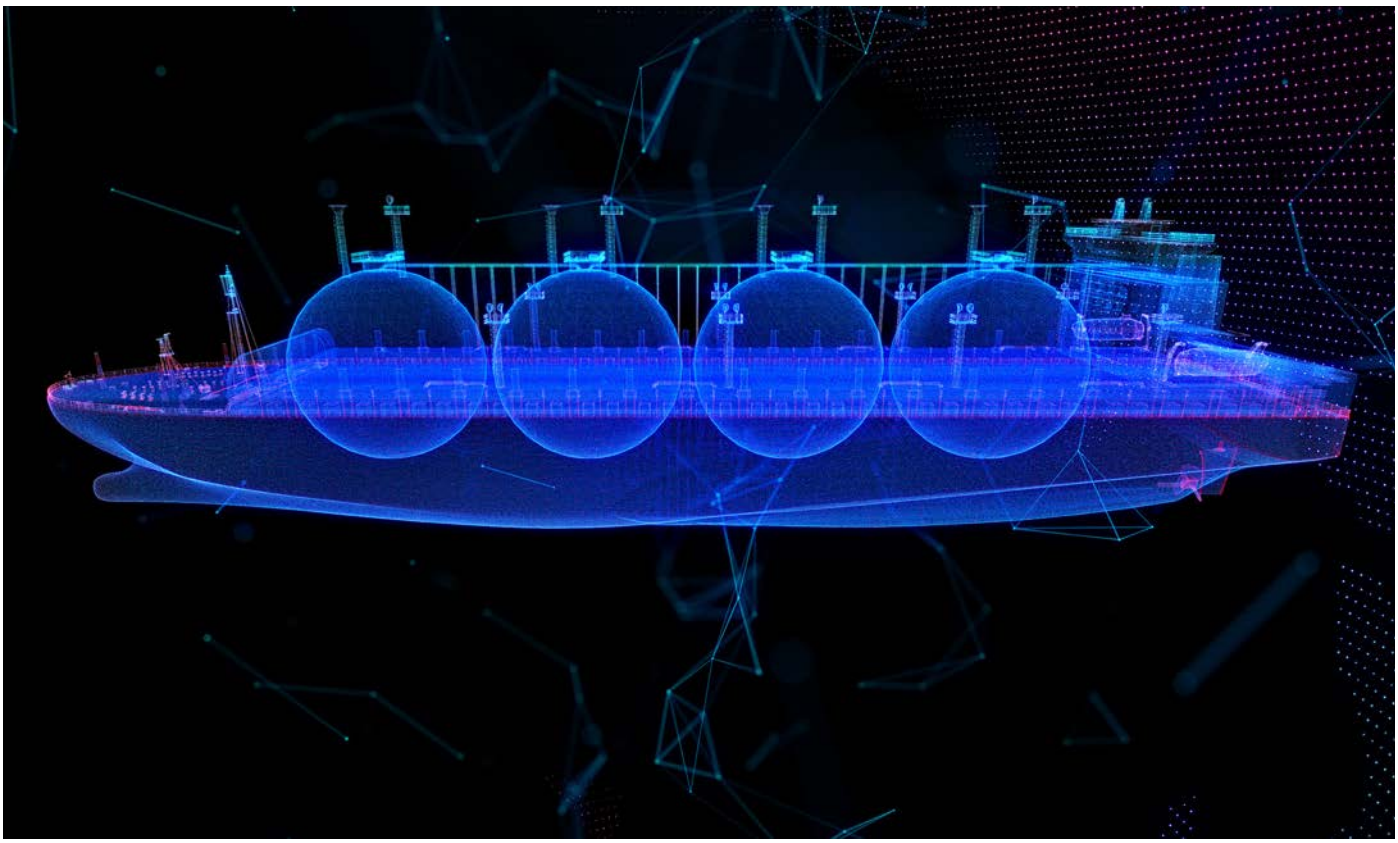
Beyond efficiency, Merzouki stressed the importance of designing ships today for fuels that may only become commercially available years from now.

Owners face a dilemma: vessels ordered today will operate for 25–30 years, but energy transition strategies remain fluid.

"Think ahead about what you will need from a hardware perspective," he said. "Maybe in your strategy you will use other fuels. Maybe in port you will need to operate with zero emissions, as required in the EU within the next seven years."

For LNG carriers, cold ironing—when ships are provided with electrical power from the shore while at port, is often impractical because cargo systems cannot simply be shut down. That makes alternative fuels—such as methanol, biodiesel, bio-LNG or e-LNG—more likely pathways. ABS says it is not a bad idea for owners to design ships so that future conversions are technically straightforward, even if the equipment is not installed at delivery.

That can include reinforcing tank tops to allow later



installation of deck-mounted fuel tanks, adjusting engine-room layouts to create space for future fuel systems, and planning routing for additional piping and ventilation.

"If you reinforce structures now, it costs almost nothing," Merzouki said. "If you try to do it later, you start touching insulation, containment systems, and the cost can double or triple."

Data, digitalisation and AI

A further layer of future-proofing lies in digital readiness.

Owners increasingly need continuous access to high-quality operational data to make maintenance, efficiency and routing decisions.

"You need to be prepared for AI," Merzouki said. "You need access to data to make operational and maintenance decisions and to optimise performance."

For ABS, that means helping owners establish digital architectures that allow data from engines, cargo systems and auxiliary equipment to be aggregated and analysed over time.

Bunker vessels: A different case

While many LNG bunker vessels today are essentially scaled-down LNG carriers, Merzouki pointed out they have different operational demands.

"LNG carriers are designed for long hauls," he said. "Bunker vessels move five miles, ten miles, sometimes 50. They are service vessels, not transport vessels."

Their operational profile is dominated by port manoeuvring, cargo transfer and short transits. That points towards hybrid or predominantly electric configurations.

"The best solution in many cases is diesel-electric hybrid," Merzouki said. "When you are alongside delivering cargo or services, you operate on batteries. When you move, engines start only to top up batteries or cover peaks."

Flexibility is also essential. A bunker vessel that delivers only LNG is commercially restrictive. ABS is seeing owners seek vessels capable of delivering multiple fuels, receiving heat, inerting fuel tanks of non-gas carriers and supporting different vessel types.

Containment systems further complicate matters. Type C, Type B and membrane tanks impose very different handling requirements. Vapour return, while standard at terminals, can contaminate bunker vessel cargo when servicing multiple ships.

"Commercially, you don't want to mix unknown vapour with your own cargo," Merzouki said. "You may need the capability to handle vapour, but not necessarily to return it into your tanks."

In the US, ABS has also worked extensively with articulated tug-barge LNG bunker concepts, where barges can be left loading or discharging while tugs move elsewhere, improving port logistics.

Methane slip: Multiple abatement pathways emerging

Methane slip remains the most contentious issue surrounding LNG as a marine fuel. Upstream fugitive emissions further up the LNG value chain are another key consideration.

On the upstream side, Merzouki said, major producers are increasingly monitoring and mitigating leaks from wells through to loading terminals.

At the engine level, however, regulation remains problematic.

"Studies based on continuous measurements show that fixed methane slip factors are too conservative. Real emissions are much lower."

That effectively penalises LNG relative to other fuels, he explained.

Nevertheless, methane slip is not negligible, and ABS sees multiple abatement pathways emerging. Engine manufacturers are modifying combustion chamber designs and control systems to reduce slip. After-treatment technologies are becoming available. More novel approaches involve partially cracking methane into hydrogen and carbon via pyrolysis, then blending hydrogen back into the fuel stream as a combustion catalyst.

You can reduce methane slip to almost zero. But we need continuous measurement and regulatory requirements

"You can reduce methane slip to almost zero," Merzouki said. "But we need continuous measurement and regulatory requirements.

ABS is also involved in studies examining methane emissions from cargo handling and conditioning systems aboard LNG carriers.

Is LNG future-proof?

For Merzouki, LNG's future-proofing lies less in the fuel itself than in its compatibility with blending.

Large liner companies are already planning to meet emission targets by blending conventional LNG with bio-LNG or e-LNG, in a similar way to biodiesel blending.

"The molecule is the same," he said. "That makes blending easier than with liquid biofuels."

Availability, however, will be constrained. Bio- and synthetic methane must compete with road transport, aviation and industry for biogenic CO_2 and renewable electricity.

"There is no free market supply chain today," Merzouki said. "If you don't have long-term supply agreements, you will not secure the fuel."

In parallel, methane pyrolysis and hydrogen blending can deliver emission reductions without relying on new fuel supply chains.

"No single solution fits all," he said. "It will be a combination of measures."

Alternative fuels: orders tell the story

Excluding LNG carriers, roughly 65% of new dual-fuel vessel orders today are LNG-capable, according to ABS data. Methanol accounts for just under 20% and ammonia remains at a nascent stage.

"We see some momentum on methanol because it is the easiest conversion for existing ships," Merzouki said. "But bunkering infrastructure is concentrated around major liner hubs."

For ships trading globally, LNG and conventional fuel oil remain the only fuels with widespread availability and proven technology.•

China's Evolving Gas Demand

Dong Liang, research fellow at the CNOOC Energy Economics Institute, examines the outlook for natural gas demand in China, from slowing growth trends and sectoral shifts to energy security, imports and the fuel's longer-term role in the country's energy mix | **Joseph Murphy**

How do you assess the outlook for natural gas demand growth in China over the remainder of this decade, particularly across the power, industrial and residential sectors?

Liang: Over the past decade, China's natural gas consumption has maintained a growth trend, although its growth rate has slowed down remarkably. The compound annual growth rate stood at 11.4% from 2015 to 2020, but this dropped to merely 5.5% in the period from 2020 to 2025. The pace of this growth deceleration has exceeded the expectations of many. Driven by urbanisation, commercial development and policy support, the residential sector has contributed to 80% of the total natural gas consumption increase over the past five years.

I believe that China's natural gas consumption will continue to grow. In particular, when carbon peaking is achieved in 2030, higher natural gas consumption will help keep the carbon emission peak at a relatively low level, thus facilitating the gradual achievement of carbon neutrality. Natural gas consumption will enter a plateau period and is projected to decline gradually after 2040, while its share in China's energy consumption structure will remain at around 9%. With the push to reduce emissions across various sectors, the residential sector will emerge as the most important sector in China for gas.

China has placed a growing emphasis on energy security in recent years. What role do domestic gas production and diversified import routes play in reducing exposure to external shocks?

Liang: In recent years, energy security has become a key issue of global concern. For China, natural gas accounts for approximately 8–9% of the country's primary energy consumption mix. Based on this proportion alone, external shocks would not pose significant risks. However, natural gas consumption in China is characterised by distinct seasonality, which I will elaborate on in the subsequent question.

LNG imports have been volatile since 2021. How do you see China balancing long-term LNG contracts with spot market purchases?

Liang: Long-term contracted LNG enjoys considerable price advantages. However, given the critical role of natural gas in China's residential sector, natural gas consumption in the country exhibits distinct seasonal characteristics. In particular, northern China requires enormous volumes of natural gas for heating in winter. To ensure such seasonal supply, spot LNG is indispensable in the Chinese market.

Pipeline gas from Central Asia and Russia has become increasingly important. How significant will incremental pipeline supplies be relative to LNG in China's future gas mix?

Liang: From the perspective of imports, there is no essential difference between pipeline gas and LNG. In 2025, the ratio of China's imported pipeline natural gas to LNG stood at approximately 8:9. The future changes in their respective proportions in China's import mix will depend primarily on price.

How competitive is natural gas likely to remain against coal and renewables in China's power sector, especially as electricity demand continues to rise rapidly?

Liang: Against the continuous advancement of coal power clean-up technologies and the rapid development of renewable energy power generation, despite the fast growth in electricity demand, the room for natural gas-fired power generation remains rather lim-

"I am fully confident about the future of natural gas in China"

ited. The core advantage of natural gas-fired power generation still lies in peak shaving. At present, price remains the key factor. If natural gas prices become more competitive, the prospects for natural gas-fired power generation will improve. However, as noted earlier, such prospects will only exist within a constrained scope of development.

Looking ahead to the coming decades, do you see natural gas primarily as a transition fuel in China, or as a long-term pillar of the country's energy system alongside renewables and nuclear?

Liang: As a 'worker' in the natural gas industry, I do not wish to predefine a scenario for natural gas. Labelling it either a transitional energy source or a complement to renewable energy may restrict our imagination regarding its application scenarios.

The share of natural gas in the primary energy consumption mix, both in China and across the globe, will hinge on the efforts of professionals in the natural gas sector. Chinese cuisine boasts distinctive characteristics, and the use of natural gas as a cooking fuel is inseparable from its preparation. Based on this alone, I am fully confident about the future of natural gas in China. This remark is half in jest, yet wholeheartedly sincere. •

Rethinking LNG construction

Amid inflationary pressure, LNG projects have increasingly shifted away from fixed-price EPC contracts in favour of cost-plus contracts where the owner bears more of the risk of higher costs, says Michael Webber, managing partner and co-founder of Webber Research | **Joseph Murphy**

Rising costs have forced a rethink of how LNG projects are built, with developments increasingly moving away from fixed-price engineering, procurement and construction (EPC) contracts in favour of structures that shift more risk back onto project owners.

According to US-based Webber Research, which estimates the timelines and cost curves of LNG projects globally, the shift reflects growing risks amid inflationary pressure.

Webber Research pursues a "granular approach" to estimating that progress and costs. It monitors construction work and cost, budget and labour curves on a quarterly basis, helping to identify potential risks, cost overruns and delays.

"We are turning this into an exact science, having granular in-depth coverage of each of these facilities, which are sometimes worth billions of dollars," Michael Webber, managing partner and co-founder of the firm, told *Petroleum Economist*. "We take a couple thousand data points and model it towards a couple dozen milestones using the same software packages the EPCs use."

That level of granularity matters, Webber said, because some LNG projects reach FID only to see momentum stall.

The pressure on EPC structures has been driven first and foremost by inflation. Construction costs have risen sharply across major LNG-building regions, while long-term LNG pricing has failed to keep pace, squeezing project economics. Costs have ramped up particularly in the US, where the sheer number of new projects underway has driven inflation, Webber said. He highlighted the shortage of skilled workers as a particular constraint.

"There are only so many qualified welders," he said. "Prices go up."

Previously, most LNG projects were built under lump-sum turnkey contracts, under which an EPC contractor guarantees a fixed price and absorbs most of the risk of cost overruns—whether caused by delays resulting from bottlenecks or spikes in labour or material costs. Amid heightened inflation seen in recent years, this model put contractors under significant strain. One prominent example was Zachry Holdings, which went bankrupt in 2024, citing cost overruns at the Golden Pass LNG project, where it had been serving as EPC contractor.

We are turning this into an exact science, having granular in-depth coverage of each of these facilities, which are sometimes worth billions of dollars

As costs have ramped up, particularly in the US, where the sheer number of new projects underway has driven inflation, many new developments, particularly greenfield ones, have instead moved to reimbursable, or cost-plus, contracts. In those structures, headline costs appear lower at sanction, but the owner bears the risk of escalation.

"There is no fixed cost," Webber said. "If you have to bring in more people or augment something else, the owner's paying for that."

While this model helps shield EPC contractors from risk, it creates more overall risk for the projects.

"We are seeing a shift towards more creative EPC structures, but that also drives more risk for projects." While reimbursable contracts can improve headline returns at FID, they introduce what Webber described as "tail risk" – the possibility that final costs overshoot expectations by a wide margin.

Construction delays impact the global supply balance—slippage in project timelines, particularly outside the US, could push some of the next wave of LNG capacity further to the right, extending the current period of relatively strong export economies.

"We believe that some of that project slippage will extend the period of positive economics," Webber said, potentially by as much as a year. While delays at projects such as Golden Pass LNG and LNG Canada are already well understood, he said the balance of timeline risk has increasingly shifted towards international developments.

Meanwhile, producers are finding creative solutions to contain their costs. Modular construction, in which components are fabricated off-site and assembled at the terminal, has gained traction as a way to reduce on-site labour intensity. "You build the modules in China or Italy and bring them in," Webber said. "It takes fewer people on site to install them."

Technological evolution is also playing a role, particularly in pre-treatment, although Webber cautioned that newer systems can introduce trade-offs when feedstock compositions change. "Legacy technology is a known quantity," he said, likening it to "an old pickup truck" that can be adapted when conditions shift.

Project outlook

Looking ahead, Webber expects the US to continue sanctioning new LNG capacity, supported by a favourable political environment. "Without such a supportive administration, the window probably would be closed," he said, though he added that only one or two additional US projects are likely to reach FID in this cycle, with expansions at existing sites more competitive than large greenfield builds.

Internationally, he sees scope for smaller and floating projects to emerge in regions with stranded gas and favourable logistics, even as large-scale developments become harder to justify. Over time, he expects Russia to return to global LNG markets once geopolitical constraints ease, adding further pressure to an already crowded supply outlook •

The LNG Demand Bottleneck

Panellists say demand growth will hinge less on the level of global supply and more on the pace of downstream buildout, policy clarity and bankable market frameworks | **Joseph Murphy**

The looming surge in global LNG supply will not spur a strong demand response without the faster buildout of regasification and supporting infrastructure, clearer policy signals and bankable frameworks that make downstream projects more profitable, panellists at the 'LNG's Role in Meeting Growing Energy Demand and Supporting Economic Development' session at LNG2026 said.

Excelerate Energy CEO Steven Kobos, Santos CEO Kevin Gallagher and Sasol CEO Simon Baloyi noted that future LNG demand growth was likely to be concentrated in emerging markets across Asia, Africa and parts of Latin America. With the third major wave of global LNG supply well on its way, liquefaction capacity is no longer the binding constraint to the market's growth. Instead, the critical bottleneck is the pace at which downstream infrastructure and market ecosystems can be developed.

The gains that can be made from relieving this constraint are significant, the executive argued. Expanding gas access can improve energy security and affordability, cut local pollution by displacing coal and other dirtier fuels, and provide dispatchable power that complements renewables in regions where electricity access and reliability are persistent problems.

Opening up new markets

Excelerate's Kobos said the company's more-than-two-decade strategy has centred on opening new downstream LNG markets, rather than competing upstream.

"We've always focused on needing to open new markets to LNG," Kobos said, citing Kuwait as an early example. Excelerate introduced LNG imports there in 2009, commissioning a terminal at Mina Al-Ahmad. The country now imports roughly 6mt/yr. Since then, Excelerate has supported market entry in countries including Bangladesh, Pakistan and Argentina.

Excelerate operates across a wide range of scales, from large floating storage and regasification units (FSRUs) to small, modular systems. Kobos said its FSRU fleet represents around 55mt/yr of regasification capacity, but the company also deploys much smaller assets, including truck-mounted and small land-based terminals, often linked to power plants in a hub-and-spoke configuration.

"You need the full gamut of downstream LNG assets to open these markets effectively and successfully," he said.

Whether LNG can be integrated quickly depends heavily on a country's starting point. In markets with existing gas pipelines and industrial users, Kobos said LNG can be "plugged in" to offset declining domestic production. In countries with little or no prior exposure to natural gas, however, developers often need to move further downstream to create anchor demand.

"In those markets, you're probably going to go further downstream to try to create anchor pull-through demand," he said, adding that gas-to-power projects are frequently central to that strategy.

Kobos argued that, while the industry has invested heavily in liquefaction, downstream infrastructure has lagged.

"There are a lot of really amazing, capable people out there in liquefaction," he said. "Where we have a shortage of investment, where we have a bottleneck, quite frankly, is downstream."

More LNG for Asia

Santos' Gallagher said LNG remains central to meeting rising energy needs across Asia-Pacific, particularly in economies seeking to expand electricity access and industrial activity.

Santos has been involved in LNG since 2003 and is a partner in three projects in Australia and Papua New Guinea. Gallagher said these assets are located about one week's sail from Asian customers and collectively provide more than 10% of Japan's LNG supply.

Once the Barossa project reaches full output, Santos' LNG contribution will be around 7mt/yr, he said, adding the project recently shipped its first cargo to Japan.

Gallagher linked LNG growth to the challenge of energy poverty, noting that around 750m people globally lack access to electricity and roughly 2b rely on traditional biomass such as wood, charcoal or dung for cooking.

"We see a huge opportunity to bring those economies out of energy poverty by providing affordable, reliable energy supply," he said.

He also said Santos has adapted its commercial strategy as markets become more volatile and customers demand greater flexibility. Rather than relying almost exclusively on long-term contracts, the company now targets a mix of long-term and mid-to-short-term agreements, alongside some exposure to spot markets.

"We target around 85% of our contracts being a combination of long-term and mid-to-short-term," Gallagher said, with shorter contracts typically running 2–5 years. Santos also aims to maintain around 15–20% exposure to spot volumes, allowing it to benefit from tight market periods and price volatility.

Pricing and contract structures have also evolved, Gallagher said, with fewer traditional rigid arrangements and more flexibility on destination, specifications and pricing indices, reflecting end-user preferences for price stability and optionality.

Policy clarity is a critical enabler of this shift. Gallagher said that, after years of uncertainty about the future role of gas in the energy mix, governments across Asia-Pacific have become more explicit about supporting gas alongside renewables.

"More recently, countries like Japan and some of our other customer nations across Asia have made it clear what the role of gas is going forward," he said, adding that Australia's future gas strategy has also helped restore investor confidence.

When we think about LNG, it's super critical from an emerging market point of view that you have to think about it beyond just molecules – Baloyi, Sasol

LNG as part of an ecosystem

Sasol's Baloyi said LNG must be viewed as part of an integrated energy ecosystem in emerging markets, rather than simply as a traded molecule.

"When we think about LNG, it's super critical from an emerging market point of view that you have to think about it beyond just molecules," Baloyi said.

Sasol has supplied domestic gas into South Africa for around 20 years and has seen firsthand how gas can stimulate power generation, industrial development and employment. In South Africa alone, Baloyi said, around 700,000 people across various industries depend on gas.

The country remains heavily reliant on coal for power generation, creating a large opportunity for gas-to-power as part of efforts to reduce emissions and improve system reliability.

Baloyi said similar dynamics apply across Sub-Saharan Africa, where around 600m people lack access to electricity. While renewables will play a growing role, their intermittency means dispatchable gas-fired generation will remain essential.

He also highlighted three enabling conditions for LNG and gas development: policy coherence, demand aggregation and alignment between public and private actors.

"Aggregation allows players to come in and set the rules necessary for everyone," Baloyi said, warning that fragmented demand and unclear regulation can deter investment.

Across the panel, speakers stressed that abundant future LNG supply alone will not guarantee demand growth. Converting molecules into sustained consumption will depend on faster downstream buildout, pragmatic policy frameworks and commercial structures that balance bankability with flexibility.

But if those pieces fall into place, they argued, LNG could underpin the next wave of global electrification and industrialisation—while delivering tangible benefits in affordability, reliability and environmental performance. •

Meeting the AI Energy Challenge

Artificial intelligence is pushing electricity demand beyond the limits of existing grids, increasing the role of gas and LNG in energy system planning as a fast, flexible solution | **Joseph Murphy**

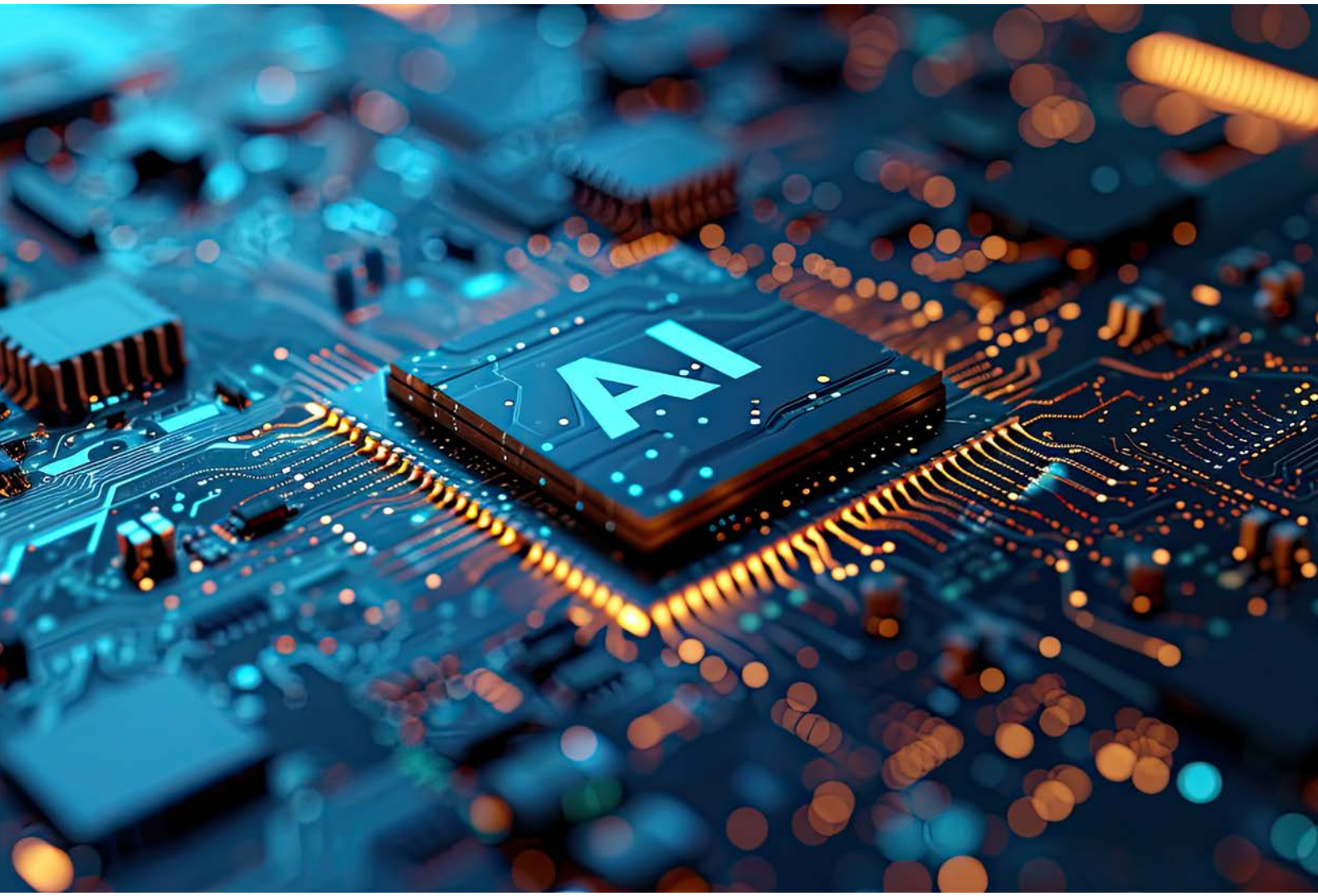
AI-driven power demand is accelerating faster than grids can respond, pushing gas—and LNG—back to the centre of energy system planning, panellists said at 'Powering AI: Meeting the Energy Demands of the AI Data Centre Boom' session at LNG2026.

The panellists, from the fields of power technology, infrastructure and environmental advocacy, agreed the surge in electricity demand from datacentres and AI workloads is not creating a new trend so much as violently accelerating an existing one. Electrification of transport, homes and industry was already under way globally, but the arrival of large-scale AI computing has placed unprecedented strain on grids that were never designed for such rapid, concentrated load growth.

The unforeseen datacentre boom

Mark Brownstein, senior vice president for energy transition at Environmental Defense Fund, said the world is now confronting the collision of two forces: long-planned electrification and an "almost out of nowhere" datacentre boom. Systems already under pressure from decarbonisation policies, electric vehicles and grid ageing are now facing new technological, logistical and financial stress. In that context, gas has re-entered the picture, not as a default solution but as a response to the limits of renewables-only pathways in meeting round-the-clock demand.

Brownstein argued that LNG will play a role but warned its footprint will matter as much as its availability.



If AI is to deliver broad social benefit, he said, the energy underpinning it must demonstrate credible environmental and social performance, from methane management to lifecycle emissions.

From the power technology side, Andreas Pistauer, vice president of sales services at Siemens, said the power sector is now in what he described as a "supercycle" unlike anything seen in decades. Having spent more than 25 years across conventional and renewable power, Pistauer said the industry is confronting simultaneous pressures: surging new demand, replacement of ageing assets, the retirement of coal-fired stations and the need for grid stability in systems increasingly reliant on variable renewables.

The scale of datacentre demand alone is staggering, he said. Conservative estimates point to around 950TWh of incremental global electricity demand by 2050, with aggressive scenarios reaching 1,800TWh—equivalent to adding the combined power consumption of several large, industrialised economies. At the same time, power plants themselves have finite lifetimes, meaning new capacity must both cover growth and replace older generation that is decommissioned.

What this means for natural gas

That demand shock is already reshaping investment behaviour. Rich Voorberg, chief infratech officer at Quality Growth, said the US gas turbine market offers a stark illustration. As recently as 2022–23, Siemens sold no gas turbines in the US, amid political and regulatory hostility. Within a year, that had flipped to hundreds of units sold, as utilities and large power users scrambled for dispatchable capacity.

Voorberg said the narrative around gas has shifted rapidly—from "transition fuel" to what some are now calling a "destination fuel", although he suggested the reality likely lies somewhere in between. Hyperscale datacentre operators, he said, ultimately want zero-carbon power, but their immediate priority is securing reliable electricity now. The prevailing mindset has become "give me power today, and we'll figure out how to clean it up later", opening the door to gas paired with future carbon capture and other mitigation technologies.

Across the panel, speakers highlighted how datacentre developers are increasingly bypassing traditional grids altogether. Pistauer said multi-gigawatt "behind-the-meter" generation is becoming the default, driven by grid-connection delays stretching to seven years or more in parts of the US. Once on-site generation is installed, there is little incentive to switch back to grid power later, particularly as wholesale prices rise.

Yet the constraints are severe. Gas turbines now face delivery times of 3–4 years, while transformers, circuit breakers and transmission equipment are similarly delayed. Even where generation can be secured, permitting, skilled labour shortages and EPC contractor capacity are emerging as binding bottlenecks. Voorberg said fixed-price construction contracts have largely disappeared in the US, replaced by open-ended arrangements reflecting supply chain risk.

The arrival of large-scale AI computing has placed unprecedented strain on grids that were never designed for such rapid, concentrated load growth

Brownstein cautioned that the speed of AI technology evolution itself adds another layer of uncertainty. Chips, models and datacentre designs are changing so fast that projecting today's energy demand linearly into the future risks both over- and under-investment. For gas infrastructure in particular, he warned, the danger lies in building assets that fail to match future system needs.

He also stressed that, in many emerging markets without legacy grids, renewables remain the cheapest first option, with gas best positioned as a complement rather than a competitor—especially as battery technologies improve. In that context, gas's long-term viability will depend on how well it integrates with renewables, storage and flexible grid design.

On LNG specifically, panellists acknowledged the tension between capital-intensive, long-lead-time projects and the load-following role gas is likely to play in AI-driven systems. Brownstein argued that this places a premium on integrated planning of gas and power systems, including storage and fast-ramping turbine technology, rather than treating LNG as a baseload solution in isolation.

Maintaining a social licence

Brownstein also raised the issue of social licence, warning that economic fundamentals alone will not sustain LNG investment if public acceptance erodes. Drawing parallels with coal's decline, he said gas risks a similar fate if methane emissions and CO_2 from combustion are not addressed seriously. Managing methane emissions, which he noted accounts for roughly a third of current warming, is central to preserving gas's legitimacy.

If the industry responds decisively, he said, LNG can remain financeable and relevant. If not, the "perfect storm" analogy invoked repeatedly during the discussion could yet end badly. •

The LNG Project Pipeline is Thinning

A new wave of LNG supply may be hitting the market, but shovel-ready projects beyond those already greenlit are few and far between, says Jason Feer, global head of business intelligence at Poten & Partners | **Joseph Murphy**

While the global LNG market is approaching near-term oversupply, the pipeline of new projects capable of moving quickly to FID is thinning, Jason Feer, global head of business intelligence at Poten & Partners, told *Petroleum Economist*.

The third wave of global LNG supply is arriving, but shovel-ready projects beyond those that have already reached FID are relatively few in number, particularly in the US, Feer said.

"You had a record year last year for FIDs," he added. "You'll see some more this year, but after those three or four projects, nobody's in a position to go to FID, maybe for a couple of years in the US."

The market is beginning to price in the extra supply, which will put greater pressure on projects still at an early stage of development. "You can see that potential weakness reflected in the forward curves, if you look at JKM and TTF," Feer said, adding that prices are being pressured simultaneously by broader weakness in the oil market.

"The oil markets are abundantly supplied, and OPEC is not making a big effort to rein in production," he said. "That's pushing down Brent-related LNG prices at the same time that you're seeing more volume coming in."

Despite a gradual shift away from oil-indexed pricing over the past two decades, oil indexation still accounts for more than half of global LNG volumes sold. "Pretty much every contract signed before 2014 was crude-linked," he said. "And when those contracts expire, that volume tends to flow into spot or shorter-term markets rather than being replaced with new 20-year deals."

As prices fall globally, natural gas prices in the US rose sharply last year, with Henry Hub averaging about $3.5/m Btu, up from roughly $2.2/m Btu in 2024, raising concerns about the competitiveness of US LNG. Beyond weather conditions, higher LNG exports have driven demand higher, as have the growth of electrification and the development of datacentres.

Oil prices too have played a role. Brent and other benchmarks fell last year as OPEC+ eased its supply restrictions and other producers also ramped up output.

"There's an inverse relationship between oil prices and gas prices in the US," Feer said. "When oil prices are high, producers drill liquid-rich shale and you get a lot of associated gas. When oil prices fall, rig counts drop and associated gas production can fall."

Higher US gas prices have already had a material impact on LNG projects.

"We've seen a couple of projects go back to their offtakers and raise prices, because the banks wouldn't finance them at the lower prices they were offering," Feer said. "That's a really interesting trend—the US getting squeezed by declining global prices on one side and higher domestic gas prices on the other."

If you're not building, by the time you realise you need supply, it's too late

This all weighs down on the prospects for new projects. In North America, Feer noted that there were only a handful of projects that have sold enough volume and have their permits that are well positioned to move forward in the near term. He pointed to the 9.5mt/yr Commonwealth LNG project in Louisiana as one example, which is targeting FID early this year. Others include Delfin LNG and Texas LNG in the US, and Amigo LNG in Mexico. Cheniere is meanwhile planning to greenlight expansions at its sites in Corpus Christi and Sabine Pass in Texas.

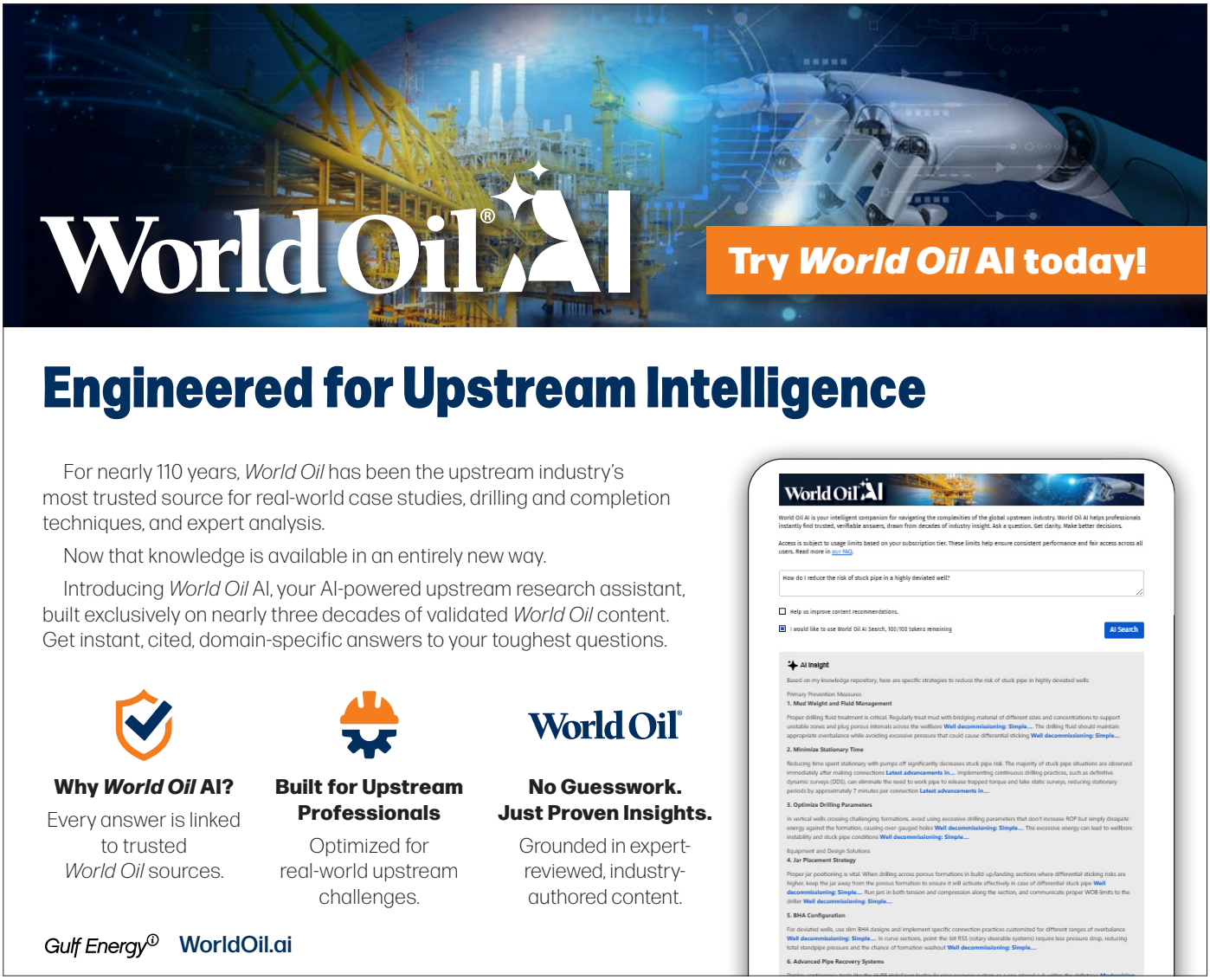
Outside the US, the picture is not much better, beyond further expansion of the North Field complex in Qatar. Security concerns have slowed progress on projects in Mozambique, while Argentina's maiden LNG project will require significant investment in midstream infrastructure such as pipelines and gas treatment, adding complications.

"Basically, the larder is bare; the pipeline is dry," Feer said.

This looming gap in project sanctioning will not have an impact in the near term, given the volume of supply arriving from already sanctioned developments in the late 2020s, but could cause a shortfall in production in the early 2030s.

In 2028, 2029 and 2030, the market looks pretty long," Feer said. "But if you don't build more plants, by 2031 or 2032 you will probably start to see the market tighten up again.

LNG projects take years to build, and delays today have long-term consequences. "If you put the brakes on for two or three years, that gets you from 2026 to 2029," Feer said. "And if you're not building, by the time you realise you need supply, it's too late." •



Innovations in Gas Purification and Treatment

Management at BASF discuss the German company's toolkit for improving gas purification and treatment | **Joseph Murphy**

Technological innovation continues to drive greater efficiencies across the global LNG value chain, strengthening project economics and, in many cases, helping to lower emissions. Speaking with *Petroleum Economist* on the sidelines of LNG2026, executives at BASF outlined some of the recent gas purification and treatment technologies that the German chemicals group has developed.

Gas purification

Peg Greene, global segment manager for gas purification at BASF, discussed the company's advanced absorbent technology, known as Durasorb® LNG Max, which simultaneously removes water and heavy hydrocarbons at an LNG liquefaction plant.

"Traditionally, that's the molecular sieve unit, where it would just remove water," Greene said. "We are basically upgrading that unit to have a dual purpose—water removal and heavy hydrocarbon removal."

The technology is particularly relevant for US Gulf Coast LNG projects, which typically receive lean, pipeline-quality gas that has already undergone extensive upstream processing. Greene said this type of gas often contains only trace levels of heavy hydrocarbons, making the downstream hydrocarbon removal unit ineffective.

Peg Greene, global segment manager for gas purification, BASF

"You actually just don't have enough heavies to have those mechanical separation techniques work," she said. "So, what we do is we remove those heavy tails. It's lean gas with a heavy tail."

While concentrations are low, Greene said these heavy hydrocarbons can cause significant problems once the gas enters the cryogenic section of an LNG plant. As the gas is cooled for liquefaction, heavier components can freeze, increasing pressure drop in the cold box and forcing operators to turn down or shut down trains.

"This causes a turn-down or complete shutdown of the train, and the producers end up losing LNG production," she said.

By capturing heavy hydrocarbons in the adsorption section, BASF's technology prevents those components from reaching the cold section at all. "The heavies never even make it downstream, and the unit continues to run and produce LNG the way it should," Greene said.

Greene pointed to the technology's application at the ten-train Elba Island LNG in Georgia, where BASF replaced conventional molecular sieve material with its adsorbent.

"The heavy hydrocarbons were freezing, forcing the shutdown of units every 2–3 months," she said. "Operational complexity was therefore through the roof."

BASF installed Durasorb® LNG Max at the first of the Elba Island trains in July 2022, and freezing has not occurred since, according to Greene.

The benefits are twofold: increased LNG production through reduced downtime and avoiding the cost of frequently cleaning the equipment. Elba Island has since implemented the technology across additional trains.

BASF also provides mercury and acid gas removal technologies. Beyond LNG, its technologies also have applications in the low-carbon energy segment. Depending on how hydrogen is produced and used, BASF supplies catalysts and adsorbents to remove impurities along the value chain.

In carbon capture and storage applications, BASF has developed its OASE© blue gas treatment technology for post-combustion carbon capture, which absorbs

CO_2 from flue gas streams. It removes water from the CO_2 before it is fed into a pipeline, which is necessary because wet CO_2 is corrosive. BASF's Sorbead adsorbent removes water from the CO_2 stream and is specifically designed to withstand acidic conditions. Greene said BASF positions Sorbead as a more robust option than molecular sieves for this service.

More broadly, Greene said BASF sees itself as a gas-treating specialist that can provide a complete pre-treatment solution for LNG plants, working alongside engineering partners to deliver optimised designs.

"We're really going to the market saying that we can take care of that part for you," she said.

Gas treatment

Petroleum Economist also spoke with Ashraf Abufaris, BASF's head of gas treatment for the Middle East and Central Asia. Producers in those regions are increasingly focused on maximising production from existing gas facilities while limiting capital spending and reducing both their energy use and their carbon footprint.

"Most companies today are trying to limit their investments while still maximising production as much as they can," Abufaris said. "The first step is to modify existing assets and help enhance capacity with the lowest possible footprint in terms of energy consumption."

He said BASF's technologies are being applied across gas production plants and LNG facilities to support that objective, with a focus on both operational efficiency and cost optimisation.

BASF draws on more than 50 years of experience, applying its gas treatment technologies at more than 500 plants around the world in that time, Abufaris said. The company has embedded this experience into its proprietary design software, known as OASE© connect.

"With this software, we can design these plants with the use of our technology to optimise the energy consumption to very low margins," he said.

The software allows BASF to reduce equipment sizes, lower energy consumption and tailor solvent formulations to improve regeneration efficiency in cyclic gas treatment processes.

With this software, we can design these plants with the use of our technology to optimise the energy consumption to very low margins – Abufaris, BASF

Regional operating conditions also shape technology selection. High ambient temperatures across much of the Middle East increase cooling requirements and energy demand.

"Once the temperature is high, you need energy to cool down the system," Abufaris said. "With our technology, we help them to operate at higher temperatures without over-reducing the cooling requirement."

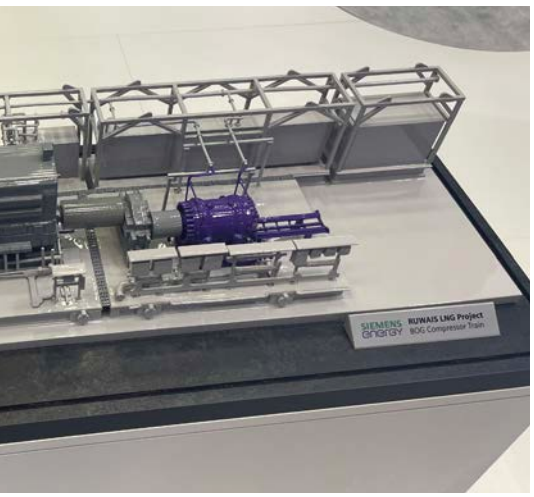
By reducing cooling duty and regeneration energy, BASF helps lower overall power consumption and associated emissions, he added.

Looking ahead, Abufaris said BASF is combining its historical process knowledge with AI and digital tools to improve plant performance.

"We're trying to develop systems that can do digital twinning, where we can read the plant data, transfer them to our cloud system, and with that we can always help to troubleshoot, to find solutions, and to improve the operational experience," he said.

He said these digital capabilities are intended to elevate operators' ability to identify bottlenecks, optimise performance and respond more quickly to emerging issues •

Ashraf Abufaris, head of gas treatment for the Middle East and Central Asia, BASF



Ruwais e-LNG Project Sees Compressor Win

Siemens Energy details how a double end drive compressor configuration improved efficiency, reduced emissions and lowered lifecycle costs for ADNOC's Ruwais e-LNG project by aligning compressor design with real operating profiles | **Jim Watkins,** European Business Development Director, Gulf Energy Information

Siemens Energy presented a detailed case study on boil-off gas compression for the Ruwais e-LNG project at LNG2026, outlining why a double end drive compressor configuration was selected over a conventional tandem arrangement. The project serves as a reference for how compressor architecture, operating philosophy and life-cycle economics can be optimised simultaneously for large, low-carbon LNG developments.

The Ruwais e-LNG project comprises two liquefaction trains with a combined capacity of roughly 9.6mt/yr. Siemens Energy is supplying three boil-off gas compressor trains to manage vapour handling during both ship loading and holding operations. Each train consists of a low-pressure compressor followed by a combined medium- and high-pressure compressor section. In total, the configuration includes six compressor casings across the three trains.

The low-pressure compressor is a horizontally split, straight-through design, while the medium- and high-pressure section is a back-to-back machine. The compressors are driven by fixed-speed motors using a double end drive arrangement, with speed increasing gearboxes and inlet guide vanes used for control. This approach allows each compressor section to operate at its own optimised speed rather than forcing all stages to run at a single common speed.

Operational flexibility was a key driver behind the design. During ship loading, all three compressor trains operate simultaneously to manage peak boil-off rates. During holding operations, which represent the majority of operating hours, only two trains are required. This enables partial-load operation without recycling or quenching, improving efficiency and reducing unnecessary energy consumption.

A central design decision was the choice of a double end drive configuration instead of a tandem compressor arrangement. In a tandem configuration, all compressor stages are constrained to a single shaft speed. For Ruwais, this would have resulted in even higher discharge temperatures at the medium- and high-pressure stages, requiring additional intermediate cooling and increasing both power consumption and system complexity. By contrast, the double end drive design allows independent speed optimisation for the low-pressure and medium-high-pressure sections. This reduces discharge temperatures, eliminates the need for extra cooling equipment and improves overall efficiency.

Lifecycle analysis played a decisive role in validating the configuration. Siemens Energy worked closely with the client to model real operating profiles, accounting for the relative frequency of ship loading versus holding modes over a 30-year project life. When these profiles were applied, the double end drive concept delivered an estimated 2.7% reduction in power consumption per year compared with a variable frequency drive based tandem solution. For a project of this scale, that translated into a payback period of roughly 2–3 years.

The compressor trains are fully cryogenic, with materials qualified for temperatures down to -196°C. The sealing system uses a tandem dry gas seal arrangement, with primary seal vent gas routed back into the LNG system. This design effectively eliminates routine emissions and supports the project's zero-flaring, low-carbon objectives.

From an execution standpoint, the trains are supplied as modularised, fully tested units. Mechanical, electrical and control systems are integrated and validated at the factory, reducing site risk and commissioning time. The architecture also allows future expansion by adding additional compressor trains without major changes to the overall system.

Taken together, the Ruwais case demonstrates how compressor selection is no longer just an equipment choice: it's a system-level decision driven by operating philosophy, emissions targets, and long-term economics. For Siemens Energy and ADNOC, the result is a configuration that improves efficiency, reduces complexity and establishes a new reference for large-scale e-LNG projects. •

General Information

At LNG2026, we are committed to ensuring you have an enjoyable experience throughout this week. Please find below a few useful housekeeping guidelines:

Access to the Conference and Exhibition

Attendees will be asked to present government-issued photo ID at security every time they enter LNG2026. This can be in the form of a valid passport or a Qatar ID (QID) for residents.
Attendees are required to wear their badge AT ALL TIMES during LNG2026, including networking functions. Attendees will only be able to access the areas of the event included in their registration.

Dress Code

Business attire is requested for attendance at the Conference, Exhibition and all networking functions.

Download the Event App

The Event App is an essential tool to help you navigate the event and contains the programme for the week, speaker profiles, exhibition layout, networking features and much more.
For any questions on the Event App, our staff at the Event App Support Desks would be delighted to assist you. The desks are located in the Spider Area, Level 1 and the Registration Area in the Exhibition Foyer, Ground Level.
For any assistance, you can also email support@allintheloop.com.

Conference and Exhibition Refreshments

Morning coffee, lunch and afternoon tea are provided to all Conference delegates.
Kiosks are open in the Exhibition foyers for food and beverage purchases for exhibitors and trade visitors.

Prayer Rooms

Prayer rooms, male and female, are available in the Conference area located on Level 1, by the QNCC Spider Café.
Additional prayer rooms are also available on the Exhibition Mezzanine Level, Hospitality Suite 4 for female attendees and Hospitality Suite 7 for male attendees.

Accessibility

The QNCC is designed to ensure equal access for all attendees with limited mobility. If you require any assistance, please ask the Organisers.

Water Stations

Water fountains are available at your disposal throughout the venue.

Photography

Professional photographers are taking photos throughout the event. These images may be used in post-event reports and marketing collateral, and supplied to industry media. If you do not want your photo to be taken, please advise the photographer.

Media Centre and Press Conference Room

We have a dedicated Media Centre and Press Conference Room at the following locations:

- Room 105: Press Conference
- Room 106: Media Centre

For media and PR enquiries, please visit the Media Team at the Media Centre or contact the team at media@lng2026.com.

Delegate Gift Bag Collection

The Executive and Technical Delegate Gift Bag may be redeemed upon presentation of your registration badge at the Delegate Bag Collection Desk located on Ground Level, near Auditorium 2.

Emergency Procedures

In case of emergency, please follow the instructions given to you by security and venue staff.

Medical Support

The event is supported by onsite medical services, with professional healthcare teams and emergency response measures in place to ensure the well-being of all participants throughout the week. Our Medical Centre is located on Level 1, by the QNCC Spider Café.

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Cloakroom

Cloakrooms are located on:

- Ground Level–Conference Side
- Ground Level–Exhibition Side

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