



# LNG'S ROLE IN RESOLVING ASIA'S TRILEMMA

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# LNG's role in resolving Asia's energy trilemma

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The events of the past two years have led to structural shifts in the LNG industry's dynamics, growing awareness of the importance of natural gas to the global economy and new realism about the need for policymakers to resolve what has come to be known as the "energy trilemma"—how to meet the world's growing energy needs securely, affordably and sustainably.

The crisis of the past two years has demonstrated all too clearly what happens when the balance fails, and that investment priorities need to be recalibrated.

This is especially so in Asia, already home to more than half the world's people and with populations set to grow significantly by 2050. With most of Asia's economies falling into the category of "emerging and developing", energy demand will be growing robustly at the same time as countries are striving to meet their net-zero emissions pledges.

The overwhelming imperative, given the region's heavy dependence on coal, especially in electricity generation, will be to phase out this most polluting of fuels.

### We will need electrons *and* molecules

Renewable energy sources such as solar and wind power will play a major role—as they are already doing in China and India—but, as the technology stands, there will be a need for energy sources that can handle the intermittency and grid stability issues that high levels of renewable electricity pose. Also, implementing the required electricity delivery infrastructure will be a huge challenge. Moreover, not all energy demand can be electrified, so molecules will be needed along with electrons.

The race is on to develop low- and zero-carbon molecular fuels, such as hydrogen, biomethane and ammonia, and the infrastructure needed to get them to consumers. These themes too will be a focus for discussion at Gastech.

But transitions will take time. For the foreseeable future, natural gas will be a mainstay of Asian energy supply, and for most countries in the region this will require imports of LNG, even for countries like China that produce gas domestically and have access to pipeline supplies.

The outlook for future LNG demand in Asia is explored in detail in this report, starting on p8 and with a focus on energy security aspects on p15.

There is also a race to reduce the carbon intensity of LNG so that its climate impact is mitigated as much as possible, as Alan Heng, Group CEO of Singapore-based global energy merchant Pavilion Energy, explains in the article starting on p4—a theme explored further on p18.

Much has been said and written about the impact that the recent crisis has had on the reputation of LNG as a secure and dependable fuel; even the IEA has been questioning its future role as a transition fuel in Asia.

However, as we discuss on pages 16–17, the number of supply projects under construction around the world suggests that project developers and their buyers continue to believe in decades of future LNG demand growth, with most of that expected to be in Asia. **PE**

When the IEA released the latest edition of its influential *World Energy Outlook* at the end of 2022, the central message was surprisingly upbeat, given that the world was still going through "a shock of unprecedented breadth and complexity delivered by the energy crisis".

The IEA concluded that the crisis precipitated by Russia's invasion of Ukraine promised to hasten the transition to a cleaner and more secure energy future—with fossil fuels projected to peak earlier than previously thought. The agency was essentially echoing the adage of Britain's wartime Prime Minister Winston Churchill that one should "never let a crisis go to waste".

Government responses to the crisis were "accelerating energy transitions", said Executive Director Fatih Birol, pointing to the Inflation Reduction Act in the US, the European Union's REPowerEU plan, Japan's Green Transformation (GX) programme and ambitious clean energy targets—"supported by real money"—in the world's two most populous nations, China and India.

### What does the crisis mean for LNG?

As LNG industry leaders gather this September in Singapore for the Gastech 2023 conference, discussions will centre around what, specifically, the crisis means for the future of their business. As the articles in this report underscore, there is much to discuss.



**PAVILION ENERGY**  
Celebrating 10 Years of Excellence

## Pavilion Energy: Fuelling ambitions for a sustainable energy future

Singapore-based global energy merchant Pavilion Energy has taken a fundamental first step towards decarbonisation by encouraging its suppliers to document their greenhouse gas emissions. It continues to grow its LNG and natural gas portfolio to facilitate Asia's transition away from coal and is formulating a strategy to become a supplier of future fuels such as ammonia and biomethane to customers in Asia-Pacific, Europe and beyond

It may have looked like just another routine delivery, but the LNG carrier that docked at the Singapore LNG terminal on 16 May 2023—having travelled from Ras Laffan in Qatar—was carrying something special: Singapore's first-ever statement of greenhouse gas emissions (SGE) for an LNG cargo.

For Pavilion Energy, the cargo's buyer, it was the culmination of a process set in motion in 2020, when it launched a multi-year tender for LNG supply that required sellers to quantify the greenhouse gas (GHG) emissions associated with producing and delivering each cargo.

The question of how precisely that should be done was addressed the following year when—in co-operation with two of its LNG suppliers, QatarEnergy and Chevron—Pavilion Energy published the necessary SGE measurement, reporting and verification (MRV) methodology to drive greater transparency and stronger action on GHG reduction measures.

"Pavilion Energy was the first company to insist that suppliers provide a statement of GHG emissions with the delivered LNG cargo. We wanted our upstream suppliers to take responsibility in abating emissions along the value chain and that has encouraged other suppliers to do the same," says Pavilion Energy's Group CEO, Mr Alan Heng.

"It's generated a lot of conversations for the entire LNG

industry and brought greater awareness and impetus to the whole discussion."

That was certainly the case at the recent LNG 2023 conference in Vancouver, Canada, which brought together industry leaders and executives from around the world. One of the main topics of the presentations and discussions was the need to minimise the GHG emissions of LNG, because of the essential role it will need to play in the world's transition to net-zero GHG emissions.

"We recognise that energy transition is a journey and that natural gas will continue to have an important role in helping economies to transition to a low-carbon future," says Heng. "We advocate natural gas as a transition fuel of choice and continue to work to help the markets we operate in to tackle the 'energy trilemma' of security, affordability and sustainability."

That trilemma was another key theme at LNG 2023 because of the recent turbulence of energy—and especially natural gas and LNG—markets.

### Crisis and opportunity

The energy crisis of the past two years began in the second half of 2021 as demand surged after the Covid-19 pandemic and Russia began to reduce its pipeline gas exports to Eu-

rope. It was exacerbated by the impacts of Russia's invasion of Ukraine in February 2022, after which its gas exports to Europe plummeted. A major consequence has been to sharpen awareness of the critical role that natural gas plays in the global energy system and the flexibility that LNG brings to supply.

Russia's weaponisation of its pipeline gas supply to Europe led to a big reduction in global gas volumes, consequent price peaks that were previously unimaginable, and a fundamental reconfiguration of LNG flows as Europe sucked cargoes away from Asia—creating not just crisis but also opportunity, especially for an energy merchant company such as Pavilion Energy.

"We don't have any indigenous sources of gas in Singapore, so we are a price-taker," says Heng. "If we have to import LNG at prices of \$40–50/m Btu, that is a very expensive option."

Fortunately, Singapore has a tradition of long-term and mid-term gas contracts, for example, for piped gas from Indonesia—generally indexed to crude oil—and so has been partially insulated from the crisis.

"Obviously, we've been paying higher prices for incremental demand and that's been an issue," says Heng, "but the crisis has increased awareness that energy security is critical and that a diverse supply of piped gas and LNG, from different geographies, is important.

"As a company, it has sharpened our focus on risk management and the importance of supply reliability. We are significantly better at risk management and our middle office operations than we were back in 2021."

### Transformational transaction

Incorporated in 2013 as a wholly-owned subsidiary by Temasek—an investment company owned by Singapore's government—Pavilion Energy is celebrating its tenth anniversary in 2023. Notable milestones during that decade are shown on p6.

One of Pavilion Energy's first initiatives was to take a 20% stake in gas blocks in Tanzania in 2013, making it a partner in the country's proposed LNG export project, which has recently made significant progress, putting it on track for start-up around 2030.

"We think it's a great opportunity," says Heng. "It's going to be another production source that's not the US, not Qatar, and it sits beautifully in between the Atlantic and the Pacific basins."

Today, Pavilion Energy has a natural gas and LNG portfolio equivalent to 8m t/yr and in fiscal year 2022/23 traded and deliv-

ered 6m t/yr of LNG. It has a fleet of six LNG carriers, of which three are owned by a Pavilion Energy/BW Group joint venture.

"We delivered one LNG cargo in 2014," says Heng. "This year we will deliver 100."

A pivotal moment in Pavilion Energy's development came in mid-2019 when the company announced it was to acquire the LNG and natural gas assets of the Spanish energy company Iberdrola, a transaction which took effect from the start of 2020. That gave the company a foot in each of the two main LNG-consuming geographies—the Pacific Basin and the Atlantic Basin—and a physical presence in Spain, along with its existing operations in Singapore and Tanzania.

Pavilion Energy could not have foreseen what was to happen in Europe in 2022, of course—and the change that was to take place in the continent's dependence on LNG—making its move into Spain more transformational than it could have hoped for at the time of the transaction.

The Iberdrola deal gave Pavilion Energy 4m t/yr of long-term sale and supply LNG contracts; long-term regasification capacity of 2m t/yr at the UK's Isle of Grain import terminal; regasification capacity in Spain; pipeline capacity at the Spain/France border; and the time charter of a newbuild LNG vessel.

In a related transaction, Pavilion Energy agreed to supply gas to Iberdrola Generacion Espana, which carries out the group's deregulated activities of electricity generation and electricity and natural gas retailing.

Today, Pavilion Energy accounts for 10% of the LNG imported into Spain; is one of Spain's top five gas marketers; has gas licences in Spain, Italy, the UK, France and the Netherlands; and in March of this year delivered its 100th LNG cargo into Europe.

"When we entered the European market, the energy transition agenda was really full on," says Heng. "At the time, some people even asked why we were doing that, given that Europe was then an incremental buyer of LNG because Russian supplies made up the bulk of its requirement.

"But we've always seen access into Europe as critical to our strategic aim of building a global LNG trading business. The Atlantic Basin has become more and more important because of the amount of LNG the US is producing, making it the growth area for supply. If you don't have an angle into Europe, you run the risk of a one-legged operation.

**PHOTOS FROM LEFT:** Crew preparing for the arrival of the first SGE methodology-certified cargo in Singapore / First SGE methodology-certified cargo prepares to dock at the Singapore LNG terminal / Pavilion Energy's Group CEO, Mr Alan Heng

“Asia-Pacific is the demand centre—and has a growing requirement—but it’s a long way from the US Gulf Coast. By being able to play in two basins, we not only have more outlets that we can reach out to, but we also have the opportunity to arbitrage between the basins.”

Beyond the immediate trading opportunities, Heng also sees advantage in what Pavilion Energy can learn by being a participant in a region that leads the world in its energy transition ambitions.

“Europe is a far more evolved market than Asia,” he says. “European operations are integrated, there are active power, gas and carbon markets, and Europe is far further down the line in terms of the energy transition journey.”

“There are a lot of best practices that we can pick up from Europe, which we think will eventually come to Asia—maybe not today but within the next decade. The lessons are well worth learning.”

### Milestones on a decade of growth

- **APRIL 2013** – Incorporated by Temasek as a wholly-owned subsidiary, headquartered in Singapore
- **NOVEMBER 2013** – Pavilion Energy acquires 20% stake in natural gas blocks in Tanzania. Recent progress suggests these will feed an LNG export project due to start up around 2030
- **MAY 2014** – Pavilion Energy/BW Group joint venture formed to acquire, manage and charter LNG carriers
- **JANUARY 2016** – Awarded the LNG bunker supplier licence to supply LNG bunker to vessels in Singapore
- **OCTOBER 2016** – Pavilion Energy appointed as LNG importer into Singapore
- **JUNE 2019** – Acquisition of Iberdrola’s portfolio of LNG and natural gas assets to give Pavilion Energy a foot in both major LNG-consuming basins: Atlantic as well as Pacific
- **JANUARY 2020** – European operations begin with LNG trading and natural gas supplies into the UK and Spain
- **NOVEMBER 2021** – Along with suppliers QatarEnergy and Chevron, Pavilion Energy publishes its Statement of Greenhouse Gas Emissions (SGE) methodology for emissions verification of LNG cargoes
- **DECEMBER 2021** – Pavilion Energy agrees to fund C-Quest Capital’s cookstove programme across Southeast Asia
- **OCTOBER 2022** – Pavilion Energy christens LNG bunker vessel newbuild *Brassavola*
- **DECEMBER 2022** – Global LNG bunker supply MOU signed with Gasum and CNOOC to decarbonise the maritime sector
- **MARCH 2023** – Pavilion Energy delivers its 100th LNG cargo to the European Union, contributing to efforts to replace lost pipeline gas from Russia
- **MAY 2023** – Partners with Japan’s Asuene in trading of carbon credits to support companies’ decarbonisation goals
- **AUGUST 2023** – Pavilion Energy, together with CNOOC, completes first ship-to-ship LNG bunkering operation in China

Back home in Singapore, Pavilion Energy participates in the city-state’s ambitions to grow its role as an Asian LNG hub. It is one of four companies licensed by the Energy Markets Authority (EMA) to import LNG through the Singapore LNG terminal and its share of the domestic gas market is growing rapidly, from a third of downstream demand in 2019 to around 40% today.

“We have also created a presence in China,” says Heng, “by selling—through the Singapore LNG terminal—to a small-scale LNG facility there.”

The Singapore LNG terminal on Jurong Island has been expanded several times since its start-up in 2013, with the share of natural gas in Singapore’s electricity mix now at more than 95%.

It has two jetties, able to accommodate the largest LNG carriers, four storage tanks and average regasification capacity of 9m t/yr, with a peak of up to 11m t/yr. According to the EMA, there is room on the site for seven storage tanks and a throughput capacity of 15m t/yr.

### Bunkering realism

Another major strand of Pavilion Energy’s business is supplying LNG as a marine fuel, and it has been expanding its global presence through co-operation agreements.

Heng is bullish about LNG’s marine prospects—despite it being a fossil fuel—because of the current lack of realistic alternatives:

“The real question for any shipping line today is: do you keep waiting for the zero-carbon holy grail to come true or do you take advantage of a fuel that is cleaner today and start doing good with whatever we can, wherever we can, whenever we can—rather than waiting for the perfect solution?”

### Fuelling the future

For a company that’s ten years old, Pavilion Energy has done a fantastic job. Looking ahead to the coming decade, Pavilion Energy sees plenty of opportunities as the energy transition accelerates and future low- and zero-carbon fuels and technologies such as carbon capture, utilisation and storage (CCUS) gain momentum.

Alongside this, it continues to work to address the climate impacts of LNG, having taken delivery of its first carbon-offset cargo in 2021 and in May 2023 partnering with Asuene, a Japanese company specialising in the trading of carbon offsets, to advance the decarbonisation journey—but stressing that emissions avoidance is preferable to offsetting, wherever possible.

“We’ve built a platform largely founded on natural gas and LNG, but it’s a platform that can do a lot of other things, especially since we have access to global markets in two important basins,” says Heng.

“The question then becomes: how do we best utilise or maximise the value of this platform? How do we participate in the energy transition going forward?”

Pavilion Energy is already pursuing biomethane opportunities in Spain and is part of a consortium of organisations involved in the joint study of ammonia as an alternative marine fuel. It is looking at the viability of hydrogen production and import into Singapore and the potential of blending these gases into the gas network.

It is also studying the potential to embed CCUS technologies along the natural gas and renewable gas value chains in Asia and Europe.

“It’s a long journey,” says Heng, “but because we are already in the cleaner energy space, the question is: what’s the best way for the platform to grow? That is the strategic question we are looking into going forward.” **PE**

# Infrastructure buildout accelerates

## New import terminals mark rapid LNG expansion across Southeast Asia

Seth Haskell, research analyst, *Global Energy Infrastructure*

2023 has been a banner year for LNG in Southeast Asia. Despite a turbulent 2022 for LNG markets, Vietnam and the Philippines have opened their first import terminals and two additional terminals in the Philippines—Pagbilao LNG and FGen LNG—are expected to open this year. This marks the onset of a phase of rapid expansion for LNG in the region. The new LNG imports will supplement the falls in the regional production of gas, which currently fuels most of the region’s electricity generation. Southeast Asia will see at least 24m t/yr of new LNG capacity added over the next five years, growing the region’s import capacity by 45%.

Most of this growth in LNG import capacity will occur in the Philippines and Vietnam. Collectively, across ten projects, the countries will add at least 22m t/yr of capacity between now and 2027, with the two terminals already opened this year representing an additional 6m t/yr. Projects currently considered early stage or speculative will likely grow capacity further, especially in Vietnam.

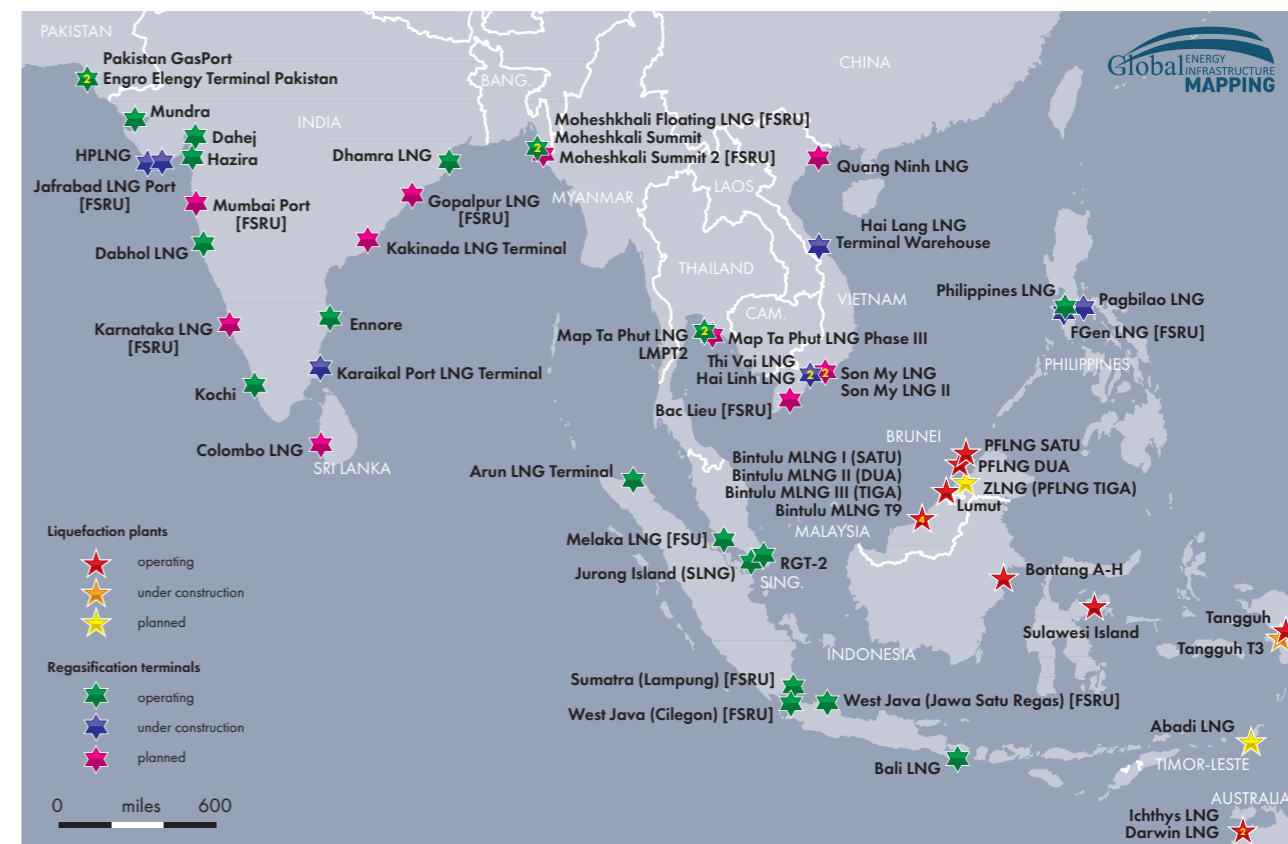
Thailand is also bringing additional LNG projects online. While domestic gas continues to cover c.80% of Thailand’s consumption, LNG’s role has steadily grown over the last decade, with imports rising from 1m t/yr in 2011 to 11m t/yr in 2022. A second LNG terminal in Map Ta Phut

was opened last year, and an expansion to the original Map Ta Phut terminal is planned. Import capacity could rise as high as 19m t/yr by the end of 2027—enough to support more than half of Thailand’s current gas consumption.

Other importers in Southeast Asia—Malaysia, Indonesia and Singapore—are not developing additional import capacity. However, Malaysia and Indonesia are building additional liquefaction capacity and their regasification terminals will continue to be important for supplying gas to major cities and small islands that are difficult to connect via pipeline domestic gas resources.

As for Singapore, an LNG terminal opened in 2013 has helped the country to diversify its gas supply away from Malaysia and increase energy security. However, although the terminal on Jurong Island imports enough gas to supply c.40% of Singapore’s gas, it still operates significantly under capacity and there is little reason to add new regasification facilities. **PE**

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LNG terminals in South and Southeast Asia



# Energy crisis resets expectations for Asia-Pacific LNG demand

**Loss of a large volume of Russian natural gas from global supply has had two big impacts. It has shown how dependent the world is on natural gas and the importance of LNG's flexibility, but it has also called into question the reliability and affordability of LNG, especially in the price-sensitive markets of Asia-Pacific, the main demand centre. What does this mean for LNG growth in the region?**

On the very day that Russian President Vladimir Putin launched his full-scale invasion of Ukraine—24 February 2022—energy industry leaders from around the world were at a conference in London, warning of a history of complacency around security of energy supply. “If energy flows are interrupted, we’re in uncharted territory in terms of how the energy market will respond,” said one CEO.

A year and a half on, as the LNG industry converged on the Canadian city of Vancouver for the LNG 2023 conference in July, the global impacts of a major interruption of natural gas flows from Russia to Europe were all too clear—not least in statistics published at the event by the International Gas Union (IGU) in its latest LNG report.

The focus on how this has affected markets in Asia-Pacific—and what the implications are for future demand growth in the region, not just in the

short term but also post-2030—will be even sharper at the Gastech conference in September, which this year takes place in Singapore, a growing regional LNG hub.

## Price sensitivity sorely tested

As Russia weaponised its pipeline exports to Europe during 2022, and Europe then scrambled to replace as much of the lost gas as possible with LNG, there was a fundamental reconfiguration of LNG trade dynamics, as cargoes were drawn away from Asia-Pacific. The price sensitivity of LNG demand in Asia-Pacific was sorely tested, not just in South Asian markets such as India, Pakistan and Bangladesh but also in more established markets such as China, where demand collapsed by a fifth, after years of robust growth.

“Securing energy supply came at a high cost to European consumers, who had to pay a high price premium

to receive priority new volumes in record short periods,” says IGU President Li Yalan, who is also chairman of Beijing Gas Group. “Consumers in other parts of the world, especially Asia, could not afford the high spot market prices, and had to switch to dirtier fuels and shed demand.”

A tightening of the global gas market that began in late 2021, as Russia began to curtail pipeline gas exports to Europe amid a post-Covid demand surge, accelerated with the invasion of Ukraine, sending natural gas and LNG prices skywards. According to the IGU report, the Platts JKM benchmark hit a record high of \$84.76/m Btu on 7 March 2022 while the Platts TTF assessment reached its all-time high of \$93.81/m Btu on 26 August 2022.

While LNG played a crucial role in keeping lights on around the world, the gas crisis came at a high cost, not just to consumers and suppliers but

also to the environment as widespread switching to coal and oil, especially in price-sensitive Asian markets, pushed up greenhouse gas (GHG) emissions.

Data recently published by GIIGNL, the association of LNG importers, shows that Indian imports in 2022 were down by 4.1m t year-on-year, Pakistan’s by 1.3m t and Bangladesh’s by 0.7m t.

LNG demand in China collapsed by 16m t to 63.3m t, as zero-Covid restrictions also impacted gas demand. That decline was the major factor in LNG imports into Asia-Pacific falling by 8% year-on-year, or 20.6m t. It remained by far the leading importing region, but its share of global trade plummeted from 73% in 2021 to 65% in 2022.

## Crisis ‘not yet over’

“LNG saved the day and provided energy security,” says Li. But she cautions that, while prices have eased considerably in 2023, “the level of risk and uncertainty remains high, the market is still out of balance and the crisis is not yet over.”

Two major concerns hang over the market as winter 2023/24 approaches in the northern hemisphere: possible further loss of Russian pipeline gas and the harsh reality that little new LNG production capacity is expected over coming months.

Uncertainty is heightened by worries over how harsh winter may be; mild weather in Europe and Asia helped to ameliorate shortages during winter 2022/23. There is also the ever-present risk of unexpected outages at liquefaction plants, like the explosion in June 2022 that put the 15m t/yr Freeport LNG project out of action for eight months.

## Three-year wait for new supply wave

“The loss of Russian pipeline gas is a loss to the global system and has not been redirected elsewhere in the way that oil has been,” said Michael Stoppard, global gas strategy lead and special advisor at information provider S&P Global Commodity Insights, during the final plenary session of LNG 2023.

“LNG has shown extreme flexibility, but it’s not been able to add incremental molecules overnight to the global system. Those spot prices that we produce at S&P Platts are telling us about the pain being felt by buyers all over the world because of gas stranded in western Siberia.

“The platform for a new wave of supply is being set up [see article on p16] but that will be a post-2026 phenomenon. So, there is going to be a lot of soul-searching about how we get through the next three

years, as we reshuffle existing trade between different regions of the world.”

That loss to global supply could grow in coming months if Russia imposes further supply cuts. In a report on gas supply security published ahead of July’s LNG Producer Consumer Conference in Tokyo, the IEA cautions that:

“A cold winter, together with a full halt in Russia piped gas supplies to Europe early in the heating season, could easily renew market tensions. Fierce competition for gas supplies could also emerge if North-east Asia experiences colder-than-usual weather and economic growth is stronger than expected in China.”

There is broad consensus that Chinese demand growth remains a major uncertainty for the global LNG market during 2023.

“We expect natural gas demand to come back but we’re not seeing China roaring back to life,” says Laura Page, principal LNG analyst at Kpler, a provider of commodity analysis. She points out that any increase in gas demand would be met partly by rising domestic production and growing imports from Russia as the Power of Siberia pipeline ramps up to full capacity.

“There is some room for growth in LNG import demand this winter,” says Page, “but it will be limited and will depend on the economic situation and temperatures. We could see up to around 3m t of additional LNG demand, supported by long-term contracts and an increase in re-gasification capacity.”

## LNG appetite returns in South Asia

Months of decline in spot LNG prices to around the \$10/m Btu level appears to have renewed appetite for LNG in the economies of South Asia, with Pakistan

recently announcing a deal with Azerbaijan’s SOCAR for one cargo a month and confirmation that a third import terminal in Bangladesh is moving forward.

Both countries increased their LNG imports in the first four months of 2023, though Pakistan struggled to attract bids for its recent tenders for spot cargoes.

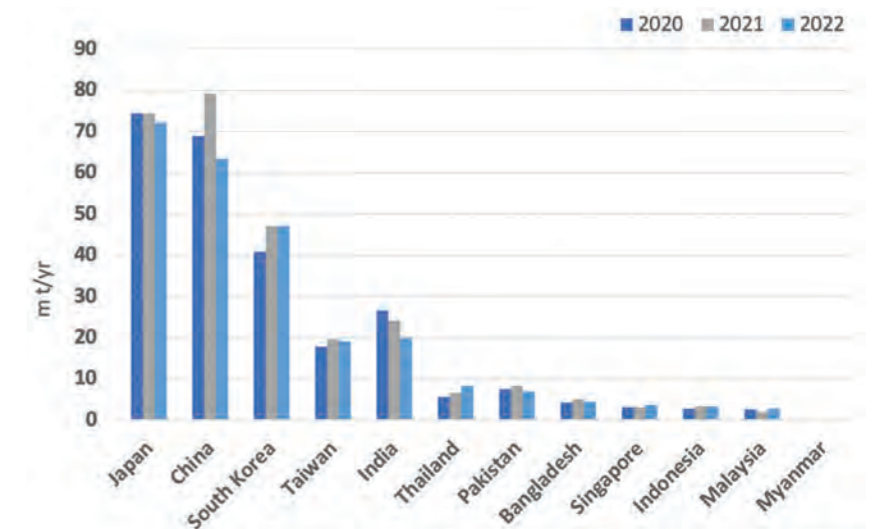
India saw the start up of its seventh LNG import terminal in March as a commissioning cargo arrived at Dhamra LNG, taking total regasification capacity to 48m t/yr, but utilisation has been low and demand in 2023 is expected to be flat after last year’s fall.

The IGU’s LNG report warns that projects in South Asia “face notable delays”, due to the spot price spikes globally in 2022 and downward pressure on economic development. This is leading to “a lack of incentives for investors” and poses “potential risks for the region’s LNG demand outlook”.

Several markets in Southeast Asia grew their LNG imports in 2022—among them Thailand, Malaysia, Indonesia and Singapore, where imports were up 19% to 3.7m t—but newly opened markets in the Philippines and Vietnam are not expected to import material volumes in 2023, partly because of their dependence on spot cargoes but also because some downstream customers are not yet ready to take gas.

In the established markets of Japan and South Korea, imports are expected to fall during 2023, as more nuclear power plants restart amid lower demand for power because of energy-saving efforts. Taiwan is phasing out nuclear power but faces LNG import capacity constraints.

The latest forecast from the IEA is that global LNG trade will grow by 4%, or 16m t/yr, during 2023, with growth largely driven by Asia-Pacific. It expects China’s demand to increase by 15% year-



Source: International Group of Liquefied Natural Gas Importers (GIIGNL)

FIG.1: LNG imports into Asia-Pacific, 2020–2022

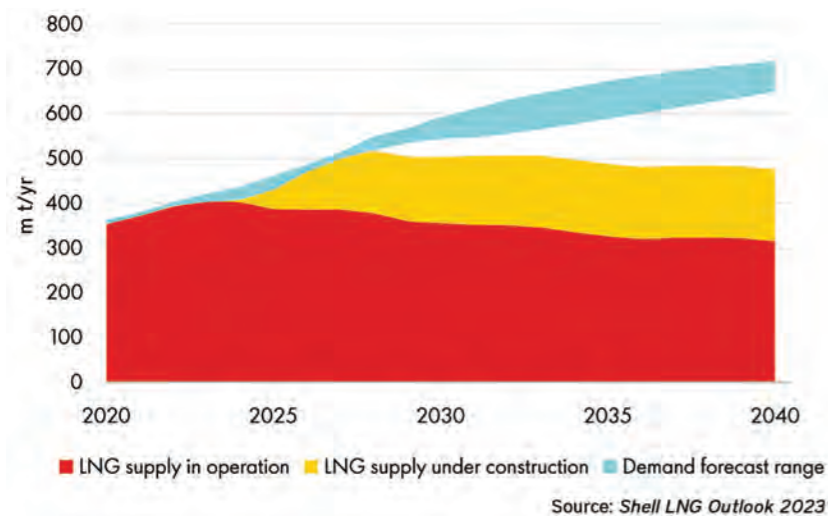


FIG.2: Global LNG supply vs. demand forecast range

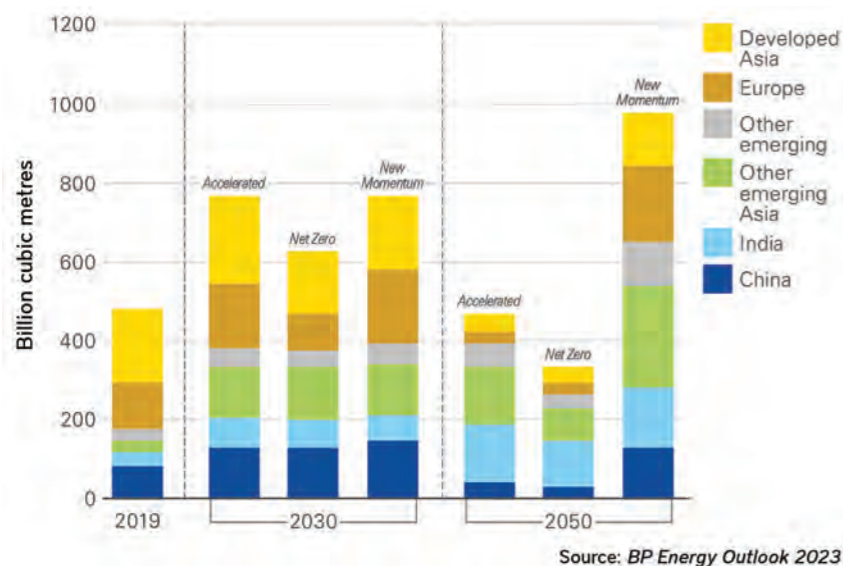


FIG.3: LNG imports by region

on-year, which would take it to 73m t/yr. For 2024, the IEA sees a further 4%, or 17.5m t/yr, global increase—“well below the 8% average growth rate experienced between 2017 and 2021” as “below-average LNG liquefaction capacity additions are expected to prolong tight supply conditions into 2024”. Imports into Asia-Pacific are forecast to increase by 6%, mainly because of Chinese procurement through long-term contracts.

**New waves of supply**

From 2024 onwards the global LNG supply-demand balance will start to ease as new waves of supply come onstream from the US, Canada, Qatar and elsewhere—a subject covered in detail in the article starting on p16—though the big waves of supply from the US and Qatar will not come until the second half of the decade.

The view of consultancy Wood Mackenzie’s LNG team is that “While contract prices are still relatively high, the balance of power is quickly shifting back towards the buyers. Spot prices have dropped 90% since the peak of 2022 and a wave of new supply is set to hit the market from 2025. “Developers must stay focused on the long-term prize. The outlook is bullish, with another 100m t/yr of capacity required to meet demand growth by the mid-2030s, a 25% uplift to current supply and on top of what’s already sanctioned.” They add that developers should “double down on Asian markets” as the region’s developing economies “lean more heavily on gas while striving to move away from coal” because “Europe’s policy pivot away from gas limits upside for LNG suppliers beyond 2030”. Pre-eminent US producer Cheniere

Energy—which has plans to double its existing 45m t/yr of export capacity—points to ambitious 2030 gas growth targets in China and India and LNG-to-power targets in Taiwan, Vietnam and Thailand. Shell, in its latest annual energy outlook, concurs with Wood Mackenzie’s view that—even with the new waves of supply coming onstream in the middle of the decade—more investment will be needed to avoid a supply-demand gap opening up before 2030, as seen in Fig.2.

**The outlook to 2050**

Projecting Asian LNG demand beyond 2030 is fraught with uncertainty and most of the organisations that publish forward-looking analysis rely on scenarios to address known unknowns. The main ones are the pace of formulation and implementation of energy and climate policy—especially by the many nations, including in Asia-Pacific, that have made net-zero emissions (NZE) commitments—and the rate of advance of the technologies needed to realise net-zero GHG ambitions, such as CCUS and zero-carbon fuels including green hydrogen and ammonia.

One exception is the Gas Exporting Countries Forum (GECF), which has published an outlook to 2050 that takes the form of a—surprisingly bullish—forecast. The GECF expects LNG trade to grow to 850m t/yr by 2050, well above most other expectations, but its secretary general, Mohamed Hamel, acknowledges that “the uncertainties have never been so large and the challenges so profound”. Other organisations, such as the IEA, BP and Shell, generally take a less definitive approach, preferring to construct a range of scenarios, generally making different assumptions about the pace of decarbonisation and progress towards NZE. Fig.3, which comes from the BP Energy Outlook 2023, shows how widely LNG demand outcomes in Asia-Pacific can vary under differing assumptions. The Accelerated and Net Zero scenarios assume the world takes action to reduce GHG emissions by 75% and 95%, respectively, by 2050 (relative to 2019 levels). The New Momentum scenario “is designed to capture the broad trajectory along which the global energy system is currently travelling”. Surprisingly, as we will see later in this publication, developers of new liquefaction capacity currently appear to be undeterred by this level of uncertainty, especially those in Qatar and the US. PE



# Gas remains crucial to Southeast Asia’s energy balancing act

The fuel will have a continuing role to play as the region seeks to balance growing energy demand with targets to reduce emissions

Kaushal Ramesh, Jun Yee Chew and Prateek Pandey

With a growing population and a drive to increase living standards and combat air pollution, Southeast Asia will need to balance surging energy needs with long-term emissions-reduction commitments. Natural gas will not only support rising power demand but also help displace more polluting fuels and support the integration of intermittent renewables into the power mix. As such, the region presents long-term macro tailwinds and key market development opportunities for gas and LNG. The challenge lies in improving access to natural gas, a goal now made more difficult following the price volatility driven by the Russia-Ukraine conflict. This will require accelerated development of countries’ own gas reserves and LNG imports at affordable prices. Due to data availability and stage of

gas market development, ‘Southeast Asia’ in this article refers to Indonesia, Malaysia, Thailand, Singapore, Vietnam, the Philippines, Myanmar and Brunei unless mentioned otherwise. Raising domestic production Despite the more prominent discourse towards increasing LNG imports, we believe increasing domestic production is an equal pillar in promoting natural gas use in Southeast Asia. The region continues to hold significant natural gas reserves, with around 85tcf of 2P reserves as of 2022. As shown in Fig.1, Southeast Asian gas production (including LNG feedgas) peaked in 2016 at around 221bcm, with 2022 production at 192bcm. The outlook is less than encouraging, with base-case production dropping to 154bcm in

2030 and 66bcm in 2040, with downside risk from sanctioning or startup delays. In the same timeframe, Southeast Asian demand (not including LNG feedgas) will increase towards 180bcm by 2030 and 224bcm by 2040. This divergent dynamic is set to turn the region into a net natural gas importer in coming years. However, the

**192bcm**  
Southeast Asian gas production in 2022

timely development of potential resources, including Abadi, Gendalo and Gehem in Indonesia; B14, F38, K5, Kuang North and Kamunsu East in Malaysia; and Ken Bau in Vietnam could help delay regional net imports to after 2035.

With short-term LNG prices having become volatile due to the Russia-Ukraine

crisis and long-term LNG prices elevated by structural labour shortages, persistent EPC inflation and, lately, the rising interest rate environment, increasing domestic gas production in Southeast Asia offers an important pathway for the fuel to play a role in the region's energy transition. The long-term dynamic of increasing demand and declining production means LNG is set to become the marginal source of supply into Southeast Asia, and therefore higher long-term LNG prices may signal new commercial momentum for undeveloped or stalled gas fields.

Pricing is one of many impediments to upstream development in the region, where the prevailing narrative has included convoluted domestic pricing regulations, regulatory uncertainty, conflicting stakeholder incentives, extensive bureaucracy and divestment by international

majors—all of which complicate production in the largely mature region. However, offshore eastern Malaysia presents a significant exception to this narrative, with continued healthy levels of sanctioning and exploration in recent times, as seen by the FID of Rosmari-Marjoram in 2022 and the robust international participation in the Malaysia Bid Round 2022. In addition to supporting domestic consumption in Sabah and Sarawak, these resources can backfill Malaysia LNG, which in turn can support growing regional LNG demand. Similarly, Eni's acquisition of Chevron's stakes in the Indonesia Deepwater Development (in addition to its acquisition of Neptune Energy), may also provide optimism for higher production from Bontang.

Despite requiring rapid and unprecedented policy reform, we anticipate accelerated domestic production (where possible) to support burgeoning demand may also be more politically palatable than runaway LNG imports, which may be perceived as promoting import dependence. Furthermore, over the long term (not considering abatement through CCUS), emissions accounting may point to a preference for regionalised trade through pipeline networks or regional LNG trade over large-scale ex-region imports.

### Enabling LNG access

Rising LNG demand (and therefore, exposure to international markets) has been a consequence of declining production and rising gas demand. Since Thailand commenced imports in 2011, the region's LNG consumption has grown to 26.5bcm as of 2022. Under our base-case scenario for domestic production, LNG

demand will grow to 91bcm in 2030 and further to 157bcm by 2040 (Fig.2), with robust growth in almost every country, including from new importers Vietnam and the Philippines, both of which have an ambitious LNG-to-power pipeline of more than 25GW combined by 2030. For the reasons elaborated later in this article, we remain conservative on how much of this will be achieved.

Affordability remains the largest constraint to LNG imports in Southeast Asia, particularly for emerging importers. Global LNG prices have moderated from the heights of 2022 but, as of August 2023, remain materially higher than pre-crisis averages. Moreover, structural labour shortages and rampant EPC inflation have limited downside movements to long-term prices required to trigger additional LNG production from new projects. In the absence of higher domestic production, the region will be forced to increase LNG imports.

Long-term contracts can provide much-needed price stability and volume certainty required to realise additional import demand. As shown in Fig.3, Southeast Asian importers had around 35bcm in term contracts (including intra-country contracts as observed in Indonesia), against 26bcm of demand (meaning some of the contract volume was likely diverted to other markets). Rising LNG demand will push the uncontracted quantity to 61bcm by 2030 and 135bcm by 2035. Southeast Asian importers will be keen to close the gap over the next few years, while many majors and portfolio players hold long positions in the second half of the decade after signing on for US LNG offtake and will need to find a market for at least some of these volumes.

In terms of price indexation, it is possible Henry Hub linkage may be welcomed due to the perception of relative stability of US gas prices, especially for LNG-to-power applications where the power-purchase agreements may have fixed cost components, though oil-linkage may also find favour due to precedence. However, the tightening interest rate environment and the strengthening US dollar over the past year may have impacted the credit quality of certain offtakers, making it more challenging for them to sign long-term contracts, leaving them exposed to the spot market and possibly discouraging LNG use. In these cases, government-to-government arrangements could help facilitate more LNG imports.

It is noteworthy that Malaysia and Thailand have embarked on enabling third-party access to their LNG terminals, which will enable competition in their domestic markets and provide clear price signals for new gas investments.

### Power and industrial demand

Southeast Asia presents multiple long-term macro tailwinds in support of natural gas demand growth. The region is set to gain substantial economic prominence, with real GDP expected to more than double in 2050 from \$3.6t in 2022, in conjunction with population growth of over 100m in the same timeframe. Higher urbanisation will also drive more electricity demand through space cooling requirements.

As per Fig.4, in our base (1.9°C) scenario, Southeast Asian natural gas consumption is set to grow continuously

until it peaks in the late 2040s at around 247bcm. Demand in the power sector is set to grow until around 2037, while demand in the industrial sector can continue to grow into the 2040s due to limited availability of substitutes for process heat and feedstock. Note that further upside from the power sector is possible through more

**66bcm**  
**Outlook for Southeast Asian base-case production in 2040**

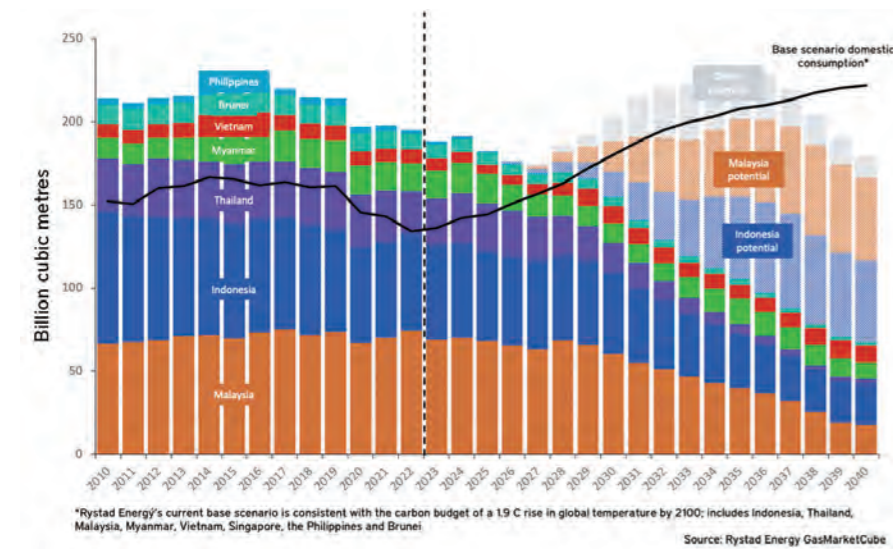


FIG.1: Southeast Asia production outlook vs. Rystad Energy Base-Case Demand

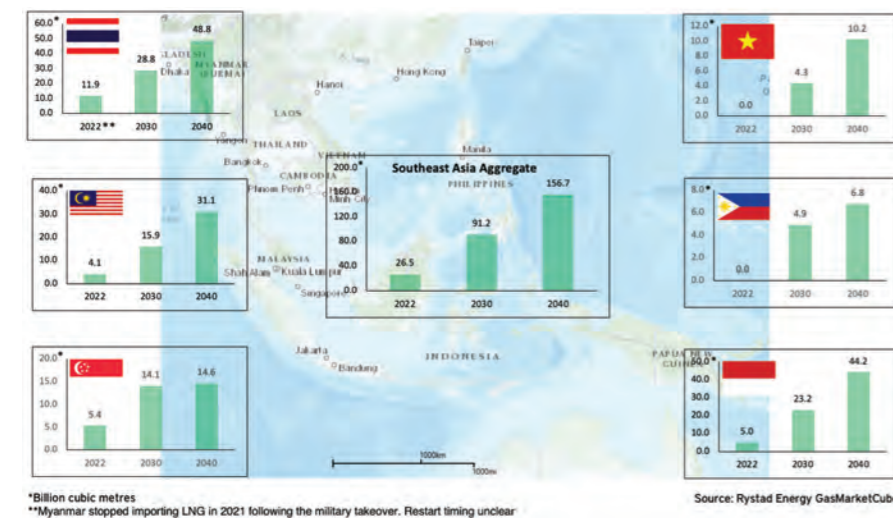


FIG.2: Southeast Asia LNG demand 2022-2030-2040

**Southeast Asia presents multiple long-term macro tailwinds in support of natural gas demand growth**

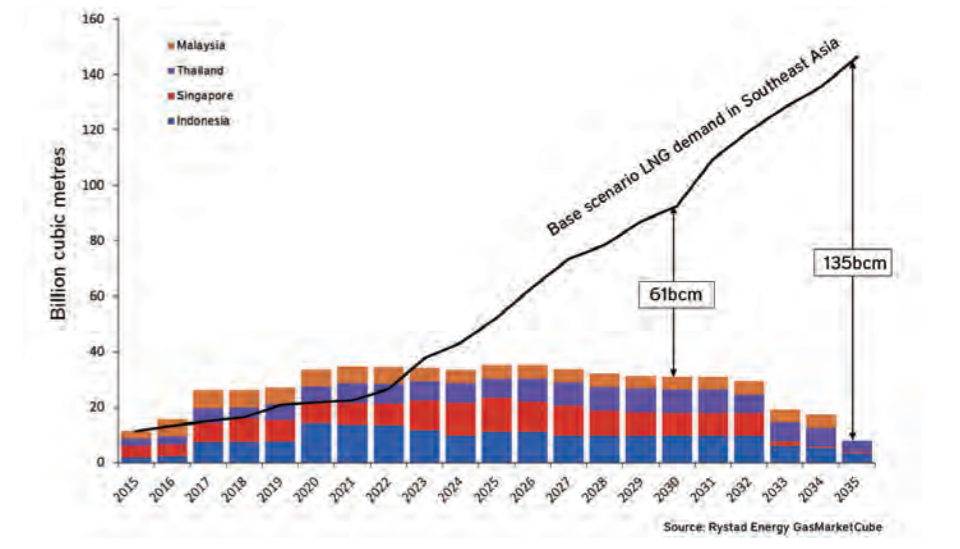


FIG.3: Southeast Asia LNG contracts by import country and LNG demand

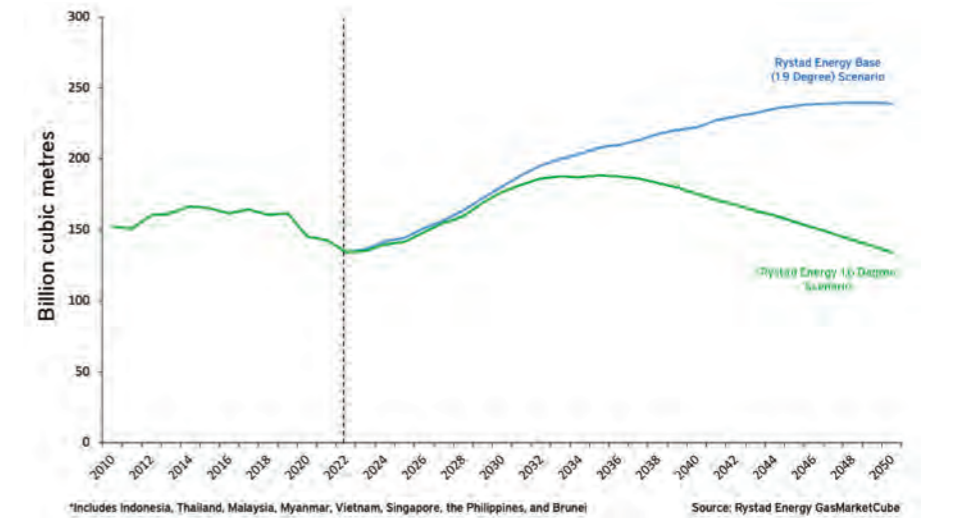


FIG.4: Gas demand scenarios for Southeast Asia

**The supply uncertainty posed by the dynamic of declining domestic production and high international LNG prices means coal may continue to find favour in the power mix over the medium term**

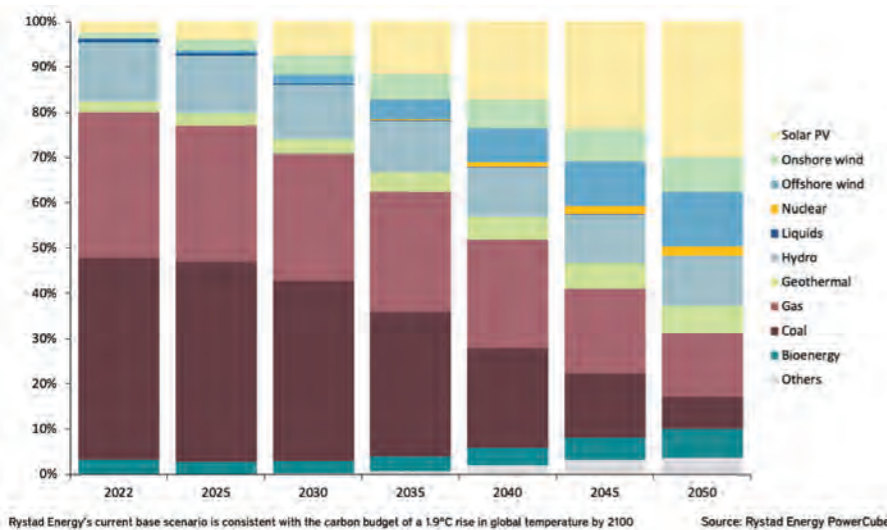


FIG.5: Southeast Asia base scenario power generation mix outlook

**224bcm**  
Outlook for Southeast Asian gas demand in 2040

policy support for coal-to-gas switching (such as a carbon price) or lower gas prices. Common drivers across countries include rising power demand, ambitious renewables generation targets and coal phasedowns. Some industrial sector demand growth is expected in Indonesia, Malaysia and Thailand due to petrochemical or gas processing plant capacity additions. Furthermore, Thailand is the only Southeast Asian country where gas use in the transport sector has caught hold, although this may eventually be phased down in favour of electric vehicles.

Even in our accelerated energy transition scenario, which corresponds to a 1.6°C change in temperature by 2100, demand continues to grow along a nearly identical pathway as our base scenario until after 2030 and peaks around 2035 at 188bcm before declining to 134bcm by 2050.

The difference is driven by lower gas consumption in the power sector in the 1.6°C scenario: it is important to ensure gas access to facilitate the power sector's transition away from coal and towards more renewables so that electricity can then be used to decarbonise the industrial, building and transportation sectors.

It is also worth noting that much of Southeast Asia is already gasified, with natural gas making up some 20% of the primary energy mix and some 32% of the power mix (2022), with substantial existing or planned infrastructure. The region therefore poses relatively less adoption risk for natural gas and infrastructure challenges than others where gas use is unfamiliar.

### Key risks to gas' future in Southeast Asia

The role of natural gas in Southeast Asia's power sector has been complicated by incumbent coal and competitive and emissions-free renewables. The supply uncertainty posed by the dynamic of declining domestic production and high international LNG prices means coal may continue to find favour in the power mix over the medium term. Given Indonesia and Vietnam are major coal producers, the fuel is still seen as affordable and reliable, and due to energy security concerns may take precedence over natural gas in the absence of more policy support, even as the need to phase down coal is widely acknowledged.

The region has also made tremendous strides towards renewables capacity additions and net-zero targets in recent years (nine out of ten governments have net-zero targets, the latest by 2065). Even as gas is a complement to renewables in coal-heavy grids, the long-term trend of declining renewable generation costs means LNG may not be able to compete on base-load, which is what is required to guarantee long-term offtake from import terminals. Between 2015 and 2022, Vietnam added 18GW of solar and about 4GW of

wind capacity, which by 2030 will grow to 25GW and 29GW respectively. We also anticipate similarly robust growth in the Philippines, with nearly 30GW of solar and 9GW of wind capacity by 2030. Other countries in the region will also have smaller renewables capacity additions, while Singapore has turned to importing 100MW of hydroelectricity from Laos.

High international LNG prices coupled with the impact of domestic currency deterioration mean that it is also unclear which suppliers would accept direct long-term exposure to the credit profiles of emerging LNG buyers in the absence of back-to-back power-purchase agreements guaranteeing revenue along the chain—and supplying to them would likely need intermediary traders or portfolio players with a higher risk tolerance or government-to-government agreements. The archipelago geography of the region also means some demand will have to be met through small-scale supply chains, which accordingly increases cost (and risk) for project sponsors.

### Gas still a solution

Like other emerging regions around the world, the burgeoning energy needs of Southeast Asia make it unlikely that renewables alone will meet energy demand growth out to 2050. Therefore, gas retains an important and sustained role in balancing the transition of the power sector.

This article paints a broad picture of the role of natural gas in Southeast Asia, but the reality is that economic development and stage of energy transition vary by country, and therefore individual pathways to economic prosperity and decarbonisation could vary significantly. Meeting the demand potential derived from macro tailwinds depends on material policy reform and regulatory certainty to increase domestic production and affordability to increase LNG imports—all of which are challenging to pull off. Even as its credentials in the energy transition may be questioned in other parts of the world, Southeast Asia is an area where the high degree of coal dependence, and indeed continuing coal capacity construction, means natural gas is still a solution. **PE**

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## How key is LNG to Asia's energy security?

The destination flexibility of LNG helped to rescue Europe from severe energy shortages in 2022, but to the detriment of consumers in Asia-Pacific. What lessons are there for the region's leaders regarding LNG's role in ensuring energy security?

The energy crisis of the past two years has highlighted the need for policymakers to address the security and affordability of energy alongside efforts to mitigate climate change—the so-called “energy trilemma”.

The role of natural gas and LNG in resolving this trilemma was highlighted in May by the leaders of the G7 economies—the US, Japan, Germany, the UK, France, Italy and Canada—when they met for a summit in the Japanese city of Hiroshima.

“We stress the important role that increased deliveries of LNG can play, and acknowledge that investment in the sector can be appropriate in response to the current crisis,” they said in their post-summit communique, “if implemented in a manner consistent with our climate objectives”.

This new-found enthusiasm is largely the result of seeing how Europe survived winter 2022/23 after losing much of its pipeline gas from Russia by boosting LNG imports.

### A tale of two crises

“LNG's contribution to global energy security was on full display in 2022 and is now at its highest since the Fukushima accident in 2011,” says Jean Abiteboul, president of the LNG importers' group GIIGNL, in a reference to how Qatari LNG helped Japan to cope with the shutdown of its entire nuclear power industry after that accident.

There is, however, a crucial difference between what happened after Fukushima and the events of last year.

In 2011, Japan was desperate for more LNG to replace lost nuclear electricity and Qatari producers had surplus LNG on their hands because of a loss of market in the US following its shale gas revolution. It was an expedient arrangement all round.

In 2022, Europe's scramble for LNG meant energy consumers in some Asian nations—notably Pakistan and Bangladesh—suffered major shortages, especially of electricity, despite those nations turning to other fuels, such as coal, to the extent that they could.

It is no surprise that Asia's emerging and developed economies, already heavily dependent on coal for power, saw the fastest growth in carbon dioxide emissions last year, according to the IEA.

In a report produced ahead of the G7 meeting, the IEA cautioned that the crisis of the past two years “challenged the case for natural gas as a transition fuel in Asia.” But it also warned: “There is a risk that declining prospects for gas may mean that emerging and developing economies in Asia hold on to their coal-fired power generation for longer, which would result in unfavourable emissions outcomes.”

While the agency has significantly downgraded its global



long-term natural gas demand projections because of the energy crisis, it now expects developing and emerging Asian markets to “see a big increase in natural gas use by 2030” as prices soften from the middle of this decade.

Moreover, with some of this growth driven by coal-to-gas switching, this will “help countries with net-zero emissions (NZE) targets accelerate the transition away from coal, even if renewables are the major source of emissions reductions”. Countries in the region with NZE targets include China, India, Malaysia, Singapore, Thailand and Vietnam.

### Shopping spree

Policymakers should note that markets with long-term contracts indexed to oil or the US Henry Hub gas benchmark were to a large extent shielded during the crisis from extraordinarily high JKM prices for spot LNG. Pakistan, for example, has been relying almost exclusively on its term contracts with Qatar for the LNG that it has managed to import.

It is a lesson not lost on Chinese LNG buyers, which have signed numerous long-term contracts with US and Qatari producers over the past two years—a shopping spree expected to continue in coming months. **PE**

The G7 stress the important role of increased LNG in a manner consistent with climate objectives



# LNG supply wave surges on faith in Asian demand growth

While some are questioning the future of LNG in Asia's energy transition, the number of supply projects under construction around the world suggests that developers and buyers continue to believe in decades of future growth



A number of commentators and analysts have begun to express doubts about the role that natural gas and LNG may play in Asia's transition to cleaner energy over coming decades—among them the IEA—however these doubts do not appear to be shared by most LNG liquefaction project developers and many buyers of their output.

In the short term, the industry has been galvanised by the crisis faced by Europe because of the loss of Russian pipeline gas supply, but there is consensus that European LNG demand will begin to wane once the crisis is over because of the bloc's ambitious decarbonisation policies. As we have seen from forecasts in this report (p8-10) future LNG demand is expected to be largely centred on the emerging and developing economies of Asia-Pacific, especially China.

Research conducted by *Petroleum Economist* (Fig. 1) shows that between now and the end of 2028 around 190m t/yr of new LNG export capacity is due to come onstream. To put that in context, LNG trade in 2022 was around 400m t so, at full utilisation, this would represent an increase of close to 50% over five years.

With a few exceptions—more about which below—the projects in the table have secured long-term offtake contracts for much of their output, reached FID and entered the construction phase. In 2021 and 2022, according to Shell's *LNG Outlook 2023*, buyers signed up to around 140m t/yr of long-term offtake, with China, Europe and portfolio players accounting for the bulk of this.

"What we're seeing is buyers making a bet that demand is going to continue—with Chinese buyers signing up to 27-year contracts which take them through to 2053," says independent consultant Andy Flower.

The heavy involvement of portfolio players, which accounted for around 56m t/yr of long-term SPAs in 2021-22, is significant because they tend to be big investors in LNG export projects and because of the role they play as intermediaries between supply projects, which generally seek long-term stability of offtake to underpin financing, and buyers, some of which may place greater value on flexibility.

## US leads the field

As Fig. 2 shows, the clear leader in LNG export capacity expansion over the coming five years is the US, which this year is expected to become the world's top LNG exporter. It has several large projects under construction, with a long pipeline of projects jostling to reach FID.

The seven projects currently operating in the US have aggregate capacity of 91.3m t/yr, significantly more than Qatar's 77.4m t/yr and just above Australia's 87.2m t/yr. Projects under construction will give the US another 78.6m t/yr of capacity by 2028, taking the total to 160m t/yr if projects proceed without delays.

There is also a long list of US projects that have received approvals for construction, operation and export but not yet reached FID. These amount to a further 148m t/yr of capacity, though how much of that will actually get built remains to be seen.

Beyond these, there are projects that have yet to be permitted, some of which have been proposed by credible existing players, such as Cheniere Energy—the pre-eminent US LNG exporter, which currently has 45m t/yr in operation.

## North Field Expansion

In second place, way ahead of the rest of the pack, is Qatar. It already has 14 trains in operation with nameplate capacity of 77.4m t/yr and is now developing what it calls the North Field Expansion project. This will add another six 8m t/yr mega-trains, taking Qatar's total capacity to 126m t/yr by 2027-28.

FID on the first four trains, which make up the \$29b North Field East (NFE) project, was reached by QatarEnergy in February 2021, with five foreign partners appointed over a period of weeks in the middle of 2022: ConocoPhillips, Eni, ExxonMobil, Shell and TotalEnergies. Completion of partner selection left QatarEnergy with 75% of the entire project.

FID has yet to be reached on the final two trains, the North Field South (NFS) project, but QatarEnergy has been proceeding with the project as though FID had been reached.

The appointment of foreign partners—ConocoPhillips, Shell and TotalEnergies—was completed in October 2022, again leaving QatarEnergy with 75%, and an EPC contract for the onshore facilities was signed in May 2023.

The \$10b EPC price tag for two LNG mega-trains and associated facilities underscored the competitiveness of Qatar LNG at a time when US projects are facing mounting costs. It remains unclear as to why FID on NFS has yet to be announced.

## More in the pipeline?

Saad Sherida al-Kaabi, Qatar's minister of state for energy affairs and president and CEO of QatarEnergy, has said Qatar's LNG ambitions may extend beyond the North Field Expansion but has yet to give any details.

What is unusual about the Qatari projects is that, so far,

FIG. 1: LNG export projects due to start up by 2028

Project	Country	Operating company	Capacity (m t/yr)	Lead shareholder	Start-up date
Tangguh LNG, Train 3	Indonesia	BP	3.8	BP	2023
Tango FLNG	DR of the Congo	Eni	0.6	Eni	
Altamira Fast LNG 1	Mexico	New Fortress Energy	1.4	New Fortress Energy	
Greater Tortue/Ahmeyim FLNG	Mauritania	BP	2.5	BP	2024
Altamira Fast LNG 2 & 3	Mexico	New Fortress Energy	2.8	New Fortress Energy	
Arctic LNG 2, Train 1	Russia	Novatek	6.6	Novatek	
Golden Pass LNG, Train 1	United States	Golden Pass Products, LLC	6.0	QatarEnergy	
Plaquemines LNG Phase 1	United States	Venture Global LNG	13.3	Venture Global LNG	
Congo FLNG 2	DR of the Congo	Eni	2.4	Eni	2025
Golden Pass LNG, Trains 2 & 3	United States	Golden Pass Products, LLC	12.0	QatarEnergy	
Energía Costa Azul LNG, Train 1	Mexico	Sempra	3.3	Sempra	
LNG Canada, Trains 1 & 2	Canada	Shell	14.0	Shell	
Corpus Christi, Stage 3	United States	Corpus Christi Liquefaction, LLC	10.0	Cheniere Energy	2026
NLNG, Train 7	Nigeria	Nigeria LNG	8.0	NNPC	
North Field East, Trains 1 & 2	Qatar	Qatargas	16.0	QatarEnergy	
Plaquemines LNG Phase 2	United States	Venture Global LNG	6.7	Venture Global LNG	
Pluto LNG, Train 2	Australia	Woodside Energy	5.0	Woodside Energy	
North Field East, Trains 3 & 4	Qatar	Qatargas	16.0	QatarEnergy	2027
Port Arthur LNG, Train 1	United States	Sempra	6.5	Sempra	
Rio Grande LNG	United States	NextDecade	17.6	NextDecade	2028
Port Arthur LNG, Train 2	United States	Sempra	6.5	Sempra	
North Field South, Trains 1 & 2	Qatar	Qatargas	16.0	QatarEnergy	
Mozambique LNG, Trains 1 & 2	Mozambique	TotalEnergies	12.9	TotalEnergies	
<b>Total</b>			<b>190</b>		

Source: *Petroleum Economist*

little of the 48m t/yr of new capacity has been sold under long-term SPAs. The first SPA for NFE, a 4m t/yr, 27-year deal with China's Sinopec, was not announced until November 2022.

In April 2023, Sinopec became the first Chinese company to take a stake in a Qatari liquefaction project—the equivalent of a 5% interest in one of NFE's four trains—setting a precedent that signalled a growing mutual dependence between one of the world's largest LNG producers and one of its largest importers.

A similar deal was signed with China National Petroleum Corporation (CNPC) in June, when it agreed to take 4m t/yr from NFE and a 5% stake in one of the trains. Earlier in June, Bangladesh's Petrobangla signed up to offtake 1.8m t/yr from NFE for a period of 15 years. No SPAs have yet been announced for NFS.

Kaabi said in June that discussions were under way with several Asian countries for offtake/equity deals similar to those signed with Sinopec and CNPC, adding that such deals would not affect the stakes of existing partners.

## Troubled projects

Two of the largest post-FID projects that are nominally under construction have large question marks hanging over them.

Novatek's Arctic LNG 2 project in Russia is one of them, because several western firms have walked away due to sanctions imposed following the invasion of Ukraine—including EPC contractor Technip Energies.

Construction is nearing completion on the first of three 6.6m t/yr trains, but there have been reports that work on trains two and three has ceased, so they are not listed in Fig. 1. The start-up date of even the first train is uncertain, given the disruptions, but it could be around the turn of the year. It was originally due to come onstream in 2022.

The other troubled project is Mozambique LNG, construction of which was halted in April 2021 when TotalEnergies de-

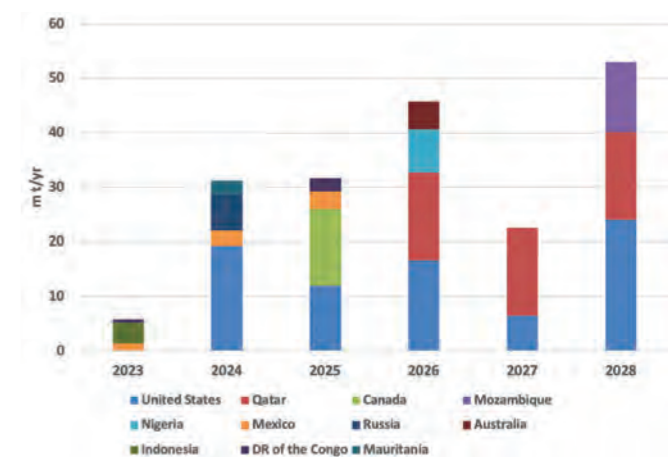


FIG. 2: New LNG liquefaction capacity by country, 2023-2028

clared force majeure because of the worsening security situation in the north of the country.

Efforts are under way to resurrect the project, but questions remain as to whether engineering contractors will stick to their original cost estimates despite several years of cost inflation. If that deadlock is resolved, the financing will then have to be revived. TotalEnergies' CEO Patrick Pouyanne recently told analysts: "My goal is to provide you with clarity on the way forward before the year ends."

The situation around Arctic LNG 2 has contributed to the tight LNG supply/demand balance expected over the next couple of years and any further problems with bringing the first train on stream would compound that.

As for Mozambique LNG, that will not start up until 2027/28 at best, by which time the global LNG market may well be facing a glut if the US LNG stampede continues. **PE**

# Asia's quest for low-emission LNG

Recognition that emerging and developing Asian economies will remain dependent on fossil fuels for longer than developed economies is fuelling appetite among the region's buyers for LNG that can demonstrate low greenhouse gas emissions

A major source of value in attending international conferences like the Gastech event in Singapore this September and the LNG 2023 event in the Canadian city of Vancouver in July is the opportunity they provide to assess the mood of an industry and its priorities.

At LNG 2023, there was no mistaking the industry's confidence in its future, not least because of how crisis has pushed energy security, reliability and affordability up the global policy agenda. However, it was also clear from presentations and informal discussions that the industry has accepted the need to tackle the issue of decarbonising LNG, as much as is feasible. The issue of climate change has not gone away.

"The crucial challenge the industry is going to have to address in the coming years is reconciling huge and growing demand for energy, particularly in the developing world, and decarbonisation to prevent the worst impacts of climate change," said Ed Crooks—former *Financial Times* energy journalist and vice-chair, Americas for consultancy Wood Mackenzie—during LNG 2023's final plenary.

"The question of how the LNG in-

dustry, as part of the broader energy system, works to resolve those tensions is going to be at the heart of everything we do for years to come."

## Downstream demand

Much of the pull for LNG with low greenhouse gas (GHG) emissions is coming from buyers in Asia because of the demands of their downstream customers.

Its importance will grow as those emerging and developing nations that have made net-zero emissions (NZE) pledges struggle to push coal out of their energy systems, while addressing the intermittency and grid stability issues of renewables such as solar and wind power.

Shell announced at the start of this year that it had just delivered its first "GHG-neutral" cargo—under a verification framework developed by LNG importers' group GIIGNL—to Taiwan's CPC. CPC's Chairman, Shun-Chin Lee, explained: "Demand for addressing GHG emissions from energy use is increasing downstream in Taiwan and we are keen to find new and better ways of meeting this demand."

He described the pilot cargo as "an

important step in improving transparency and accountability of GHG-neutral LNG—not just for us but for the industry as a whole."

## Building trust

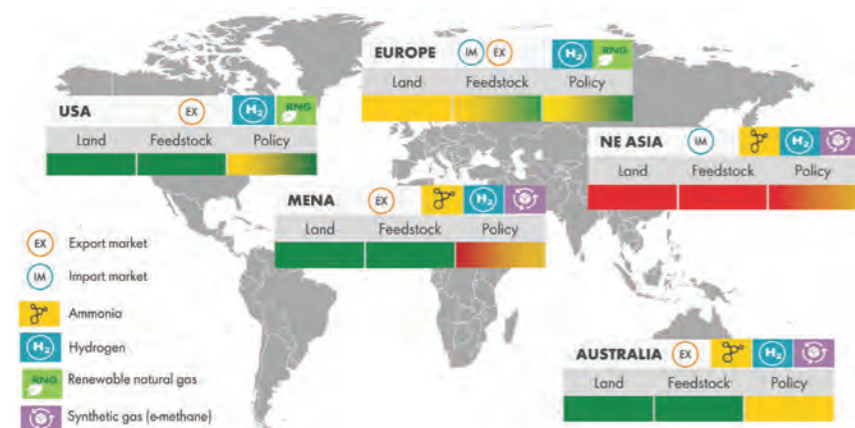
These are still early days. While LNG project developers are planning their strategies to reduce emissions across the entire LNG value chain, the imperative right now is to build trust with LNG buyers and end-customers. This makes the measurement, reporting and verification frameworks developed by organisations such as GIIGNL and Singapore's Pavilion Energy [see article starting on p4] a fundamental first step in the trust-building process.

The LNG 2023 conference also provided insights into the longer-term issue of how the vast LNG-importing infrastructure now being constructed in Asia might in future be repurposed for the importation of zero-carbon gases—such as green hydrogen, ammonia, renewable natural gas and e-methane—because it will not be possible to electrify all energy demand.

Analysis conducted by Shell for the *LNG Outlook* it published earlier this year concluded that North America has "many natural advantages that make the path to decarbonising its gas industry increasingly clear", as illustrated in **Fig.1**.

In contrast, Asia—especially North Asia—will find the transition much more challenging. It is likely to have to rely on imports of decarbonised gases to meet much of its demand "in the same way that it relies on imports of LNG today". In this context, repurposing of LNG import infrastructure would make a lot of sense.

Expect plenty more discussion on these topics as the LNG industry gathers in Singapore for this year's Gastech. **PE**



**FIG.1:** Asia will find the transition to decarbonised gases much harder than North America

# UPCOMING EVENTS



MAY 2024

Hosted in Singapore

## Asian LNG Strategy

Building on the success of 2023, this event will return to Singapore in 2024. This boutique event is a perfect occasion to join your peers for a day of discussion, debate, thought leadership, and exclusive networking.



JUN 2024

Hosted in Houston

## US LNG Strategy

This inaugural event will welcome senior decision makers, LNG producers & project developers, operators and suppliers from across the LNG supply chain to explore the next steps for US LNG exports.



OCT 2024

Hosted in London

## European Gas Strategy

This unique event will bring together the industry's leading decision makers to share their insight and intelligence on the short and long term trends for the European gas market.

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Event Manager  
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