



Commissioning cargo lined up for Vietnam's Cai Mep LNG terminal

Singapore-based AG&P and Vietnamese oil trader Hai Linh Company are striving to get Vietnam's second LNG terminal into operation to source fuel for power generation. A commissioning cargo is reportedly lined up for delivery in October, though the operators could arrange with state-run PetroVietnam to get an earlier cargo from PetroChina.

PetroVietnam Gas, CEO of AG&P LNG, told Reuters that the company was "working on accelerating the commissioning and target to complete [it] in the next three months."

PetroChina has been delivering a string of cargos to the Thi Vai regasification terminal. One shipment in mid-June came from Brunei's LNG terminal in Lumut and had been used to fuel gas-fired power stations to meet peak electricity demand this summer. The shipment is already the fourth for the Thi Vai LNG terminal this year, which currently has a capacity of 1 mtpa but is planned to be expanded to 3 mtpa in the next stage.

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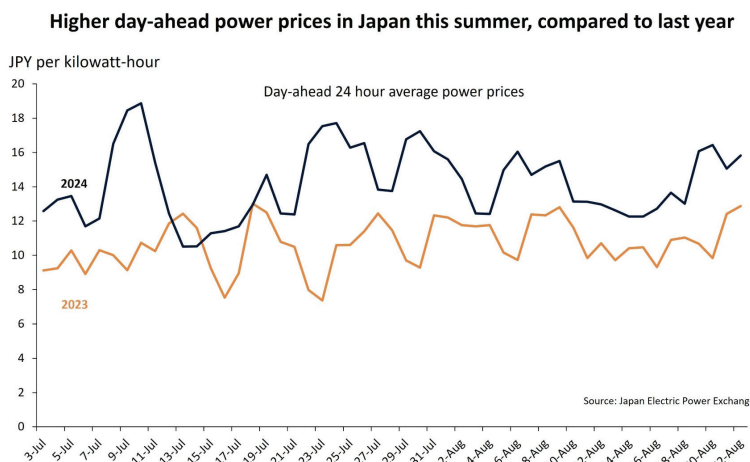
View of Cai-Mep LNG terminal

Asian importers seek spot LNG cargoes to fuel power stations

Persisting summer heat across Asia and maintenance at three nuclear plants in Japan make utility buyers seek LNG cargoes to fuel gas peaking power stations. JERA, for once, bought an unknown volume of spot LNG for September delivery and prices for October were last seen trading above \$14.5 per MMBtu, as supply is squeezed amid reduced output from Petronas' LNG export complex in Bintulu, Sarawak.

Train 7 and 8 at Bintulu LNG in the north of the Malaysian territory on Borneo Island are still on reduced levels, though maintenance seems to have been completed at the other trains. Over in Australia, a short downtime of the Australia Pacific LNG export terminal on August 20 to replace a valve added some bullish element to prices – even though Chevron already completed maintenance work at Australia's Gorgon LNG Train 2.

JERA, Japan's largest LNG buyer and power



generator, purchased what seems to be substantial LNG volumes of spot cargoes due to be delivered in early September to secure fuel for

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PetroVietnam had tendered for LNG cargoes to be delivered to the Thi Vai import terminal in May and early June. Most of the volume had been designated for power generation as a brutal heatwave pushed up electricity demand for cooling.

Timeline may slip to mid-November

As for Cai Mep, the terminal will be Vietnam's second regasification terminal as the government aims to reduce the country's reliance on coal-fired power generation. Under the strategy, known as PDP8, Vietnam aims to more than double its installed power gen capacity to 150 GW by 2030, up from 69 GW at the end of 2020. Some 13 new LNG-fuelled power plants are envisaged that are meant to cover 15% of the country's total electricity needs.

Timely commissioning and start-up of Cap Mep LNG is instrumental to meet this target – though this could prove difficult. "Given we have just received the import licence, we are now working on accelerating the commissioning and target to complete (it) in the next three months," Sathyamoorthy said.

"We will look to lock the commissioning cargo in October for end-October to mid-November delivery." ■

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peaking power stations as the heatwave is forecast to continue.

The utility's 243 MW Shin-Nagoya gas-fired power plant unit 7-5 is offline through to August 24, due to turbine equipment maintenance. Unit 1 of the Anegasaki gas power plant, with a nameplate capacity of 646.9 MW, also faced a brief outage on 19 August but resumed operations on the same day.

An unplanned outage, meanwhile, is confirmed for the 300 MW Unit 5 of Kashima-Kyodo to adjust fuel consumption and the combustion process. The unit is owned 50% each by JERA and Nippon Steel.

Day-ahead prices up 31%

Electricity traders in Japan observed day-ahead power prices bounce back following a week of the 'Obon' holiday season during which many factories shut operations. Day-ahead power prices ranged from JPY 17 to JPY 21 (\$0.12 to \$0.14) per kilowatt-hour for the week as of 21 August – some 31% higher week-on-week.

"Power prices in Japan have been higher this summer compared to last year, due to an ongoing heatwave and planned maintenance at two nuclear power plants, which is expected to last until the end of August," Rystad Energy's senior analyst Masanori Odaka commented.

Though Japan's Shimonita in Gunma prefecture and Date city in Hokkaido have been facing power outages following a typhoon, he thinks "any decline in Japan's gas consumption is likely to remain limited due to the region's specific power gen mix and high temperatures in other parts of Japan."

Looking at LNG storage, major electric utilities in Japan reported a combined LNG storage levels of 1.92 million tonnes, down 3% week-on-week and 5% lower than the five-year average 2.02 million tons for the end of August from 2019 to 2023. Odaka was quick to point out that this was, however, at a higher level compared to the combined storage level of 1.72 million tonnes at the end of August last year. ■

Energy professionals prepare for AI-driven transition

A "data-driven transition" is underway as nearly 50% of energy professionals, surveyed by DNV, plan to integrate Artificial Intelligence into their operations in 2025. Smart grids, predictive maintenance and real-time data analytics unravel the sector – though this requires strategic vision and leadership, analysts stress as "a timely and effective energy transition will be impossible without it."

Leaders and Laggards contrast sharply when it comes to applying digital technology: While 28% of respondents identified their organizations are excelling in digitalization and showing greater optimism about achieving revenue, profit, and decarbonization goals, 37% reported the opposite. Of the former, the named Leaders, 68% say they have quality data and 80% and benefit from digital tech, compared to 21% and 33% of Laggards.

The value of AI-driven applications is often diluted by issues around how to best integrate systems and databases. "Typically, companies have a lot of legacy systems where data is locked into the application," Paula Doyle, chief digital officer at Aker BP describes, noting it would be necessary to "liberate and contextualize data from industrial systems to make it accessible to both humans and machines [for] better and faster decisions."

Questioned about the use of 'emerging technologies' – like AI (27%) and digital

twins (34%) – around one-third of Leaders say they are "live or advanced," compared to just single-digit percentages for Laggards. In fact, most Laggards reported being in the early development stages (planning or piloting) of all the key technologies DNV asked about.

AI helps lower generating costs

AI and advanced data analytics are deemed pivotal for realising the clean energy transition. By 2050, AI is forecast to support a \$1.3 trillion decrease in generation costs and reduce grid equipment costs by \$188 billion.

Power system costs could be curbed by 6% to 13%, DNV reckons. In fact, 47% of surveyed energy professionals say their organization will use AI-driven applications in their operations in the year ahead – a figure climbing to as high as 69% for Digital Leaders. "Efficient automation of data delivery becomes extremely important, and this is where AI can play a key role," Aker BP's Doyle concluded. ■

Gas to Power Journal

Publisher
Stuart Fryer

Editor
Anja Karl
Tel: +44 (0)7733 684 682
anja@gastopowerjournal.com

Advertising
David Jeffries
Tel: +44 (0)7973 642 086
djeffries@lngjournal.com

New Business & Databases
Stephan Venter
Tel: +44 (0) 207 017 3407
venter@gastopowerjournal.com

Subscriptions
Margarita Tokere
Tel: +33 (0)7 67 62 58 77
margarita@gastopowerjournal.com

Layout & Production
Vivian Chee
chee@thedigitalship.com

JERA; Lotte to develop hydrogen and ammonia value chains

Japan's largest power generator JERA has agreed with South Korea's Lotte Fine Chemical to develop low carbon fuel supply chains centred around hydrogen and ammonia. The accord comes as electric utilities in both countries seek to co-fire the clean-burning fuels in gas and coal power stations in a bid to decarbonise operations.

JERA strives to position itself "at the forefront of the energy transition in Asia," chief low carbon fuel officer Ryosuke Tsugaru said, stressing this encompasses "not only the power sector but also hard-to-abate industries."

Acknowledging JERA's leading role for clean energy supply in Japan, the CEO of Lotte Fine Chemical Kim Yong-seok said he finds the collaboration "meaningful."

The Ulsan-based company has built a clean ammonia supply chain based on its over 50-year experience as an ammonia distributor in Asia. "Through this agreement with JERA, we will take the next step to contribute ourselves to enhance the national competitiveness of Korea," Kim vowed.

Demo projects

Various demonstration projects for co-firing clean fuels are underway in Japan. JERA is testing hydrogen co-firing at several LNG-fuelled power stations. The aim is to switch approximately 30% of the LNG used for electricity generation (by volume, equivalent to approximately 10% of heating value) to hydrogen by fiscal 2025.

Ammonia co-firing tests are also carried



Lotte re-exports ammonia from Ulsan Port

out by JERA together with the engineering major IHI Corp at the 1 GW Hekinan coal-fired power station with a view to demonstrate an ammonia co-firing rate of 20% at Unit 4.

Test runs evaluate both boiler heat absorption and emissions of exhaust gases

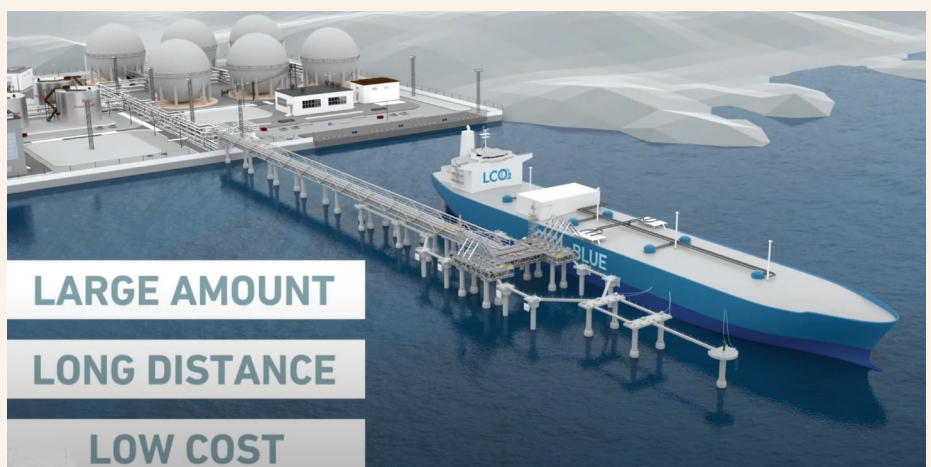
for different materials. IHI is developing the burners while JERA is charged to procure the necessary ammonia to fuel the demo plant as well as utility-scale coal power stations in the future. Setting up firm value chains is a precondition for that, hence the cooperation with Lotte comes in handy. ■

Liquefied CO2 carriers to be designed by Japanese septet by 2028

Seven Japanese majors – K Line, NYK Line, Nihon Shipyard, Imabari and Mitsubishi Shipbuilding – are looking to establish standard specifications and designs for liquefied CO2 carriers in the coming four years. Demand for LCO2 carriers is posed to grow as post-combustion carbon capture and storage (CCS) gets retrofitted at Japanese power stations with the captured carbon to be stored at sea.

Carbon dioxide sequestered and gathered from Japanese industries and power producers are meant to be shipped in special carriers, and the government is convinced "it is necessary to build and supply LCO2 carriers stably within Japan to realize the CCS value chain and improve economic efficiency."

The seven companies hence agreed to carry out a joint study for a standard LCO2 carrier and a construction supply



chain by 2028. Focus of the study will be on the design of the carriers and how to enable construction at Nihon shipyard initially and also other Japanese shipyards eventually.

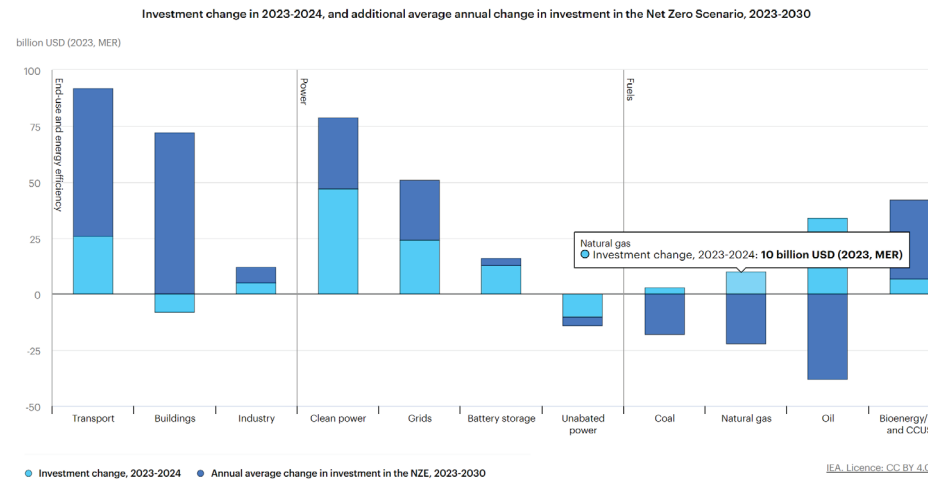
The septet vowed to collaborate widely with industry stakeholders, including other shipyards, and to advance decarbonisation by developing low emission ships that are fuelled by ammonia. ■

Clean energy spending to hit \$2 trillion amid race to set up supply chains

Energy investment worldwide is on track to exceed \$3 trillion this year, with some \$2 trillion going toward clean technologies – almost double the amount spent on coal, gas and oil, the International Energy Agency (IEA) finds. Renewables, nuclear power, grids, storage and low-emissions fuels are in focus, helped by industrial policy as major economies compete for first-mover advantages.

“For every dollar going to fossil fuels today, almost two dollars are invested in clean energy,” said IEA executive director Fatih Birol, noting that companies in the US, Europe as well as Japan, South Korea and China compete for setting up new clean energy supply chains, notably for critical minerals and clean fuels like hydrogen and ammonia.

Falling technology costs and considerations of energy security underpin rising investment hybrid wind, solar and energy storage projects. “But there is a strong



element of industrial policy, too,” the IEA head noted, “as major economies compete for advantage in new clean energy supply chains.”

In 2024, more money is going into solar power projects than all other electricity generation technologies combined, the

IEA's World Energy Investment report finds. Analysts reckon investment into solar PV is set to grow to \$500 billion as falling module prices spur new investments.

China's clean energy splash

Clean energy investment in China is on track to reach \$675 billion this year, spurred by strong domestic demand across three industries: solar, lithium batteries and electric vehicles. Europe and the US fall far behind, with clean energy investment of \$370 billion and \$315 billion respectively.

These three economies make up more than two-thirds of global clean energy investment, which highlights the disparities in international capital flows into energy.

In emerging and developing economies (outside China), clean energy spending is set to exceed \$300 billion – led by India and Brazil. Yet, this accounts for only about 15% of global clean energy investment, far below what is required to meet growing energy demand in many of these countries, where the high cost of capital is holding back the development of new projects, IEA analysis finds.

Oil industry spends just 4% on clean energy

Global upstream oil and gas investment is fairly range-bound this year and expected to rise 7% to \$570 billion, following a similar increase in 2023. Investment predominantly comes from national oil companies in the Middle East and Asia.

Just 4% of the oil & gas industry's overall capital spending went towards clean energy in 2023. In contrast, coal investment continues to rise, with more than 50 gigawatts of unabated coal-fired power were approved last year – the highest since 2015.

Saxony strives to tap lithium deposit

Germany strives to tap a large lithium deposit in the Saxon ore mountains, where the critical mineral for electrifying road transport could be sourced as a by-product from geothermal power plants. First commercial production is envisaged to start in 2027, aiming to produce 24,000 tonnes per year – enough for around 500,000 electric cars.

Gauging copper reserves, a report by the Institute for Geosciences and Natural Resources (BGR) finds Germany has reserves large enough for “around 18 million electric cars or [to provide] 750,000 wind turbines with electrical cables.”

Cobalt, copper and lithium are key minerals for producing batteries for utility-

scale energy storage and electric vehicles but also for wind turbines. So far, German manufacturers had to import 39 of the 46 most relevant raw materials. Domestic mining is hoped to change that. The EU's Raw Material Act stipulates that at least ten percent of the annual consumption of critical raw materials is to be mined within the union by 2030.

More than 100 mining projects are underway in Germany in a bid to help cover domestic copper and lithium demand, though most exploration campaigns are still “in the early stages and require considerable investment,” BGR co-author Michael Szurles said. Project approval tends to often be rejected amid widespread opposition against domestic mining.

“A large proportion of the mineral raw materials required in Germany each year are extracted from domestic deposits,” said Volker Steinbach, head of the raw materials department at the BGR. “But Germany has a comparatively low production of the mineral resources categorised as critical or strategic by the EU and is therefore currently largely dependent on imports.”



Thermal barrier coatings market to top \$1.6 billion by 2031

Demand for higher engine efficiency will see the market for thermal barrier coatings expand from \$17.82 billion this year to over \$25.41 billion in value by 2031, Coherent Market Insights forecasts. Novel ceramic coating materials can withstand higher combustion temperatures and last longer, supporting end- industries such as aerospace, industrial gas turbines, and automotive.

Thermal barrier coatings use special ceramics that allow turbines to combust natural gas, coal or hydrogen at ever higher firing temperatures, increasing efficiency. Currently, temperatures in cooled turbines reach around 1,250 degrees, enabling efficiency rates of over 63%.

Promising new coating materials that gain are double ceramic layers (DCL), rare earth oxide-stabilized zirconia, and mullite. Other advanced options under research are nanostructured materials, functionally graded materials, solution precursor plasma sprayed (SPPS) coatings, and hybrid polymer-ceramic coatings.

Thickness, not conductivity

It is clearly the thickness, not the thermal conductivity, which is important to minimise the coating temperature, technical research finds. The microstructure of the coating determines



the behaviour of the material under high temperature and high-pressure conditions.

Soaring demand for fast-ramp peaking power stations, and demand for lightweight and fuel-efficient aircraft is seen the coating market grow at a rate of over 5% through to

2031. However, the availability of substitutes and economic cyclicality still pose challenges to market players, analysts warned. The lack of substitutes for certain raw materials used in coatings can prolong lead-times, delay manufacturing and propel up prices. ■

Hitachi launches technology that eliminates SF6 in electric switchgear

Japan's Hitachi Energy has launched an SF6-free solution for high-voltage switchgear that is claimed to not compromise on size, performance, or safety of transporting electricity over long distances. As electricity demand soars and grids are expanded to integrate renewables, Hitachi Energy expects the high-voltage switchgear market to grow by 140% to \$60 billion by 2050.

Sulfur hexafluoride (SF6) – a little known gas – is critical in keeping the lights on as it is vital to transmit electricity over long distances. Grid operators, challenged by facilitating the fast-rising build-out of wind and solar power units, need to rapidly expand the grid's power transmission capacity while not causing potent greenhouse gases like SF6. Already today, around 1,300 tons of the gas is used in UK substations alone, and more than 10,000 tons in the EU, analysis by Hitachi Energy finds.

"But leaks mean switchgear is responsible for 80% of all SF6 emissions, which total 220 million tons of CO2 equivalent per year – same as the emissions of 50 coal-fired power plants," said Markus Heimbach, managing director of the High Voltage Products Business Unit at Hitachi Energy.

With switchgear typically in service for 40 years, it's important to act fast, as deci-



sions taken today will determine the success of Net Zero in 2050," he noted. The novel technology is hailed as "the world's highest voltage SF6-free switchgear" – the EconiQ 550 kV circuit breaker that can be used in gas-insulated switchgear (GIS) or dead tank

breakers and the EconiQ 420 kV Live Tank Breaker.

China, the source of 57% of global SF6 emissions, could contribute substantially grid-connecting wind, solar and hydro power in a more sustainable way. ■

TAQA and JERA close financing of Najim cogeneration plant in Jubail

Abu Dhabi-based developer and electric utility TAQA and Japan's largest power producer JERA have announced financial close of Najim Cogeneration Company, project vehicle for a CHP project at Jubail, Saudi Arabia. The new plant will supply up to 475 MW of electricity and 452 tons per hour of steam from combined-cycle operations to a nearby petrochemical complex.

The expansion of the SATORP petrochemical complex will house one of the largest mixed-load steam crackers in the Arab Gulf region. That cracker requires both electricity and process steam on a substantial scale, hence TAQA in March this year entered into an electricity and steam purchase agreement with Saudi Aramco Total Refining and Petrochemical Company ("SATORP"), a joint venture company owned by Saudi Aramco and TotalEnergies.

Financial close now follows shortly after the PPA and steam purchase accord. The cogeneration plant is will be developed by a special purpose entity owned by TAQA (51%) and JERA (49%) on a 25-year build, own, and operate basis extendable by five years. Both partners will also operate and main the plant's operation throughout its lifetime.

"TAQA is proud to take on a developer role as well as the operations and maintenance at the plant, two focus areas for capability expansion for TAQA, as well as

adding 475 MW of power generation and 452 TPH of steam generation to our overall capacity," said Farid Al Awlaqi, chief executive of TAQA's generation business. The venture is the company's third generation project in Saudi Arabia and will be powered by J-Class gas turbine technology, manufactured in Japan.

Technically speaking, the CHP is designed to optimize energy efficiency, and reduce environmental impact, and it will play a crucial role in supporting SATORP's Strategic Expansion operations. "By leveraging cutting-edge technology, the plant will ensure



SATORP refinery and petchem complex

reliable and efficient power and steam generation, setting new standards in operational performance and sustainability," JERA's global strategy Steven Winn pointed out.

In terms of sustainability, the project has provision for the future installation of a carbon capture plant and is capable of hydrogen co-firing. ■

Mitsubishi secures order for H2-ready gas turbine in Saudi Arabi

Mitsubishi Power has received an order from Samsung C&T to provide its M501JAC hydrogen-read gas turbine for a new 475 MW cogeneration project in Saudi Arabia. The combined-cycle plant is being developed by TAQA and Japan's largest power producer JERA and will produce industrial steam and power plant for the SATORP petrochemical complex at Jubail.

Expanding the petchem complex will require more electricity and process steam, which TAQA already sold upfront to Saudi Aramco Total Refining and Petrochemical Company (SATORP), a joint venture company owned by Saudi Aramco and TotalEnergies. This PPA was the basis for financial close for the CHP.

An M501JAC gas turbine will be at the heart of the cogeneration plant, providing flexibility, faster start-up times, and load-following capabilities. Dr. Frank Possmeier, Chief Business Development Officer, TAQA's Generation business said TAQA and its partners were "pleased to harness the efficiencies of the J-class turbine."

"Developing the most efficient and reliable utility projects is a priority for TAQA; as we look to offer best-in-class generation plants



Assembly of M501JAC gas turbine

for our partners," he noted, anticipating that "the Najim Cogeneration Plant will exemplify a world-class facility once it is operational."

The turbine to be used at Najim CHP will be the first Mitsubishi Power heavy duty gas turbine assembled in the Kingdom, in Dammam, aligning with Saudi Arabia's localization targets set out in 'Vision 2030'. ■

GEMS 7 supports GWh-scale storage

Wärtsilä's newly launched GEMS 7 energy platform operates autonomously to support multi-GWh-scale energy storage projects. The software gives electric utilities visibility at cell level, allowing for site partitioning to allocate cells to different revenue streams, and reduces latency for fast frequency response events – critical in both California and Australia.

Energy capacity of batteries is classified in units below 100 MWh, between 100 to 500 MWh, and above 500 MWh. ResearchandMarkets reckons the global market for battery-based electricity storage is estimated to reach \$25.6 billion by 2029, expanding 26.9% annually from a size of just \$7.8 billion this year. ■

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