



EU needs 7% of its gas coming from Russia, flows may run via Turkey

Though the EU has slashed its dependency on Russia, which supplied 40% of the bloc's gas needs prior to the war in Ukraine, it still needs a minimum of 7% of its gas consumption coming from Russia, the French energy consultant Thierry Bros reckons. The Russian President Vladimir Putin offered to step up flows and re-route them through Turkey.

The new hub for Russian gas in Turkey could lead to an expansion of the 31.5 Bcm/year TurkStream pipeline. Currently, deliveries are low and just benefit Turkey as well as Serbia and Hungary. Flows of Russian gas to Turkey and through the Ukrainian gas network totalled 1.94 Bcm in October, down 9% on the previous months, according to S&P Platts figures. The October total of 1.94 Bcm contrast sharply with much higher deliveries at 10.08 Bcm in October 2021 – exposing both the extent of Russian supply cuts and the potential upside.

"We could move the lost volumes from the Nord Streams along



the bottom of the Baltic Sea to the Black Sea region and thus make the main routes for the supply of our fuel, our gas to Europe go through Turkey," Putin told an energy conference in Moscow. "If the plan is economically feasible and offtakers are interested, it could turn Turkey into one of 'the largest gas hubs for Europe,'" he said.

The Turkish President Recep Tayyip Erdoğan welcomed the plan,

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Shenzhen Energy signs LNG deal with BP to source gas for power gen

The Chinese utility Shenzhen Energy has announced it signed a long-term LNG import contract with BP to source fuel for gas-fired power stations under construction in Guangdong province. Shenzhen Energy estimates that "around 2024, as the gas power plants go into operation, the group's total gas demand will rise significantly."

The agreement is Shenzhen Energy's first long-term international LNG contract and its first long-term offtake deal with BP Singapore, the Chinese utility said in a statement. The signatories, however, did neither specify the contracted volumes of LNG deliveries, nor the duration of the contract.

BP has been shipping LNG to China since 2006 when it purchased cargoes from Australia for resale to China National Offshore Oil Corp (CNOOC). The first BP cargoes were delivered to the Dapeng Guangdong regas terminal, situated near Shenzhen City and it is assumed that



Dapeng Guangdong regas terminal

future cargoes will head to that terminal as well.

Powering growth in Shenzhen City

Shenzhen City, often dubbed as China's Silicon

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though it is unlikely that Russia's western European gas customers are willing to increase offtake any time soon. Putin had earlier suggested to deliver gas directly to Germany via the undamaged Nord Stream-2 pipeline, but the German government refused noting Russia was "no longer a trustworthy supplier."

Shelling risks to paralyse transits through Ukraine

The trickle of gas still flowing through the Ukraine to Continental Europe could soon run dry as emergency power cuts as Russian

missile strikes threaten to paralyse the compressors at a gas transit pipeline. If Russian gas deliveries fall to near-zero and China's LNG imports recover, Europe would be facing a 30 Bcm gas supply gap next summer, analysts at the International Energy Agency (IEA) warned.

This summer, the process of filling EU gas storages benefitted from the fact that Russian pipeline deliveries were close to "normal" levels for much of the first half of the year – before Gazprom halted flows over a row on sanctions and payment terms. Rus-

sia delivered around 60 Bcm of pipeline gas to the EU in 2022, but in 2023 Gazprom is likely to halt direct supplies completely as it tries to make Europe commit to buy gas re-routed via Turkey.

Global LNG supply, meanwhile, expected to rise by "only 20 Bcm," next year – much less than the likely decline in Russian pipeline deliveries (80 Bcm) to the EU over the same period. And if China's LNG imports recover to 2021-levels, they would capture over 85% of the anticipated rise in global LNG supply, analysts warned. ■

High energy prices undermine Germany's attractiveness for industry

Safeguarding Germany as an industrial location will be difficult in 2023, as a survey by the industry federation BDI found that 58% of companies regard the price hike for energy and raw materials as a "strong challenge." Some 34% even said the energy crisis could ultimately force them out of business, or leave the country.

Wholesale gas prices for 2023 are currently about eight times higher for German companies than for competitors in the US, a situation that could lead to the winding-up of the basic materials industry. Making goods like aluminium in Germany is simply no longer be competitive on world markets, the metallurgic industry association WVM said. Moreover, the production volume of chemicals firms has fallen 10%, while the number of company insolvencies was about a quarter higher in August 2022 than one year earlier.

Eager to preserve Germany as an industrial location, economy minister Robert Habeck vowed to "create conditions that enable industry and value creation to stay here, to produce here, and to organise the ramp-up of future markets' goods in Germany. The government already agreed on a

€200-billion "defence shield" package to help cash-strapped businesses and household shoulder soaring energy prices, which are still up 38% year-on-year.

About 25,000 large industrial gas consumers are proposed to pay €0.07 per kilowatt-hour for the first 70% of their 2021-use in the period from 1 January 2023 until end of April 2024. Private households, meanwhile, would be asked to pay €0.12/kWh for a 'basic quota' of 80% of their consumption levels last year.

But for any gas used above that level, customers must pay the regular contract price – likely to be significantly higher.

To rein in costs, industry is already using about 20% less gas than before the start of the crisis. BDI president Russwurm said a fast and far-reaching re-activation of coal-



fired power plants will be necessary to bring down energy costs and provide companies with more planning security.

"Every kilowatt hour counts," he said, arguing that both lignite and hard coal plants should be made available quickly by reducing regulatory hurdles. Russwurm also urged policymakers to strengthen investments in the expansion of renewable energies and in the rapid ramp-up of the hydrogen economy. ■

Gas to Power Journal

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Valley, is part of the Guangdong-Hong Kong-Macao Greater Bay Area. Home to a population of over 70 million, it is one of China's most dynamic and fastest growing regions with rising energy demand.

"To meet the demand of Guangdong province and Shenzhen City for energy security and stability, Shenzhen Energy Group is making efforts to promote the construction of gas power plants," the utility said.

In March, Shenzhen Energy ordered three H-class combined cycle power units from Siemens Energy for the Phase II project at Dongbu power plant and the upgrade

project at Mawan power plant. The annual total power generation of the two plants is expected to exceed six billion kilowatt-hours, and most of the plant's fuel needs will be covered with imported LNG.

Though Chinese LNG buyers are well covered for the coming winter and are expected to avoid buying expensive spot cargoes, they are rushing to secure long-term LNG offtake agreements. Shenzhen Energy's deal with BP comes just days after Sinopec signed a 27-year deal to import 4 mpta of LNG from Qatar Energy – the longest such agreement to date. ■

Long-term LNG contracts sold out until 2026; Japanese buyers say

No long-term LNG contracts are available before 2026 – they have all been sold out, Japanese gas importers told the trade ministry in a survey. Asian and European buyers are “in huge competition”, they said, as Sinopec just managed to strike a 27-deal with QatarEnergy for 4 mtpa of LNG offtake from its North Field East expansion project.

“The LNG procurement environment has changed completely. Procurement can also be said to be in a state of war,” Japanese gas importers told the trade ministry. A lack of investment into liquefaction and export projects, combined with Europe’s

rush to replace most of Russian pipeline gas deliveries with LNG, is heating up the global competition for cargoes.

With the Chinese economy fast recovering from regional lockdowns, savvy state-owned energy companies sign up long-term supply deals for decades to come. Sinopec

agreed to splash out \$60 billion over nearly 30 years as it commits to purchase 4 mtpa of LNG from QatarEnergy’s North Field East project. First shipments will be delivered in less than four years’ time.

Sinopec’s willingness to commit to firm offtake over 27 years gave it the

upper hand in securing Qatari LNG over rival European and particularly Germany buyers who are reluctant to sign long-term contracts. In fact, most European LNG buyers prefer 5-year offtake agreements as much of the continent’s gas-fired power stations will be co-fired with hydrogen.

“Long-term deals are important for both seller and buyer,” QatarEnergy chief Saad al-Kaabi pointed out, adding the deal with Sinopec “takes our relationship to new heights as we have a SPA that will last into the 2050s.”

Proceeds from the Sinopec deal will bolster QatarEnergy’s North Field East project which includes six LNG trains, designed to boost Qatar’s liquefaction capacity from 77 million tons to 110 million tons in three years. The massive expansion will cost Qatar and investors including Shell and Exxon Mobil nearly \$30 billion – hence long-term offtake is vital to guarantee a stable rate of return. ■



Canadian gas imports vital to balance US demand during winter peak

Despite falling volumes, Canadian pipeline gas imports remain important to balancing US markets particularly during the winter when cold temperatures drive gas demand for heating. Imports in the eastern US generally peak in January or February at approximately 2 Bcf/d – except for February 2021, when the winter storm Uri pushed up imports to 9.5 Bcf/d.

ample capacity on pipelines and in storage facilities in Canada allow suppliers to rapidly increase flows, helping to stabilize US markets if needed. Imports of Canadian gas helped US working gas stocks reach 3,644 billion cubic feet (Bcf) as of November 11.

Injectors this season, at 2,150 Bcf, were 16% higher than one year ago, analysts at the US Energy Information Administration (EIA) pointed out. Moderate temperatures during the first couple of weeks in November contributed to continued larger-than-average injections which continued well beyond the end of the refill season on October 31.

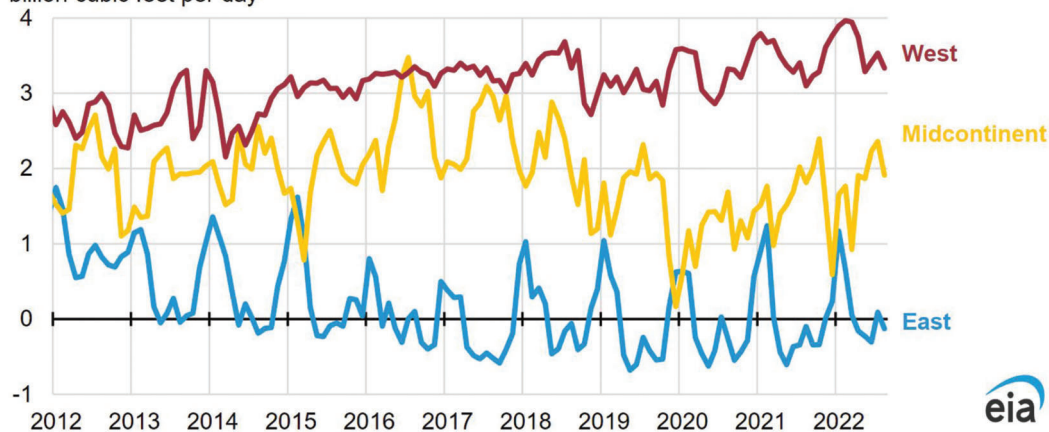
Gross imports of dry natural gas from Canada covered around 8% of supply in the United States as of the end of August, while U.S. gas production averaged 92%, or 97.0 billion cubic feet per day (Bcf/d), according to the government’s Natural Gas Monthly. On the other

hand, the US exports increased to 24% of all pipeline gas trade with Canada with flows particularly high during spring and autumn, when US gas flows into Canada to build inventories.

This summer, however, a prolonged heat wave in California and the Pacific Northwest pushed up power demand for air conditioning while less hydropower output was avail-

able due to drought. Gas-fired power stations had to be dispatched to balance the grid, but fuel was scarce as pipeline constraints reduced gas inflows from the Permian Basin. In consequence, gas imports from Canada increased by 4.1% compared with summer 2021, transported via border-crossing points at Sumas, Washington, and Eastport, Idaho. ■

Monthly U.S. natural gas pipeline net imports from Canada by region (Jan 2012–Aug 2022)
billion cubic feet per day



Data source: U.S. Energy Information Administration, [Natural Gas Imports and Exports/Pipelines](#)

North America at risk of forced generator outages during cold spell

Low coal and gas inventories put large parts of the North American bulk power system at risk of having insufficient electricity supplies during a severe winter, the North American Electric Reliability Corp. (NERC) finds. Inadequate generator weatherisation could lead to a "significant number of forced outages" in Texas and southern parts of MISO, analysts warn.

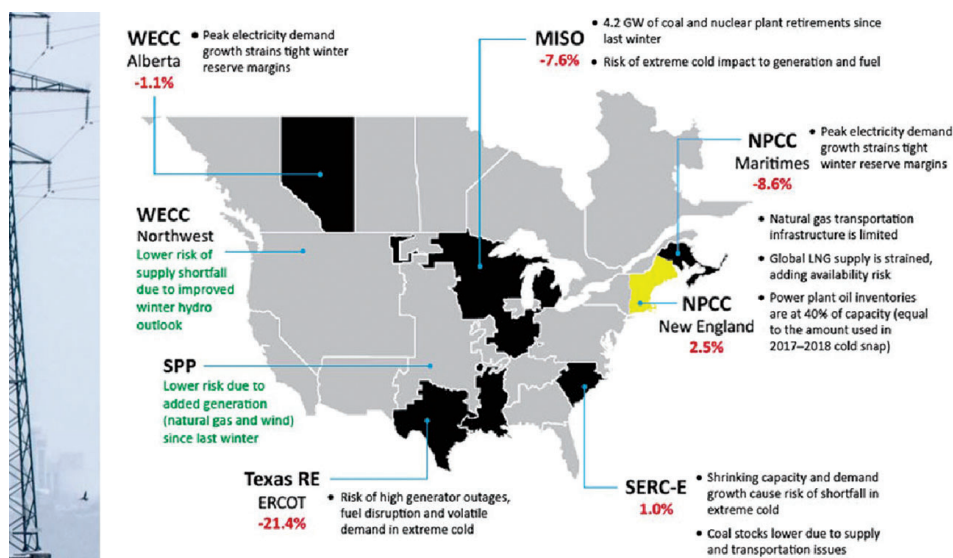
Most at risk is the Electricity Reliability Council of Texas (ERCOT) with a projected reserve margin of -21.4%. Power generators and pipeline infrastructure in Texas and in the southern part of the Midcontinent Independent System Operator (MISO) are not prepared for prolonged cold

temperatures and "remain vulnerable without weatherization upgrades." Soaring electricity demand during an extreme cold "compounds the risk," analysts noted.

Tight capacity margins are the main concern in the Midcontinent ISO. Since last winter, MISO retired over 4.2 GW of nuclear and coal-fired capacity while adding just a few

new resources. The projected reserve margin under extreme winter condition stands at -7.6% as fuel supply issues could hamper the dispatch of peaking plants.

New England has limited gas transportation capacity and pipelines can freeze during an extreme cold. On such days, the regional electricity supply relies on LNG and oil-fired generators which keep the projected reserve margin at a positive 2.5%. But global LNG supply is strained, while power plants' oil inventories are at just 40% capacity which adds to the availability risk, analysts warned.



Uniper to reactivate oil-fired power plant in February to save gas

Uniper will return the light fuel oil-fired Irsching 3 power plant (415 MW) to the market from February until the end of 2023 to stabilise electricity supply in southern Germany while complying with a law to burn as little gas as possible. Previously, Uniper had already reactivated the two hard coal-fired power plants Heyden 4 (875 MW) and Scholven C (345 MW).

Irsching 3 will essentially serve as a back-up for the rest of Uniper's power plant portfolio to avoid critical situations in the grid in case of gas scarcity, the operator said.

The 415 MW plant is currently held in grid reserve by the grid operator TenneT. Despite reactivating the plant temporarily, Uniper will still decommission it as planned at the end of 2023. Unit 3, commissioned in 1974, has all operational and environmental permits in place and is scheduled for a four-week overhaul from the end of May.

In addition to the oil-fired Unit 3, the Irsching site also consists of two gas-fired units: The Ulrich Hartmann power plant (unit 4) has a capacity of 561 MW and went into operation in 2011. With an efficiency of 60.4%, it is one of the most efficient CCGT plants in the world. Unit 5, commissioned in 2010, has an efficiency of 59.7% and will be accompanied by Unit 6 which is being built for grid stability and scheduled to go into operation in 2023.

AGL to shut down Torrens Island B gas power plant already in 2026

The Australian utility AGL has decided to close its 1,280 MW gas-fired power station Torrens Island B in South Australia in 2026, nearly ten years earlier than planned. The station has been loss-making for years and its closure date on June 30 will coincide with the completion of the state's new 800 MW interconnector with New South Wales.

"We are losing money with this power station here and this will be just emphasised by the new built interconnector, which is currently under construction — EnergyConnect," said AGL chief operating officer Markus Brokhof.

EnergyConnect is a 900-kilometre electricity transmission line being built between Wagga Wagga in New South Wales and Robertstown in South Australia, with a connection to Red Cliffs in Victoria. Various wind and PV project will be built along its route that are expected to help NSW customers to save \$180 million a year on electricity bills.

The government insisted Torrens Island B needs to keep running until the interconnector is ready, and AGL will receive AS\$19.5 million to keep 200 MW of gener-



Torrens Island Power Station

ating capacity operational as a contingency reserve.

The older unit A has already been mothballed in 2017 even though the operator spent AS\$800 million in 2009 to expand and upgrade the 480 MW unit to cover peak demand. But since then gas prices surged in Australia despite national production levels soaring as most of the fuel is liquefied and exported to Asian markets. Domestic power producers, meanwhile, have struggled to source fuel at an adequate cost.

Five Japanese utilities join forces to procure hydrogen and ammonia

Japan's five big power producers – JERA, Kyushu Electric, Chugoku Electric, Shikoku Electric and Tohoku Electric – have teamed up to secure large volumes of hydrogen and ammonia to fuel their thermal power stations in Japan. Joint procurement is aimed expanding supply chains and securing firm fuel deliveries at a lower cost as the generators strive to decarbonise.

Hydrogen and ammonia do not emit CO₂ during combustion, hence a series of trials is underway to co-fire coal and gas power stations worldwide with these clean-burning fuels. Each of the five Japanese utilities has looked at ways to use hydrogen and ammonia in their thermal power plants – now they need to secure firm supplies.

JERA is already looking to set up a hydrogen and ammonia receiving and supply base at Keihin waterfront in Kanagawa Prefecture in the greater Tokyo area. The Keihin hub will be situated in the centre of the Kanto region where JERA owns thermal power stations, designated for ammonia co-firing.

Starting from fiscal 2023, JERA wants to switch 20% of the fuel at Unit 4 of its Hekinan Thermal Power Station (4,100 MW) to ammonia which is why it needs to procure and import ammonia at large. In mid-February, JERA hence conducted a competitive bid to procure up to 500,000 tons of ammonia per year under a contract

running from 2027 until the early 2040s.

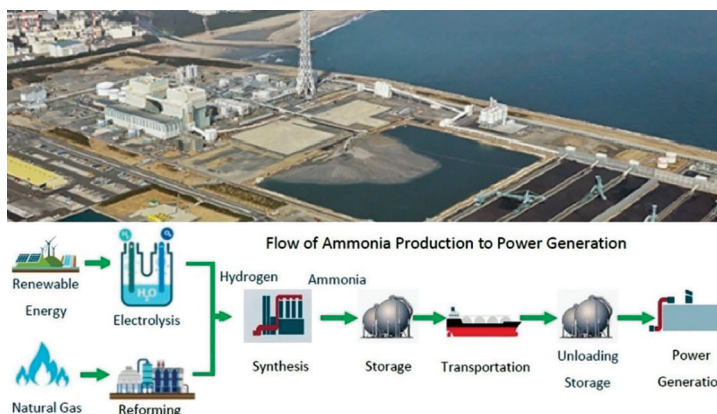
Research for higher co-firing rate

Together with Mitsubishi Heavy Industries (MHI), researchers at JERA have received Japanese government funding to develop a novel technology that will increase the rate of ammonia co-firing at boilers in thermal power stations. Burning ammonia is carbon-free and the JERA-MHI team vowed to verify co-firing with at least 50% ammonia at two different boiler types by 2028.

Government funding for the project has been made available for an 8-year period from financial year 2021 to financial year 2028. Within the first four years of the project, JERA and MHI have committed to develop a new burner capable of single-

fuel ammonia combustion and draw up a master plan for equipment to demonstrate its use in actual boilers.

Based on the results, the two companies will decide whether to install the burners at JERA's coal-fired boilers made by MHI. For the actual plant demonstrations, the two partners are now working on verifying a novel technology to co-fire at least 50% ammonia at two power plant units with different boiler types. The test runs are due completed in early 2028. ■



Sharm El Sheikh power plant may continue to run on hydrogen blend

Evaluations are underway whether to run the 288 MW Sharm El Sheikh power plant on a hydrogen blend following tests during the COP27 Climate Conference. One of the plant's LM6000 aeroderivative gas turbines was co-fired with hydrogen at a rate of 600 cubic meters per hour and achieved around 42% operational efficiency, GE told Gas to Power Journal.

The hydrogen co-firing project was executed less than five months after a strategic cooperation agreement was signed between Egyptian Electricity Holding Company (EEHC), GE, Hassan Allam Construction, and PGESCO.

GE led the project, together with the engineering firm PGESCO, and build hydrogen-natural gas blending system at the Sharm El Sheikh power plant, owned and operated by EEHC. Hassan Allam supplied the hydrogen

needed for testing, and the piping and cabling system that transported hydrogen to the mixing skid and the turbine.

The test runs in mid-November were the first time that GE's LM6000 gas turbine was run on hydrogen-blended fuel on the African continent. Though the peaking power plant can now run on hydrogen blends, it is not clear if it will do so continuously as operator EEHC first needs to secure stable supply of the zero-carbon fuel.



EEHC's Sharm El Sheikh power plant

The American manufacturer had already demonstrated the co-firing of a LM6000 turbine at New York Power Authority's Brentwood power station on Long Island in November 2021 during an eight-week pilot project. Learnings from the Brentwood project were applied by GE at Sharm El Sheikh and shared with other project partners. ■

NEWS NUDGES

Aiming for green H₂ at scale in Thailand

The Saudi developer and investor ACWA Power has signed a Memorandum of Understanding (MoU) with the Thai power producer EGAT and national energy company PTT to produce green hydrogen and derivatives at scale in Thailand. By investing \$7 billion, the trio aims to produce 225,000 tons of hydrogen per year, equivalent to some 1.2 mtpa of ammonia. The aim is to tap "valuable export opportunities" as Europe's green hydrogen market is forecast to grow 40% until 2030.

Producing hydrogen from LNG onboard ships

Finland's clean energy pioneer Hycamite is working with Wärtsilä to cost-effectively produce hydrogen from LNG onboard marine vessels. A concept design is being compiled by mid-2023 with the aim to start prototype testing during the second half of 2024.



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Mammoet transports gas turbines to Fujairah F3 for 2023 start-up

The transportation specialist Mammoet has shipped and lifted three Mitsubishi-made M701J gas turbines to the site of the Fujairah F3 power plant – in time for a start-up in early 2023. The 2.4 GW unit is set to become the UEA's largest independent combined-cycle power plant, with all equipment imported via Abu Dhabi port's Fujairah terminals.

Samsung C&T carries out EPC works for the project under a contract worth \$977 million. The Japanese construction firm has selected Mammoet to transport, lift and install a total of 105 power plant components – including the three turbines – over 23 kilometres from the port to the project site in Ras Al Qidfa.

The Fujairah F3 plant is being built between the existing F1 and F2 water and electricity plants and once, operational, it will be capable to supply 380,000 house-

holds with electricity.

The 2.4 GW power unit is being developed by a consortium of Abu Dhabi Power (ADPower, 60%) and Japan's Marubeni (40%) which awarded a contract by Emirates Water and Electricity Company (EWEC) to finance, build and operate the plant.

For Mitsubishi, the F3 project is the first in the Middle East to utilize advanced JAC-Series gas turbines. M701 JAC-class gas turbines achieve an efficiency greater than

64%, reliability of 99.6%, and the lowest carbon emissions per unit of power when used in combined cycle, the manufacturer said. Capable of operating on a mixture of up to 30% hydrogen and 70% natural gas, the turbines are meant to run fully on hydrogen in the future. ■



Fujairah F3 is being built between the F1 and F2 units

Mitsubishi to upgrade turbines at Singapore CCGT to curb emissions

Mitsubishi Power, part of MHI, has been contracted by Tuas to upgrade two of four M701F gas turbines, rated 360 MW each, at its combined-cycle power station in Singapore. The upgrade will improve the heat rate by reducing the volume of cooling air, which will lower emissions of the CCGT two units by 16.9 kilo-tonnes per year.

The upgrade will help Tuas Power to improve the CCGT's overall energy efficiency and comply with decarbonisation targets set out in Singapore's stringent energy policies. Works at two of four units at the 1,440 MW power station are scheduled for completion in 2023.

"This upgrade will enable us to generate electricity while reducing emissions, yet without compromising the plant's energy output," Tuas' plant manager Cheng Tin Swan said. To ensure a high operating rate, Mitsubishi will not only upgrade the CCGT but also provide ongoing support under a long-term service agreement. ■

Entergy gets approval to build 1.2 GW hydrogen-ready CCGT in Texas

The Public Utility Commission of Texas has approved Entergy's proposal to build a 1,215 MW Orange County Advanced Power Station near Bridge City, allowing for construction to start in April 2023. Powered by two Mitsubishi M501JAC turbines, the combined-cycle plant will be able to run on blends of up to 30% hydrogen by volume along with natural gas.

Entergy Texas said it expects modern, dual fuel CCGT to be in service by summer 2026. Situated in one of the largest industrial regions in the US, the hydrogen-ready plant will replace end-of-life legacy gas generation and will be capable of powering more than 230,000 homes. The operator expects the plant to realize over \$100 million in fuel savings the first year and provide well over a billion dollars in net benefits to customers over its life.

Works to build the plant will create more than 7,000 direct jobs, followed by approximately 27 permanent jobs once it will be operational. Project development and construction of the Orange County CCGT is found to underpin nearly \$1.8 billion in total

economic activity in Southeast Texas.

Mitsubishi Power, which is supplying the two M501JAC turbines, claimed the plant

would eventually operate fully on hydrogen – provided the operator can source enough of the clean fuel. Hydrogen produces no emissions when burned and helps turn gas power generation assets into

a destination technology, not just a bridging technology as the world strives to reach net zero. ■



Render of Orange County CCGT

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