



Japanese utilities buy expensive spot LNG as they need to restock

Tohoku Electric and Kyushu Electric have had to purchase expensive spot LNG as they are running very low on gas stocks to fuel their power plants. The two utilities were seen buying late-February cargoes at \$35–40 per MMBtu, while the JKM Mar-21 contract was trading around \$10 per MMBtu.

Several Japanese firms will likely need to restock over the coming weeks, analysts at Energy Aspects said. The London-based consultancy forecasts Japan's aggregate stocks to be at around 3 million tons by the end of February—down from the five-year average of 4.1 million tons.

Restocking to normalize gas inventories is expected to further boost LNG demand over the coming week. Japanese utilities already appear to have boosted stocks to 1.25 Mt, up by around 0.25 Mt week-on-week, and analysts see "pent-up demand in China and Pakistan."

As more LNG is gradually being made available in the Pacific Basin, demand will also come from industrial segments as they are seeking to make up for lost output during recent supply shortfalls.

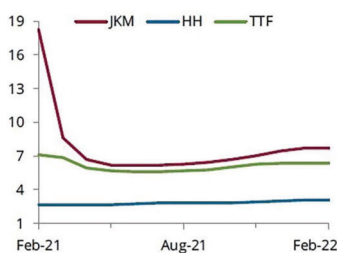
"Given the high spot prices in recent weeks and cold weather outlooks, it was extremely hard for other Northeast Asian buyers to give up cargoes unless they had ample gas in storage or the ability

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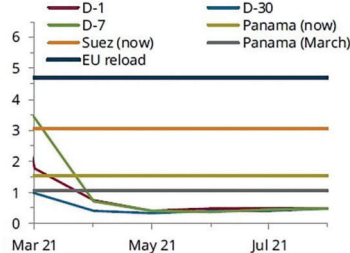
Tepco's Futtsu LNG import terminal and power plant

Global prices, \$/mmbtu



Source: CME, Energy Aspects

JKM-TTF spreads vs freight diffs., \$/mmbtu



Source: CME, Fearnleys, Energy Aspects
*freight diffs are the increases in freight costs to send cargoes to Northeast Asia instead of Europe

McDermott studies ways to expand liquid hydrogen storage

US natural gas producers have asked McDermott to carry out a study into how to best expand current liquid hydrogen storage capacity limits. CB&I, part of McDermott, specialises in cryogenic storage and is currently building the world's largest liquid hydrogen sphere for NASA.

The award of the study, funded by large US upstream players, shows that industry leaders recognize that "effective, affordable storage solutions are imperative to achieve a sustainably powered future," said Samik Mukherjee, McDermott's senior VP for Projects.

"Hydrogen, like wind and solar, plays a major role in decarbonisation," he stressed, hence "the study aims to unlock even greater potential in this field."

CB&I Storage Solutions, part of McDermott, is designing and building field-erected spherical cryogenic hydrogen storage, tanks and terminals.



CB&I cryogenic storage is used for liquefied gases

The company has completed more than 59,000 structures throughout its 130-year history - building up extensive expertise and strategically-located operations.

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to switch to alternative fuels," analysts said. Looking ahead, the arrival of milder weather patterns could encourage some companies to make some intra-basin cargo offers for February–March.

Intra-basin arbitrage to close by April

The substantially lower prices for JKM Mar-21 contracts indicates there will be no demand for European reloads and cargoes being diverted from the Atlantic Basin. Analysts expect the intra-basin arbitrage window

between the Atlantic and the Pacific Basin to completely close by April. This should also reduce the number of US shipments to Northeast Asia and ease the Panama Canal congestion.

Starting from March, the start-up of the 4.5 mtpa Corpus Christi Train 3 will add between 5 to 10 vessels per month, though it is unclear how much of that will be going to the Pacific Basin. Energy Aspects expect 19 vessels to be delivered to Northeast Asia over the first quarter of 2021, which is up from just four vessels over the first quarter in 2020.

By the summer, the JKM-TTF arbitrage will likely have closed as Northeast Asia will be then largely supplied by shipments from Australia or the Middle East. The restart of Prelude, the world's largest floating liquefaction plant, as well as tie-in of Eni's Merakes field to Indonesia's Bontang facility this month should stabilise or even boost supply. Meanwhile, Chevron's Gorgon LNG plant is expected to not return to full operations before the end of the third quarter of 2021, once heat exchanger issues are sorted out. ■

EIA sees Brent rise to \$54/bbl on lower OPEC and US production

The U.S. Energy Information Administration (EIA) says crude oil prices will rise from \$50 per barrel in December 2020 to \$56/bbl in the first quarter of 2021 due to OPEC's production limit and falling output of US fracking companies. Brent prices could hit \$54/bbl in 2022, impacting oil-indexed gas supply contracts.

The rise in oil prices is largely caused by a rebound in global demand for petroleum liquids that exceeds available supply in the first quarter, leading to inventory draws.

Production, meanwhile, will remain on fairly low levels as OPEC is implementing agreed oil production limits and Saudi Arabia said it would voluntarily cut production by an additional 1.0 million b/d during February and March.

US crude oil output from the lower 48 states, excluding the Gulf of Mexico, is forecast to fall in the first quarter as the recent rise in Covid-cases continues to limit operations. In 2021, EIA expects crude oil production in this region will average 8.9 million b/d while total US oil output could reach 11.1 million b/d – substantially less than 2020 production.

Inventory draws in the first quarter will put upward pressure on prices, pushing up prices to \$53/bbl, though stock draws

are set to decrease by the end of the first quarter.

Henry Hub prices rebound

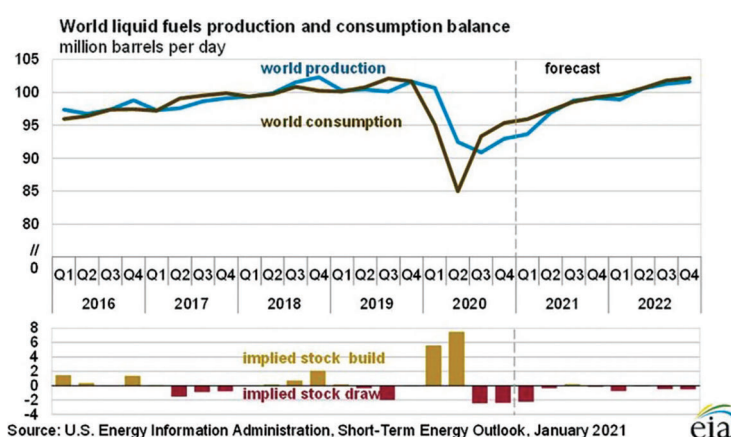
The slowdown in US fracking activity is curtailing both shale oil and gas output. Prices at the US benchmark Henry Hub are consequently forecast to increase from an average of \$2.03 per Million British thermal units (MMBtu) in 2020 to around \$3.01/MMBtu in 2021, limiting the availability of natural gas for power generation.

Declines in US gas production this winter will more than offset to pandemic-related fall in consumption, leading to inventory withdrawals that outpace the five-year average. Forecast natural gas inventories end March 2021 at 1.6 Tcf, 12% lower than the 2016–20 average.

On the demand side, gas-burn in the power sector will continue to fall as rising prices

make power producers dispatch their coal-fired power plants ahead of gas-fired ones. Coal's forecast share of electricity generation will rise from 20% last year to 22% in 2021 and 24% in 2022, while power generation from gas will fall from 39% last year to 36% in 2021 and 34% in 2022.

Looking further ahead, analysts expect US fracking operations and output to recover slowly, while US gas consumption will decline by 2.8% in 2021 and by 2.1% in 2022, mostly due to lower demand from the power sector. Henry Hub prices are forecast to rise to \$3.27/MMBtu on average in 2022. ■



Source: U.S. Energy Information Administration, Short-Term Energy Outlook, January 2021



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Publisher
Stuart Fryer

Editor
Anja Karl
Tel: +44 (0)7733 684 682
anja@gastopowerjournal.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
Tel: +44 (0) 208 995 5540
chee@btconnect.com

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The liquid hydrogen sphere, under construction for NASA at Cape Canaveral, will provide the capacity to store 1.25 million usable gallons of liquid hydrogen to support the Moon to Mars Exploration programme.

"In 1960, we built the first liquid hydrogen sphere with the capacity to store 170

cubic meters. Over the last sixty years, we have expanded that threshold by about 30-fold to 5,000 cubic meters," said Cesar Canals, Senior Vice President of CB&I Storage Solutions. The explicit aim of CB&I is to provide its customers world-class storage solutions for even the most complex energy infrastructure projects. ■

Kawasaki to supply Japanese utilities with hydrogen from Australia

Kawaskai Heavy is striving to replicate its LNG supply chain with hydrogen from Australia, targeting power producers in its Japanese home market as offtakers for the alternative fuel. Under an A\$500 million pilot project, Kawasaki wants to ship the first cargo of liquid hydrogen to Japan this spring.

The Japanese government is supporting Kawasaki's plans that are in line with policies to increase the country's annual hydrogen demand from currently 2 million tons to 3 million tons by 2030, and to a staggering 20 million tons by 2050.

Kawaski vowed to build two commercial-scale hydrogen carriers to import 225,000 tonnes by 2030, and expand its fleet to 80 hydrogen carriers by 2050. Over the next ten years, the Japanese manufacturer aims to increase hydrogen-related sales by 120 billion yen (\$1.16 billion).

Before the summer, Kawasaki aims to transport over 75 tonnes of hydrogen,

extracted from brown coal in the Australian state of Victoria. To liquefy hydrogen, it needs freezing to minus 253 Celsius - significantly lower than LNG's minus 162 Celsius - which adds to the cost of commercialising hydrogen.

Striving to bring down costs

To develop a hydrogen supply chain, Kawasaki urgently needs to bring down costs. It said the aim is to reduce hydrogen supply cost from currently 100 yen (\$0.96) per cubic meter to 29.7 yen by 2030, and down to just 18 yen by 2050.



The world's first liquid H2 carrier, Kawasaki-made 'Suiso Frontier'

"We need demand from the power sector to bring down cost by scaling up," Motohiko Nishimura, Kawasaki's vice executive officer, told Reuters, adding the company is in talks with multiple companies and cities to find buyers and land to build a bigger receiving terminal for the commercial project.

Ultimately, Nishimura wants the Japanese government to incentivise the use of a cleaner fuel and create a system to clarify who would bear the extra cost. ■

Shell, MHI and Vattenfall plan 100 MW hydrogen project in Hamburg

Three global energy majors – Shell, Mitsubishi Heavy Industries and Vattenfall – have teamed up to produce hydrogen from wind and solar power at Hamburg-Moorburg power plant. The aim is to build a scalable electrolyser with 100 MW initial output. Production is due to start in 2025.

Moorburg is the site of a gas-fired power plant operated by HEW, and Vattenfall had been operating a coal-fired power plant here since 2015. But the coal plant was shuttered in December 2020 in the context of the German coal exit and a decision by the regional TSO on the plant's system relevance is expected in March 2021.

Vattenfall has said it wants to clear part of the power plant site to make space for the green hydrogen project as the company seeks to transform its business from thermal fuels to low-carbon alternative energy sources.

Ultimately the electrolyser is meant to be scaled up and complemented hydrogen

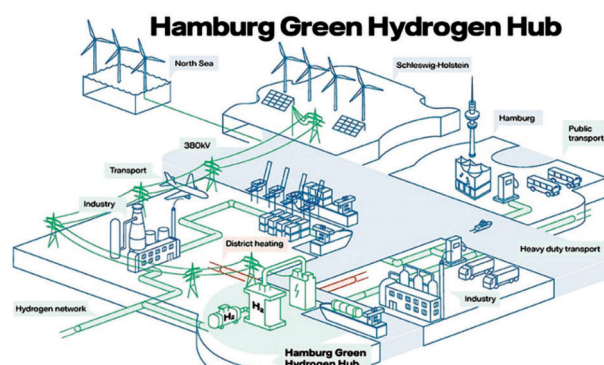
storage tanks and a logistics chain to turn the site into a so-called 'Green Energy Hub'. The project is anticipated to be one of the largest green hydrogen plants in Europe.

Site reachable by ship

The Moorburg site is deemed an 'ideal location' for a future German hydrogen hub as it is connected to both the national 380,000 volt transmission network and the 110,000 volt network of the City of Hamburg. Overseas ships can also directly call at the location, using the local port facilities as an import terminal.

Numerous potential customers are situated near the site allowing project developers to cover the entire hydrogen value chain – from generation to storage, transport and utilization in various sectors.

Funding is intended to come from the EU under the "Important Projects of Common European Interest" (IPCEI) scheme. An application for project finance will be made in the first quarter of 2021, along with a submission of the full project outline. ■



NEWS NUDGES

Hydrogen production surges

Global green hydrogen production is seen skyrocket at a rate of 57% between 2019 and 2020, according to Frost & Sullivan, rising from 40,000 tons to 5.7 million tons. The hydrogen surge comes as industry and power generators increase investment in alternative low carbon technologies and more countries set binding targets to reach carbon neutrality by 2050.

Low-carbon batteries

Geyser Batteries, a Finnish cleantech startup, has calculated the emissions of its electrochemical recuperators (ECR) to be significantly below industry averages. The ECR is an energy storage used for heavy-duty applications in the power grid and industrial machinery. The calculation, validated by the research institution VTT, shows the carbon footprint of ECR production is up to 74% lower when compared to its closest competitor, supercapacitors based on li-ion batteries. ■

Gazprom sets up subsidiary in Mongolia to advance pipeline to China

Gazprom has registered a subsidiary in Mongolia to conduct a feasibility study for a trunkline to supply Russian gas to China. With the Soyuz Vostok gas pipeline, 'Power of Siberia II' gas pipeline will extend through Mongolia, and its capacity is meant to be 1.3 times higher than that of 'Power of Siberia'.

Alexey Miller, chairman of Gazprom, said the new pipeline will allow the Russian gas company to export large amounts of gas from Western Siberia not only westward but also eastward. Starting from early November, Gazprom has been busy laying the second 800-km section of the Power of Siberia gas pipeline, running between the Kovyktinskoye field Irkutsk to the Chayandinskoye field and onwards to the Chinese border across Mongolia.

The Government of Mongolia agreed in

principle to the Russian gas interconnector as it will earn transit fees and volumes are likely to rise as China imports more gas to facilitate a fuel shifts from coal to gas for heating and power generation. More than 7.1 million households have been connected to the Chinese national gas network over the course of 2020, particularly in northern China, increasing local gas demand.

Pipeline gas gains attractiveness

Price-sensitive Chinese buyers increasingly prefer pipeline gas, sold on oil-indexed

contracts, over spot LNG – especially after the latest price spike for spot cargoes. Eager to limit domestic price rises, the National Development Reform Commission (NDRC) has set firm guidelines. Trucked LNG prices are not permitted to exceed 20% of the city gas price guideline,

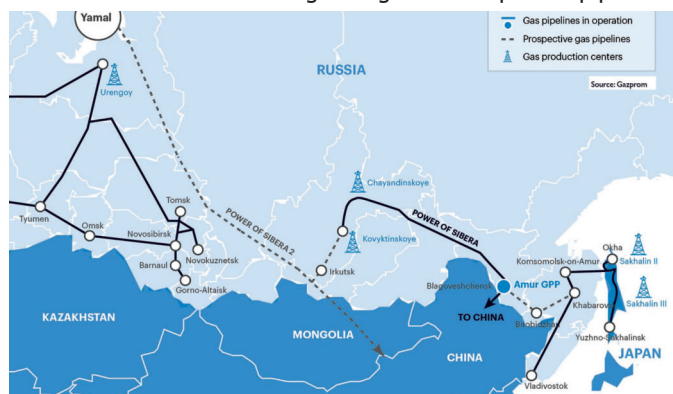
while several LNG import and regas terminals were notified that ex-factory trucked gas prices should not be higher than Yuan 5,500-6,000 per million ton.

State-controlled CNOOC, PetroChina, Guangzhou Gas and Guangdong Energy have consequently left some high-priced LNG purchase tenders un-awarded. Instead, they turn to pipeline gas imported from Russia as well as the Central Asian republics of Turkmenistan, Kazakhstan and Uzbekistan.

Russia keen to step up exports

The Russian gas major Gazprom has already been delivering 25% more natural gas than contracted to China through the 'Power of Siberia' pipeline in October and November. Further increases are planned in 2021.

Alexey Miller, chairman of Gazprom, offered his counterpart at CNPC to increase Russian gas deliveries by an additional 6 bcm after supplied volumes have been "consistently and in excess of the planned amounts" from early October until today. Prices were not disclosed.



Overcapacity in Bangladesh's power system is building up

Utilisation of Bangladesh's thermal power plants is in decline amid rising reliance on costly LNG imports, which increases the cost of power generation. Data from the Bangladesh Power Development Board's (BPDB) latest report shows that overall power capacity utilisation fell from 43% to just 40% in fiscal year 2019-20.

Planned capacity additions over the next five years could well see capacity utilisation fall further. "With another 21,000 MW due to come on line by 2025 and only 5,500 MW of old capacity due to be retired, utilisation will drop below 40% unless a very high rate of power demand growth is maintained," said Simon Nicholas, analyst at Energy Economics and Financial Analysis (IEEFA).

IEEFA estimates that capacity utilisation will drop below 40% over the next five years unless power generation growth is maintained at or above 10% per annum. This would have significant implications for the BPDB's finances as well as power tariffs,

"Under power purchase agreements (PPAs), operators of thermal plants get paid regardless of whether the plant is utilised or not. Any payments to plants that sit idle raises the per unit cost of generation, which ultimately requires the government to bail out BPDB's losses or the need to increase power tariffs for consumers.

"On top of the overcapacity problem, the planned future reliance on expensive imported coal and LNG will raise the per unit fuel cost for thermal power," Nicholas said. Several tenders for LNG imports into Bangladesh have been cancelled due to concern over high prices during 2020, and he expects this trend will intensify as Asian LNG prices have risen further in early 2021.

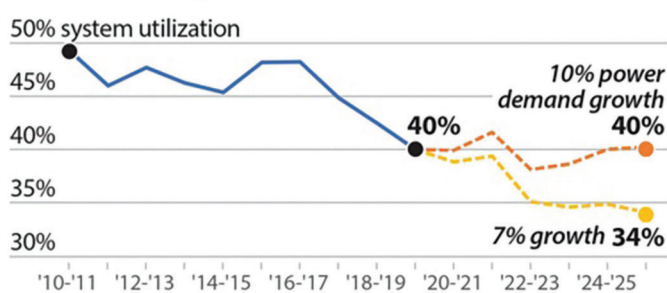
The current overcapacity issue is made worse by the fact that a large volume of new oil-fired generating capacity is bound to come online which will add further cost pressure on the BPDB, in addition to costs for importing coal and LNG. More than 1,000MW of new oil-fired power is due operational by the end of 2021 according to the BPDB, which about to launch a new Power System Master Plan (PSMP)

to address overcapacity and fuel issues.

The Bangladesh government is reportedly considering cancelling the coal-fired power project pipeline and replacing them with LNG projects." But replacing coal power capacity with similar capacities of LNG-fired capacity will not address the nation's overcapacity issue, Nicholas said, suggesting a turn to utility-scale solar instead and a build-out of the power transmission network to better utilize existing capacity.

Power System Utilization in Bangladesh

Future scenarios predict continued underutilization.



Source: Bangladesh Power Development Board, IEEFA IEEFA

Oil and gas industry vows to step up green investment in 2021

Global oil and gas companies want to double down on green energy investment as they transform their businesses, a survey by the classification society DNV GL finds. Over half of the respondents plan to spend more on renewables, while 48% want to invest more in decarbonised gas.

These transformational investments are planned to be carried out this year despite a crash in industry confidence. Only 39% of respondent said they are confident for industry growth in 2021, down from 66% last year and 76% in 2019. DNV GL's research is based on a survey of more than 1,000 senior oil and gas professionals and in-depth interviews with industry executives.

Industry consolidates as peak oil nears

Just a fifth (21%) of respondents said they will increase investment in oil projects in 2021, as the sector increasingly comes to terms with the notion that the world's demand for oil has peaked or will peak in the short to medium term. Expectations for an increase in natural gas investment remain steady at 37%, according to DNV GL findings.

Most oil and gas professionals said the shift towards more green energy investment will reshape the wider industry. Eight in ten believe there will be rising consolidation among major players in the year ahead, while some smaller oil upstream companies might go out of business.

Lenders reassess oil risk

Priorities are shifting as investors reassess the risks of financing oil and gas projects, and as governments and industry pour billions into green recovery strategies follow-

ing the Covid-19 pandemic.

The oil and gas industry is moving through its third major downturn in 12 years, but the outlook for 2021 but this downturn may well be different

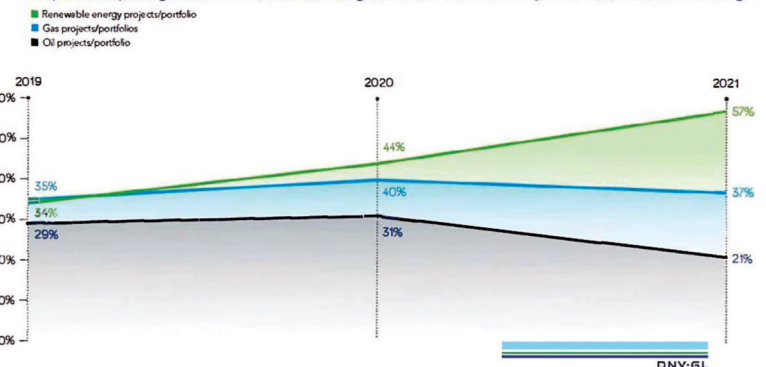
to previous ones. According to DNV GL's Vice President Hans Kristian Danielsen, once of the most striking differences is the shift in capital away from fossil fuels.

"The financial markets – through the effects of the Covid-19 pandemic – have seen what peak oil demand could look like, and are increasingly factoring in changing sentiment in society towards a decarbonised future," he said, stressing there are signs that our sector may invest to transform rather than cut costs to find its way out of the present crisis.

Cost cutting reaches limits

Strategic reorientation will likely involve the sale of assets or entire business units. Nearly two-thirds of respondents expect more demergers, divestments and spin-offs, up from 46% last year. Cost cutting will still be a universal priority (96%) for 2021, but the industry is already lean.

Proportion expecting to increase investment in oil, gas and renewables for the year ahead (at the time of asking)



A resilient 63% say their organization will still achieve acceptable profits if the oil price averages between \$40-50 per barrel in 2021. However, there are signs that traditional cost cutting methods are hitting their limits.

But the industry is not hitting the spending brakes as hard as it did after the downturn in 2014. The proportion of respondents expecting to maintain or increase Capex has fallen to 62% – down from 72% going into 2020 – but this is much higher than the 43% recorded following the last downturn.

"Companies are betting long term when making transformational investments, aiming to navigate the multiple transitions taking place at different speeds around the world," Danielsen commented. Though DNV GL sees a crash in confidence for industry growth in 2021, it sees growing confidence in the opportunities that lie in a decarbonised future. ■

Allianz restructures €800bn equities on the way to climate neutrality

Germany's largest insurer Allianz has made plans to restructure €800 billion in investments to lower emissions related to equities and corporate bonds by a quarter by 2025, compared to 2019. The measures are part of the insurer's interim target as it aspires to reach climate neutrality by 2050.

Allianz chief investment officer (CIO) Günther Thallinger said the new carbon reduction target will initially apply to certain asset classes only, namely listed shares and corporate bonds. Furthermore, Allianz aims to bring real estate investments in line with a 1.5-degree-Celsius path by 2025, set out under the Paris climate agreement.

"Other asset classes are in the pipeline. Step by step, we will thus cover our entire €800 billion of investments from the insurance business," Thallinger said.

The Allianz CIO underlined that "with change, we start with ourselves - to then

support others to move towards carbon neutrality." By integrating sustainability aspects the insurer seeks to mitigate climate-related risk and turn to future-orientated business models instead.

Stop selling insurance to coal companies

Munich-based Allianz, with 140,000 employees worldwide, aims to make its own business operations climate-neutral by 2023. This includes a stop of selling insurance coverage to coal-fired power producers and coal mines with a view to phasing out all coal risks by 2040 Reinsurance compa-



nies Hannover Re and Munich Re announced similar policies.

The more stringent climate target is part of the plans of the "Net Zero Asset Owner Alliance," which brings together 33 major international investors who collectively manage €5 trillion. German insurer Munich Re and the Swiss insurers Zurich and Swiss Re have also joined the initiative. ■



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Ansaldo to supply AE64.3A turbine to upgrade CCGT near Trieste

Ansaldo Energia has been contracted by steelmaker Arvedi to supply an AE64.3A gas turbine to refurbish a combined-cycle power plant in Servola, near Trieste. The 120 MW power unit will supply flexible power to balance non-dispatchable supply from renewables and is due operational by the end of 2021.

Arvedi Group, one of Europe's largest steel companies with a consolidated turnover of over 2.9 billion Euros, is operating the CCGT to power its manufacturing operations in Servola. Any excess electricity produced is sold to the local grid operator.

By investing to upgrade the gas turbine, Arvedi Group will be able to enter the power plant into the Italian Capacity Market for electricity supply, launched two years ago to remunerate operators of flexible plants to make capacity available at short notice. Similar as in other European countries, the Italian capacity market has been designed to ensure adequate electricity supply to avert any risk of grid imbalances or power shortages.

At the same time, the Italian government also seeks to encourage investments in ef-



AE64.3A turbine at the factory

ficient, low-polluting and flexible plants. Natural gas is seen as the ideal complement to non-dispatchable renewable energy supply, as well as energy storage.

The customer Arvedi Group said it has chosen Ansaldo's proposed solution as it helps save fuel costs and complies with Italy's stringent environmental regulations. The AE64.3A gas turbine has been validated to guarantee high efficiency, operational flexibility and low emissions. ■

Mitsubishi supplies 228 MW G-series gas turbine for El Paso Electric

El Paso Electric (EPE) has selected Mitsubishi Power's Smart M501GAC gas turbine to replace three older units and balance renewable energy supply. EPE is adding 200 MW of solar power and 50 MW of battery storage, counting on the 228 MW turbine's rapid dispatch capability to mitigate intermittency issues.

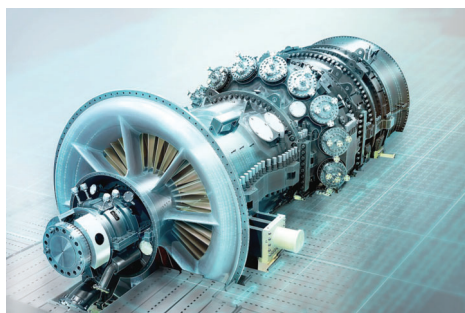
The M501GAC is an enhanced-response gas turbine, capable of starting up and shutting down rapidly to respond to customer energy usage and renewable energy variability. Dispatching the gas turbine alongside renewable resources is expected to save 600 million gallons per year of water, which is a precious resource in EPE's arid region.

The Smarter M501GAC integrates fea-

tures of Mitsubishi's reliable G-Series turbine technology, which has amassed 5.7 million operating hours, and its TOMONI digital solutions. The customer EPE will use the new turbine to replace three less efficient ones that had been over 60 years in operation.

Capable to partly run on hydrogen, the installation of the new turbine is in line with New Mexico legislation moving toward 100% carbon-free emissions by 2045. According to Mitsubishi, the M501GAC turbine can run fully on natural gas, or on a mixture of natural gas and up to 30% hydrogen.

"To help achieve our goal of reducing our carbon footprint 40% below 2015 levels by 2035, we sought a partner that could deliver a gas turbine with flexible and reliable power to complement renewables, as well as deep industry expertise in renewable integration," Steve Buraczyk, Senior Vice President of Operations at El Paso Electric, said,



Render of M501GAC gas turbine

ACWA Power breaks ground on 1.5 GW power plant in Uzbekistan

Saudi's ACWA Power has led the development of three power projects in Uzbekistan, worth \$2.5 billion, with a combined capacity of 2,500 MW. Ground breaking on the 1,500 MW Sirdarya CCGT was followed by the signing of power purchase agreements (PPAs) for two wind parks.

Under a contract with the Uzbek energy ministry, ACWA Power has been designing and delivering the three projects to help meet Uzbekistan's rising electricity demand that is expected to reach 110 billion kWh by 2030.

Recent energy reforms in the Central Asian republic stipulate that gas power plants should be built in combination with renewable energy supply. The two latest wind parks projects, located in Bukhara and Navoi, will have a combined capacity of 1,000 MW.

The \$1.2 billion Sirdarya CCGT project is designed to meet 15% of Uzbekistan's electricity needs and will account for 8% of the country's installed capacity. The plant has a capacity of 1,500 MW and an efficiency rate of over 60% – saving almost twice the gas currently used for electricity production compared with older plants in Uzbekistan.

The two wind power projects have a total investment value of \$1.3 billion, and are intended to offset 1.6 million tonnes of carbon emissions per year. Driven by approximately 200 wind turbines, the projects will contribute one third of Uzbekistan's 3 GW wind energy targets and supports the government's aims to have 30% of its power capacity from renewable sources by 2030. ■

suggesting "Mitsubishi Power delivers both" given the flexibility of the G-Series turbines and their hydrogen capability.

"Like many of our customers throughout the United States, EPE is replacing carbon-intensive assets with a combination of renewables, storage and natural gas power generation to meet the growing demand for cleaner affordable and reliable electricity," said Paul Browning, President and CEO of Mitsubishi Power Americas. The gas turbine will enable EPE's current decarbonisation plan, integrate with the utility's intermittent solar power sources and provide a path to greener fuels. ■

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