



Germany's CSU wants to restart 9 GW nuclear capacity over gas crisis

Bavaria's Conservative Party (CSU) is intensifying calls for a nuclear renaissance after Russia's Gazprom reduced gas deliveries through Nord Stream from already low levels. Hubert Aiwanger, the Bavarian economy minister, wants to reinstate operations of the 1,344 MW nuclear power station Gundremmingen-C, owned by RWE, and proposed a similar move for PreussenElektra's Grohnde and Brokdorf nuclear power stations, both with a capacity of 3,900 MW.

If reinstated, these three nuclear blocks would add 9,144 MW of stable, baseload power generation capacity to the German grid. The three blocks have been taken offline at the turn of the year 2021/22 and are now in the first stages of being dismantled. Having spoken to RWE, the plant operator of Gundremmingen-C, the Bavarian minister is convinced that the block could be brought back into operation at a "reasonable cost" before the upcoming winter to help alleviate the risk of shortages in electricity supply, caused by reduced imports of pipeline gas and insufficient gas in storage.

Critics, notably the Green Party, adamantly oppose this move arguing it would take time to purchase and install the nuclear rods.



But KWU, now Framatome, which built the nuclear power station back in 1976 told press it would be technically possible to restart nuclear blocks if they have been standing still for less than one year.

Nuclear restarts can help replace coal power

Today, Germany's baseload power generation is largely covered by lignite and hard coal as well as renewable energy sources. Nuclear power has been gradually on the way out – in line with the nuclear

continued on page 2

"No oil & gas company has a credible energy transition plan," Fitch

Fitch Ratings has criticised upstream companies for failing to develop a clear and robust transition plan away from fossil fuels. Among the companies announcing details about future investments, low-carbon Capex is 5% to 25% of total Capex from now until 2030, meaning that 75% to 95% of their Capex is still going into fossil fuel exploration and production activities.

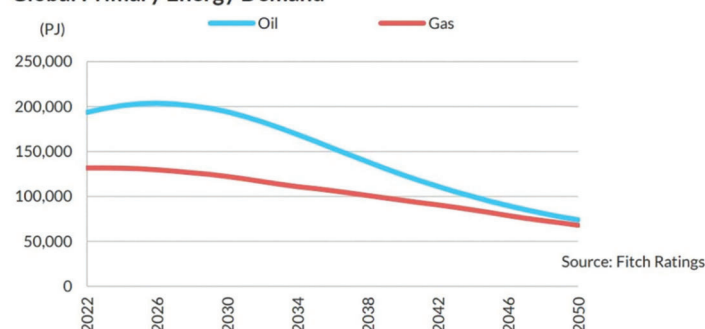
Though most European oil majors and some mid-caps and juniors have been increasing investments in renewable energy and other alternative fuels, while most US majors see blue hydrogen and carbon capture solutions (CCS) just as possible new revenue streams.

European majors "lead the pack"

Tougher regulation and rising public awareness are the main reason for European majors leading the pack in terms of emission reduction targets.

"Mid-caps and juniors are increasingly feeling

Global Primary Energy Demand



pressure from stakeholders to catch up," analyst said, explaining that the inclusion of Scope-3 emissions in companies' targets is a "clear differentiator in terms of ambition." However, methodologies to calculate emissions and set targets still

continued on page 2

AGENDA

COMPETING FUELS

Analysts warn of rising cost for nuclear in Britain as RES get cheaper

3

Germany restarts 1.8 GW of lignite power to pre-empt energy crisis

3

SUPPLY

Shutdown of Freeport LNG lowers overall US gas exports by 2 Bcf/d

4

HYDROGEN

ACWA Power and POSCO team up on green hydrogen and ammonia

5

Green ammonia market to top \$18 million by 2031

5

TECHNOLOGY

'Lifecycle upgrade' can turn MAN 48/60 engines into 51/60 units

9

Continued from page 1, top story

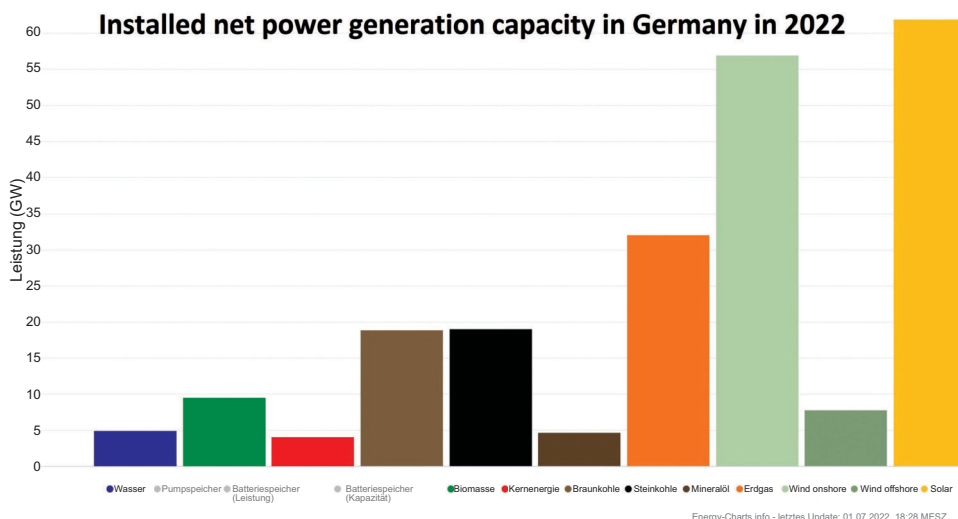
exit law – while the output of gas-fired power stations has been in sharp decline due to acute fuel shortages.

As of July 1, Germany's remaining three nuclear power stations had a combined capacity of 4,060 MW, compared with 18,900 MW lignite-fired and 19,400 MW hard coal-fired as well as 32,090 MW gas-fired power generation capacity. Meanwhile, the dispatch of gas power stations has been substantially reduced due to low supply and record high fuel prices.

Renewables, on the other hand, contribute rising volumes of inherently intermittent electricity supply: some 56,930 MW of on-shore wind, plus 7,700 MW offshore wind and 61,940 MW solar photovoltaic is backed up by flexible fossil plants as well as 4,940 MW run-off river hydro power, and 9,780 MW hydro storage and power plants, some 4,720 MW of ageing oil-fired power stations and just 2,500 MW of battery storage capacity. In total this makes 236,130 MW of minimum installed capacity, some of which can be ramped up further, if needs be.

Aim to end gas-burn to end dependence on Russia

In fact, the regulator Bundesnetzagentur (BNetzA) is taking steps to end gas-burn for power generation altogether in the face of



Russian cuts in supply. As of today, Gazprom has reduced flows through the Nord Stream 1 interconnector to just 20% of pipeline capacity, or 33 million cubic meters per day. The double-leg pipeline, has a maximum capacity of 55 billion cubic meters (bcm) and supplies natural gas from northern Russia via the Portovaya compressor station and through the Baltic Sea to the northeast Germany city of Lubmin.

Reacting to Russia's cuts in supply, the regulator has instated the highest alert stage – meaning a rationing of gas supply for industry but possibly also for household

customers is under discussion. The explicit aim is to reduce gas consumption on a European level by 15% starting from August 1 through to March 31, 2023.

But some southern European states – notably Italy, Spain, Portugal and Greece are against this proposal – hence a compromise will have to be found to get it through Parliament. The matter is being debated in Strasbourg, whilst the Commission in Brussels is already preparing to enact emergency rules to ease cross-border flows of natural gas between EU member states in the upcoming winter 2022/23. ■

Continued from page 1

lack common standards which complicates comparison.

A credible emissions reduction plan needs to encompass Scope 1, 2 and 3 and specifically methane emissions across a company's entire operations, Fitch analysts underlined. Reductions are increasingly likely to be in absolute, not just intensity terms, and targets should cover short, medium and long term, they added.

Focus on flexibility & low cost base

For upstream players in the oil & gas sector, the energy transition to a low-carbon world still presents "significant and unique risks such as demand destruction, price volatility, regulatory shocks, cost increases and investor pressure," analysts said, hence a company's financial flexibility and asset mix will determine its ability survive and manage the transition.

Companies with high financial and operational flexibility (scale, business mix, diversification) and an overall low cost base, and companies with low-intensity production and assets in more benign environmental regulatory environments are better placed to ensure profitability in the long term.

"Majors, due to their size, asset mix and business diversification, are generally in a stronger position to successfully manage the energy transition," analysts said, warning that mid-caps and juniors will face difficulties as they generally do not have the cash and/or scale and in-house expertise and capacity to develop robust climate strategies, finance decarbonisation effects while staying profitable. ■

NEWS NUDGES

INNIO Waukesha & Detection collaborate on digital ecosystem

Wisconsin-based INNIO Waukesha Gas Engines and Detection Technologies are collaborating to expand asset connectivity, drive a digital ecosystem and empower customers' transition to decarbonisation. The cloud-based solution combines Waukesha's engine analytics with Detection's compression monitoring into a single solution to gain deeper insight across a fleet of installed gas engine and compressor packages.

OptiFuel decarbonises Argentinian trains

Beaufort-based OptiFuel, a provider of decarbonization solutions for rail, marine and power generation, has agreed to work with the Argentinean transport ministry to repower trains and put into service 400 switcher and line haul freight locomotives. These new trains will be 100% powered by compressed natural gas (CNG) and/or renewable natural gas (RNG), with low or zero emissions.

Gas to Power Journal

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

Analysts warn of rising cost for nuclear in Britain as RES get cheaper

Britain's plan for net-zero by 2050 largely relies on nuclear power, with National Grid estimating over 17 GW of nuclear capacity by 2050, more than double today's 8 GW. Though EnAppSys analysts classified nuclear as a stable energy source, it is "one of the few technologies that sees costs continue to increase," while capital costs for renewables keep falling.

Considering the current cost-of-living crisis, Ukraine crisis, COVID and Brexit – the question is if taxpayers can really afford to pay their share towards dozens of new nuclear projects without seeing a return on investment for over a decade? Or perhaps large-scale nuclear build-out will serve the country well in the long-term?, analysts ask.

Before being ousted, the UK Prime Minister Boris Johnson boldly stated that the government plan is to "build a nuclear reactor every year rather than once every decade". His plan was voiced at a time when France is having trouble with its nuclear fleet, with half of its 64GW installed capacity of "always on" nuclear notably shut down due to routine maintenance or

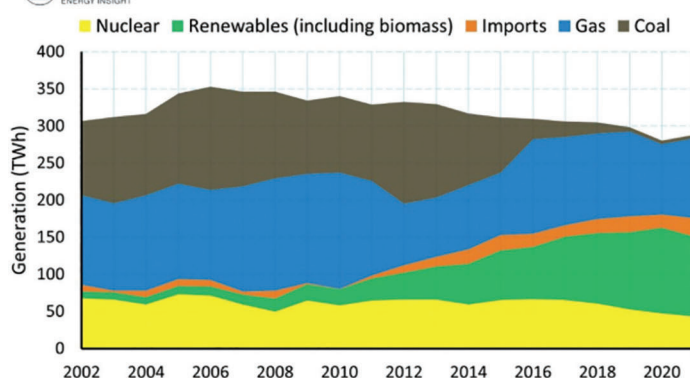
defects. Germany will shutter its last three nuclear plants by December, while Belgium, Switzerland and Spain all have their own phase-outs planned.

Britain, though keen on new nuclear, has not had the best track record with its own nuclear plans, with some plants closing earlier than expected. "Future projects have also been seemingly plagued with setbacks and issues," EnAppSys argues: Hinkley Point C was initially expected to begin generation in 2023, it is now tentatively scheduled for 2026. Sizewell C was expected to start construction last year, but as of 2022, construction has not yet started – and is expected to take between 9 and 12 years.

But despite its shortcomings, there are undeniable benefits to nuclear: France's nuclear generation allows the country to benefit from low market prices relative to the rest of Europe, and France regularly exports to surrounding countries which bolsters the financials of the country's large partially state-run utilities.



GB Cumulative Generation by Source



Germany restarts 1.8 GW of lignite power to pre-empt energy crisis

The German coalition government has given the green light to take 1.8 GW of lignite-fired power generation capacity back into operation from a reserve scheme, as of October 1. It requested for more gas to be held in storage as filling levels at all storage facilities are at 65.1%, while the large Rehden storage is just 34.4% full as of today.

The activation of lignite-fired reserve power plants is designed to reduce gas consumption. The German economy and climate minister Robert Habeck explained "these lignite-fired power plants can then also return to the electricity market and replace natural gas power plants." But critics doubt this will be enough to meet demand, as the coal-to-gas switch in power generation can replace only a fraction of Germany's overall gas use, notably the huge demand from energy-intensive industry and for space heating during the winter.

Habeck announced the move to restart these moth-balled lignite power stations on Thursday, when presenting a wider plan as to how industry and household customers could reduce their consumption of natural gas in the upcoming autumn and winter season. Having triggered Phase-2 of a "Gas Emergency Plan" some weeks ago, the government is on high alert to pre-empt the risk of a full-blown energy crisis and a subsequent recession.

As for gas storage, the targets for filling

facilities up quicker envisage them to be 85% full as of October 1, and 95% by November 1. These new rules also prevent utilities from selling the gas that they have already stored at times of high prices, Habeck explained.

Low flows through Nord Stream, hamper storage in-feed

Gazprom, the Russian state-owned gas export monopoly, has resumed flows through the Nord Stream 1 interconnector to Germany as of Thursday this week – albeit at low levels. Having returned from its annual maintenance, Nord Stream 1 currently runs at just 40% of its full capacity.

This complicated the in-feed of natural gas into Rehden, one of Germany's largest gas storage facilities that used to be managed by Gazprom Germania but is now in the hands of Kassel-based Astora GmbH, one of Europe's largest gas storage operators. Astora also own

the large cavern storage unit at Jemgum as well as the Austrian storage unit in Haidach, together with Wingas, RAG Austria and Gazprom Export.

To ensure gas storages are full before winter, the government set a new target to fill them to 75% by 1 September, as the reduced deliveries through Nord Stream "speak a clear political language," Habeck commented. The more stringent targets for filling up gas storages envisage them to be filled to a level of 85% by 1 October, and 95% by November 1.



Garzweiler open-cast mine with RWE's lignite power stations in the background

Shutdown of Freeport LNG lowers overall US gas exports by 2 Bcf/d

US LNG exports have fallen by around 2.0 billion cubic meters per day (Bcf/d) due to a fire and subsequent shutdown of the Freeport liquefaction and export plant. Texas-based IFO Group is preparing a report on the accident and consequences for global LNG markets and the US power sector, while the operator plans "at least a partial restart in October."

Partial service at Freeport LNG is hoped to resume in about 90 days. The three-train facility has a liquefaction capacity of 15 million tons per year (mtpa) and accounts for around 15% of US LNG supply, increasingly in demand from European buyers.

Contractors have been rushed to Freeport LNG to undertake repairs and maintenance work on a storage tank. Re-

ports said the explosion and fire occurred along a 700-foot pipeline section where LNG had become trapped, causing pressure to build. A subsequent rupture released a cloud of gas that ignited, whereby the fireball lasted for 5 to 7 seconds, and the fire burned for some 30 minutes. No injuries were reported and operators at Freeport LNG estimated some 1.6 million cubic feet of natural gas was burned during the fire.

Henry Hub forward prices fall as supply retreats

Prices at the bellwether US trading point Henry Hub fell after the accident, largely because the outage at Freeport LNG reduced exports which put downward pressure on production. July estimates of the US Energy Information Administration (EIA) state that LNG exports averaged 10.1 Bcf/d in June. That was down by 1.5 Bcf/d from May – due

to the outage.

Looking ahead, EIA analysts also said it expects LNG exports to remain below average, at 10.5 Bcf/d in the second half of 2022, some 1.8 Bcf/d lower than in its June outlook. Therefore, analysts anticipate the Henry Hub gas spot price to keep falling from its June average of \$7.70/MMBtu to an average of \$5.97/MMBtu in the second half of the year.

With these lower prices, the EIA expects a rise in domestic gas consumption – both by industry and by US power generators. Total gas demand, including domestic consumption and exports, is forecast to fall by 0.7 Bcf/d over the second half of 2022.

By early 2023, however, US gas production is likely to return to growth which will put additional downward pressure on prices. The July STEO outlooks forecast for the 2023 Henry Hub spot prices will average around \$4.76/MMBtu. ■



Monthly Henry Hub spot price nearly doubled in 12 months

Spot gas prices at the US Henry Hub have nearly doubled over the past 12 months amid limitations in gas-to-coal switching, low storage levels and soaring LNG demand in Europe. Monthly prices rose from \$3.84/MMBtu in July 2021 to over \$7.70/MMBtu in June this year, Refinitiv Eikon data shows, as demand growth for exports outpaced domestic production.

The average inflation-adjusted (real) monthly Henry Hub spot price reached a 12-month high of \$8.17 per MMBtu in May 2022, the highest price since November 2008. The latest surge in gas prices was largely caused by capacity constraints: US liquefaction and export plants have been running near or at full capacity for most of the past few years.

Demand keeps rising – both from US power producers and industry – as well as from Asia's growing economies and from western Europe which frantically seeks to source non-Russian gas supplies as the Kremlin's uses energy as a weapon while its war against Ukraine unfolds.

Almost all US upstream gas production was exported as LNG over the past months, but rising global gas prices increased demand at home. Growth in economies in Asia and constraints on LNG exports to Europe from Russia have contributed to strong international gas demand which in turn increased the volume of US LNG exports.

Gas-burn for power generation became more expensive and utilities were seeking to replace gas peaking plants with coal-fired plants. Rising demand outpaced increases

in U.S. dry natural gas production over this period, analysts at the US Energy Information Administration (EIA) pointed out. In its June Short-Term Energy Outlook (STEO), analysts estimate that 95.0 billion cubic feet per day (Bcf/d) of dry gas was produced during the first half of 2022, down just slightly from the last half of 2021.

In the United States, high gas-burn for electric power generation, combined with high levels of LNG and pipeline gas exports, in July 2021 led to below-average inventory builds and relative high prices. By Decem-

ber that year, mild weather reduced demand for space heating which is largely based on natural gas in the United States. This allowed gas inventories to build back to the five-year (2016–20) average level and brought prices back down.

The Henry Hub spot price averaged \$5.51/MMBtu in October and fell to average \$3.76/MMBtu by the end of 2021. But starting from the first quarter of 2022 (January–March), colder-than-normal temperatures resulted in total natural gas consumption exceeding the five-year (2017–21) average. ■

Monthly average Henry Hub natural gas spot price (Jan 2000–Jun 2022)
dollars per million British thermal units



Data source: Refinitiv Eikon

ACWA Power and POSCO team up on green hydrogen and ammonia

Saudi infrastructure investor and operator ACWA Power has teamed up with POSCO Holdings to jointly develop green hydrogen and its derivatives like green ammonia. The aim is to decarbonise POSCO Group's power generation, and its steel manufacturing processes alongside that of other energy-intensive companies in South Korea.

Both the hydrogen and ammonia will be produced using renewable energy sources – and through new greenfield investments – as POSCO vowed to meet its ambitious targets to produce 500,000 tonnes of hydrogen globally by 2030. POSCO Group said its output will be used for its own power generation needs, and will be sold to other Korean industrial off-takers in the construction, energy, chemicals and related sectors.

POSCO, the steel making company of POSCO Group, as of 2021 can produce 42.9 million metric tonnes of steel. This makes it the sixth largest steel producer in the world, and largest in South Korea.

AWCA proud to work with "likeminded-partners"

ACWA Power chairman and CEO Paddy Pad-

manathan said the partnership with POSCO Holdings, in his view, underlines the company's commitment towards "working with like-minded partners" to help ensure the critical and timely achievement of net zero targets.

"With tangible project commitments in Saudi Arabia and Oman, ACWA Power is at the forefront of scaling up green hydrogen, whose output – ammonia – will lead to the outcome of decarbonising entire industries, including hard to abate industrial activities like steel manufacturing," he said.

Together with NEOM and Air Products, ACWA Power is developing the first at-scale green hydrogen project in Saudi Arabia. When complete in 2026, the project will produce 1.2 million tonnes of green ammonia per year for the purposes of decarbonising local industries. ■



POSCO steelworks in South Korea

Green ammonia market to top \$18m by 2031

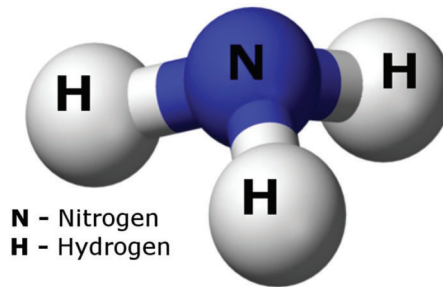
The global green ammonia market is projected to reach \$18.28 billion in terms of revenue by 2031, growing at a rate of 23.24% according to ResearchandMarkets estimates. Tighter emissions regulations and zero-carbon energy goals drive to shift power generation and industry to use ammonia in replacement, or in combination with natural gas.

Researchers note that utility as well as industry customers are aware of the pressing need for alternative, low-carbon fuel sources. Ammonia is one of these, next to hydrogen – but both require long-term storage of the fuel and suitable carriers for importing the fuel often from sun-blessed regions to the world's industrial centres in Northern Europe, North America as well as Japan, China and South Korea.

Cost of producing hydrogen from wind and solar has fallen steadily, which is another factor to spur the demand for green ammonia during the forecast period from 2024 through to 2031. But analysts cautioned the higher installation cost for the integrated infrastructure of green ammonia will hinder market growth in the upcoming future.

Green ammonia is a market that is still in its infancy and at a development phased. Increased research and development activities are underway to develop green ammonia, which is expected to increase due to rising public concern and government regulations related to carbon emissions and the protection of environmental health.

Looking ahead, analysts say green ammonia has the potential to make a "signifi-



cant impact by decreasing global dependence on fossil fuels" and helping reduce greenhouse gas emissions.

Consumption of green ammonia is expected to increase post-COVID-19 pandemic as the planned projects come online. In March 2022, ACME Group of India, a solar power producing company, signed a joint venture agreement with Norway-based company, Scatec ASA, to initiate a production facility of green ammonia in the sultanate of Oman, with an annual production capacity of around 100,000 tons.

Key players in the market and competitors in terms of synopsis technology are Aker Clean Hydrogen, CF Industries Holdings, Air Products, Haldor Topsor, Fusion-Fuel, HY2GEN, Eneus Energy, Hive Energy, and Siemens Energy among others. ■

Rolls-Royce to launch H2 program

Britain's prime manufacturer Rolls-Royce has announced a new hydrogen programme and given an update on its research into hybrid-electric power. The aim is to improve efficiency, both for aviation and stationary gas turbines, with the company planning a series of rig and engine tests to prove hydrogen can deliver stable power supply from the mid-2030s onwards.

Two ground tests are planned, on a Rolls-Royce AE 2100 engine in the UK this year and a Rolls-Royce Pearl 15 jet engine at a future date – a range of location options are being assessed for this including the Rolls-Royce test facility in Mississippi, US. Research carried out earlier found there is market potential for hydrogen-powered aircraft and this technology could later be applied to aero-derivative gas turbines used for peaking power stations.

Hybrid-electric and hydrogen power systems are also part of a regional research project underway with Widerøe and Embraer. "Research on hybrid electric has already been carried out on our Power Generation System 1 demonstrator – made up of an AE 2100 engine with specialist controls and thermal management systems," the company said in a statement.

Tests in Bristol, UK, and Trondheim, Norway, were recently concluded and have now confirmed the system delivered more than 1.5 megawatts (MW) of power – the first time this has been achieved in the aviation sector. Now, Rolls-Royce wants to carry out further work to understand how a production version of PGS1 might be achieved. ■



CLEAN & SUSTAINABLE COOLER BY DESIGN[®]

Chart is at the forefront of the transition

to a low carbon future through technology, equipment and services delivering hydrogen, LNG and biogas for energy and transportation. Our carbon capture technology also removes harmful pollutants including SO_x, NO_x and mercury.

www.ChartIndustries.com
LNG@ChartIndustries.com

CHART
Cooler By Design.®

Germany hands \$15bn bailout to Uniper after Russian gas supply cuts

The German government has taken a 30% stake in Uniper and injected 15 billion in cash into the indebted company which was at the brink of collapse, having to compensate for cuts in Russian gas supplies with expensive spot LNG. Uniper shares fell to a record low, while the German chancellor Olaf Scholz said he would help households shoulder rising energy bills.

As Germany's biggest importer of pipeline natural gas, Uniper has been hit hardest by the Russian gas supply curtailments and as a result is under extreme financial pressure. "Since mid-June, Uniper has received only 40% of the contracted gas volumes from Russia and has had to source the replacement volumes in the market at significantly higher prices," the company said in a statement.

Fortum refused to provide more cash

The bailout is one of the biggest ever agreed in German corporate history – and follows Uniper's plea for support on July 8. The German government's new 30% own-

ership in Uniper will reduce the stake of its Finish parent company Fortum to 56%, down from previously 80%. Several alternatives financing models had been discussed but Fortum insisted that the German government needs to support Uniper as the country's largest gas importer in order to provide and ensure its own energy security.

"The security of supply businesses needs to be owned by the German federal state that has the required strong creditworthiness," argued Fortum CEO Markus Rauramo. He refused to pour any more cash into the indebted company.

"We want to find a long-term solution together with the German government that addresses the consequences of a potential prolonged or even expanded gas curtail-



ment and further price hikes in a way that is sustainable for consumers and Uniper alike, and preserves the company's credit rating," Rauramo said.

During the Uniper's earlier corporate crisis, Fortum had provided the utility with an €8 billion credit facility comprising both shareholder loans and parent company guarantees, which is now almost fully drawn by Uniper, meaning the company was in urgent need of fresh funding. ■

Gazprom to cut gas deliveries through Nord Stream to 20% capacity

Russia's Gazprom announced it would further reduce gas supplies through Nord Stream 1, blaming a technical error at another Siemens Energy-built gas turbine at the Portovaya compressor station. But the German manufacturer says this claim was "untrue" and only used by Gazprom as a pretext to lower supplies to just 20% of the pipeline's capacity as of Wednesday.

As tensions escalate between the Kremlin and Western countries over the war in Ukraine and sanctions against Russian companies and oligarchs, state-run Gazprom is seemingly using contractual gas supplies as a weapon. The company on Monday explicitly asked Siemens to provide them with all documents "that, taking into account current sanctions regimes of Canada and the EU, will allow" for the export of the gas turbine engine for the Portovaya compressor station. Gazprom said Siemens would have to reveal this information as part of the turbine maintenance agreement.

Just days earlier, Gazprom said it would not be able to guarantee smooth operating of the Nord Stream 1 gas pipeline if a key turbine engine from Canada was not to be returned. Now, this turbine is one its way back but Gazprom found a second turbine which is allegedly faulty.

Supply risk escalates

From Wednesday, the further reduction in Russian gas deliveries to just 20% of the capacity of Nord Stream 1 will escalate the risk of gas shortages and insufficient gas in storage for the coming winter. Staying cautiously optimistic, Fitch Rating analysts

estimate that the shortfall in natural gas will not exceed 10% of annual European consumption, although the actual amount will depend on factors such as weather that are difficult to predict.

"While the logic of gas rationing is embedded in local regulation, the details on the impact for specific issuers or the merit order for industries is more difficult to estimate," Fitch analysts said in a market note. We also understand that certain EU countries are entering into bilateral agreements on gas supply in case of emergency in line with EU framework for security of gas supply," they explained.

Nord Stream, stretches over 1,224 kilometres across the Baltic Sea from Russia to Greifswald in eastern Germany. The double-leg pipeline, with 55 billion cubic metres (bcm) maximum capacity of both lines per year can be used for electricity production equivalent to the average annual output of 148,000 wind turbines or 46 coal-fired power plants of 800 MW.

Storage targets cannot be reached

But the tone of the German regulator BNetzA is getting more and more alarming, in particular because the further reduction

in Nord Stream gas flows will mean that the targeted gas storage levels cannot be reached.

On July 22, the government set a new target to fill them to 75% by September 1, and further to a level of 85% by 1 October, and 95% by November 1. But more and more market observers doubt the news gas storage plans can be achieved, unless the current supply situation will drastically improve.

These new gas storage targets also mean that companies are prevented from selling the gas that they have already stored at times of high prices, energy and climate minister Habeck explained. His ministry hence decided to activate a reserve of lignite power plants to reduce gas consumption for power generation on October 1. The minister explained that "these lignite-fired power plants can then also return to the electricity market and replace natural gas power plant."

Eager to pre-empt a gas crisis, the head of the regulator is in discussion with Germany's industries as to how energy consumption can be curtailed. A merit order, specifying which industry will be safeguarded from potential supply cuts has not been finalised yet, though the regulator stressed that household customers and critical infrastructure will be ringfenced. ■



Gastech

Gastech Hydrogen

EXHIBITION & CONFERENCE
FIERA MILANO, ITALY 5-8 SEPTEMBER 2022

Co-Hosts

Baker Hughes

TELLURIAN



eni

Visitor registration is now open



In a time of unprecedented change, join us at Gastech Milan 2022!

As the global energy landscape undertakes a rapid transformation, being present at Gastech 2022 will be critical in securing the position of your business in our new energy future.

Access the latest industry knowledge, technical expertise, products, solutions, and services.

Register for your complimentary visitor pass
register.gastechevent.com

@gastechevent #Gastech



Scan the QR code

Under the patronage of



Supported by



Host Region



Host City



Host Venue



Organised by



'Lifecycle upgrade' can turn MAN 48/60 engines into 51/60 units

MAN PrimeServ, the manufacturer's after-sales brand, is now offering customers to retrofit older MAN 48/60 marine and power-plant engines as part of a 'lifecycle upgrade'. Converted engines will be technically equivalent to new-built MAN 51/60 units and should achieve significant fuel savings, lower emissions as well as a higher operational reliability.

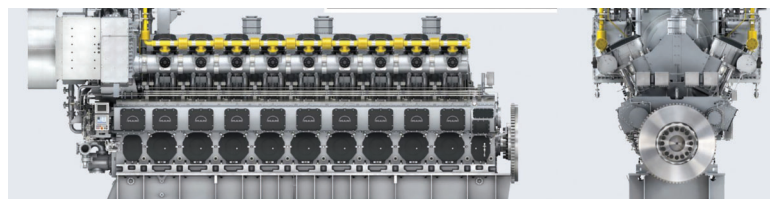
MAN 48/60 engines can be found in ship propulsion, engine-based power plants and turbomachinery trains for the oil & gas and process industries. The four-stroke engine has a load range from 1,050 to 1,200 kW/per cylinder, a specific fuel oil

consumption of 7323 kJ/kWh at 1,050 kW/cylinder.

Fuel types for the 48/60 as well as for the two-stage turbocharged MAN 18V48/60TS engine are: heavy fuel oil with a viscosity of up to 700 cst, marine diesel oil or gas oil. Thanks to its two-stage turbocharging it can

be run continuously at shaft power outputs from 18,900 up to 21,600 kW. The newer engine version – the MAN 51/60 gas variants – can be either used for

combined-cycle operation or also for combined heat and power (CHP) operation, which increases the engine's overall efficiency. In contrast to the older 48/60 engine, the newer 51/60 engine version is fully fuelled by cleaner-burning natural gas. The manufacturer says its design of the cylinder head and combustion chamber also ensure an outstanding air-fuel ratio for ideal combustion of lean air/ gas mixtures. The pistons can be exchanged without removing the connecting rod and bearing cap. In terms of power output, the 51/60 engine generate 7,244 kJ/kWh at full load when optimised for power generation and assuming 98.7% methane as a fuel, a technical spreadsheet published by the manufacturer shows.



Electr. Genset heat rate at 100% load and efficiency

18V

Optimized for power generation (TA Luft)	kJ/kWh ₉	7,244	7,376
Optimized for combined cycle (TA Luft)	kJ/kWh ₉	7,244	7,376
Optimized for combined heat and power (TA Luft)	kJ/kWh ₉	–	7,416

Nominal generator efficiency: 98.7%; Methane no. ≥ 80; without pumps; 5% tolerance

Drax submits plans to build world's largest CCS project in Britain

British energy company Drax has submitted plans to develop two bioenergy with carbon capture and storage (BECCS) units at its North Yorkshire power station at a projected cost of £2 billion. Start of construction is scheduled for early to mid-2024 and once fully operational, the BECCS units will remove a minimum of eight million tonnes of CO₂ from the atmosphere per year.

CEO Will Gardiner called Drax's BECCS project a "once in a generation opportunity" to initiate and grow a whole new sector of the economy and lead the world in a vital green technology necessary to help tackle the climate crisis. "Drax aims to invest billions of pounds and create thousands of jobs developing BECCS in the UK," he said, "provided that the UK government has in place policies to support the feasibility and delivery of negative emissions technologies."

Spelling out the company's aspirations for cleaning up Drax – once one of Britain's dirtiest power stations, Mr. Gardiner said: "BECCS at Drax will not only permanently remove millions of tonnes of CO₂ from the atmosphere every year, but it will also generate the reliable, renewable power this country needs. No other technology can do both."

MHI contracted to implement BECCS technology

Drax Group has contracted Mitsubishi Heavy Industries Engineering in June 2020 to implement BECCS technology for a pilot project. The 12-month pilot will capture 300kg of CO₂ a day, running on biomass flue gases.

Biomass is one of the fuel sources at the Drax Power Station which has partly been converted from thermal coal to cleaner-

burning bioenergy. The pilot will test MHI's CCS technology while helping realize Drax's ambition to be a carbon negative company by 2030.

During the pilot project at Drax, two of MHI's proprietary solvents will be tested, one of which – KS-1 Solvent – is already being used at 13 commercial plants delivered by MHI, including Petra Nova in Texas, U.S., the world's largest post combustion carbon capture facility, capturing 1.4 million tonnes of CO₂ a year.

The other is the newly developed KS-21 Solvent, designed to achieve significant performance improvements and cost savings. "KS-21 has many promising characteristics including lower volatility and more stability against degradation," MHI specified, forecasting this "will result in operational cost savings making the Advanced KM CDR Process even more economic for future deployment."



Works have started to retrofit Drax Power Station with CCS

NEWS NUDGES

Cummins launches first Centum Series genset

Cummins Inc. has market introduced the first set of Centum Series generators, engineered as high-efficiency engines with a smaller footprint. The first release – the Centum C1250D6E / C1500D6E generator – includes a compact QSK38 engine and S Series alternator which delivers electricity efficiently and in a smaller footprint while complying with U.S. Environmental Protection Agency (EPA) emission standards for Tier 2 up to Tier 4.

Ultrasonic testing market to top \$424m by 2027

The market for ultrasonic testing equipment market is forecast to reach \$274.21 million this year and could reach to \$424.62 million 2027, rising at a rate of 9.14%. Main growth drivers are the need for portable, non-destructive testing techniques for fiberglass and carbon fiber composites, especially in the oil & gas, automotive and power generation sector.



Gas to Power Journal

Peakload Power and Energy Storage

WEBINARS

CARBON CAPTURE & REUSE

2 AUG 2022 15:30 BST LONDON TIME



**JANNE HARSTAD
RASTEN**
AKER SOLUTIONS



**ANDREAS
NORTHEMANN**
BASF



**ANDREW
BAXTER**
CHART
INDUSTRIES



**MANUEL
HERRAIZ**
TENAKSA



**PETER
KLOTZSCHE**
MAN ENERGY
SOLUTIONS SE

SPONSOR



MAN Energy Solutions
Future in the making

HAVE YOUR SAY:
Register for free to join this webinar