



## Solar plus storage hybrids could reach 7.5 GW in the US by 2025

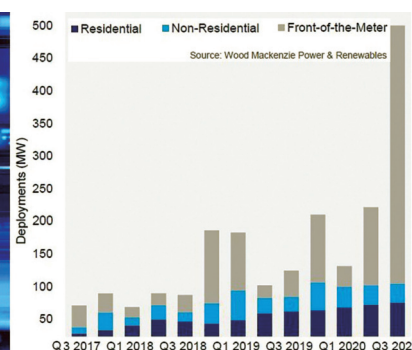
Energy storage deployments in the United States have risen 240% over the previous high, set last quarter, to 476 MW new capacity. Large-scale utility procurements for solar-paired energy storage will see the US battery market grow from 1.2 GW in 2020 to nearly 7.5 GW (and 26.5 GWh) in 2025.

According to Wood Mackenzie projections, solar-paired storage will account for the vast majority of new installations, as developers aim to capture value from the Investment Tax Credit.

"The signs are pointing toward an unprecedented increase in energy storage in the coming months, moving us closer toward achieving our 100 GW by 2030 vision," said Kelly Speakes-Backman, U.S. Energy Storage Association CEO. She is hopeful that the incoming US President Joe Biden will continue the regulatory reform to ensure "a more resilient, efficient, sustainable, and affordable electric grid for all."

Front-of-the-meter (FTM) storage procurements – particularly in California – have grown dramatically in number and size, paving the way for the US energy storage industry to realize its 100 GW by 2030 goal.

Despite the economic downturn and Covid-related slowdowns, nearly 400 MW and 578 MWh of front-of-the-meter energy storage



were deployed in the third quarter, surpassing previous records of 133 MW and 296 MWh for this sector. According to the US energy storage monitor, more FTM units were installed last quarter than in any other quarter over the past seven years.

### Residential storage to grow six-fold

Falling prices, technology improvement and efforts to ensure eligibility are expected to lead to further growth in the US storage deployments. The residential market is growing steadily and hit 52 MW/ 119 MWh in the third quarter.

"Although the residential storage market has hovered at around

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## ContourGlobal buys portfolio of US power plants for \$837 million

British utility ContourGlobal enters the US energy market by acquiring gas power plants in Texas and New Mexico as part of an \$837 million deal. ContourGlobal said it was buying the assets, including a 1,502 MW combined-cycle plant in Trinidad, from Western Generation Partners on a debt and cash-free basis.

Press reports indicate, however, the consideration for the assets includes existing project net debt of around \$210 million.

The addition of gas generators, notably the largest independent power plant in Trinidad and Tobago, offers the potential to enhance these assets with battery storage and hybrid technology, ContourGlobal pointed out.

The asset purchase includes the 604 MW Hobbs combined cycle gas turbine plant (CCGT) in New Mexico, and the 230 MW Borger cogeneration plant in Texas. In California, ContourGlobal will be buying a power unit driven by eight fast-ramp turbines in the Kern region, with a combined capacity of 371 MW. Part of the deal is also the 72 MW Waterside peaking unit in Connecticut.

Most of these plants have a weighted average contract life of nine years at inception, but the new



The Hobbs CCGT in New Mexico is part of the deal.

owner said the assets have "visible re-contracting opportunities," which could prolong the contracted life to over 10 years.

### Deal expected to close in Q1-2021

London-headquartered ContourGlobal said the US market entry will add \$92 million to its adjusted core profit in the first year after completion of the

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7,000 deployments per quarter in 2020, the sector is now set to expand by 6x through 2025, with increasingly active markets in New York, Massachusetts, PJM, Texas and Florida, among other states," said Wood Mackenzie analyst, Chloe Holden. By contrast, non-residential deployment added just around 30 MW each quarter this year.

### Regulator permits DER aggregations

The US energy regulator FERC on September 17 issued Order 2222, which removes regulatory barriers to aggregation of distributed energy resources (DERs) in wholesale electricity markets. Utilities and grid operators can now start to centralise grid

services and scale up storage capacity.

"Potential upside from landmark FERC Order 2222 could start to become clear next year as market operators and utilities make plans for implementation," Ms Holden said, suggesting "these decisions will impact where and how quickly storage companies will be able to centre grid services." ■

## IEA expects solar to become 'the new king' of global power markets

'Dirty king coal' is losing out on cost not only to natural gas but also increasingly to solar power. Based on solar PV's "extremely competitive costs," the International Energy Agency (IEA) expects energy from the sun will be the "new king" of world electricity markets, overtaking gas.

Solar projects now offer some of the lowest-cost electricity in history, and together with offshore wind, total renewable capacity is seen to be on course to surpass natural gas in 2023 and coal in 2024.

### Solar build-out to surge in 2021

Construction and commissioning activity will accelerate in 2021, with developers striving to bring projects into operation that had been delayed due to the coronavirus crisis. Europe and India are forecast to lead the renewable surge in the New Year.

India's green energy addition next year are forecast to almost double 2020-levels, as several auctioned wind and solar PV projects will come online. In the Europe Union, capacity additions are largely driven by previously auctioned utility-scale solar PV and wind projects in France and Germany coming online. Low-cost financing and grants through the EU recovery fund are poised to help the bloc meet its 2030 renewable energy target.

Growth in solar PV deployment is also set to continue in 2021 – notably in the United States, the Middle East and Latin America – where the pre-Covid project pipeline was robust thanks to continued cost declines and uninterrupted policy support.

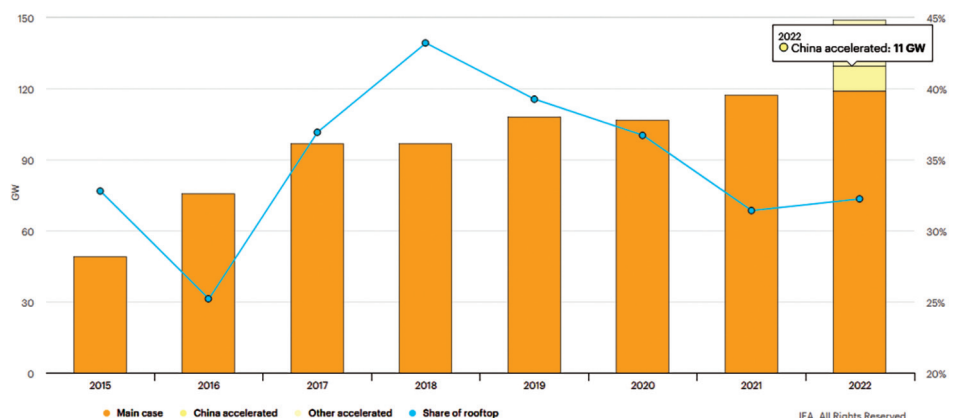
### Thermal coal on the out

Investors and power plant operators increasingly turn their back on thermal coal. "The shale revolution in the United States unleashed a formidable competitor to coal – natural gas," IEA analysts commented. Low gas prices have squeezed US coal demand more than any other factor. In 2009, coal's share in the US power mix was 45%, with gas at 23%. By 2019, coal's share had fallen to 24%, while gas now accounted for 38% of power generation.

The combination of lower gas prices and carbon pricing in Europe resulted in a similar decline for coal there. Coal's share in the EU power mix was 31% compared with 16% for gas in 2009 and just ten years later coal was down to 15%, and gas was up to 22%, according to IEA figures.

Changes to China's economic structure and growth further undermined coal's growth prospects. Though China still produces and consumes about half of the world's, analysts stressed it is "no longer a major source of demand growth." Policies to reduce air pollution and shift towards a less energy-intensive economy have greatly reduced coal-burn in Beijing, Shanghai and other mega cities – in contrast to India where coal-burn is expected to remain strong throughout the 2010s. ■

Solar PV capacity additions, 2015-2022



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transaction, which is scheduled close in the first quarter of 2021.

"We are materially increasing our adjusted EBITDA and obtaining opportunities to further expand our presence in these key markets. Two of the three major assets are located in Texas and New Mexico in the US-Mexican integrated natural gas market and very close to our assets and operations in

Mexico," said ContourGlobal President and CEO Joseph C. Brandt.

"The third major asset is located in the Caribbean region, an area where we have been an active operator and developer for a decade. The other assets provide critical flexible generation, supporting the transition to renewables in highly developed, constrained markets." ■

## Japanese and Korean investment in PJM gas generators face high risk

Japanese and Korean investors need to reassess the financial risk of gas-fired power projects in the Pennsylvania-New Jersey-Maryland (PJM) system, where wind and solar gain competitiveness against natural gas. Analysts say Japan's exposure to such projects in PJM amounts to several billion U.S. dollars, and several plants face delays.

**N**orman Waite at the Institute for Energy Economics and Financial Analysis (IEEFA) estimates Japanese interests have cumulatively invested several billion U.S. dollars of equity into more than twenty PJM gas-fired power projects since 2000, while Korean players have invested nearly \$500 million in just two projects in the past three years alone.

### Newcomers beware: PJM over-reliant on gas

The pandemic has cut daily peakload in PJM, the largest US regional power network, by 13.5 GW and demand is unlikely to recover before 2023. Analysts hence warn of a "capacity surplus," suggesting the network is "over-reliant" on gas peaking power plants.

Total electric generating capacity in PJM has nearly tripled since 2002, while demand notched up just 1%. Last year, PJM's peak load was approximately 150 GW and installed capacity totalled 198 GW. Critics say electricity customers are paying for new capacity that is deemed "unnecessary." The PJM system operator says peak power demand may only start to return to pre-crisis levels by 2024.

"Whereas Japan has taken a deliberate investment path in PJM gas-fired power assets for over 15 years, Korea's entry to PJM

has been fast and aggressive since its first investment in 2017," he said, warning the green energy transition is putting investment in thermal generating capacity at risk.

"As long-term strategic players, Japanese investors may be as prepared as any PJM investor for those risks ahead," Waite said. But he reckons that Korean investors are "relative newcomers to PJM and may not be ready for what's coming."

### Proposed peaking plants face delays

Financing for proposed gas power plants in PJM has been hard to come as investors are hesitant in the face of the looming oversupply and tepid demand recovery. All 11 of the currently proposed gas-fired powers stations in PJM are delayed and the network's most recent capacity auction has been delayed by about a year.

Critics say this is clearly a case of buyer, or financier, beware: "Investments made today in U.S. natural gas-fired power plants are at risk due to rapidly changing market conditions that increase the likelihood of

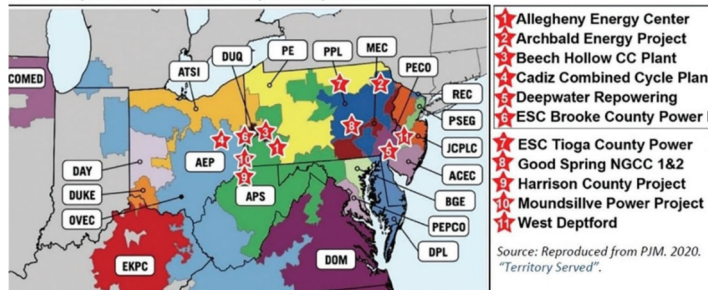
these assets becoming stranded before the end of their useful life," said Liz Stanton, senior economist at the Applied Economics Clinic.

### Clean energy gets cost-competitive

Wind and solar power, combined with battery storage, are getting close to outcompeting thermal capacity on cost. Clean energy-related legislation among states in PJM's territory is likely to accelerate the phase-out of coal power units and may limit the deployment of new gas peaking plants.

Fuel costs for gas peaking units are bound to rise given that more and more of cheap US shale gas is being turned into LNG and exported. Henry Hub gas prices are increasingly volatile and tied to global markets, making it more difficult for project developers to gauge long-term profitability of gas peaking units. ■

PJM Proposed Gas Plants in Early Development



## Gas generation surges 31% in US Northeast

Electricity from gas-fired generation has increased throughout the United States over the past five years. Gas-burn surged 31% in the Northeast, by 20% in the Central region, and by 17% in the South but remained flat in California and the Northwest, where renewables gained ground.

**P**eaking gas power plants produced a record 53 million MWh in the Central region in July 2020, which is 37% more than the 2015 summer peak month. The Central region includes Texas and Louisiana, with high seasonal demand for air conditioning, while electricity consumption in November is on similar levels like in the Northeast.

Nearly 35 gigawatts (GW) of net summer capacity entered service since 2019, according to the US government's latest Electric Power Annual report. Most new gas-fired capacity was added in PJM Interconnection, a regional transmission zone that coordinates electricity flows for more than 65 million people in the Northeast.

### Cheap shale gas triggers plant conversions

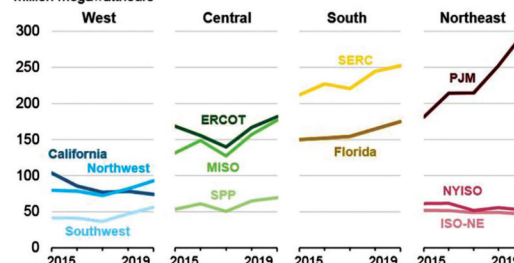
New-build gas generators in Central and Northeast regions benefit from cheap fuels supply from fracking operations in the Appalachia shale basin. In states such as Ohio, Pennsylvania, and West Virginia, relatively low gas prices have made it more econom-

ical to generate electricity using natural gas instead of coal.

When natural gas and coal are similarly priced, most gas-fired generators can produce electricity more efficiently and ramp-up faster to full load, which makes them preferable for peakload dispatch.

Stiff competition between coal and gas generators is most pronounced in the Midcontinent Independent System Operator's (MISO) area as well as in Texas' ERCOT zone and in PJM. Here utilities retired substantial amounts of coal power units, or converted them to run on gas. ■

Regional breakout of U.S. natural gas-fired electric generation (2015–2019)  
million megawatthours



Source: U.S. Energy Information Administration, Power Plant Operations Report

# RWE implements GE's first LM2500XPRESS at Biblis grid stability plant

RWE Generation has chosen to install 11 units of GE's latest LM2500XPRESS technology, based on aeroderivative gas turbines, to deliver 300 MW of reserve power at Biblis to help stabilise the grid in southern Germany. The novel LM2500XPRESS power plant is 95% factory-assembled for fast and easy site installation.

**S**implified modules, containing LM2500 aeroderivative turbines, generators, fuel supply systems and grid connection, will be pre-assembled by GE and delivered to the site in Biblis. The fast-ramp grid reserve plant will be built adjacent to RWE's decommissioned Biblis nuclear reactor.

## OCGT to fire up on Amprion's request

RWE Generation had been contracted by the regional TSO Amprion in early November to build a dedicated grid stability plant in Biblis. The plant will be built on a car park, just outside the decommissioned 1,200 MW nuclear power plant from which RWE generated more than 500 billion kilowatt hours of baseload power between 1974 and 2011. The two nuclear power units at Biblis have been shut down since June 2017 and are currently being dismantled.

Once commissioned in October 2022, the

fast-ramp open-cycle gas power (OCGT) will not be available for dispatch in the German wholesale power market. The sole purpose of the plant is to balance intermittent supply from wind and solar power sources, with RWE to be remunerated by Amprion for these services.

## Slow grid built-out requires 'reserve plants'

Germany has passed laws to exit nuclear power by 2022, and phase out coal-fired power by 2038 at the very latest. The use of renewables is rapidly expanding and has led to massive amounts of surplus wind power supply in northern Germany.

However, it has proven difficult to trans-

port all the power down to load centres in the south, which repeatedly caused critical situations when electricity imports had to be arranged at short notice from the Czech Republic, Austria or France. Several initiatives to expand Germany's high-voltage grid were met by harsh public criticism, making it necessary to build fast-ramp grid reserve plants instead. ■



LM2500XPRESS power unit

# Uniper selects Siemens grid stabilisation services for two UK projects

Europe's largest power producer Uniper has contracted Siemens Energy to upgrade two grid stabilisation plants in the UK. Synchronous condensers will be installed, or retrofitted, at the Grain combined-cycle power plant in Kent and at the Killingholme power plant in Lincolnshire, with both projects due operational in 2021.

**A**t Uniper's Grain CCGT, Siemens will install two synchronous condensers while the two steam turbine generators at the Killingholme plant will be repurposed to enable synchronous condenser operation. Synchronous condenser provides short-circuit power, inertia, and reactive power for dynamic loads - key elements of grid stability.

The two grid stabilisation units will also be equipped with rotating machines, flywheel, and control systems and will use the existing grid connections at each site. Siemens has supported Uniper with front-end engineering design (FEED) to get everything installed and commissioned before summer 2021.

Mike Lockett, Uniper UK

group chief commercial officer power, hailed the close cooperation with Siemens to "create a bespoke solution that meets the needs of National Grid ESO, and which is the right fit for the Killingholme and Grain facilities."

## Aiming for Net Zero by 2025

National Grid ESO has set up a Stability Pathfinder programme, under which Uniper

will dispatch both plants once retrofitted with synchronous condensers. "Contracts and technologies such as these are cheaper and greener, helping us as the system operator to reduce emissions and save money for electricity consumers," commented Julian Leslie, Head of Networks and Chief Engineer at National Grid ESO. Grid stabilisation plants are vital for reaching National Grid's ambition to operate the GB electricity system carbon free by 2025.

"As GB's electricity generation system moves to more decentralized, renewable power, projects like this which provide inertia without generating any power, are taking centre stage," said Karim Amin, Executive Vice President, Generation, Siemens Energy. Grid stabilisation units provide flexible electricity supply at short notices and are effectively enabling large scale wind and solar-PV deployment on the Britain's path to reach net zero emissions. ■



Siemens synchronous condenser

# ENGIE and Singapore University look into liquid air energy storage

French utility ENGIE will work with NTU Singapore and infrastructure developer Surbana Jurong on storing energy using liquid air. The process makes use of excess electricity from the grid to cool air, turning it into a liquid state that is 750 times more compact and has the energy density of a lithium-ion battery.

**A**ir can be liquefied and stored at -196 degrees Celsius, mostly by using excess renewable energy. When energy is needed, the liquid air is turned back into a gaseous state, which creates high air pressure that can power a turbine to generate electricity. The cold energy from the process can also be harvested to chill water for use by chilled water air-conditioning systems in buildings.

## Longer life-cycle than batteries

A liquid air energy plant is estimated to last for 25 years or longer as it does not have any electrodes, cathodes or anode materials that degrade after hundreds of charge and discharge cycles like a battery. In contrast, it needs only storage containers and generators to harvest its energy potential, making it a greener and more sustainable

alternative.

The concept of liquid air energy storage was first developed in the UK and is now sought to be adapted for use in Singapore and other tropical urban cities, researchers said. To that end, the heads of NTU, Surbana Jurong and ENGIE Lab Singapore signed a memorandum to develop new 'Liquid Air Storage Cogeneration System for Cooling and Power Applications'.

## Testing nitrogen use

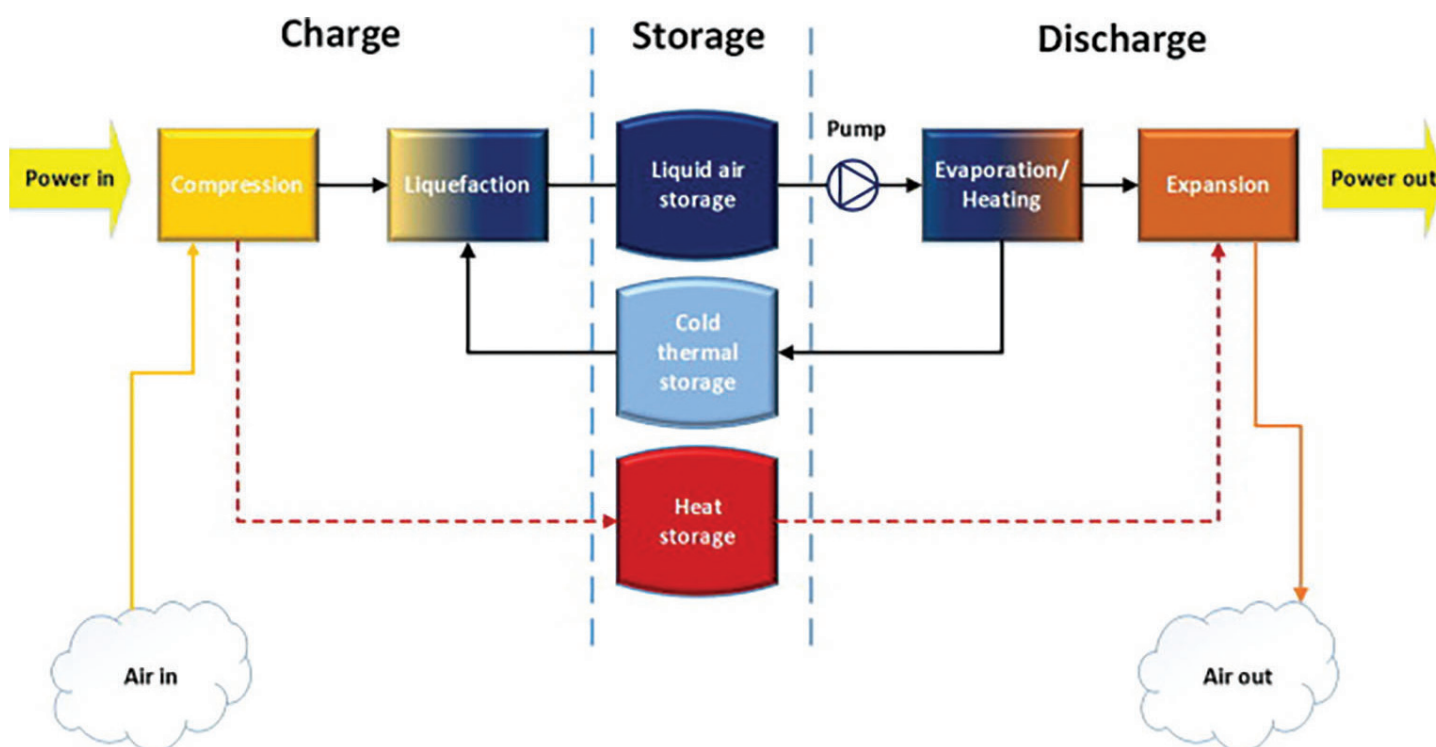
The aim of the collaboration is to "test and develop cryogenic-related solutions that can help remove carbon emissions and improve energy efficiency," said Yeo Choon Chong, CEO of Surbana Jurong's ASEAN Division.

By using nitrogen in a liquid air storage system, it is possible to provide cooling and

electricity to data centres with zero-emissions at point of use. Researchers say this practice offers "a valid solution to replace diesel backup power generators."

Prof Romagnoli, co-director of the NTU-SJ corporate lab said the ultimate aim was to "harvest waste energy, store it sustainably, and to use that to supplement Singapore's energy needs, thus reducing the overall carbon footprint."

Loic Villocel, Managing Director of ENGIE Lab Singapore hailed the partnership as "vital" for the company's five year roadmap, with key areas like cooling technologies and sustainable data centres. In Singapore, data centres account for 7% of the city states' annual electricity consumption and over 37% of the data centres' energy usage are used for cooling the servers. ■



# First 750 MW turbine at Bac Lieu CCGT to be installed in early 2021

Installation of the first 750 MW gas turbine at the 3,200 MW Bac Lieu combined-cycle power plant in Vietnam's Mekong Delta will start in early 2021. The Singapore-based investor led Delta Offshore Energy will sell all electricity from the integrated LNG-to-Power project to Vietnam Electricity starting from 2023.

**D**elta is the lead-developer for the 3.2 GW power station at Bac Lieu CCGT, designed to consist of four 750 MW gas turbine units and a fifth unit with 200 MW. Provincial authorities hope the construction of the plant will create thousands of jobs and contribute trillions of Vietnamese dong to in tax revenue.

## Start-up scheduled for 2023

Detailed engineering work and a full feasibility study have been completed, with Delta developing the LNG import solution together with Norway's 7 Seas. The \$4 billion integrated LNG regas and power generation project will mostly private-funded. "The existing Public-Private Partnership model is obsolete given Vietnam's fiscal reality as debt levels approach the National Assembly's im-

posed ceiling and is re-enforced by Vietnam's sovereign credit rating threshold," said Ian Nguyen, Director of Origination and Government Relations for Delta Offshore.

## LNG to be shipped from the US

To ensure gas supply, Delta has signed an agreement with Australian-listed LNG Ltd, the developer of the Magnolia LNG venture to deliver 2 million tonnes per annum (mtpa) to Vietnam. The shipments from Louisiana would be on a free-on-board (FOB) basis for a 20-year term, with options to extend. Once arrived at Bac Lieu, Delta will then regasify the landed LNG for use in its projected 3.2 GW combined-cycle power station.

"Our alliance with LNG Limited will allow the Government of Vietnam to have a stronger relationship with the U.S. market and the long-term stability of the Henry Hub Index, which fits perfectly with the Vietnamese National Power Development Plan," said Bobby Quintos, engineering managing director for Delta Offshore Energy.



## GE completes turbine overhaul in Iraq

General Electric has completed of a major overhaul of a 9E.03 gas turbine at the Al Qudus power plant in Iraq on behalf of the energy ministry. The revamped plant now generates an additional 125 MW of electricity on top of its existing 1,125 MW capacity.

Works were executed safely and on time in the face of the pandemic with GE hailing the site staff's "tremendous commitment and resilience in continuing to execute the project."

The latest Al Qudus project build on GE's track record of various works at the plant in the recent past, including the installation and commissioning of a new 9E gas turbine in 2019. The American OEM had previously installed three 9E gas turbines at Dubai Electricity and Water Authority's E Station, part of the wider the Jebel Ali power and desalination project.



Al Qudus 9E unit

# Siemens gas turbines bring Leipzig Süd CHP to 93% fuel efficiency

Two SGT-800 gas turbines will help Stadtwerke Leipzig's new combined heat and power (CHP) plant produce 125 MW of electrical and 163 MW of thermal output at a fuel efficiency of 93%. Commissioning of the CHP is due in late 2022, with the two turbines set to eventually run on hydrogen.

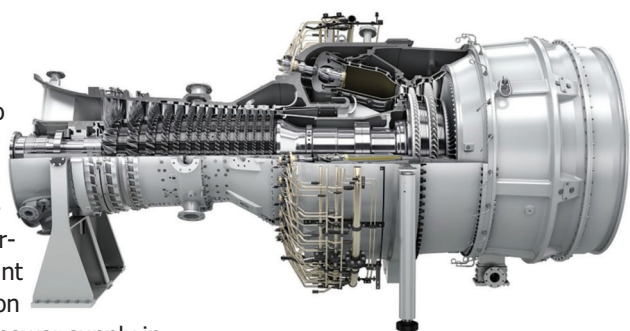
**I**nvesting in a new CHP helps Leipzig's municipal utility become independent of district heat supply from an ageing lignite-fired power plant in Lippendorf, a nearby town. Moreover, the CHP is bound to deliver green energy as it is intended to run on 30-50% green hydrogen initially which will later increased to 100%.

The order from Stadtwerke Leipzig covers the supply of two SGT-800 gas turbines, each with a maximum efficiency of 41 percent. The turbines are expected to be fired with natural gas, starting in late 2022, and be successively converted to hydrogen

combustion.

The scope of supply also includes two SGen-100A generators and a SIESTART battery solution, which ensures that the plant can perform a black start. The plant can subsequently start up on its own without an external power supply in the unlikely event of a widespread blackout.

"By investing in a new cutting-edge district heating power plant, we're not only ensuring that Leipzig will be supplied with electricity and heat in the coming decades.



The SGT-800s will be hydrogen-cofired

We are also getting ready to pursue decarbonisation (by) increasing the share of hydrogen in the fuel," said Karsten Rogall, managing director of Stadtwerke Leipzig.

## DNV GL suspends work for Nord Stream 2 over US sanction threats

Norwegian-German registrar and classification society DNV-GL has decided to suspend works for the Nord Stream 2 project. Vessels, supervising progress on the controversial pipeline project, are deemed "subject to US sanctions," DNV-GL said, noting it "will no longer provide services that may be incompatible with the PEESA law."

**P**EESA, short for 'Protecting Europe's Energy Security Act', is a bill that authorizes the US to address Russian pipeline projects that are seen to "create risks to U.S. national security, threaten Europe's energy independence and consequentially endanger Europe's political and economic welfare."

US sanction threats have sparked outrage in Germany, and companies involved in the project called for political support. German and European officials said they reject extraterritorial sanctions, criticising interference in their sovereign right to set energy policy. Germany's foreign minister Heiko Maas said that "no state has the right to dictate its energy policy to the EU. And that will not succeed either."

lead-developer Gazprom is determined to complete the pipeline and may choose to turn to another classification society instead.

Construction of the second Nord Stream 2 pipeline leg, linking Russia and Germany through the Baltic Sea, is nearly completed – except for a final stretch of about 120 km. Pipe-laying works on that final part of the overall 2,460 km gas pipeline was halted after the US enacted a sanctions bill (PEESA) in December 2019.

Gazprom is likely to forge ahead with laying the final stretch with the Russian special purpose vessel 'Akademik Chersky' regardless of sanctions. If and when completed, the second leg will boost Nord Stream's total capacity by 55 billion cubic meters (Bcm) per year to 100 bcm/y. According to Nord Stream 2 AG, the overall costs of the project will total around 9.5 billion Euros. ■

### Gazprom determined to forge ahead

Certification is necessary for pipelines in order to go into operation; hence the withdrawal of DNV-GL is dealing a blow to the Russian-German gas interconnector. However, the



Route of Nord Stream's first and second pipeline leg

## Germany's first auction takes 5 GW of coal capacity offline by year-end

The first round of auctions for decommissioning 4 GW of Germany's hard coal plants has been oversubscribed, with almost 5 GW to be offline by year-end. Stiff competition at the auction drove down compensation payments for plant operators to €60,000 – well below the planned maximum of €165,000.

**T**he Federal Network Agency (BNetzA) has awarded bids with a total capacity of 4.78 GW, with the average bid being "significantly below the legal maximum price", said BNetzA head Jochen Homann.

"A high level of competition has pushed the awarded sums down considerably," Homann said. Overall, plant operators will receive about €317 million for withdrawing their plants from the electricity market. The agency awarded submitted bids based on the ratio between the asked compensation price and the resulting CO2 emissions reduction.

### Operators hail "very early exit opportunity"

Hard coal plants that successfully participated in the first decommissioning auction are primarily located in Northern Germany. Among the installations that will now be taken offline in 2021 are both blocks of the Moorburg heating plant, in Hamburg, which had been opened by operator Vattenfall only in 2015.

Depending on whether or not the plant would be transferred into a capacity reserve, Vattenfall said it will seek to support em-

ployees in "finding new jobs". If Moorburg is not classified as "system relevant" by the BNetzA, the firing of coal will be stopped at the latest on 1 July 2021.

Uniper succeeded in auctioning off its plant Heyden 4, with a capacity of 875 MW, with CEO Andreas Schierenbeck hailing the "very early exit opportunity" provided by the BNetzA by accepting the plant's close given Uniper's intention to shut down a total capacity of 2.9 GW by 2025 "at the latest." The utility's last coal-fired power plant would therefore be the controversial Datteln 4, which only started operation this year. Schierenbeck said planning security regarding plant closures would help the utility focus on new projects, "for example

in the hydrogen sector".

### Exiting coal by 2038, at the latest

Decommissioning auctions will lead to complete end to coal-fired power production by 2038 at the very latest, as stipulated in Germany's coal exit law. Parliament had set out a shutdown schedule for individual lignite power plants, compensation payments for operators and auctions for hard coal plant operators to gradually take capacity off the grid over the coming years.

Germany's transmission grid operators can ask for some of the plants to be transferred into a capacity reserve to serve as a backup in "critical situations". However, these plants will no longer participate in the electricity market in any event from 1 January 2021.

Critics had claimed coal power utilities had been granted too much compensation for plants that might have turned into liabilities for operating companies. The auction has shown how a competitive situation can reduce compensation claims. ■

Hard coal plants that took part the 1st decommissioning auction are primarily located in northern Germany.



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