Gas to Power Journal
Peakload Power and Energy Storage

Focus on clean-burning fuels vs. renewables

Weekly News 20 January 2023

India's target of 15% gas share in the energy mix at risk; Fitch says

The Indian government is likely to miss its target to increase the share of gas in the country's energy mix to 15% by 2030, from 6% in 2021, considering "progress has been minimal," Fitch Rating reckons. On the contrary, nearly 40% of installed gas-fuelled capacity stands idle amid record LNG prices as power producers fire up coal-fired units instead.

Petronet's Kochi LNG import terminal with a capacity of 5 mtpa

Despite resilient demand for city gas and rising domestic production, gas consumption from price-sensitive industrial and power gen sectors has plunged as utilities switch to cheaper alternate fuels in the absence of robust emission norms, analyst commented. Today, India's gas demand growth rate is only 53% of the level required to meet the 15% gas use target.

Responding to record fuel prices, Indian power producers idled nearly all of their 25,000 MW installed gas-fired power generation capacity while LNG imports fell by around 16% year-on-year in 2022, ship-tracking data shows. Sustained high prices for imported LNG could cement India's continued reliance on coal power and accelerate the renewables build-out.

Risk of coal shortage as power demand rebounds

Coal-fired power stations currently cover an estimated 72% of the country's electricity needs, and Fitch anticipates the thermal power plant load factor to average 64.5% in the first half of this year amid rising domestic coal supply.

Risks of a power deficit loom large in the first quarter as the rise

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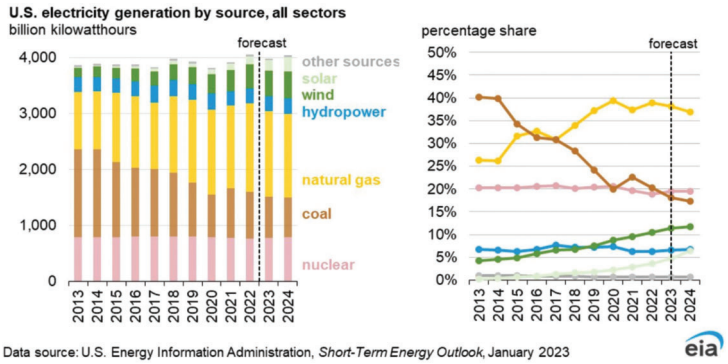
Drop in US gas prices prompts power producers to ditch coal

Mild weather and rising US shale gas production have pushed Henry Hub spot gas prices temporarily below $4/MMBtu, prompting power generators to reverse the gas-to-coal switching trend. But analysts at the US Energy Information Administration (EIA) expect prices to rebound to above the $5 mark in late January, once the Freeport LNG export terminal resumes partial operation.



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, January 2023

Based on the most recent press release from Freeport LNG, analyst expect the facility to resume partial operations in late January which will propel up US LNG exports to a higher level, leaving less surplus supply for American power generators. "However, any additional delays to the restart of Freeport, which was originally scheduled to resume partial operations in November, will contribute to downward pressure on prices in the near term," EIA analysts said in their latest Short-Term Energy Outlook (STEO).

Apart from the return of Freeport LNG, no additional liquefaction capacity is bound to come onstream this year which will leave most of the rising dry gas production for the domestic market. The

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AGENDA

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in Indian coal production is deemed inadequate to meet soaring demand while high seaborne coal prices are limiting imports. Electricity demand is forecast to rise by 18.5% in the first quarter, albeit from a low base year earlier, as the Indian economy recovers from the pandemic.

Looking ahead, Fitch Rating sees little change for natural gas growth to outpace India's total energy growth. Apart from price volatility, demand is also adversely affected by the country's patchy gas pipeline network which used to limit the build-out of LNG import terminals even at times for low gas prices.

The current underutilisation of India's LNG import infrastructure risks to create temporary supply bottlenecks in case demand picks of sharply. But the likelihood of sustained high gas prices and customers switching to alternative fuels will slash the returns of LNG importers and gas-fired power producers and make them reconsider Capex plans. ■

Siemens Energy to build 6 GW of power gen capacity in Iraq

Siemens Energy CEO Christian Bruch has signed a memorandum with Iraq's electricity minister Ziyad Ali to develop 6 GW of power generation capacity in the country over the next five years. The envisaged deal, worth billions of Euros, includes the construction of new gas-fired power projects, upgrade and expansion of existing plants, renewables build-out and grid stabilisation.

A reliable and affordable supply of electricity is vital to keep a society stable, especially in countries like war-torn Iraq. Siemens Energy CEO Bruch hence called "the electrification of large parts of an entire country [...] one of the most important talks of [the company's] business." He pledged Siemens Energy would work towards ensuring the power gen build-out was achieved "as quickly as possible," in cooperation with its partners in Iraq.

Signing of the MoU in Berlin

Making better use of associated gas

Iraq electricity minister said the deal includes a plan to make better use of associated gas, a by-product of the oil extraction process, e.g. by using it for power generation. Large parts of the fuel for the 6 GW new power gen capacity could come from a new gas processing plant, under construction by Total, at Iraq's southern fields of West Qurna 2, Majnoon, Artawi, Tuba and Luhais. The gas plant is designed to produce 300 million cubic feet of gas per day (mcf/d) initially, and double that in phase-2 which would also help minimise gas imports from Iran.

Overall, the Iraqi government is set to spend considerable amounts to build out the country's energy infrastructure, and Siemens Energy seeks to play a key role in this development. Rival manufacturer GE is also vying to snap up some of the planned projects.

Back in 2019, the US government had successfully pressured Iraq to allow both GE and Siemens bid on all contracts, worth several billion dollars, and awarded them equally among the two rivals. In May that year, Iraq's electricity ministry had signed an implementation agreement with Siemens to kick off the execution and project financing of the 'Iraq Roadmap'. Phase-1, valued at €700 million ($785 million), including EPC for the 500 MW Zubaidiya power plant, the upgrade of 40 turbines and grid infrastructure. The entire four phases of the Roadmap were meant to see contracts awarded for up to $14 billion. ■

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EIA expects production to expand both the Permian region in West Texas and Southeast New Mexico and in the Haynesville region in Louisiana and East Texas, spurred by the completion of new pipeline infrastructure this year and next. Expansion of Whistler Pipeline whose capacity is bound to rise by 0.5 billion cubic feet per day (Bcf/d) to 2.5 Bcf/d as early as September. Expansion of the Permian Highway Pipeline and the Gulf Coast Express Pipeline by 0.55 Bcf and 0.57 Bcf, respectively, will follow suit in November and December.

Rising production and flat LNG exports are expected to keep Henry Hub gas prices around $4.90/MMBtu this year, before falling further to $4.80/MMBtu in early to mid-2024 – before the build-out of LNG export capacity creates a new outlet and adds bullish impetus to prices.

Solar growth outnumbers coal and gas

Though ample supply of affordable gas will cause coal-to-gas switching, the main growth in installed US power generation capacity will come from utility-scale photovoltaic. EIA analysts anticipate the share of U.S. renewables generation rises from 21% in 2022 to 24% in 2023 and to 26% in 2024 – with two-thirds of this growth staged by solar PV.

The share of gas-fired generation is seen retreat slightly from 39% last year to 38% in 2023 and 37% next year, while the share of coal power is forecast to fall from 20% to 18% and 17% over the same period.

Retirements of coal power station will take of 10 GW of installed capacity this year and another 4 GW in 2024. At the same time, renewable generation increases by 20% between 2022 and 2024 as utilities plan to add 32 GW of utility-scale solar in 2023 and other 32 GW next year, reducing coal-fired generation. ■

Gas to Power Journal

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IEA expects renewables to surpass coal power in just two years

Renewables will make up over 90% of global electricity expansion, overtaking coal to become the largest power source by early 2025, the International Energy Agency (IEA) says. Installed solar, wind and hydropower capacity is seen grow by 2,400 GW through to 2027 – almost a third more than anticipated earlier – as countries strive to rely less on imported fossil fuels.

Come 2027, renewables could cater for almost 40% of the world's electricity output and push down the share of coal, gas and nuclear, IEA analysts said in their latest report on the sector.

The war in Ukraine is accelerating renewables investment in Europe where governments and businesses are looking to rapidly replace Russian gas with alternatives. The amount of wind and solar capacity added in Europe between 2022 and 2027 is expected to be twice as high as in the previous five years, driven by a combination of energy security concerns and climate ambitions.

China, India and the United States are also implementing policies and regulation to combat the energy crisis. As a result of its recent 14th Five-Year Plan, China is expected to account for almost half of new global renewable power capacity additions through to 2027. Meanwhile, the US Inflation Reduction Act has provided fresh support and long-term visibility to expand renewables in the United States.

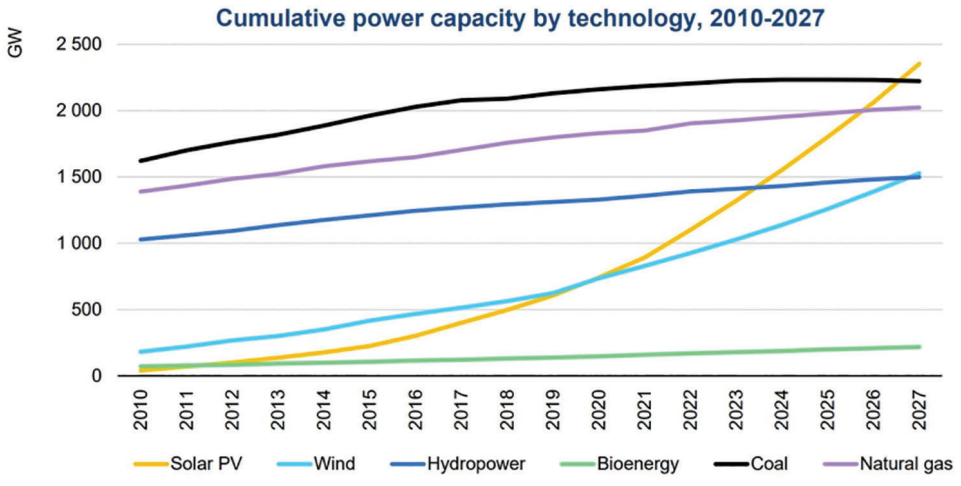
"Renewables were already expanding quickly, but the global energy crisis has kicked them into an extraordinary new phase of even faster growth as countries seek to capitalise on their energy security benefits. The world is set to add as much renewable power in the next 5 years as it did in the previous 20 years," said IEA executive director Fatih Birol.

Solar PV stages fastest growth

Cumulative solar photovoltaic capacity is set to almost triple to over 2,350 GW by 2027, surpassing hydropower next year, natural gas in 2026 and coal in 2027, the IEA finds. Still, hydropower will remain the primary source of renewable energy given that it has almost no intermittency issues, unlike wind and solar.

Supply chains of solar photovoltaic will get diversified as the US and India are expected to invest as much as $27 billion over the next three years. Still, China is set to stay the dominant player in this market segment, though its global manufacturing capacity could fall from 90% today to 75% by 2027.

Biofuel demand is set to grow by 22% over the forecast period, with the United States, Canada, Brazil, Indonesia and India make up 80% of the expected expansion thanks to supportive policies in place. ■



Source: IEA analysis based on World Energy Outlook 2022. (2022), Fossil fuel capacity.

EU business leaders confident despite headwinds from energy crisis

Despite high energy costs and supply-chain disruptions, over 77% of European business leaders are confident their companies can accelerate growth, an Accenture survey finds. European companies outperform their rivals in Asia and the United States on sustainability, talent and liquidity but they lag behind in sales and using technology to boost top-line growth.

Released at the World Economic Forum's Annual Meeting in Davos, the report analyses the financial performance of nearly 3,000 companies globally.

Companies in the European Union reported strong profitability but are slower to grow revenues compared to their peers. They are also less likely to innovate using emerging technologies, shift to a technology-driven business model and have a digital-savvy leadership compared to North American and Asia Pacific companies.

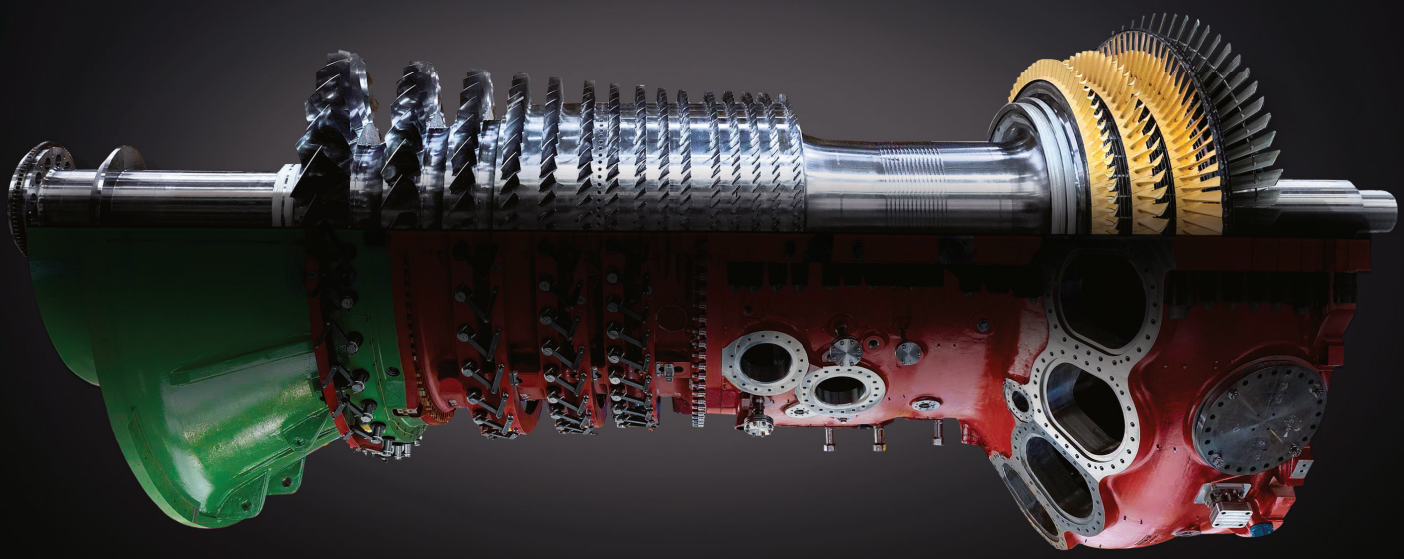
"European companies' strong profitability and lower growth pattern suggests they are more likely to squeeze value from existing business streams than growing new ones," said Michael Brückner, Chief Strategy Officer of Accenture Europe. If European companies had invested in R&D at the same rate as North American companies, this would have equated to an additional $388 billion in investment over the past five years.

Looking ahead, Brückner urged companies in the EU to quickly build a digital core to reinvent their business model, align to new customer needs and accelerate the energy transition. By adopting net zero and circular principles, European companies could gain a competitive edge which they should use for fast-track project execution.

By fostering large-scale adoption of early green energy solutions, they could improve energy efficiency – not only to navigate the energy crisis but as a long-term solution to reduce emissions and costs. ■

ITALIAN ENERGY

BRIGHTER FUTURE



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GE and Japan's IHI to develop 100% ammonia-capable combustion

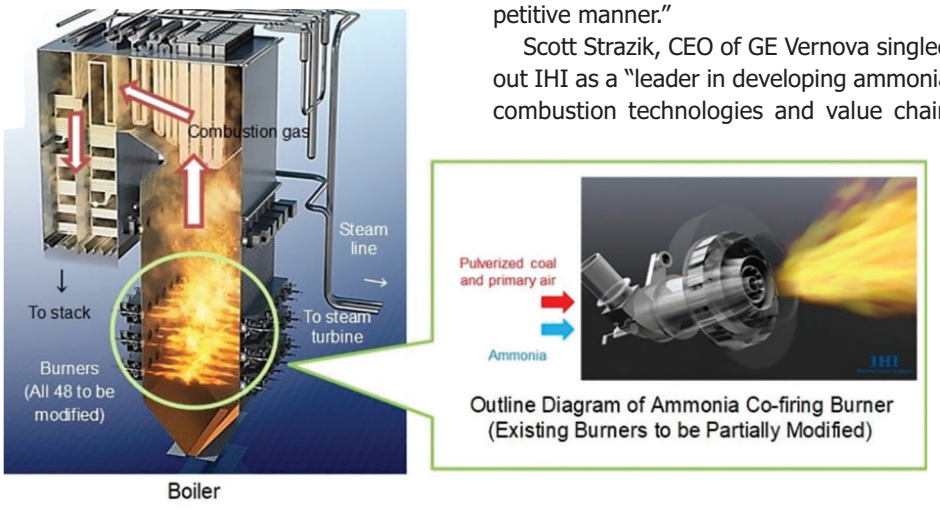
GE Gas Power and Japan's IHI Corp have teamed up to develop gas turbines capable to fully run on ammonia by 2030. "We want to satisfy demand for large-scale ammonia gas turbines (...) and expand the fuel ammonia value chain," said IHI president Hiroshi Ide whose company is fast-tracking a demo project at JERA's Hekinan thermal power unit 4.

The Japanese technology conglomerate IHI has developed hydrogen- and ammonia-utilization technologies which the American turbine manufacturer seeks use for its heavy-duty gas turbine. GE's explicit aim is to fire its 6F.03, 7F and 9F gas turbines with up to 100% ammonia in a "safe and commercially competitive manner."

Scott Strazik, CEO of GE Vernova singled out IHI as a "leader in developing ammonia combustion technologies and value chain development globally." He expressed hope the collaboration will allow power plant operators to adopt carbon-free fuels such as ammonia in their GE gas turbines.

IHI is close to piloting its ammonia combustion technology in Japan. Together with JERA, Japan's largest power producer, it fast-tracking works to generate 20% of heating value at Hekinan thermal power plant's Unit 4 from ammonia starting from fiscal 2023.

JERA is in charge of ammonia procurement and construction of a storage tank and vaporizer, while IHI's role is to develop the burners to be used in the demonstration. Test runs will evaluate various materials for the burners, boiler heat absorption and emissions of exhaust gases. ■



Rolls-Royce successfully tests mtu engines with pure hydrogen

Tests of a 12-cylinder gas variant of the mtu Series 4000 L64 engine running fully on hydrogen fuel have been conducted successfully, Rolls-Royce announced. Trial runs show very good characteristics in terms of efficiency, performance, emissions and combustion, with the first 100% fuelled mtu engine set to be installed at the German inland port of Duisburg.

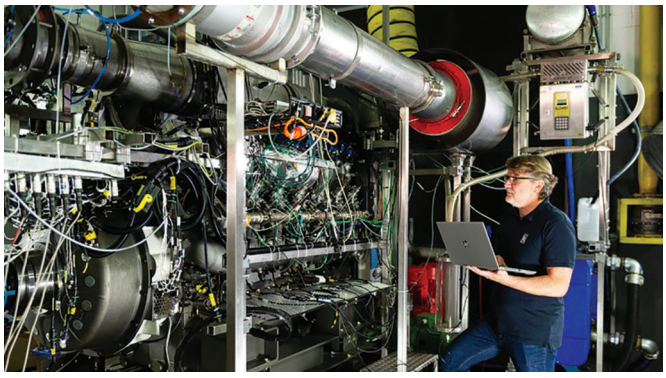
For several months, the mtu gas engine has been undergoing bench testing and continuous technical improvement while running purely on hydrogen. "We are very pleased with the rapid progress. The very low engine emissions are well below the strict EU limits, no exhaust gas aftertreatment is required," said Andrea Prospero, an engineer at Rolls-Royce responsible for the development of the hydrogen engine.

Once commercially launched, the fully hydrogen-fuelled mtu Series 4000 L64 engine will be available to customers as a reliable and clean power source for gensets and combined heat and power plants. For gas engines already installed, Rolls-Royce offers a conversion solution.

Powering the enerPort II lighthouse

At Duisburg, the engines will power the enerPort II lighthouse project and provide climate-neutral energy for a new container terminal. The port operator is working to build a hydrogen-based supply network for its new terminal, ready for operation in 2024.

Most of the port's future electricity requirements will be generated directly on site from hydrogen in a CO2-neutral manner. To that end, two combined heat and power (CHP) plants will be built, based on mtu Series 4000 hydrogen engines with 2 MW installed capacity as well as three mtu fuel cell systems 1.5 MW total capacity. ■



MHI evaluates ammonia co-firing at Thai thermal power plant

BLCP Power Station

Mitsubishi Heavy Industries (MHI) will participate in a feasibility study on co-firing up to 20% ammonia to fuel the 1,434 MW BLCP Power Station in Rayong province in southeast Thailand. MHI would provide ammonia burners and boilers, while JERA would procure and transport the clean-burning fuel to designated ammonia receiving and storage facilities.

Committed to reach carbon neutrality by 2050, Thailand is eager to cooperate more closely with Japan on decarbonisation technologies for clean fuels like ammonia and hydrogen. Given that MHI had supplied the coal-fired boilers and steam turbines for the large BLCP Power Station, the manufacturer was the obvious point of call for decarbonising it as well as similar other plants in the future. ■

Greek firms start work on 840 MW power plant at Alexandroupolis

Construction has started on a gas-fired power plant in Greek's northern port city of Alexandroupolis, developed in connection with a floating LNG import terminal. Built by Public Power Corp, DEPA and Copelouzos Group, the 840 MW plant will cost €400 million and is slated to start operations in 32 months, with most electricity designated for export.

Inaugurating the project, the Greek Prime Minister Kyriakos Mitsotakis said the plant will "increase our capacity to produce electricity, reducing electricity imports, but mostly increasing exports." He disclosed "our ambition is to become an energy security producer for our neighbours in the Balkans."

Selling electricity to Bulgaria

The plant is being built at Alexandroupolis Industrial Area where several gas pipelines and international power interconnectors meet. Electricity output from the plant can be fed into the Greek grid at the Nea Santa ultrahigh voltage substation, where the second Bulgaria-Greece power link enables transmission to Martisa East. EU funding will help boost the line's transmission capacity to 1,400 MW from Greece to Bulgaria and 1,700 MW vice versa.

Fuel for the 840 MW gas power station will be sourced from a nearby floating LNG import terminal, under construction and led by Gastrade, as well as from the IGP pipeline. The FSRU vessel, provided by GasLog, will have a storage capacity of 153,500 cubic metres and a nominal gas send-out rate of 625,000 cubic metres per hour.

Substituting coal power

Due operational at the end of 2025, the combined-cycle power plant will help substitute ageing coal-fired capacity. Developers claim the CCGT will have 63% operational efficiency, which will lower fuel consumption as well as emissions. Once in full swing, the power station is expected to employ 800 staff.

The regional power grid operator IPTO reckons, at least three new gas-fired power stations could be required in the region by 2030 to support plans to decommission coal-fired power units, operated by Public Power Corp. Greek aims for a power mix of natural gas, renewables and batteries though new gas power plants may well need a capacity mechanism to keep them commercially viable in the face of high gas prices. ■

Render of CCGT at Alexandroupolis

Geo-data help SSE and Equinor manage ground risk at Keadby 3 site

Geotechnical assessments carried out by Fugro and in situ ground testing will support the development of SSE Thermal and Equinor's Keadby 3 power station with carbon capture in North Lincolnshire, UK. Geo-data will help developers understand ground conditions at the site of the 910 MW power project, manage potential hazards and lower associated project costs.

Keadby 3 became the power CCS project in the UK to receive planning permissions in December. When complete, the flexible gas-fired power plant will be equipped with carbon capture technology, capable of capturing up to 1.5 million tonnes of carbon annually.

Front End Engineering Design (FEED) is being carried out by Aker Solutions, Siemens Energy and Altrad Babcock, while Aker Carbon Capture will deliver the carbon capture technology.

With fieldwork underway, Fugro is performing a range of in situ testing to deliver a comprehensive assessment of the ground at the Keadby 3 site. "With our Geo-data, ground characteristics and behaviours can be confidently determined, and potential hazards identified, allowing solutions to be modelled and managed," explained Matthew Chappell, Fugro's head of site investigation. The aim is to avoid engineering challenges related to ground risk.

Site of SSE's Keadby power station

Start-up targeted in 2027

The 910 MW power CCS project in North Lincolnshire received a Development Consent Order, following an extensive period of consultation. Assuming success in the UK Government's Cluster Sequencing Process, project partners will take FID so that the power station could be operational as early as 2027.

Venturing into CCS, Equinor and SSE Thermal are also working on the Peterhead Carbon Capture Power Station in the north-east of Scotland. In addition, they are developing Keadby Hydrogen Power Station, which could be the world's first large-scale 100% hydrogen-fuelled power stations, supported by Aldbrough hydrogen storage project. ■

MAN dual-fuel engines to power Irish plants

Two Irish utilities have contracted MAN Energy Solutions to supply 16 dual-fuel engines with a combined generating capacity of 311 MW for three new power plants, currently under construction. Two plants are situated near Dublin and third in the Midlands town of Athlone, all intended as back-up facilities to compensate for fluctuating renewable power supply.

"By 2030, the Irish government wants to increase the share of renewable energies in the power supply to 80%. At the same time, it needs sufficient back-up capacity to ensure security of supply at all times of day and year," said Martin Höhler, MAN's head of power plants sales Europe.

The investment firm Sustainable Development Capital is developing a 111 MW plant at Dublin's Grange Castle Business Park. Powered by six MAN 18V51/60DF engines it will be dispatched for peak shaving at times of sudden spikes in electricity demand.

Greener Ideas, a joint venture between Mountside Partners and the Centrica subsidiary Bord Gáis Energy, is developing the other two power plants situated in the Profile Park in Dublin and near Athlone, County Roscommon. Each plant will employ five MAN 18V51/60DF engines to provide 100 MW of electricity to back up and help balance the power grid. ■

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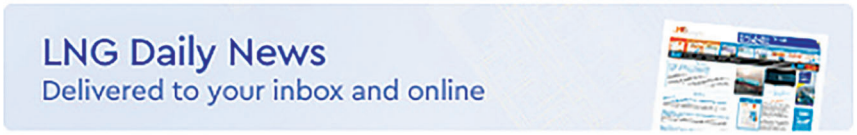

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