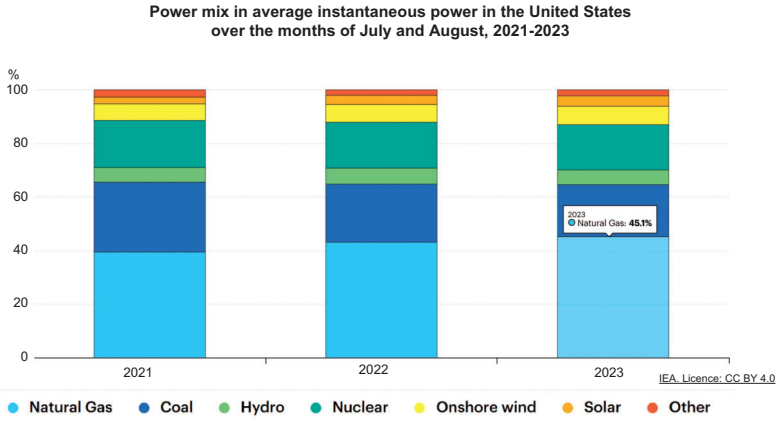
Gas to Power Journal
Peakload Power and Energy Storage

Focus on fossil power vs RES and flexibility challenges

Weekly News 8 December 2023

Gas-burn stronger than ever in the US power gen sector; IEA finds

Natural gas covered almost half of the United States' electricity demand this summer amid significantly lower gas prices, coal plant retirements, low output from wind and hydropower and high cooling demand. According to the International Energy Agency (IEA), the steepest price drop occurred in gas producing regions – like Texas and Louisiana – accelerating the coal-to-gas switch.



In July and August, the share of the cleaner-burning fuel in the US power mix rose from 40% to 45%. In contrast, the share of coal contracted from 23% to 17% over the same period. Accordingly, the average utilisation of coal-fired generation fell from 48.5% to 39.8% in the first seven months of the year, while the capacity factor of gas-fired generation increased from 54.6% to 57.7%.

Low gas price trigger switch from coal

Prices dropped by 60% all through the first three quarters of 2023 at the US benchmark Henry Hub. Regional gas prices were even lower, notably in the large shale gas producing regions which also benefited from a particularly mild winter. The substantial price swing sparked a fuel switch from coal to gas. IEA analyst noted the "switching was particularly noticeable in regions with wholesale markets, where competition between resources is based on short-run marginal cost economics."

In Midwest (MISO) and Central (SPP) regions, coal had become more competitive in 2021 and 2022 due to a jump in gas prices. But gas became much more competitive again also in these regions this year as its price fell, analysts pointed out. In contrast, coal-burn remained dominant in the Central as the coal to fuel power stations is here predominantly procured on attractive long-term contracts, IEA figures show. Still, more efficient gas-fired units managed to displace older coal plants.

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German power market faces big flexibility challenge; Uniper warns

Rapid renewables build-out has created a substantial flexibility challenge in the German electricity market, Uniper Chief Operating Officer (COO) Holger Kreetz warned. Currently, there is 85 GW dispatchable capacity in the German market and on the coldest day last winter, the system needed 80 GW, he told a panel at the Enlit Europe conference.

Though German policy makers push for decarbonising existing fossil power assets through post-combustion carbon capture or hydrogen co-firing, the industry keeps waiting for the government to issue a clear-cut carbon management strategy. This limbo hampers investment in new flexible generating assets.

Beware long lead-times

According to Kreetz, investment decision should be taken as soon as possible. "With more renewables, its lots of GW needed to be built and even if we had the details on the [flexibility] auction tomorrow, this would mean earliest in 2029 we would have the first assets up and running," he said.

In his view, renewables combined with flexible gas-fired power plants are the most economical and suitable path for a utility to maximise its asset value. "To decarbonise [these] thermal assets, flexibility needs will increase rather than decrease," he noted, suggesting this will be "a big challenge for society, OEMs and utilities."

Unipers's 846 MW Irsching power plant

Last winter, Uniper had to reactivate several oil-

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AGENDA

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Operational challenges for ageing coal fleet

The age of assets is also decisive: "With an average age of 43 years compared to 22 years for their natural gas counterparts and almost an entire fleet of more than 30 years of age, coal plants are faced with new challenges," analyst said, referring to their ways to operate.

For instance, in the fourth week of August – when natural gas for power reached its zenith – just some 80 GW were used for baseload compared to about 95 GW last year in the same week, IEA figures show. "With coal plants running at about 125 GW on the peak for both years, this meant that the coal capacity used for peaking went from about 30 GW to 45 GW in just a year," analysts commented.

Operating a power plant flexibly, in load-following or cycling mode, in response to economic conditions also reduces plant efficiency. A study by the Electric Power Research Institute (EPRI) shows there is an efficiency penalty of around 40% (14 000 Btu/kWh vs 10 000 Btu/kWh) when plants are running near minimum load condition compared to baseload operation. This adds between $3 to $12 per MWh to the operating cost of the unit at current coal prices.

Liberalised markets switch faster

Market type is impacting the speed of fuel switch. Evidence gathered by the IEA shows natural gas is replacing coal at faster rates in regions with liberalised markets than in regions with vertically integrated utilities. In fact, gas generation was up 5% between 2019 and 2023 in regions with vertically integrated utilities while it soared 22% in regions with liberalised markets.

Regulated utilities use 'must-run designation' to dispatch power units at rates much higher than merchant, or competitive, supplier – also at times when fuel and electricity prices suggest that running coal plants is unprofitable. Between 2017 and 2022, Potomac Economics that 24% of must-run starts by regulated utilities were unprofitable, compared with only 9% by merchant suppliers. Though this rate fell to 9% by regulated utilities in 2022, merchant plants had no unprofitable starts that year.

Proponents say must-run designations are necessary because MISO commitment and dispatch parameters are ill-suited to the operations of coal plants, which can have high start-up and shut down costs, fixed fuel contracts (take or pay) and less flexible ramping rates. But some utilities in MISO, e.g. Xcel Energy in Minnesota, change this practise by running their two remaining coal units in a more economic, seasonal operation. ■

Budget crisis forces German gov' to put power plant strategy on hold

Germany's economic ministry had to push back a long-awaited power plant strategy after the county's highest court blocked the use of €60 billion from the government's Climate and Transformation Fund. The strategy envisages the construction of hydrogen-ready gas power plants with up to 25 GW installed capacity, corresponding to 50 large plants which were meant to be operational from 2030.

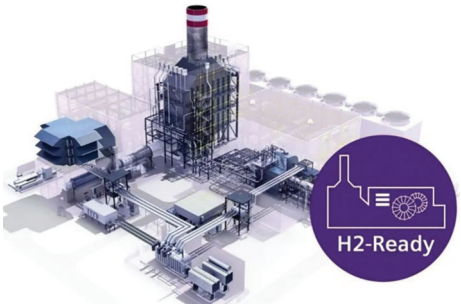
But that start-up date is now unlikely as the court ruling has derailed the government's funding plans and an alternative is not easy to come by.

However, additional fast-ramp gas power plants are essential for the German energy transition. "Without backup power plants, there will be no [early] phaseout of coal, and we should always be aware of that," the parliamentarian Markus Hümpfner told the business daily Handelsblatt.

Without dedicated funding, investors will shy back from building backup power plants as a combination of renewables and energy storage would reduce the runtime of gas peakers, making them unprofitable. The grid operator TransnetBW has proposed funding such backup plans partly though a fee payable by electricity consumers.

Relief packages in doubt

The court ruling might also hinder the implementation of a €28 billion package to lower industry power bills. Germany's coalition government has agreed a relief package 2024 to 2027 for industry burdened by high power prices. Measures include slashing the electricity tax from €1.537 to just €0.05/MWh for at least two years and extending subsidies that shield against rising CO2 cost in an effort to discourage firms from moving production abroad.



"Next year alone that will be relief worth up to €12 billion," chancellor Olaf Scholz from the Social Democrats (SPD) said when first announcing the package. The agreement was meant to provide planning security for energy-intensive companies – particularly for steel, glass and aluminium producers as well as for the chemical industry – but now it is unclear if the package can be financed. ■

Gas to Power Journal

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and coal-fired power units to stabilise electricity supply at the height of a European gas crisis. At the time, German utilities were required by law to burn as little gas as possible.

Syngas – one way to decarbonise

At Chemelot in the Netherlands, Uniper now plans to develop a plant for the production of syngas which can replace natural gas in chemical production processes. Through a scalable process, biomass is torrefied and then converted into syngas which can also be co-fired in power stations.

The Uniper COO explained the utility's syngas production plant at Chemelot forms part of the company's wider decarbonization activity across Europe and at the Maasvlakte, where it is currently undertaking a FEED study for 100 – 500 MW of green hydrogen production.

The project is currently in the early development phase, aiming for a first operational phase in 2027/28. ■

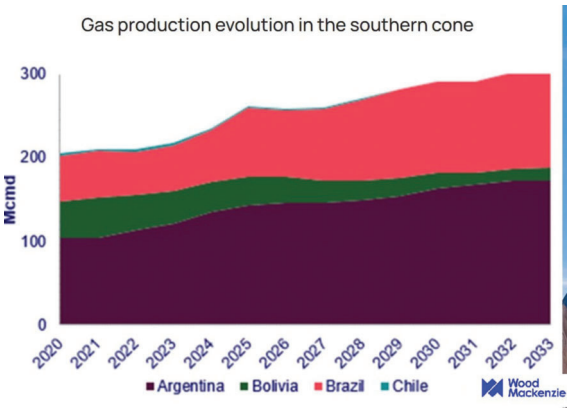
Rising gas production in Brazil, Argentina to reshape regional dynamics

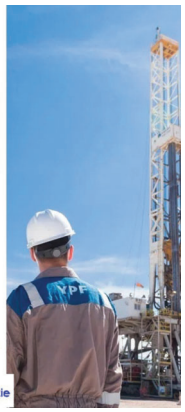
Southern cone gas supply dynamics will be reshaped over the next ten years by rising production in Brazil and Argentina while dwindling output from Bolivian fields impedes exports. Upstream players the region's four key countries plan to invest $46 billion through 2033, making Brazil almost self-sufficient while Argentina could account for 72% of forecast spending – despite spiralling inflation.

Already this year, Argentina's upstream investment is on track to reach a record $11 billion. If export restrictions, capital controls, energy price controls and infrastructure bottlenecks are fully removed, S&P Global analysts believe Vaca Muerta – Argentina's largest unconventional hydrocarbon deposit – could produce an additional 40% in crude volumes and an additional 30% in natural gas volumes by 2030.

LNG and crude oil exports could triple Argentina's local demand in less than ten years, the former energy secretary Emilio Apud reckons – and hydrocarbons together with lithium mining are meant to sweep export dollars into Argentina's ailing economy.

Rising gas production in Argentina and Brazil will reshape regional supply dynamics. "The region will evolve from the current state of Bolivia balancing Brazil and Argentina and Argentina exporting seasonally to Chile to a state in 2033 where Argentina and Chile will be integrated, Bolivia will be producing only for its internal market and Brazil will be supplied by domestic production and by firm LNG offtake," said Eduardo Seraphim, gas research analyst for Wood Mackenzie. However, this requires Brazil and Argentina to develop domestic infrastructure which in the latter's case is hampered by macroeconomic uncertainties, he warned.





Solar PV to displace gas generation

Gas-to-power demand in the Southern Cone region is set to fall as the power sector will focus on renewables, notably solar. This will free up more natural gas from Argentina to be exported via pipeline to Chile or to be liquefied and sold as LNG to global markets.

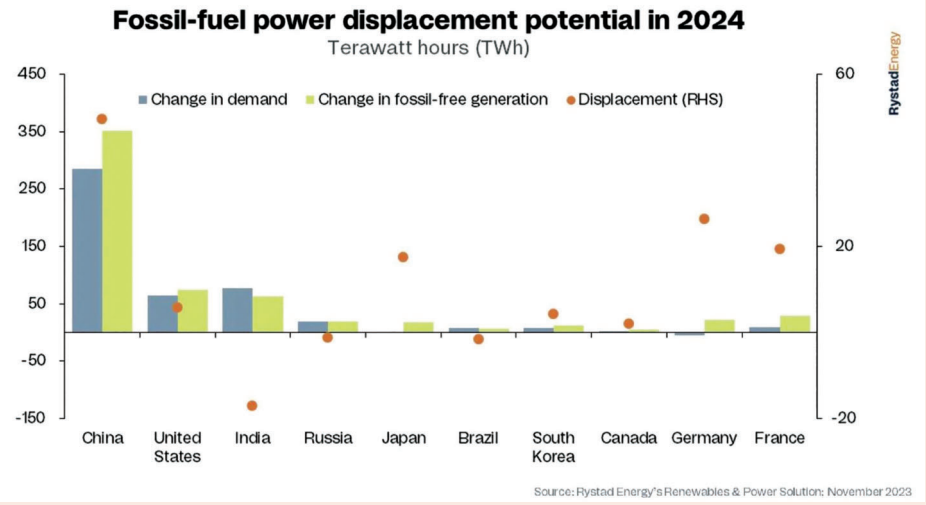
New electricity supply is forecast to attract $94 billion of investment through 2033, with renewables accounting for 81% of that Capex due to a big boost in solar PV spending. "Driven by advances in batteries and lower costs, solar will outpace wind growth rates and become the leading technology for expansion over the next 10 years in Argentina, Brazil and Chile," WoodMac reckons, forecasting: "The total solar market is set to add 48 gigawatts (GW) of utility and distributed projects, while wind will add 31 GW of onshore projects through 2033."

The consultancy's "Southern Cone Investment Horizon Outlook" finds total investment in new power supply would lead to a cumulative capacity of 400 GW by 2033. ■

Fossil power generation gets displaced by low-cost renewables

Though the world's coal generation fleet continues to expand, exponential growth of renewable power is starting to eat into the amount of coal-fired electricity produced from next year. According to Rystad Energy, levelized cost of energy (LCOE) for solar PV and onshore wind is $50/MWh on average – much less than $84/MWh for coal and $144/MWh for gas power in Asia.

The comparison of LCOEs considers a coal price of $122/tonne and a gas price of $17/MMBtu, Rystad specified, suggesting "investments in renewable energy are a more economical choice for most countries, leading to installations setting new records every year."



Close to 300 GW of solar PV and 140 GW of wind capacity are expected to be installed globally in 2024, more than half of that in Asia, where there is a more urgent for displacing coal power generation. This could take global capital expenditure in solar PV and wind capacity to more than $600 billion next year.

"Capacity gains are only as valuable as their output, though," analysts noted, conceding that the efficiency of renewable energy sources is still "well below" fossil-fuelled power generation.

The world's electricity demand is forecast to reach about 25,400 TWh next year, 3% higher than 2023. Most of the growth will be driven by expanding economies in Asia – and further out by the electrification of the transport and industrial sectors during the 2030s. Generation from carbon-free energy sources, together with nuclear, hydro and bioenergy, is expected to add 845 TWh of new supplies in 2024. ■

TTF gas prices ease despite cold snap and LNG supply disruptions

Despite a cold spell in continental Europe and LNG delivery disruptions from Australia, gas prices at the Dutch Title Transfer Facility (TTF) remain bearish. High storage levels of 97.4% in Europe and a muted demand outlook caused an 8.7% fall in prices to $13.71 per million British thermal units (MMBtu) at the end of November.

Likewise, Asia spot LNG prices and US Henry Hub prices edged lower to $16.42/MMBtu and $2.84/MMBtu respectively on 28 November, from $16.465/MMBtu and $2.99/ MMBtu a week earlier.

In Australia, LNG exports from the 9 mtpa APLNG facility on the country's east coast are currently disrupted, delaying the departure of tankers. APLNG typically exports one cargo every 2-4 days, hence Rystad Energy estimates the disruption could impact around 0.3 million tonnes of LNG if the problems persist for two weeks.

The restart of operations at Shell's 3.6 mtpa Prelude FLNG in early December, following maintenance, will add some length to global supply as did the resumption of full operation at Train 3 of Chevron's Gorgon LNG plan following an electrical incident which led to a production loss of 0.2 million tonnes.

On the buy-side, European demand is fairly low due to stable piped gas flows and a sluggish economy. Over in Asia, cooling temperatures prompted CPC in Taiwan (China) to purchase LNG this week for delivery early next year. Pakistan also purchased one LNG cargo for January 2024 delivery, with Thailand buying four cargoes in total for delivery next January and February. Analysts pegged Asia spot LNG prices around $16/MMBtu.

Winter weather is still a wildcard in determining China's gas demand for the year, with its industrial and manufacturing sector continuing to see lagged recovery. China's gas demand for 2023 is now forecast to be up 6.1% year-on-year to 389 Bcm while China's LNG imports this year are forecast to grow 6.7% year-on-year to 68.1 Mt, both below earlier forecasts. ■

Fluxys' Zeebrugge LNG terminal

Fossil fuel demand projected to peak by 2030, despite higher gas use

McKinsey modelling finds the world's overall demand for fossil fuels will peak by 2030, although gas demand will keep rising largely due to the fuel's balancing role for renewables until batteries are deployed at scale. Post 2050, the outlook for gas differs widely and hinges on the place of renewables build-out and electrification.

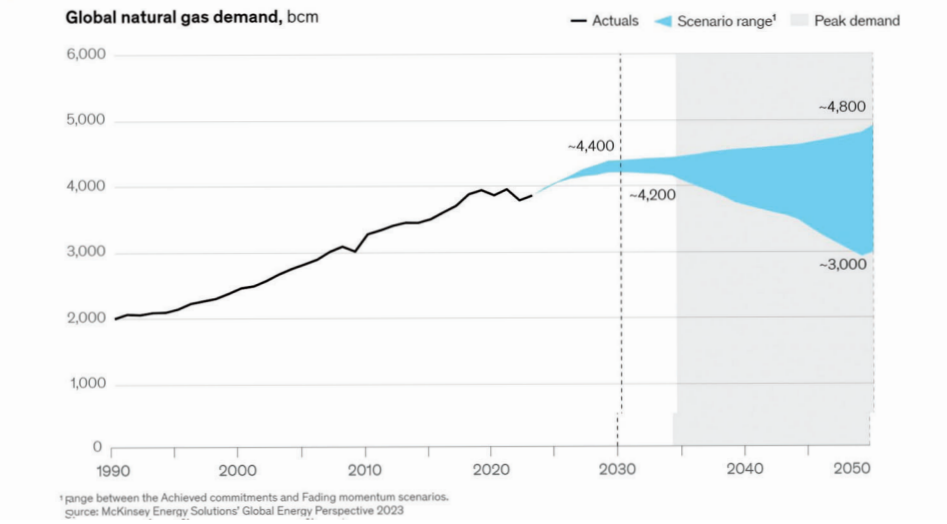
Oil demand almost halves by 2050 in the Achieved Commitments scenario, assuming a slowdown in car-parc growth, enhanced engine efficiency and continued electrification of transport. In contrast, in the Fading Momentum scenario, oil demand would decline by just 3% over the same period.

Unabated coal is likely to be phased-out entirely overtime – replaced by generation from hydrogen-ready gas power plants which are flexible in dispatch and can support grid stability.

Renewables will continue their rapid growth – given that they are already the lowest-cost option for incremental new-built power generation capacity in many regions. By 2030, McKinsey expects renewables will provide between 45% and 50% of global generation, and between 65% and 85% by 2050.

The fast ramp-up of renewables, especially solar power, could see power sector emissions plunge by up to 71% by 2050 compared to current levels, despite a doubling of electricity demand. But supply chain issues and slow grid build-out is hampering the green energy transition.

Fossil fuel demand is projected to peak before 2030, but the future outlook varies widely.



¹Range between the Achieved commitments and Fading momentum scenarios.
Source: McKinsey Energy Solutions' Global Energy Perspective 2023

Major investment needed

Investments in the energy sector are projected to grow by between 2% and 4% per annum – roughly in line with global GDP growth – to reach between $2 trillion and $3.2 trillion in 2040. But despite regulation favouring decarbonisation, between 25% and 40% of that investment will still be spent of conventional power generation to offset plant retirements and ensure the availability of dispatchable assets to balance the system.

The focus will gradually shift to green technologies, which currently only account for 20% of total investment but that figure is expected to reach over 40% by 2040. The transition will be mainly driven by the strong uptake of EV charging infrastructure and CCUS. Despite the absolute increase, McKinsey analysts point out that energy investments as a share of GDP remain stable at between 1.2% and 2.2% across all years and scenarios.

Bottleneck that could slow the transition are limits of raw materials for batteries and wind generation, as well as insufficient manufacturing infrastructure or land availability for green energy sources. ■

MHI successfully tests an ammonia single-fuel burner at Nagasaki

The Japanese manufacturer pointed out "this combustion test confirmed that the basic structure of the burner simultaneously provides for stable combustion of ammonia and suppression of NOx emissions." This is an important development milestone for applying the technology in actual boilers of thermal power plants.

As a next step, MHI plans to conduct a combustion test using an actual size burner in a larger 4t/h combustion test furnace. Based on these results, MHI will then take steps for application of the burner it has developed for thermal power plants in Japan and overseas.

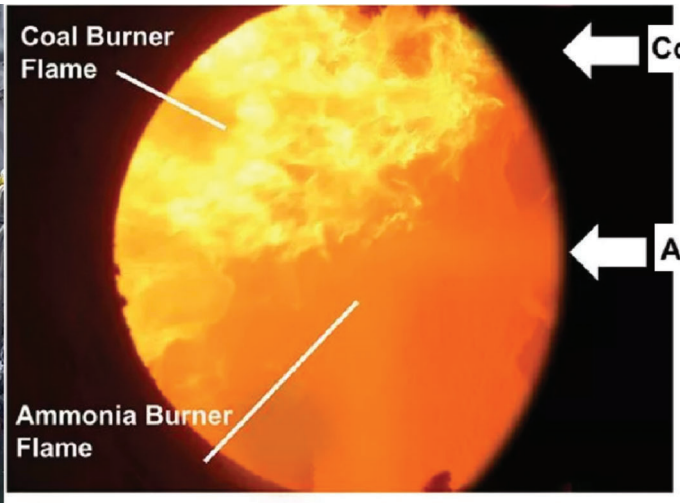
Since fiscal 2021, MHI has been pursuing "development and demonstration of high-ratio ammonia co-firing technology in coal-fired boilers" as part of the Fuel Ammonia Supply Chain Establishment project. By 2024, the manufacturer plans to develop burners capable of ammonia single-fuel firing for both circular firing and opposed firing type burners.

Europe's first ammonia-fired CCGT

Together with Centrica, Mitsubishi Power is exploring the development, construction, and operation of Europe's first-ever ammonia-fired power generation facility at Bord Gáis Energy's Whitegate combined-cycle power station in Cork, Ireland.

As one of only two such plants in the world, the CCGT will demonstrate the use of ammonia as an emission-free fuel. The ammonia for the Whitegate CCGT in Ireland will be supplied through Centrica's global trading network.

So far, ammonia has been included into the fuel mix through co-firing at coal power plant – a process that blends ammonia with coal during the combustion process which allows the plant to use less coal to produce the same amount of electricity. Though combusting ammonia produces no emissions, its overall carbon footprint depends on the way the ammonia has been produced. ■



(Arrows indicate the burner installation location and the furnace feeding direction.)

GE spends over $5 million in power plant service center in Spain

GE Vernova plans to spend over $5 million in increased service capabilities at the Fierro Service Center in Andoain, Spain, to meet the growing maintenance needs of aging gas power plants. GE added some 350 gas turbines in combined-cycle configuration in 2002 and over 300 in the following year – and these power plant fleet now needs servicing.

Moreover, approximately 330 gigawatts (GW) of gas turbine equipment was sold worldwide Between 1998 and 2001 – an amount equal to all the gas turbines ordered in the 15 years prior to 1998.

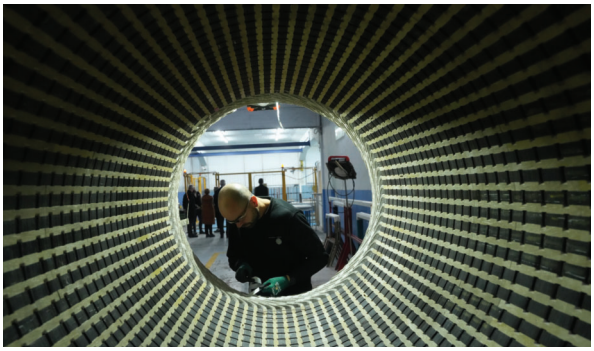
"Due to the rapid growth of generators during the late '90s and the projected power demands of the future, we predict demand for generator maintenance is going to increase rapidly for the next decade and GE Vernova is committed to support our customers and meet this need," said Morgan Terrill, GE's supply chain development leader.

The focus at the Fierro Service Center is to help repair F-Class generators installed in Spain and further afield. Situated in Andoain, northern Spain, the service centre will improve the shop flow and adopt lean processes to service motors, generators and transformers. The site will also expand generator stator winding manufacturing capabilities with the aim of delivering double the current annual capacity of generator stator bars.

The site at Andoain originally performed industrial and hydroelectric generator repairs and will now get a second line for generator stator bar manufacturing that includes forming equipment, an insulation taping 3 D robot and hot press for a digitalized heat treatment process.

The Spanish minister for economic development, Arantxa Tapia Otaeg, welcomed GE's decision to invest in the centre near San Sebastian. "Tapping into the skilled talent base and robust infrastructure in the region, this expansion is testimony to the center's strengths as a location for advanced manufacturing and repair activities," he said.

Engineers at the centre will help power producers to benefit from better quality, speed, and performance from their assets. ■



First CO2 battery project raises €60 million, aims for Q3-24 start

Energy Dome's first CO2-based thermo-mechanical energy storage system in Sardinia has secured a €35 million project level grant and €25 venture debt from the European Investment Bank (EIB). The project will use a 20MW/200MWh CO2 battery, capable to supply electricity to the grid for 10 consecutive hours with start of commercial operation planned in the third quarter of 2024.

Render of Energy Dome's CO2 battery in Ottana, Sardinia

The funds will be made available through the EU–Breakthrough Energy Catalyst partnership which invests in emerging climate technologies to accelerate their adoption and reduce related costs. Mario Fernandez, head of Catalyst at Breakthrough Energy singled out long-duration energy storage as a "critical enabler" of the clean energy transition.

The CO2 battery draws on the energy of CO2 when changing between its gaseous and liquid state: When in charge mode, the CO2 is withdrawn from an atmospheric gasholder – the Dome and then compressed (which generates heat), liquefied and stored in vessels under pressure at ambient temperature. When energy is needed, the CO2 is heated up, evaporated and sent into an expander which drives the generator in order to feed climate-neutral electricity into the grid.

Claudio Spadacini, founder and CEO of Energy Dome claims the CO2 battery's high round-trip efficiency and Capex requirements are "significantly more competitive than the Lithium-Ion benchmark." He announced the new funding arrangement at the COP28 climate summit in Dubai.

The maiden unit in Sardinia will be the first of a series of identical units, allowing Energy Dome to reduce cost and improve the bankability of future units. The modular CO2 Battery does not use materials from rare metals, Energy Dome said, stressing "its main components are based on already existing and known supply chains."

MAN Energy Solutions will supply a 20 MW CO2 expander, with the turbomachinery due to be shipped in summer 2024 for installation. ■

Capchem of China plans to build battery factory in Louisiana

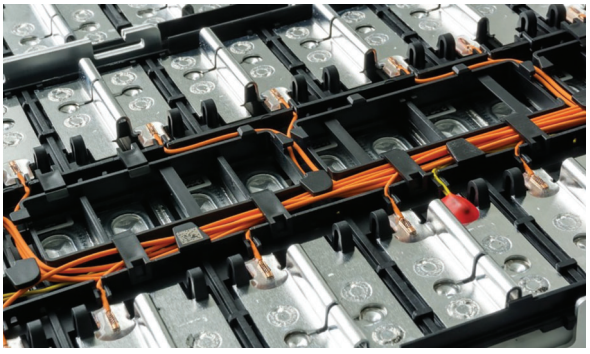
The American arm of Shenzhen Capchem Technology plans to spend $350 million to build an integrated carbonate solvent and lithium-ion battery electrolyte manufacturing facility in Ascension Parish, Louisiana. The project would cater to the growing demand for li-ion batteries for electric vehicles and energy storage, with construction slated to start in 2025.

Capchem aims to open the factory in 2025 and vowed the proposed factory would create 95 direct new jobs with an estimated average annual salary of $71,000, while Louisiana Economic Development hopes the venture could create another 474 indirect jobs.

The integrated battery factory is designed to produce 200,000 tons of solvent and 100,000 tons of electrolyte annually. The solvent would be made from ethylene oxide and CO2 as feedstock and produce carbonate solvents based on Capchem's proprietary ECOSIP technology. Hereby, lithium salts, carbonate solvents and functional additives are blended to produce solvents.

"Capchem USA's consideration of a new EV battery-related manufacturing facility underscores yet again how Louisiana's commitment to sustainability can strengthen our economy," Gov. John Bel Edwards commented. Capchem board chairman Johnson Qin disclosed the project will primarily targets to help electrify the automobile industry and promote localization of the lithium-ion battery supply chain in North America.

To attract and secure the project, the state of Louisiana has offered Capchem an incentives package that includes workforce solutions of LED FastStart and a $2 million performance-based grant for infrastructure expenses contingent on meeting investment and employment targets. Capchem is also expected to participate in the state's Industrial Tax Exemption and Quality Jobs programs. ■



NEWS NUDGES

CCS projects unevenly spread

According to BMI's database, almost 95% of carbon capture projects, planned or under construction are located in either Europe or North America, with the UAE standing out as a notable exception to this trend. Fitch analysts said this highlights the importance of growing access to transition capital and finance across emerging markets.

Digitalisation of CHPs essential

The digitalisation of combined heat and power (CHP) plants via sensors, IoT connectivity and AI algorithms is essential for decarbonising the district heating sector, the International Energy Agency (IEA) said. District heating and cooling sector accounts for more than half of total energy consumption in many industrialised countries and is hence a central area for decarbonising the wider energy system.

MAN wins sustainability award

MAN Energy Solutions has received the 16th German Sustainability Award as one of the winners in the 'Mechanical and Plant Engineering' company category. The jury highlighted MAN's contributions of transforming the industry, e.g. through carbon capture and engines running on synthetic fuels.

Karpowership and PIS develop LNG and power projects in Indonesia

Pertamina International Shipping (PIS), part of Persero, and Turkey's Karpowership have partnered to develop LNG import, distribution and power generation infrastructure in Indonesia. Persero's president director Nicke Widyawati disclosed the collaboration focusses on floating mini-LNG import facilities and small-scale distribution because "gas is a bridge to renewable energy," not least for island nations.

The general partnership agreement (GPA) was sealed during the COP28 climate summit in Dubai, signalling the parties' commitment to provide cleaner and more accessible energy solutions. Key areas are decentralised power generation, with a special focus on powership technology, unlocking remote gas assets through floating liquefaction (FLNG) as well as utilising parts of the gas bounty elsewhere in Indonesia via floating storage and regas units (FSRU) and local distribution.

Both parties vowed to also look at alternative fuel sources, including hydrogen, ammonia and methanol in an effort to decarbonise Indonesia's coal-dominated power sector.

Khan-class Powerships can generate 470 MW on a single vessel

JERA sets out clean energy pathways

Eager to help Indonesia decarbonise, the Japanese trio TEPCO Power Grid, JERA and Tokyo Electric Power Services (TESPCO) earlier agreed to carry out a data collection survey on pathways to clean up the county's gas and electricity sector. With 6-7% GDP growth since 2010, Indonesia sees strong electricity demand growth - currently mainly covered by coal - though the government in Jakarta pledged to achieve carbon neutrality before 2060.

Indonesia consists of many islands, similar to Japan, hence JERA believes it will be able to leverage its experience gained in drawing up a decarbonization roadmap at home. As one of the world's leading LNG importers and traders, JERA has the potential to help finance the conversion of coal-fired power stations in Indonesia to natural gas and then fuel these revamped power units with super-chilled, cleaner-burning gas.

TEPCO Power Grid, for its part, said it will focus on institutional and financial aspects when seeking to decarbonise Indonesia's energy networks while TESPCO wants to leverage its technical capabilities and expertise gained from working in developing countries in Asia and Africa. ■

Centrica and Mitsubishi develop Europe's first ammonia-fired CCGT

British utility Centrica and Mitsubishi Power are exploring the development, construction, and operation of Europe's first-ever ammonia-fired power generation facility at Bord Gáis Energy's Whitegate combined-cycle power station in Cork, Ireland. As one of only two such plants in the world, the CCGT will demonstrate the use of ammonia as an emission-free fuel.

Low carbon ammonia has a higher volumetric density than hydrogen, enabling the utilisation of low carbon hydrogen in a form which is easy to transport and store. Its use as a fuel is a promising long-term solution to decarbonise power generation and industry.

The ammonia for the Whitegate CCGT in Ireland will be through Centrica's global trading network.

Chris O'Shea, Group CEO at Centrica said the project would be one of many where the utility seeks to demonstrate how the hydrogen economy could work in practice. "In this instance, we hope to be able to show how hydrogen could be stored and transported as low carbon ammonia, delivering cleaner energy for customers at the point of use," he explained.

Several ammonia-related projects are in the making globally, advanced by affiliates like the Green Ammonia Consortium in Japan, the Australian Renewable Energy Agency (ARENA), and Neom in Saudi Arabia.

Render of the ammonia-fuelled Whitegate CCGT in Cork

So far, ammonia has been included into the fuel mix through co-firing at coal power plant – a process that blends ammonia with coal during the combustion process which allows the plant to use less coal to produce the same amount of electricity. Though combusting ammonia produces no emissions, its overall carbon footprint depends on the way the ammonia has been produced. ■

Expanded Al Layyah Station opens in Sharjah

Sheikh Sultan bin Muhammed Al-Qasimi has inaugurated the expansion of the Al Layyah Power & Desalination Station in the emirate of Sharjah. Built at a cost of AED 2.1 billion ($570m), the expansion brings the plant's total capacity to 1,026 MW.

The new Al Layyah unit includes two M701F gas turbines with a capacity of 345 MW, two boilers to recover waste heat, and a steam turbine with a capacity of 336 MW. Operational efficiency of the new combined-cycle unit will reach 58%, helping to reduce carbon emissions by some 2.2 tons per year.

For the Al Layyeh expansion, SEWA liaised since 2018 with an alliance of Mitsubishi and Elsewedy Electric. Works have been impacted by the pandemic which led to cost overruns. ■

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