



Japan turns to nuclear and renewables to reduce Russian gas imports

Japanese Prime Minister Fumio Kishida has pledged to further reduce Russian oil, gas and coal imports by increasing the dispatch of nuclear power plants and adding more renewables. Japan suspended all nuclear power units after the 2011 Fukushima crisis, but the PM said an accelerated restart will not only lower fossil fuel imports but also curb emissions.

“We will use nuclear reactors with increased safety measures to contribute to reducing the global dependence on Russian energy carriers. Launching just one already existing nuclear reactor will be equivalent to supplying the world market with a million tons of LNG per year,” Kishida said. To that end, the government plans to invest 150 trillion yen (\$1.16tr) over the next 10 years in non-fossil power sources which is expected to nearly halve the country’s greenhouse gas emissions by 2030.

PM Kishida stressed there would be no change in Japan’s policy of importing Russian LNG from Sakhalin-1 and -2, in which both Japanese companies and the government hold stakes. The Sakhalin-1 liquefaction terminal has been partially funded by Itochu, Marubeni and Inpex, while Sakhalin-2 counts Mitsui and Mitsubishi



LNG carrier berthing at Japanese port

among its investors.

Russia accounted for 9% of Japan’s total LNG imports of 74.32 million as the fifth largest supplier in 2021 and 4% of total crude oil imports of 2.48 million b/d, according to ministry of finance data. Moreover, Russia also covered 11% of the Japan’s coal imports, mostly used by the electric power sector.

Burdened by a sharp rise in energy prices, most Japanese companies support this policy as baseload nuclear power and renew-

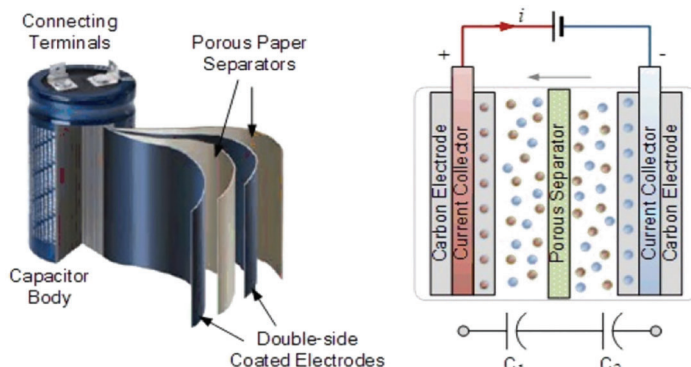
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Global supercapacitor market to top \$3.4bn by 2024, driven by China

The global market for supercapacitors – used together with static condensers to reduce voltage fluctuations on the power grid – will reach \$3.4 billion by 2024, according to ResearchandMarket projections. China will keep drive demand, with an anticipated 24.2% growth rate over the forecast period.

China already accounts for an 22.6% market share of the world’s supercapacitor market which is experiencing rapid growth due to the need to balance the in-feed of renewable energy on the grid. Wind and solar power cannot provide grid inertia as they are not being run at grid frequency – hence supercapacitors and synchronous condensers need to be added to stabilise the grid frequency.

Considering the fast build-out of renewable energy storage worldwide and unmet energy storage



needs, there are opportunities for flywheels, fuel cell and superconducting magnetic energy storage in addition to supercapacitors, analysts noted.

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ables, with zero operating costs, are hoped to reduce power generation costs and bring down prices.

Offering to divert LNG to Europe

In April, Japan offered to divert its surplus LNG cargoes to the EU to alleviate the bloc's gas crisis after Russia lowered supplies. In

March, Japan already diverted several hundred thousand tons of LNG to Europe and promised additional cargoes – much needed relief for the tight EU gas and power market.

The European Commission estimates an additional 15 million tons of renewable hydrogen can replace 25-50 bcm per year

of imported Russian gas by 2030. Japan could help source some 10 mt of green hydrogen which Europe wants to import, while 5 mt more renewable hydrogen produced in the EU, in addition to the 5 mt already planned. Joint purchases of hydrogen from producing nations could help lower the price. ■

Siemens Energy issues profit warning as problems at wind unit mount

Siemens Energy has warned sales and margins in 2022 will come in at the low end of its forecast range due to mounting problems at its Spanish wind turbine division. "Disappointing is the performance of Siemens Gamesa which is weighing heavily on the group," Siemens Energy CEO Christian Bruch said.

"The situation aggravated further since the last profit warning," Bruch said, promising investors the company will take suitable steps though he ruled out a divestment of Siemens Gamesa at the moment. "As majority shareholder, we provide our expertise to get to the bottom of the problems and to tackle the issues," Bruch said. Siemens Energy owns 67% of the Spanish wind power division, which is suffering from supply chain disruptions.

Posting second quarter results today, Siemens Energy lowered its sales forecast for 2022, anticipating a decline of 2% as opposed to an increase of 3%.

Solid result for Gas and Power

The Gas and Power (GP) segment, in contrast, delivered a "solid operating result and a strong order intake – despite first impact

of the sanctions in Russia," the Siemens Energy CEO said. Demand in the Americas reporting region was especially strong.

An order intake of €7.9 billion helped increase the order backlog to a record of €89.3 billion. But compared to the exceptional high prior-year figure, orders came in 27.5% lower for the quarter on a comparable basis.

Revenue of €6.6 million was slightly down by 1.7%, as moderate growth in Gas and Power was more than offset by a decline in the Siemens Gamesa Renewable Energy (SGRE) unit which

also led to a negative EBITA at -€76 million, down from a positive €197 million in the prior-year quarter.

The revenue in Gas and Power is mainly driving by transmission, industrial applications and the service business which is expected to stay strong going forward. ■



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Batteries vs. Supercapacitors

Supercapacitors can also be put to use to smooth out any potential performance gaps of conventional batteries. Still, the use of batteries – particularly lithium-ion based ones – is has substantial cost and size advantages, hence supercapacitors are not expected to fully replace them.

Lithium-ion batteries have over 20 times the energy density compared to a superconductor and are capable of storing 30 times more energy than their weight. By comparison, supercapacitors have very high power-density which means energy can be released rapidly and recharged quickly.

Combining both technologies into a hybrid configuration is considered ideal. Hereby

supercapacitors will remain a supplementary technology to batteries and engines that run on fuels in most applications.

Nonetheless, complete replacement is possible at offshore wind farms where supercapacitors can provide shore burst of electricity in order to adjust turbine blades in changing wind conditions. The superior power density of supercapacitors compared to batteries make them ideally suited to facilitate a quick "load levelling" of fluctuating wind power.

Their quick response time make supercapacitors well suited for static condenser and dynamic voltage regulator (DVR) applications, since power can be rapidly absorbed or injected to help reduce voltage fluctuations. ■

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China's gas demand drops as factories stay closed in regional lockdown

Industrial gas demand in China's Jiangsu province, north of Shanghai, plunged 43% in April from a year earlier as regional lockdowns to contain the spread of the coronavirus disrupts manufacturing. China's Zero Covid approach weighs heavy on energy consumption, Morgan Stanley said, pointing at last month's 6% in countrywide gas demand as power generators turn to coal.

China, the world's largest LNG importer, has repeatedly imposed regional or city-wide lockdowns over the past two years to quell regional Covid-19 outbreaks which lowered LNG demand at a time of high prices. Morgan Stanley analysts pointed out China's weak industrial gas demand in March and April was caused by high-cost gas and Covid-containment measures.

Record high LNG prices in Asia – with the Japan-Korea Marker for June delivery last seen trading at \$23.155 per MMBtu – have prompted China's state-dominated gas importers to purchase less cargoes. Over the first four month of the year, China's LNG imports have fallen by 16% to 20% due to a combination of high spot prices, mild weather and low demand both from industry and power generators.

Turn to domestic coal

Keen to keep a lid on energy costs, China's central government in Beijing has implemented measures to boost domestic coal supply as an alternative fuel source for power generation. These policies are seen

having an impact on global commodity prices, Wood Mackenzie noted.

Increasing domestic coal production in China and less gas-burn in the power sector is gradually feeding through into prices. China's benchmark Qinhuangdao price, currently around RMB1100/t, is expected to ease off to RMB1000/t in May and fall further to around RMB700/t by late summer.

As for LNG, weak Chinese demand has led to a long Asian balance which led to a price parity to Atlantic LNG, analysts said, anticipating prices could trend downwards as abundant piped gas and LNG supply are pushed into storage in Europe.

Price control

China's state planning body NDRC has been diversified energy imports and is boosting domestic oil, gas and coal production to keep prices under control. Acknowledging the risk of supply disruption after Russia's invasion of Ukraine, NDRC stressed the government had "conditions, ability, confidence



Manufacturing activity slowed in China

and means to ensure a safe and reliable supply of energy."

Since March, China diversified the sources of its oil and gas imports and rushed to import more thermal coal which fuels over 60% of the country's power plants. Going forward, the NDRC will work to amass 200 million tonnes of government-deployable coal stocks.

Domestic coal is hoped to bridge any eventual gap in fuel supplies, hence the government approved hundreds of new coal mining projects as well as extensions of existing mines. China's domestic coal production hit a record of 4.07 billion tons last year, and is meant to grow further. ■

Hyundai Motor to build LNG-fuelled cogeneration plant at Ulsan

South Korean carmaker Hyundai Motor has decided to build an LNG-fuelled cogeneration plant at its automotive manufacturing site in Ulsan. Hyundai said it aims to source over 70% of its annual electricity demand from the new 184 MW heat and power plant, replacing three-fourth of the electricity it used to purchase from Korea Electric Power Corp.

Hyundai's Ulsan automotive plant has a large and growing energy demand, consuming 1.29 million MWh of electricity and some 710,000 metric tons of steam for manufacturing cars like the Santa Fe, Veloster, Gen-

esis and the i40. The new onsite heat and power plant (CHP) will be Hyundai's first on-site generator, allowing it to become independent from having to purchase electricity from the grid.

Construction for the 184 MW CHP at Ulsan will begin this autumn with a view to commission the plant in 2025. Hyundai announced works will commence as soon as the environmental impact statement is completed.

South Korea's energy policy which encourages industry to build privately-run CHPs to improve the stability of the country's central power grid and re-

duce emissions through the shift from coal to gas generation. Complying with this policy, Hyundai decided to build and LNG-fuelled power plant and take further steps to mitigate its overall emissions as the company aims to reach Net Zero by 2045. Similarly, SK Group's chipmaking arm SK Hynix is building a 585 MW LNG-fuelled cogeneration plant in Cheongju.

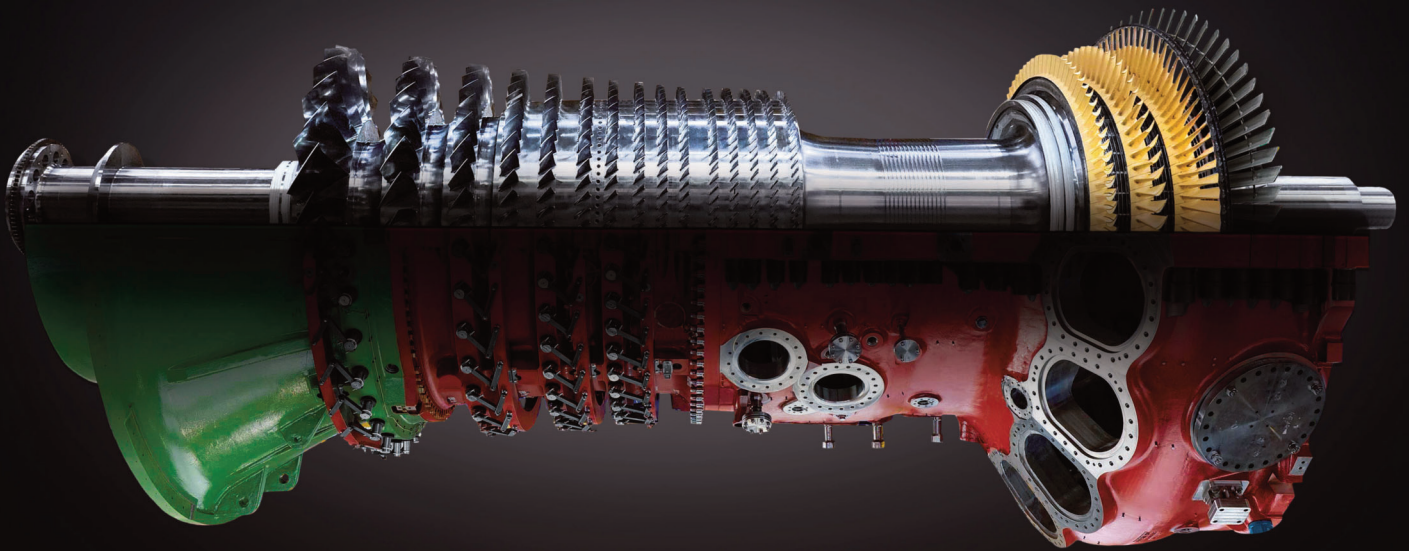
Burning regasified LNG in a highly-efficient cogeneration plant is expected to reduce emissions by 30%, compared to a similar sized coal-fired power unit and will also reduce Hyundai's energy costs. "As Hyundai Motor consumes thousands of gigawatts of electricity each year, it is more profitable in a long-term perspective for the carmaker to generate energy on its own," analysts commented. ■



Hyundai's automotive factory at Ulsan

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GAS Entec builds modular FSRU for floating power plant off Dakar

Gas Entec has built what it calls the world's first modular floating storage and regas unit, converted from a 125,000 cmb LNG carrier. The M-FSRU, scalable from 15 to 300 mmscfd per unit, is now used to deliver natural gas from LNG to Karpowership's 236 MW floating power plant in the port of Dakar, Senegal.

The converted Dwiputra, is now named KARMOL LNGT Powership Africa. The modular FSRU was developed and built on behalf of KARMOL, a joint venture between Turkey's Karpowership and Japan's Mitsui OSK Lines (MOL). The float-

ing complex will serve as an offshore gas storage to balance the supply of on-shore grids in Senegal.

Second Karpowership for Senegal

In Senegal, the Turkish company Karpowership has already been operating a 235 MW powership since August 2019 which covers around 15% of the country's electricity needs. Now, the first LNG-fuelled FSRU, operated by KARLMOL, will help this Powership switch to running on LNG possibly as early as by the end of June.

"With the successful completion of the M-FSRU, Senegal will be the first country in West Africa to transition to clean gas energy, replacing

high emission fuels with LNG. [...] We will reliably deliver re-gasified LNG to Karpowerships' floating power barge and pass along this clean energy in a commercially-compelling way to the high-growth country of Senegal," KARMOL Board Member Gokhan Kocak commented.

By regasifying LNG onboard a specially designed FSRU for direct use in a Karpowership, KARMOL intends to accelerate the roll-out of LNG-to-Power projects in countries with no domestic gas resources. The Turkish-Japanese joint venture company announced plans to convert its entire fleet of Powerships to LNG. To that end, the JV already has another FSRU under construction which will be released shortly and is destined to be deployed offshore Mozambique. ■



FSRU 'Karmol LNGT Powership Africa'

NFE returns to profit as Fast LNG-to-Power projects advance

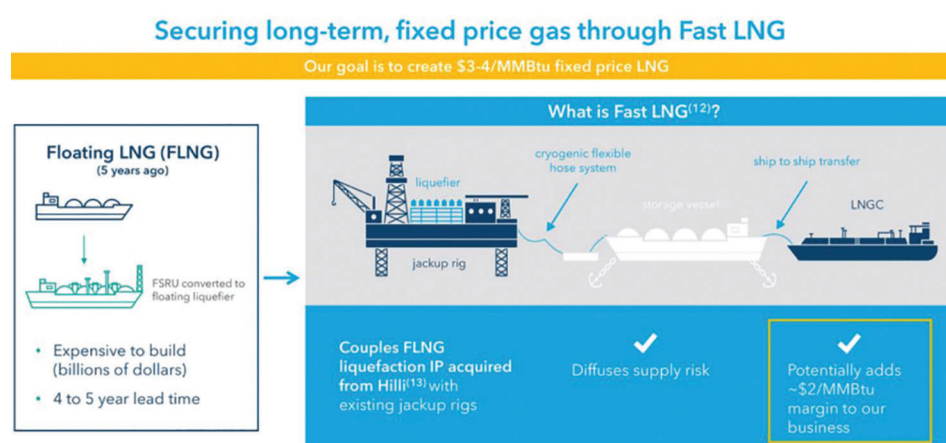
New Fortress Energy (NFE), holder of LNG regas terminals, shipping and power gen assets, has reported a first-quarter net income of \$241.2 million, recovering substantially from a loss of \$39.5 million in the prior-year quarter. The company is progressing its 'Fast LNG' liquefaction concept in integrated LNG-to-Power projects on the US Gulf Coast and Africa.

NFE's Fast LNG liquefaction design pairs modular, midsize liquefaction unit with jack-up rigs or similar floating infrastructure which substantially reduces operating costs and enables faster deployment than today's floating liquefaction vessels. The company is also working to optimise the use of its nine FSRU, including operational and 3 conversion candidates and three open or coming open in 2022.

First quarter revenues of NFE increased to \$505.1 million, up from 145.7 million in the same three months of 2021. Looking ahead, LNG said it was on track for gross full-year adjusted earnings in 2022 and 2023 of over \$1.0+ billion and over \$1.5 billion, respectively.

On the US Gulf Coast, NFE recently entered two 20-year sales and purchase agreements with Venture Global for 2 mtpa of LNG supplied on a free-on-board (FOB) basis. Analysts expect NFE to use these LNG volumes in some of its LNG-to-Power projects in the Americas.

Several integrated LNG regas and power gen projects are being advanced in Brazil, Mexico and Nicaragua as well as in the Caribbean. NFE announced it was working on two Brazilian projects, one in Barcarena



NFE Fast LNG concept

for Norsk Hydro and a second in Santa Catarina in southern Brazil. The company said it was also positioned to supply LNG through the Santa Catarina terminal for power plants with more than 400MW of capacity from the second quarter of 2022.

In Africa, talks are progressing with the Italian energy company Eni for 1.4 mtpa that is envisaged to be sold under a tolling arrangement with 50 percent offtake rights to NFE. These volumes will be sourced from the Congo where one of NFE's Fast LNG facility will be set up to make use of the associated gas in some of Eni's offshore field.

Production is envisaged to start in the second quarter of 2023.

The venture in Congo will be similar to the one in Mauritania, where NFE has developed an energy hub, including natural gas, power and LNG, utilizing existing offshore gas reserves owned by Mauritania as well as neighbouring Senegal. Under an agreement with the Mauritanian government, NFE supplies supply gas to the existing 180 MW Somolec power plant and a new 120 MW combined-cycle unit, under development, and but it will also produce LNG and green ammonia for export. ■



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World's largest flywheel arrives at Ireland's Moneypoint power station

The world's largest flywheel – manufactured at Siemens Energy's factory in Muelheim – has arrived at Moneypoint power station in southwest Ireland. The 177 tons heavy device completes the synchronous condenser at a grid stabilisation plant, built on behalf of the Irish utility ESB at the site of the Moneypoint coal-fired plant to help transform it into a green energy hub.

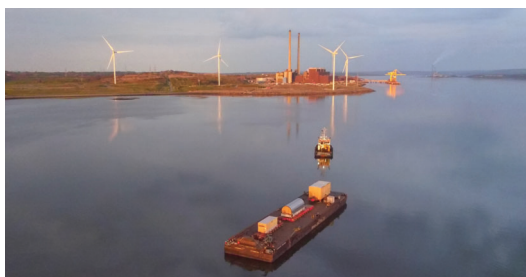
Due to Ireland's swift shift to renewables, the grid increasingly lacks inertia which used to be provided by the rotating masses of generators and turbines from coal- and gas-fired power stations. These rotating masses are vital to stabilize the grid: If electricity demand and supply get out of balance, the frequency drops. Rotating masses store a high amount of energy, that can compensate for such a drop in a blink of an eye and long enough that the operators can take appropriate steps to feed in energy into the system, e.g. by firing up a peaking plant or tapping supply from energy storage.

Need for reactive power

Wind and solar power units, in contrast, cannot provide inertia because they are not operated at grid frequency. That is where synchronous condenser come into play: In synchronous condenser plants, a conventional generator provides, in addition

to reactive power compensation, the necessary inertia for grid stabilization with its rotating masses.

In the Irish grid stabilization plant, the flywheel is additionally attached to the phase shifter. At a negative pressure close to perfect vacuum, it can rotate in its chamber at 3,000 rotations per minute and can thus briefly provide the stored rotational energy. The flywheel can thus multiply the inertia that the grid stabilization system can provide by a factor of 6.8, Siemens Energy explained, adding it will be the first plant of its kind in Ireland. ■



Flywheel transported by barge to the Moneypoint site

Thomassen to retrofit Frame 9 turbine at Uniper's Rotterdam CCGT

Uniper has selected Thomassen Energy and PSM to retrofit one gas turbine at Unit 3 of Rotterdam Capelle (RoCa3) power plant with the HyFlex LEC-II combustion system, capable to run on a blend of natural gas and hydrogen. RoCa3 is a combined-cycle power unit, driven by a Frame 9E gas turbine, which will co-fire up to 30% hydrogen.

To achieve its decarbonisation goals, Uniper is planning to switch the fuel source for its RoCa power plant from Groningen natural gas to a high caloric gas supply in 2023. The new high calorific gas supply will then be blended with upwards of 30% hydrogen.



Uniper's RoCa power plant

The HyFlex LEC-II upgrade will be first implemented at the RoCa3 combined-cycle unit in early 2023. In contrast, RoCa 1&2 are open-cycle units commissioned in 1983 and are each run by a Frame 5 gas turbines that will continue to run mostly on natural gas.

Thomassen's HyFlex LEC-III combustion retrofit system, developed jointly with their US sister company PSM, will have enhanced fuel flexibility with ultra-low emissions when coupled with the AutoTune digital combustion solution.

"Our H2 fuel-flex retrofit solution selected by Uniper for RoCa3 has been operating successfully on three Frame 9E turbines in the



Hagit power plant

Energean seals 15-year gas supply deal with Israeli power station

Energean, a gas-focussed independent E&P company, has agreed to supply up to 800 million cubic meters of natural gas per year to the East Hagit power plant in Israel. The 15-year contract covers a total quantity of up to 12 bcm of gas, sold with a mechanism that is not linked to Brent oil prices.

Developed by EH Partnership, a joint venture between Edeltech and Sikun & Binui Energy, the East Hagit power plant is one of four Israeli power plants that has just been privatised. Energean also supplies natural gas to fuel Ramat Hovav and Alon Tavor, the first two power stations privatised in Israel.

The gas supply agreement could generate revenues of up to \$2 billion over the offtake period, Energean's CEO Mathios Rigas revealed, adding new GSPA with East Hagit was delivering on one of the company's key milestones for 2022: "This is the third in a row for us from the Israel Electric Corp power plant privatisation programme and I want to thank Edeltech and Shikun & Binui Energy for their continued trust and confidence," he said.

Rigas also confirmed the Energean Power FPSO has sailed-away and will soon be delivering first gas from Karish, which is said to "remain on track for the third quarter this year." ■

Netherlands at another customer location since 2018 with hydrogen up to 35% demonstrated hydrogen fuel blending," said Peter Stuttaford, CEO of Thomassen Energy.

Having retrofit options for the installed fleet of gas turbines today, which will ultimately allow operational flexibility with 0 – 100% hydrogen, will provide the power generation industry with carbon free and firming capacity to balance the inherent intermittency of grid-scale renewable generation, he underlined. ■



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