



Nord Stream 2 on track to start operations in late-September

Pipe-laying works for Nord Stream 2 continue until the end of September for the final stretch from Borholm Island up to the German border. The Danish maritime authority confirmed works are being carried out by the Russian-flagged Akademik Cherskiy pipe-laying vessel and fellow ship Fortuna. Sea-trials will be carried out to scrutinize the pipeline before start-up.

Final works had been delayed over the threat of US sanctions, but the project's lead investor Gazprom vowed to "go it alone, if necessary." Various European companies – Allseas, Bilfinger and Munich Re – have exited the project though actual sanctions were only levied on the Russian company KVT-RUS, the owner and operator of the pipe-laying ships.

Staying defiant, Gazprom and KVT-RUS keep fast-tracking works on the final 110-km of pipe-laying in Danish waters and about 28-km in German waters. Two pipe-laying ships are working day and night to complete the project before the autumn. Finally, the overall pipeline will need to be scrutinised before commissioning.

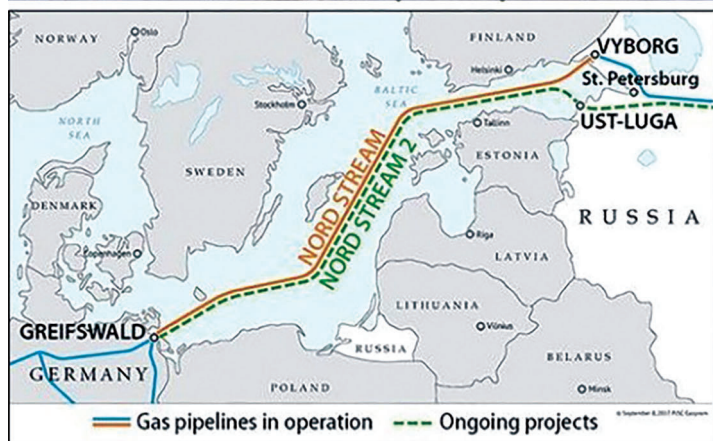
Start-up hinges on sea trials

"Everything depends on the [sea] trials," the Nord Stream 2 consortium underlined. Once pipe-laying works are finished, unconnected pipe sections need to be tied in above-water and engineers

continued on page 2



Russian-flagged pipelaying ship Fortuna



Rising fuel costs drive US utilities to switch from gas to renewables

Rebounding spot prices at the Henry Hub have prompted US power generators to switch from natural gas-fuelled power plants to renewables and thermal coal units. The Henry Hub spot price averaged \$2.66 per million British thermal units (MMBtu) in April and is forecast to rise towards \$3.05/MMBtu in the latter half of this year.

The Short-Term Energy Outlook (STEO), issued by the US government, forecasts a 12% decline in gas-burn for power generation, a 21% rise renewable energy output,

and an 18% increase in the contribution of coal-fired power nationwide over last summer. This trend will be most pronounced in Texas and the Midwest.

"We believe renewable sources will primarily make up for the decrease of natural gas usage in Texas," said Stephen Nalley Acting Administrator of the US Energy Information Administration (EIA). "Our forecast is that 28% of Texas's electricity demand will come from renewables this summer, up from 21% in 2020."

In Texas, dispatch for gas-fired generation between June and August 2021 is forecast to total just 47 billion kWh, down from

continued on page 2

AGENDA

SALES

Mitsubishi Power achieves 40.8% share of heavy-duty GT market

2

MARKETS

Covid crisis in India puts a lid on energy demand

3

Gas demand to grow through 2040 despite Net Zero policies

3

POLICY

German gov' allocates €8 billion to fund 'climate pact' from 2022

5

PROJECTS

MHI to supply turbo-machinery to Koch's ammonia plant in Iowa

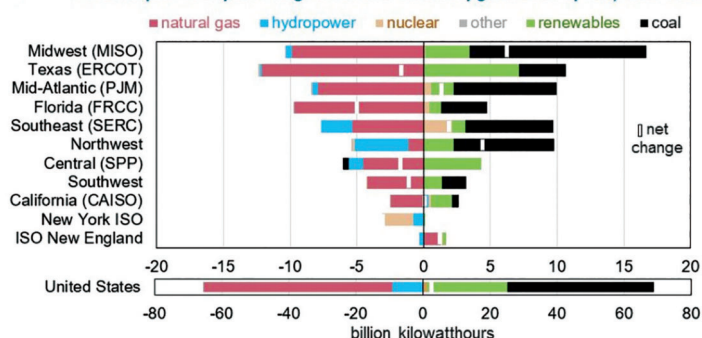
6

ELECTRIFICATION

Adding value by electrifying the UK's heating system

8

Forecast year-over-year change in summer electricity generation by fuel, 2020-2021



Source: U.S. Energy Information Administration, May 2021 Short-Term Energy Outlook

Continued from page 1, top story

need to verify the design and functionality of the completed pipeline.

DNV GL, a Norwegian-German classification society, has been tasked to "verify the safety and technical integrity" of the project and to issue a certificate of compliance if the project has been completed satisfactory. Only if certified, Nord Stream 2 can be commissioned to enter full commercial operation.

In February, the construction firm Bilfinger and the infrastructure finance arm of Munich Re have both withdrawn from work related to the construction of the Nord Stream 2 pipeline through the Baltic Sea, due to looming US sanctions. Bilfinger was

meant to deliver and operate process control systems and supply a heat and power unit.

Were bribes paid to finalise Nord Stream?

It has become clear that the German government was ready to pay over €1 million to the Trump administration to avert US sanctions against Nord Stream 2. Finance minister Olaf Schulz had offered the money to his US counterpart Steven Mnuchin, saying Germany would support the construction of LNG import terminals.

In the written proposal, sent by Scholz in

a letter to Washington on August 7, 2020, the German government offered to "public support for the construction of LNG import terminals by making available state funding on favourable terms." When questioned over the letter, he refrained to say actual bribes have been paid.

The former Trump administration had openly backed the US oil and gas industry which wanted to export LNG to Germany via the proposed terminals in the ports of Brunsbüttel and Wilhelmshaven. The latter project will now be built to import hydrogen instead of LNG, after Uniper re-evaluated plans. ■

Mitsubishi Power achieves 40.8% share of heavy-duty GT market

Japan's Mitsubishi Power, part of MHI Group, has captured the top gas turbine market share (29%) by megawatt in the first quarter of 2021, according to McCoy data. It also secured 40.8% of the heavy-duty gas turbine segment, amid strong orders intake for Series Air-Cooled (JAC) turbines.

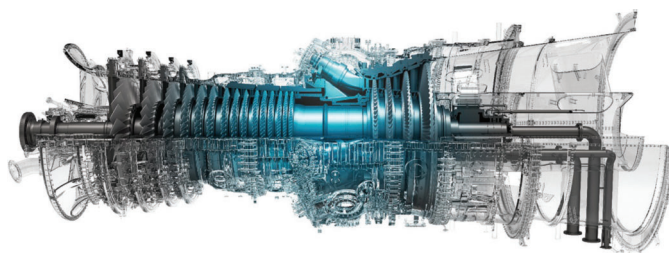
Strong project execution track record, high performance, and product reliability were the main causes for Mitsubishi Power's high market share. The Japanese manufacturer has extensive experience with large gas turbines, including the F, G and J series.

The G series has exceeded 5.6 million actual operating hours (AOH) with 94 units now in commercial operation. The J series has surpassed 1.3 million AOH with 46 units now in commercial operation, and has 99.6% reliability.

In the heavy-duty gas turbine (HDGT)

market, the most popular segment for combined cycle gas turbines, the JAC has an efficiency greater than 64%. Mitsubishi claims the turbine offers lowest emissions in its class.

All of Mitsubishi's heavy-duty gas turbines now ship with hydrogen capability for even deeper decarbonisation. As delivered, the gas turbines are capable of operating on



M501JAC quarter section

a mixture of up to 30% hydrogen and 70% natural gas, which can be raised to 100% hydrogen in the future. ■

Continued from page 1

59 billion kWh last summer. The fall relates to a fall of the share of gas in the state's energy mix from 52% in summer 2020 to

an anticipated 42% this summer. According to STEO projections, some of the fall will be compensated by coal-fired power units, but most by new wind and solar PV installations.

LNG exports push up domestic gas prices

The latest rise in US spot gas prices are caused by strong growth in LNG exports and a rebound in domestic demand from industry as the coronavirus crises eases, analysts noted. In 2022, the Henry Hub price is forecast to fall to an average \$3.02/MMBtu amid slowing growth in LNG exports and rising production.

In the short run, the fuel switching from gas to coal generation and renewables is bound to lower overall US gas consumption this year by 0.7% to 82.6 billion cubic feet

per day (Bcf/d). Expanding economic activity and more stringent emissions rules will partially revert the fuel switch in the medium term and push up US gas consumption to 82.5 Bcf/d on average in 2022.

Lifted lockdowns boost energy use

With lockdowns lifted and fewer pandemic-related restrictions in place, the US economy is recovering which will spur a 1.5% increase in total electricity sales this summer over last summer, lead by a 4.5% rise in sales to industry.

"Increased electricity use will be most notable in hotels, restaurants, and other businesses that faced major hurdles in 2020 due to stay-at-home orders," Nalley said. The STEO forecast assumes US growth at 6.2% in 2021, followed by a 4.3% rise in 2022. ■

Gas to Power Journal

Publisher
Stuart Fryer

Editor
Anja Karl
Tel: +44 (0)7733 684 682
anja@gastopowerjournal.com

New Business & Databases
Stephan Venter
Tel: +44 (0) 207 017 3407
venter@gastopowerjournal.com

Subscriptions
Margarita Tokere
Tel: +33 (0)7 67 62 58 77
margarita@gastopowerjournal.com

Layout & Production
Vivian Chee
Tel: +44 (0) 208 995 5540
chee@btconnect.com

Covid crisis in India puts a lid on energy demand

As the pandemic spreads across India, city gas demand and gas-burn for power generation is forecast to plunge by up to 30%. Infections keep rising in mega cities like New Delhi, Mumbai and Kolkata, putting a lid on household's energy use.

A nationwide lockdown caused a 40% fall in India's overall gas consumption, though the share of gas in the country's energy mix is comparatively small at just over 6%.

The spike in Covid19 cases has made India's utility buyers sell LNG cargoes heading to the country as energy demand dropped amid calls for another nationwide lockdown. Six to seven LNG cargoes are

already diverted, Kpler ship tracking data shows, and four tankers switched to floating storage.

The six LNG tankers diverted from India since April 20 are understood to have changed destination to China, Japan, Europe and Kuwait instead. Anticipation more India-bound cargoes will be diverted and tied up for longer as they look for a home elsewhere, such distressed cargoes are

tightening global tonnage availability, analysts at Energy Aspects noted.

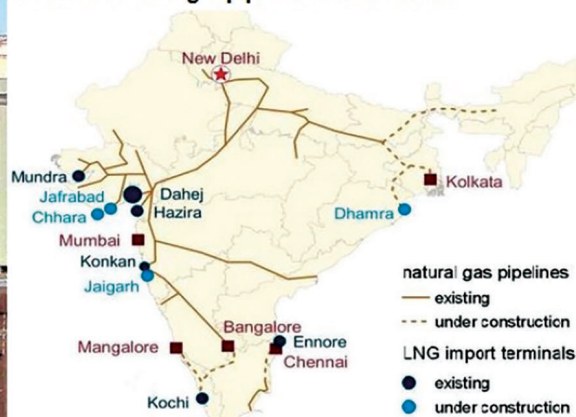
Growth in LNG imports hinge on pipeline links

Prior to the pandemic, India's natural gas market looked poised to grow. Developers sought to bring another 2.5 billion cubic feet per day (Bcf/d), or 18.99 million tons per annum (mtpa), of regasification capacity online by 2023. However, growth in LNG imports is connecting LNG regas terminals on coasts to demand centres further inland via pipeline.

North-western India has a highly developed natural gas infrastructure, and both Hazira and Dahej are the most highly utilized terminals in India (at 97% and 110%, respectively). The southern and eastern regions, in contrast, lack pipelines to move gas from coastal LNG import terminals to demand centres further inland: LNG imports to the existing Kochi terminal are currently limited to local markets; pipelines expanding to nearby Mangalore are expected to come online in 2020 and Bangalore in 2022. ■



India's LNG and gas pipeline infrastructure



Gas demand to grow through 2040 despite Net Zero policies

Reaching Net Zero emission means reducing fossil fuel use, but gas-burn is still forecast rise through 2040 – amid a lack of alternatives. The phase-out of coal and nuclear power in Germany requires gas generation to change from providing baseload to backup power and meeting residual loads.

In a 2-degree scenario, the contribution of clean wind and solar power would need to rise to nearly 1,500 MW – a huge infrastructure and flexibility challenge for the European wholesale power market. Fast-ramp gas generators will be vital to shield against intermittency risks and provide the necessary inertia to stabilize the grid, particularly because ageing and emissions-intensive coal power units are being retired.

"Lower coal and nuclear will offset some of the pressures from renewable growth over the next decade and help maintain demand – gas will therefore continue to provide a similar amount of capacity but will change from being a baseload provider to providing backup and meeting residual loads," said Tom Heggarty from Wood Mackenzie's Power & Renewables research team.

Shift from positive to negative TWh

As renewables take a greater slice of the power mix, the system will shift from one

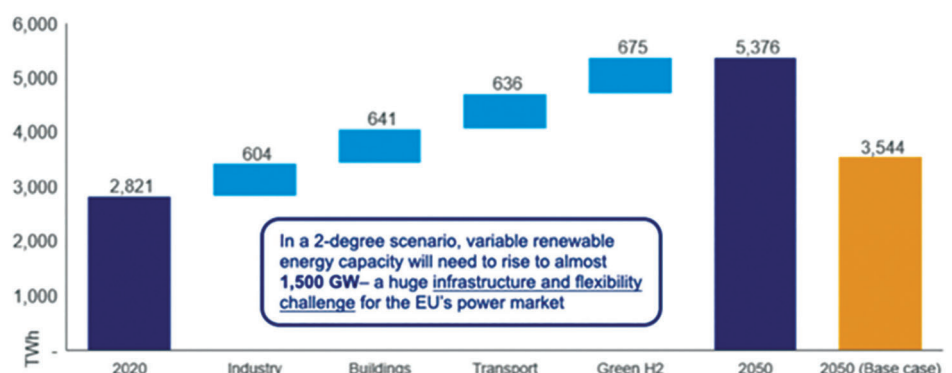
where supply volumes are focused only on positive terawatt-hours and system headroom to one where negative terawatt-hours and system foot-room become just as important.

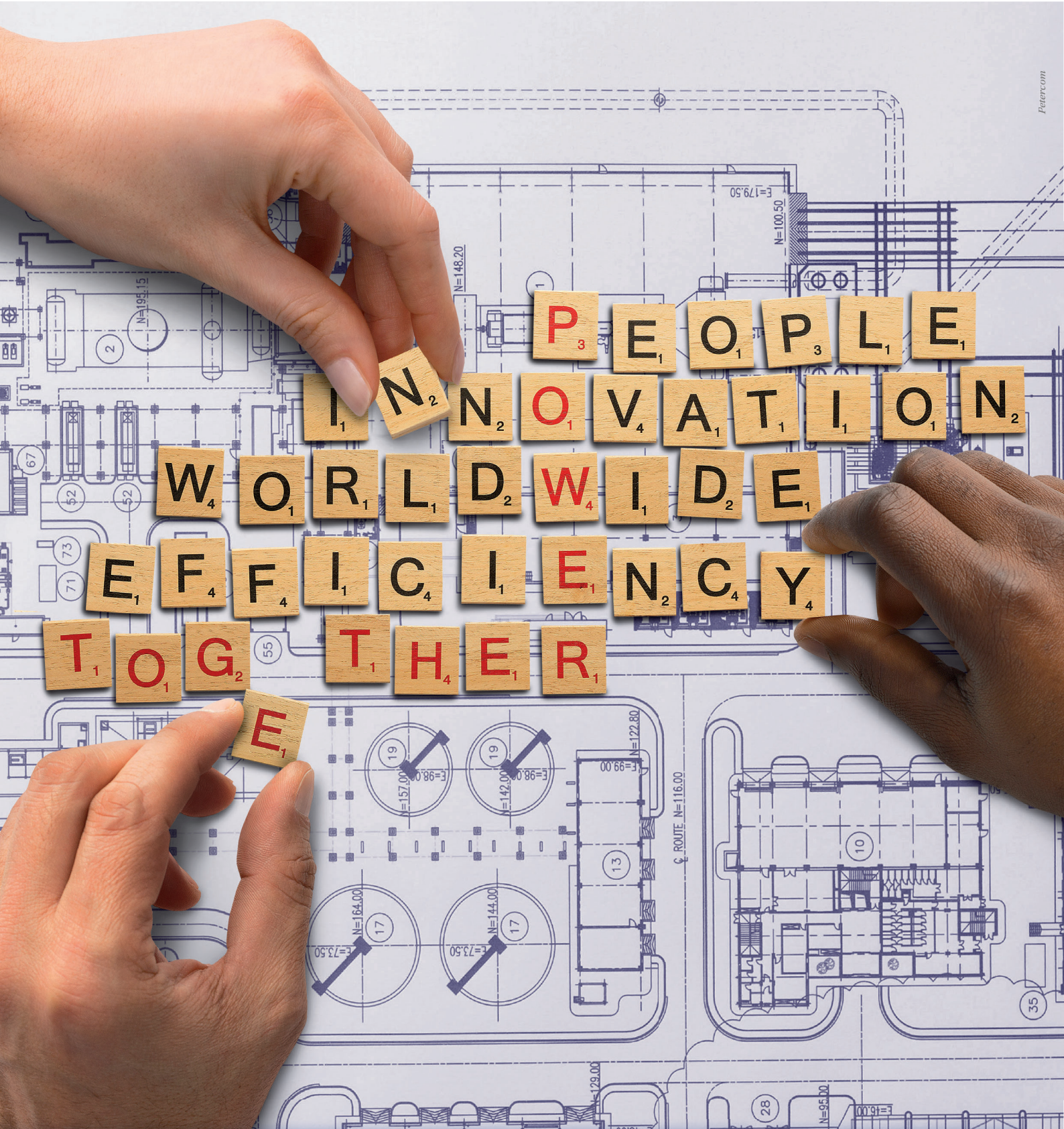
Fast-cycling units which can reduce their power output as requested or offtakers who can boost their demand will be key to balance the electricity in the future.

"Battery storage will become more competitive and displace growth in a gas peak-

ing capacity," WoodMac analyst Dan Eager said. The ability to ramp-up quickly, load follow, import, export and store will be central to the effective operation of power networks, he underlined, suggesting this will become a key investment criteria.

Radical redesign of today's wholesale power markets might well be necessary, going forward, rather than just adding new cleaner-burning technology to an existing system. ■





PEOPLE
INNOVATION
WORLDWIDE
EFFICIENCY
TOGETHER

Power Together

Manufacturing and technological capabilities,
design expertise,
innovative spirit and ability to deliver results,
to offer tailor made solutions based on Customers' needs.

ANSALDO
ENERGIA

ansaldoenergia.com

German gov' allocates €8 billion to fund 'climate pact' from 2022

Germany's coalition government has approved a 'climate pact' that allocates up to €8 billion to finance initiatives from 2022. Urgent action is required in energy, industry and transport as Chancellor Angela Merkel vowed to reach Net Zero emissions five years earlier than planned in 2045. The steel, chemicals and cement industry has come under intense scrutiny.

Through the 'climate pact', the government seeks to push industry executives to invest into climate-friendly production, particularly in Germany's energy-intensive industries. The aim is to speed up emission cuts in sectors with high process emissions such as steel, chemicals and cement.

In Sweden, trials at a commercial steel mill show that burning hydrogen can replace fossil fuels currently used to produce high-temperature heat. Ovako's trial at its Hofors steel mill, together with Linde Gas, showed that hydrogen had no effect on the quality of steel.

Economics don't add up

Though green hydrogen, produced from variable wind and solar generation, can act as long-term energy storage – it's not viable yet. To get from 80,000 tonnes produced today to a required 35 million by 2035, governments will need to "heavily incentivise green hydrogen – and soon" – similar to past subsidies for wind and solar.



Steel makers are urged to burn hydrogen to generate process heat

"The use of low-carbon hydrogen can help decarbonise sectors where direct use of electricity is not an option, from shipping and aviation to industrial processes like steelmaking," commented Tom Heggarty from Wood Mackenzie's Power & Renewables research team. Today, hydrogen is already used as a feedstock for refining and petrochemical production, but analysts reckon its importance needs to grow if Europe wants to achieve its Net Zero emission targets.

Just a tiny share of 0.1% in 2020 was actually green hydrogen, produced from water by renewables-powered electrolysis. The

NEWS NUDGES

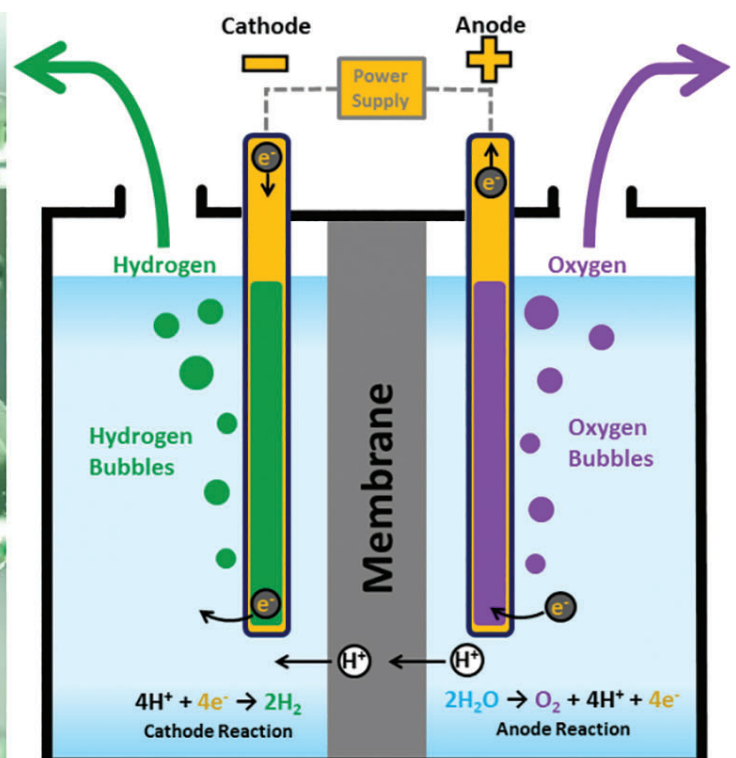
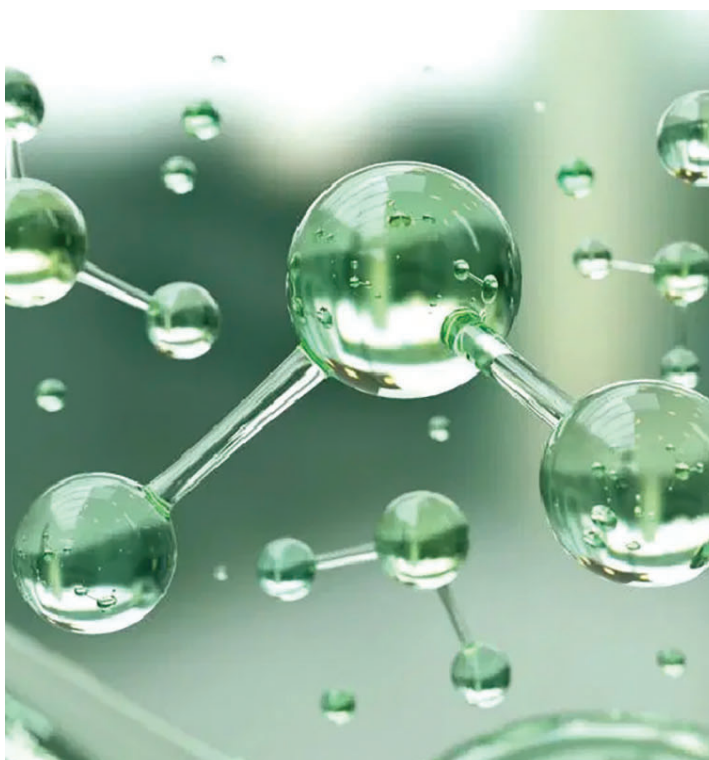
Germany advances Net Zero target to 2045

The German government has pulled forward the date for Net Zero emissions to 2045 in a move designed to accelerate and intensify efforts to reduce emissions from the transport and power sector. The new target is to curb emissions by 65% by 2030 (up from the previous 55% goal) and reach a 88% reduction by 2040, followed by Net Zero five years later.

Critical mineral demand soars

Batteries for electric vehicles and utility-scale energy storage are increasingly in demand, requiring ever larger supplies of critical minerals. Suppliers "must act now," the International Energy Agency (IEA) urged, warning any delays might create energy security hazards. Otherwise, the transition to clean energy could end up slower and more costly.

lion's share of today's hydrogen (99.6%) still comes from hydrocarbons. According to Wood Mackenzie figures, around 71% is grey hydrogen, produced via the reforming of natural gas to produce CO₂ and hydrogen. Most of the remainder is brown hydrogen, derived from coal via gasification.



MHI to supply turbo-machinery to Koch's ammonia plant in Iowa

MHI Compressor International (MCO-I) will deliver and install four compressors and two steam turbines in the second quarter of 2022 to help expand Koch Fertilizer's ammonia production facility in Fort Dodge, Iowa. Koch freed up \$140 million to modernise its Fort Dodge plant and boost ammonia production capacity by 85,000 tons per year.

The order stipulates that MCO-I will work with Koch Fertilizer and its nominated EPC firm to supply one SynGas compressor train and one process air compressor (PAC) train. Each train will be installed as 'footprint replacements' for the non-MCO-I SynGas and PAC trains onsite,

to minimise impact to the existing facility's infrastructure.

Flexible frame design

"Our approach to flexible frame design enabled us to meet this project's unique requirements and spatial constraints with new, state-of-the-art turbine and compressor technology that will improve the efficiency and reliability of trains critical to ammonia production," said MCO-I account executive, Steve Lucchesi.

The equipment will be jointly manufactured and tested between MHI Compressor's factory and MCO-I's Houston

facility. Delivery and installation at the Fort Dodge ammonia production plant is slated to be completed before summer 2022.

Having worked extensively on large capacity ammonia applications, MCO-I's latest order win in Iowa underlines the company's position as a vendor for compression in ammonia applications. The Japanese manufacturer is one of the world's largest manufacturers of process compressors and mechanical drive steam turbines.

MCO-I was established in the US in September 2012 as a group company of Mitsubishi Heavy Industries (MHI). The Compressor unit MCO is wholly owned by MHI in Hiroshima, Japan, holds a 70% stake with Mitsubishi Corporation (Americas) as a 30% joint venture partner. ■



MHI-built ammonia syngas train

Italy's Terna orders two Siemens STATCOMs to stabilise the grid

Terna, the Italian transmission system operator, has ordered two static synchronous compensator (STATCOM) systems for grid stabilisation from Siemens Energy. The containerized 125 Mvar units will be added in Villanova, Abruzzo region, and Latina in the Lazio region, and will facilitate electricity to Montenegro and Sardinia.

The first synchronous condenser in Fano is planned to be commissioned at the end of 2021, and the second in Rosara in October 2022. The two STATCOM systems will be commissioned in June 2022.

Faster lead-times

Delivered in containers, the STATCOMs can be quickly added to the grid by avoiding building approval procedures. The units operate with 125 megavolt-ampere reactive (Mvar) each at 400 kilovolts and are based on SVC PLUS technology which combines modular multi-lever converters with fewer components.

This simplifies designing, planning, and engineering, so the overall STATCOM can be containerized, which in turn reduces space requirements and simplifies the construction permitting procedure.

Reactive power and inertia

Terna said it opted for grid stabilisers to integrate rising volumes of renewable energy supply to the grid. Wind and solar power, in particular, are characterized by high degrees



View into Siemens SVC Plus

of volatility and intermittency. The two new STATCOM systems will stabilize voltage fluctuations by acting as either a source or sink of reactive power, which significantly reduces the risk of voltage drops and blackouts.

In addition to reactive power, the synchronous condensers will provide short circuit power and inertia – both vital to compensate for fewer conventional power plants. The STATCOMs use a conventional generator to provide the short circuit contribution and enlarge the necessary inertia by coupling a loss optimized flywheel to the rotating mass of the rotor. In this way, they help stabilize network frequency. ■

Rolls-Royce delivers MTU emergency genset to data center in Madrid

Rolls-Royce has installed and commissioned eight MTU emergency generator sets with 9.2 MWe power output at a major bank near Madrid. The four mtu 4000 DS1650 and four 2000 DS1100 units ensure continuous electricity supply to the bank's data centre should the public power grid fail.

The overall solution consists of two types of MTU gensets: four mtu 12-cylinder units, with 1,425 MWe output each, and four 16-cylinder units, with 880 MWe output each.

The emergency generator sets were built and assembled in Ruhstorf, Germany, and then placed in 20 and 40-ft containers at PSH Energia, a partner of Rolls-Royce's Spanish subsidiary.

Before handover to the customer, the turnkey systems were put through their paces in the usual factory acceptance tests, and in further tests designed to prove that the power node requirements specific to the project were being met. Reliable operation at customer site is ensured through MTU's ValueCare agreement which covers both preventive and corrective maintenance over 12 years, as well as 24/7 support and annual testing. ■



BRIGHTER FUTURE

COOLER BY DESIGN™

Did you know Chart's LNG power generation solutions provide natural gas to hundreds of thousands of homes? This is one way Chart facilitates LNG as a safe, clean-burning fuel for energy, transportation and industry.

Learn more at www.ChartLNG.com
LNG@ChartIndustries.com



Adding value by electrifying the UK's heating system

Smart electrically-driven heating is a "valuable field in which to invest", Delta-ee says with reference to over 30 million units of electrically-driven heating units across Europe. In the UK, new business models provide heat-as-a-service, helping the customer avoid buying natural gas or wood pellets to fuel heating appliances by simply purchasing the heat, and comfort that comes with it.

Considering that European utilities have lost over €100 billion in value over the past fifteen years, Delta-ee recommends "stakeholders should take advantage of digitalisation" and try to extract value from the electrification of heat. Delta-ee, a research and consulting company, provides analysis and advice on distributed energy markets.

Enablers for the 'electrification of heat' are manifold, according to 'Delta-ee's Smart Electrically-driven heating report', such as making self-consumption from rooftop photovoltaic systems more attractive to maximise energy independence of private households. Requiring smart metering and reformed electricity retail settlement practice are further enablers as are transparency of the electricity system ancillary services market and the willingness of Transmission System Operators (TSOs) to procure ancillary services from distributed residential assets.

Customer engagement is vital, the report finds, as leaders in this field have been experimenting with a range of customer propositions. "Many of these are focused on reducing energy bill - but green credentials and customer usage insights are among other models being employed."



Smart meters empower consumers

Demand-side response and flexibility are becoming increasingly important, like in the UK where the Department for Business, Energy & Industrial Strategy (BEIS) lately announced its new plan to upgrade the UK's energy system and give homes and businesses more control over their energy use. Full implementation of the plan to move to a smarter energy system alongside other is hoped to help save up to £40 billion over the coming decades, according to research by Imperial College and the Carbon Trust.

By rolling out smart meters throughout Britain, enabling suppliers to offer lower tariffs and making it easier for firms to develop smart appliances and gadgets, the plan will help consumers use energy when it is cheapest or get rewarded for returning it to the grid when it is needed. The plan also recognises the role of energy storage and

NEWS NUDGES

Toshiba buys EtaPRO business

Toshiba America Energy Systems Corp (TAES) has agreed to acquire the EtaPRO business from GP Strategies. The digital platform will enhance Toshiba's servicing and maintenance solutions for turbines and power gen equipment. EtaPRO creates empirical and physics-based digital twins to detect and diagnose equipment deterioration or operating abnormalities. The technology is used on nearly 700 GW of generating capacity.

SynCraft orders J412 engines for biomass plant

INNIO Jenbacher has received orders to supply two J412 gas engines, with 500 kW electrical output, for SynCraft biomass power plants in Austria. Each year the two units will process 6,000 metric tons of residual wood into 7,000,000 kWh of renewable power and 10,000,000 kWh of process heat.

the opportunities presented by falling costs of battery technologies; hence Ofgem said it is committed to removing barriers to the introduction of this technology in Britain's national power network. ■



LNG Journal Subscription Package

LNG Journal is a ten-in-one subscription product with end-to-end insight into liquefied natural gas. The LNG Journal platform includes:

LNG JOURNAL	Monthly Online + optional print magazine
LNG UNLIMITED	Online every Tuesday
GAS TO POWER JOURNAL	Online every Friday
LNG MARKET TRACKER	Online every Wednesday
LNG SHIPPING NEWS	Online every second Thursday
LNG MONTHLY MARKETS	Online Monthly
LNG CHINA	Online every second month
LNG NORTH AMERICA	Online every second month
LNG FUELLING	Online every quarter
DAILY UPDATES and Newsletters	

Sign up now for an Online Subscription at only US\$1095; €835 or £755

Discount options are available for multi-users

Contact us for more information or to arrange a free trial



Subscription Contacts

For new subscriptions or general subscription queries please contact:
Stephan Venter
+44 207 017 3407
venter@lngjournal.com

To renew an existing subscription or to upgrade your package, please contact:
Gabi Weck
gabi@lngjournal.com