



'Deep decarbonisation' of world's energy system still 15 years away

Carbon emissions will remain "stubbornly high" for another 15 years, the Norwegian classification society DNV GL says, though global emissions from energy use are forecast to fall 15% in the years through 2035. The oil & gas industry will still account for over 80% of energy-related emissions in 2050.

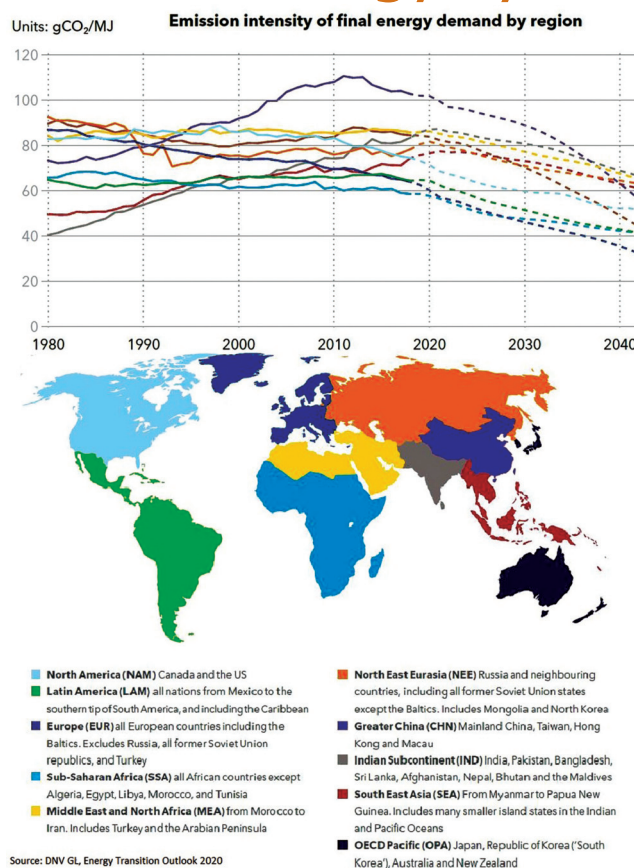
The energy transition is "still nowhere near fast enough to deliver on the COP 21 Paris Agreement" – which aims to keep global warming to 'well below 2°C' and to limit the increase to 1.5°C, analysts commented. In a dedicated oil and gas report to its 'Energy Transition Outlook 2020', DNV GL shows that the world will exhaust the 1.5°C carbon budget under the Agreement in 2028 and the 2°C budget in 2051.

"Pressure is increasing on the oil and gas industry to decarbonise, and this is coming from all sides: from society and governments, from investors, and also from people within the oil and gas industry. The industry needs to prepare for an energy system that does not accept the release of carbon emissions," said Liv A. Hovem, CEO, DNV GL – Oil & Gas.

Shift to 'scope 3 emissions'

In 2050, the industry is expected to not be measured on carbon emissions per barrel of oil or gas it has produced, as is the default today, but by lifecycle emissions per barrel of oil or gas consumed.

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Pressure mounts on Merkel to end support for Nord Stream 2

Angela Merkel is under growing pressure to end her support for the German-Russian Nord Stream 2 pipeline project. Leading CDU party members and the Green party want the German Chancellor to halt construction after the poisoning of Russian opposition leader Alexei Navalny, while economist say the pipeline is "unnecessary."

Norbert Röttgen (CDU), the current chair of the Bundestag, called for a "clear European response" and said "diplomatic rituals" would no longer suffice as a reaction to Russia's "inhumane politics". Allowing Gazprom to complete Nord Stream 2 would be, in his view, "the ultimate confirmation for Vladimir Putin that he is pursuing exactly the right policy because the West is doing nothing, at least in the areas that interest him."

DIW calls pipeline 'unnecessary'

Merkel has been saying she would like to treat the Navalny case and the pipeline project as two "separate" matters. However, she might now be pressured into changing her stance especially after the German Institute for Economic Research (DIW) cast doubt on the pipeline's usefulness from an economic perspective.

"The energy demand analyses on which the project is based clearly overestimate German and European energy demand."

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This includes so-called 'scope 3 emissions', which include all emissions from combustion or use of oil and gas products.

Hydrogen and carbon capture and storage (CCS) could transform the oil and gas industry's ability to remove significant amounts of carbon emissions.

DNV GL forecasts that fossil fuels will account for 54% of primary energy supply in 2050, compared to around 80% today.

Gas to dominate world's energy mix from 2025

Much of this supply will come from natural gas, as it becomes the world's largest

energy source from the mid-2020s. Just 13% of natural gas will be decarbonised in 2050, with 12% of world energy emissions captured by CCS – most from natural gas.

The transformation to decarbonising gas will not scale for another 15 years, and only really gets going in the 2040s.

"The transition to renewables and efforts to cut carbon intensity will significantly reduce emissions, but they will not deeply decarbonise natural gas, which the world's energy system will depend upon for years to come," said Hovem. "It is only by removing the carbon from natural gas – before or after combustion – that the oil and gas industry can deeply de-

carbonise, reaching hard-to-abate sectors throughout the value chain," she underlined.

PPP key for timely hydrogen roll-out

Public energy policies are key, not just in setting out the path for the world and the oil and gas industry to decarbonise, but also in deciding how quickly it heads down that path.

DNV GL points to policies in Europe, China and North America that will create the impetus for scaling hydrogen and other low-carbon fuels, and propel recognition that scaling CCS will be essential to meet climate targets. ■

Asian power sector could attract \$1.5 trillion investment through 2030

Investment in the power generation sector in Asia Pacific will amount to over \$1.5 trillion over the coming decade, Wood Mackenzie forecasts. Wind and solar are seen account for up 66% or \$1 trillion of that investment, with just \$500 billion spent on new gas- and coal-fired power projects.

Availability of low-cost coal and energy security had traditionally been key drivers for investment into coal-fired power plants in Asia, but the sentiment is shifting as political leaders strive to set economies on a greener and cleaner pathway.

"The next decade will see gas/coal investment split at 40/60 but the share of coal is falling and beyond 2030 gas will contribute 70% with coal falling to 30%," said Wood Mackenzie senior analyst Rishab Shrestha. "Coal investment, meanwhile, will fall from its peak of \$57 billion in 2013 to \$18 billion by the end of the decade."

A staggering 170 gigawatts (GW) of new power capacity is forecast to be added annually in the Asia Pacific region, and analysts say the pace of additions will accelerate beyond 2030.

"We should see a slight slow-down in capacity additions in the next five years due to coronavirus related sluggish demand,"

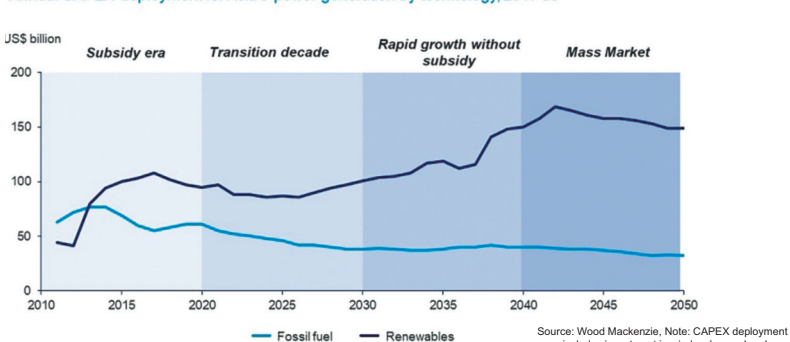
Shrestha said, adding "this should pick up from 2026 onwards."

However, wind and solar investment is likely to fall 20% from peaks seen in 2017 given that generous subsidies are being gradually withdrawn. "In the next five years subsidies are being cut, grid constraints are increasing, and renewables investment is falling in key markets amidst more exposure to market forces," Wood Mackenzie research director Alex Whitworth noted.

By 2030, the share of wind and solar will more than double to 17%, with over 51 regional Asian markets out of 81 modelled exceeding 10% variable renewable energy in

Asia is entering a transition decade; moving towards unsubsidised renewables

Annual CAPEX deployment for Asia's power generation by technology, 2011-50



generation (VRE).

Gas and dispatchable power will be key to provide flexibility to power systems. Energy storage capacity will more than double during the transition decade to 9% of peak load, with pumped hydro storage dominating, as battery storage rapidly develops. Wood Mackenzie expects renewables to be competitive with new coal plants by 2030, setting the stage for a "new era of subsidy-free growth." ■

Gas to Power Journal

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European natural gas consumption," the DIW said in a new. "On the supply side, there is no indication a gap will occur in case Nord Stream 2 is not built," analysts underlined.

Start-up of the second Nord Stream leg would increase the pipeline's overall transport capacity to nearly 99 bcm per year which is bound to greatly reduce Germany's need for additional LNG imports. The pipe-laying vessel laying 'Akademic Cherskiy' was meant to build the final stretch of Nord Stream-2 after the Swiss pipe-laying firm Allseas ended works over the threat of U.S. sanctions.

Several calculations on the economic feasibility of Nord Stream 2 indicate that partners involved in the project are likely to face losses of several billion Euros. Apart from Gazprom, Nord Stream's lead developer, the European utilities Uniper, Winterhall, Engie, OMW and Shell are also invested in the project.

Europe's natural gas and power demand is only slowly recovering from coronavirus-related effects, so analyst see no need for any additional gas import infrastructure in Germany for foreseeable future. ■

Vietnam, Myanmar rush to develop LNG regas terminals for power gen

Project developers Vietnam and Myanmar have taken more risk to complete LNG import terminals in record time to help stave off looming power shortages. Hải Linh Company has built a terminal in Vũng Tàu, southeast Vietnam with a planned start-up in Q2-2021, while the small-scale Thanlyin regas terminal in Myanmar is already operational.

The Thanlyin LNG-to-Power project has been developed by China National Technical Import & Export Corp. (CNTIC), together with VPower Group. Developers "have taken more risk" to accelerate works, analysts commented.

Both the Vũng Tàu and the Thanlyin terminals are privately owned and started construction before any sales and purchase agreements were signed. In Myanmar, novel offloading systems, operated by LNG-Easy have also been used to begin imports before terminal construction is complete.

The maiden cargo for the Thanlyin terminal was received in mid-June, delivered by Petronas of Malaysia directly to the new FSU – and not to Myanmar's land-based Yagon LNG terminal.

Fast-tracking power projects

CNTIC and VPower Group said they are fast-tracking construction of the 350 MW gas



Render of Hải Linh's proposed Vũng Tàu LNG terminal in Vietnam

power plant in bid to avoid the recurrence of blackouts this summer. According to the government tender notice, developers were given seven month to complete the project but commissioning is now running two month late – possibly due to the delayed delivery of fuel.

But perhaps the most interesting development is the proposed regas in Southern Mozambique targeted for construction in Q1-2021.

"Although demand in Southern Mozambique is presently modest, the terminal will also target demand in Northern South

Africa to replace decline at the Pande and Temane fields, which currently supply gas to more than 30 industries in the Maputo/Matola area and also to South Africa, through the 865-km ROMPCO pipeline," explained Wood Mackenzie's Asia LNG Research Analyst Otavio Veras. ■

Delta to use Stena's LNG regas tech for power project in Vietnam

Delta Offshore Energy (DOE) has struck a technology license agreement with Stena Power & LNG Solutions to use its jetty-less LNG regas technology for a power project in Vietnam. Stena's self-installing regas platform (SRP) will provide fuel for the 3,200 MW Bac Lieu combined-cycle power plant in the Mekong Delta.

DOE will make use of Stena's floating Jetty-Less Autonomous Transfer System (ATS) as well as its SRP platform to ensure a stable fuel supply for the combined-cycle power plant.

McDermott has already been contracted to provide front-end engineering design (FEED) services for a subsea gas pipeline that will connect a regasification platform, located approximately 22 miles (35 kilometres) offshore, to the planned power plant.

Novel jetty-less solution

Commenting on the agreement, Bobby Quintos, Managing Director - Engineering, Delta Offshore Energy said: "The metocean and tidal conditions in Bac Lieu are very challenging from a traditional FSRU deployment perspective, so we had to collaborate with Stena to think of 'out of the box solutions' in order to make this work, thus the development of the jetty-less solution for our project."

The ATS unit can be adapted to small distribution/bunker vessels and is designed to cope with persistent wave conditions. The semi-submersible unit ensures high operational regularity, and requires low operational expenditure as no propulsion, additional large machinery or manpower

between loading operations is required.

Svein Hellesmark, Chief Technology Officer, Stena Power & LNG Solutions pointed out the company has been cooperating with DOE on the Bac Lieu project for more than 2 years, noting it "has been an extraordinarily interesting and inspiring journey." ■



U.S. energy storage market grows 72% in Q2 on record deployments

Energy storage markets in the United States staged a staggering 72% growth in the second quarter, with 168 MW new-built capacity. That's the highest quarterly total on record, according to the U.S. Energy Storage Association (ESA), falling just behind Q4-2019 when 186.4 MW were added.

Large front-of-meter (FTM) energy storage market grew more than four-fold quarter-on-quarter, with new deployments totalling 89.8 MW. California, in particular, as well as Hawaii successfully kept installations progressing through coronavirus lockdowns. One large project that partially came online in California accounts for more than two-thirds of the total front-of-meter MW deployed.

Targeting 100 GW energy storage by 2030

"We are encouraged by the growth the energy storage market has seen this quarter," said ESA chief executive Kelly Speakes-

Backman. "Despite any setbacks from the coronavirus pandemic, the market for energy storage is poised to see significant growth in 2020." The ESA head is confident that its vision of 100 GW of new energy storage by 2030 is "entirely reasonable and attainable," which would push the U.S. closer to a more resilient, efficient, sustainable and affordable electric grid.

The non-residential market was more volatile in than the residential market: At 29.5 MW, the segment saw a 7% drop in quarterly deployments as the market absorbed the shocks from coronavirus lockdowns more acutely than the residential segment. However, analysts pointed out that

the segment "still achieved its fifth-highest level of quarterly deployments thanks to surging installations in Massachusetts."

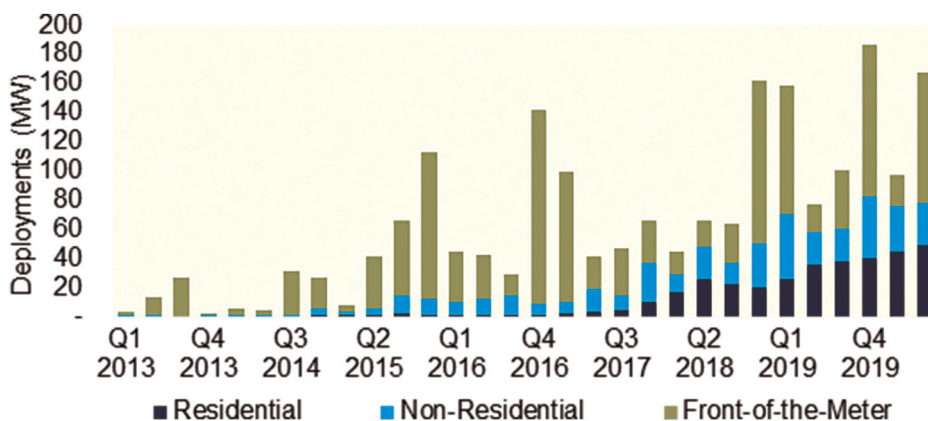
MWh growth seen exceed MW additions

With Q2 deployments setting a record this year, Wood Mackenzie and ESA forecast the US energy storage market to grow significantly over the next six years. The US market will grow more than sevenfold by 2025 compared to the annual market in 2020.

"In that timeframe, MWh growth is expected to accelerate faster than MW growth," analysts noted "as average discharge durations increase over time due to a focus on services such as capacity increase."

The FTM segment will continue to make up the bulk of the market through 2025, driven by massive investment from vertically integrated utilities in regulated markets and developers taking advantage of wholesale market opportunities and incentives in key markets.

Non-residential demand is largely tied to community solar-plus-storage. The majority of this is concentrated in Massachusetts and New York and driven by those states' strong incentive programs and access to wholesale markets.



Rolls-Royce to supply three MTU battery containers to Cook Island

Rolls-Royce has been awarded a contract to supply three 40-foot MTU-brand battery containers for a microgrid on the Pacific island of Rarotonga. The customer, Vector Powersmart of New Zealand, will integrate the batteries into an existing power plant run by the local utility Te Aponga Uira.

With a storage capacity of 4,268 kWh and a power output of 4,800 kVA in total, they will serve as a power reserve, grid support and enable the increased use of renewable energy.

The microgrid currently supplies the approximately 11,000 inhabitants of the remote Cook Island with electricity, consists of photovoltaic systems, diesel generators and battery containers. The island aims to cover its entire energy needs from renewables in the near future.

Vector Powersmart has already installed two microgrids in cooperation with Rolls-Royce:

- On the Cook Island of Aitutaki, a 20-foot battery container is controlling the local microgrid since 2019, making use of various power sources.
- At a vacation resort in Glenorchy, New Zealand, a 130 kVA battery container stores the excess power from the photo-voltaic systems during the day and provides it at night and as emergency power.

The British OEM Rolls-Royce Power System, together with its German counterpart MTU, is offering its customers a wide range



Render of MTU batteries in connection with solar PV

of energy solutions. These range from simple storage to complex microgrids that intelligently combine battery storage with renewable energies and diesel or gas gensets.

China leads on LNG regas capacity additions amid rising power demand

Global regasification capacity under construction is forecast to reach a 10-year high at 144 million tonnes per annum (mtpa) in 2020, with China accounting for over a third of the new-built capacity. Wood Mackenzie warned, however, the expansion of the Caofeidian and Rudong LNG terminals could be delayed to 2021.

“Access to capacity in China is being shaken up, with the new national pipeline company, PipeChina, likely to take ownership of a number of national oil company-owned terminals soon,” said Wood Mackenzie research director Giles Farrer.

Unsurprisingly, China also suffered from delays in capacity additions due to Covid-19 which could push back commissioning and start-up of some major infrastructure project. In China, developers aspire to add 52.6 mtpa of additional regas capacity, including 22.4 mtpa at ten new terminals.

Throughout Southeast Asia, construction schedules have been impacted by coron-

avirus-related lockdowns, causing delays to pipeline infrastructure and limiting LNG send-out from some of the terminals. India is also striving to build five new terminals with 20.0 mtpa of total capacity.

Four terminals seen reach FID before year-end

Wood Mackenzie expects a total of seven regas terminals to take final investment decision (FID) this year. Three new regas terminals – Cyprus LNG, and China’s Yantai LNG and Tianjin LNG – have already taken FID in the first half of 2020.

“We think a further four terminals have a



Tanker being loaded at PetroChina’s Rudong LNG terminal in Jiangsu Province

good chance of reaching FID before the end of the year: Alexandroupoulos LNG, in Eastern Greece, Hong Kong LNG, Vila do Conde terminal from Golar, located in North Brazil and Puerto Sandino, in Nicaragua,” Farrer said.

In terms of imports, four new projects have started receiving cargoes in this year including Brazil’s Sergipe LNG, India’s Mundra LNG, Puerto Rico’s San Juan project and most recently Myanmar’s Thanlyin project. ■

Utilities switch U.S. coal power plants to seasonal operation

Coal is losing out against natural gas in the U.S. on fuel cost; hence utilities have started to use their under-utilized coal power units to cover seasonal demand peaks. This became evident during the latest heat wave that gripped most of the United States during July and August 2020.

Four large coal-fired plants announced plans to operate on a seasonal basis so far this year. Two of the plants, totalling 1,193 MW, are in Minnesota, and the two others are a 793 MW plant in Arizona and a 645 MW plant in Louisiana. While the two units in Minnesota will run during summer and winter, the plants in the southern states of Arizona and Louisiana only help cover peak summer demand.

Throughout the United States, output from coal power generation has been greatly reduced. From 2011 to mid-2020, 95

Gigawatts (GW) of coal capacity was closed or switched to another fuel, according to EIA data, and another 25 GW is slated to shut down by 2025.

This summer, on a peak demand day like July 27, 2020, output from coal-fired generating plants reached an hourly dispatch of 161.5 GW, data from U.S. Energy Information Administration’s (EIA) Hourly Electric Grid Monitor shows. That day, coal accounted for 24% of US electricity supply in the Lower 48 states, compared to 45% covered by gas-fired plants.

Starker seasonal differences

Seasonal differences in capacity factor have become more pronounced during the past two years.

During the winter and summer months, the coal fleet operates at an average capacity factor, or utilization rate, of more than 60%. However, in the spring and fall, the average capacity factor has been less than 50%.

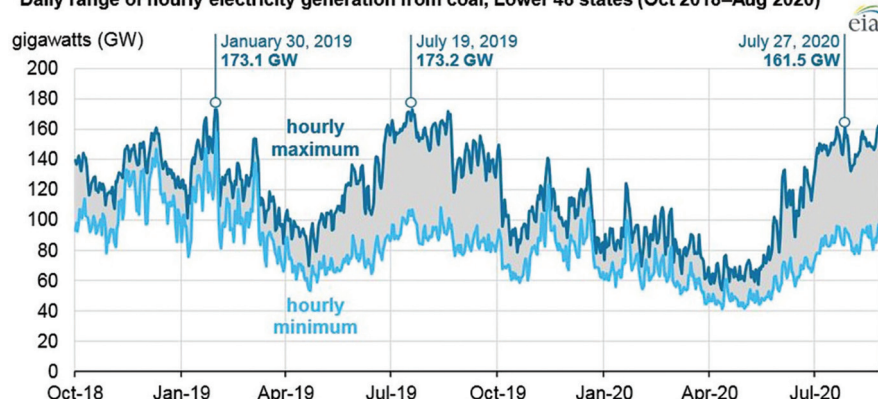
In April and May 2020, the coal fleet operated less than 30% of the time. “As a result, coal-fired plants sometimes assert that they are unable to operate for enough hours to produce enough annual revenue to cover costs,” analysts commented.

Shutting down plants during shoulder seasons

In an effort to improve the economics of coal plants, owners are now evaluating plans to run plants on a seasonal basis, when electricity demand allows for steadier operation.

“The expectation is that completely shutting down plants when electricity demand is low will limit financial losses,” EIA analysts explained. ■

Daily range of hourly electricity generation from coal, Lower 48 states (Oct 2018–Aug 2020)



Source: U.S. Energy Information Administration, *Hourly Electric Grid Monitor*

MAN's PrimeServLab extends scope of engine-fluid analyses

PrimeServ, MAN Energy Solutions' after-sales division, has launched a stability analysis of new fuel types – first introduced to the market in 2020 – to test their compatibility with other fuels. The so-called P-value analysis is now part of PrimeServ Lab's standard programme.

The Lab analyses fluids such as fuel oil, lube oil, cooling water as well as separator control samples of both lube and fuel-oil for both stationary and marine four-stroke engines. Diesel-fuel analysis has also been increased in scope as MAN is now also offering with lubricity, bio-fuel content and ignition delay added to standard reporting.

Novel urea solutions

Similarly, due to the introduction of SCR (Selective Catalytic Reduction) catalysts, PrimeServ Lab now also analyses urea solutions to ensure reliable catalyst function in SCR systems.

Analysis carried out by PrimeServe is being done on a modular basis, comprising six different packages. Returned samples are analysed and form the basis for a com-

prehensive report with operational recommendations where applicable.

"Our undisputed competitive advantage is the outstanding knowledge of engines and engine fluids that we have, as an OEM, which enables us to evaluate fluid analyses with great accuracy. In contrast with most other labs, PrimeServLab doesn't specialise in the analysis of individual fluids but, rather, specialises in the analysis of all engine flu-

ids – to provide a complete picture," said MAN PrimeServ's Dr Holger Gehring.

All essential fluids are covered with the aim to extend engine-lives and identify potential issues or risks that could cause disruption if unnoticed. According to Dr Gehring, "this significantly reduces the amount of downtime, damaged equipment and profit losses our customers would otherwise endure."



Nokia to deploy IP/optical solution to State Grid Corp of China

State Grid Corporation of China (SGCC) has contracted Nokia to deploy IP/Optical solutions to ensure stable power supply for SGCC's 1.1 billion customers. The network upgrade helps the Chinese TSO to monitor and control the world's largest utility grid and transfer large data volumes across long distances.

As the world's largest utility company, SGCC supplies electrical power to more than 1.1 billion people across 26 provinces, covering 88% of Chinese national territory. The grid upgrade will be carried out in Hebei, Hunan provinces and Chongqing municipality, as well as expansions in ten other provinces, including Jibei, Jiangsu and Sichuan.

"Data-driven insights are key to SGCC's overall digital transformation as it looks to deliver safe, reliable electricity for more than 1 billion people," Markus Borchert, President of Nokia Greater China, said. The reliable transport network will evolve over time dependent on the customer's need.

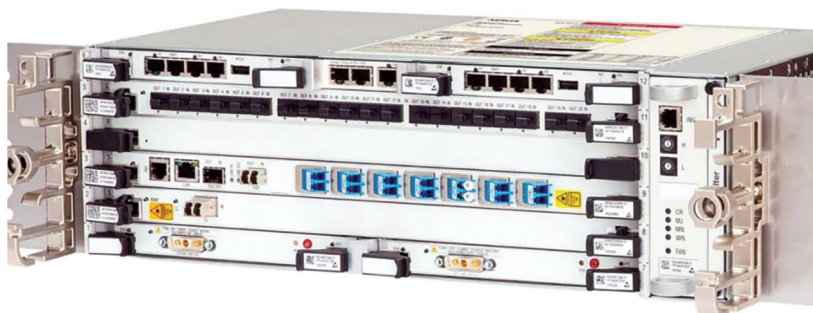
For SGGC, the roll-out of Nokia's IP/Optical solutions will allow expand network coverage to more power stations and busi-

nesses, while increasing capacity and flexibility.

Nokia's WaveFabric optical solutions will provide the provincial backbone with bandwidth to connect high-voltage power stations and substations along the electrical power transmission line. With the Nokia 1830 Photonic Service Switch (PSS) WDM/OTN, the SGCC regional backbone can be optimized for high capacity, multi-service support, and resilience, also ready for OTN sinking extension in the future. Operational control is facilitated via an application management tool that enables access control, real-time performance monitoring, the Finish telecommunication company explained.

Compared to wire cables, optical networks provide a more reliable, faster and higher bandwidth network for data transmission. Reliable and resilient networks allow for real-time decision making and enhance operational productivity.

Headquartered in Espoo, Finland, Nokia has deployed over 1,300 mission-critical networks worldwide to customers in the transport, energy, large enterprise, manufacturing, webscale and public sector segments.



Nokia 1830 Photonic Service Switch (PSS)

nesses, while increasing capacity and flexibility. Nokia's WaveFabric optical solutions will provide the provincial backbone with bandwidth to connect high-voltage power stations and substations along

CTCI and GE to build five combined-cycle units in Taiwan by 2024

Taiwan's engineering, procurement, and construction (EPC) company CTCI Corp and consortium partner GE have won a multi-billion dollar EPC contract to add five combined-cycle power units at two power stations by 2024. The new-builds are in line with government targets to increase the ratio of gas-fired power to 50% by 2025.

Three of the new units will be added to the 3,900 MW Hsinta Power Plant and two new units will enhance capacity of the 2,600 MW Taichung Power Plant, both owned by state-owned Taiwan Power Company.

Units to be powered by 7HA.03 turbines

CTCI Corporation will provide engineering and construction of civil work and erection for the generating units, as well as whole work of balance of plant. GE will deploy ten units of its latest gas turbine technology, the 7HA.03, with its matching steam turbine, generators and HRSG at both sites.

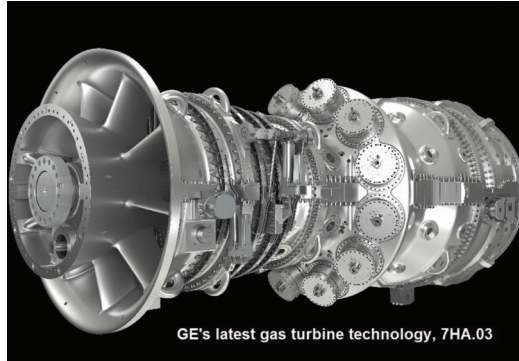
"Building on a proven track record of delivering and commissioning projects in

Taiwan, GE is proud to support Taiwan Power Company in their energy transition program to increase electricity production capacity with more efficient technologies, and bring fast, flexible power to Taiwan," said Ramesh Singaram, President and CEO

of GE Gas Power Asia.

CCGTs in line with Taiwan's clean energy policy

The new generating units will commence operations in phases from 2024, gradually replacing coal-fired power generating units, in line with Taiwan government's non-nuclear and clean energy policy that seeks to increase gas-fired power ratio to 50% by year 2025. ■



Cummins secures first order for new C25G gas generator in China

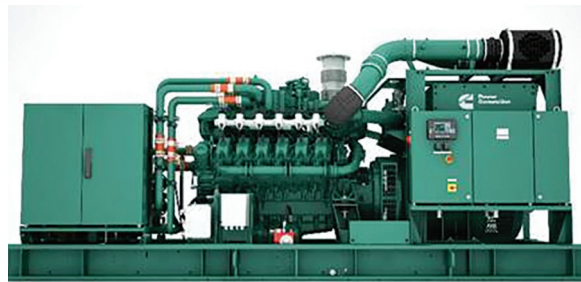
US engine manufacturer Cummins has secured its first project win for its new gas-fuelled C25G generator in China, offering offers 500kW of continuous power as well as heat and cooling for an 18 floor office block in Shandong Province.

The customer's project team that designed the 26,730 square metre, 18 floor commercial building, currently under construction, was looking to invest into a more efficient energy distribution system that would cover all power and heat requirements of its premises.

Cummins said its C25G gas generator was selected as it allows the building to "significantly reduce energy costs," through thermal recover and overall electrical, cooling and heating efficiency. "This machine is the latest genset in our gas-powered portfolio and we look forward to seeing it providing our customer in China with a reliable power solution that not only reduces energy usage and costs, but also emissions," said Haoming Liu, senior gas business manager at Cummins.

Up to 41.6% efficiency

C25G generators have an electrical efficiency of up to 41.6% at 50Hz, comparatively low maintenance costs and fast lead times, the manufacturer stated. The C25G gas generator series is available with a



Cummins' C25G generator

power density of 500kW (50Hz) and 580kW (60Hz) from a 25L engine.

Technically speaking, this latest gas generator model joins Cummins' QSK60G and HSK78G gas product portfolio, offering various gas generator capabilities for prime, peaking power and island mode applications.

Apart from the generator, Cummins will also provide balance of plant (BOP) items such as the radiator, sound-proof enclosure, switchgear and digital master controller to the customer.

Advanced control systems fitted to the C25G series give commercial users and utility customers access to advanced monitoring, diagnostics and predictive analytics to maximise the generators' uptime and reduce maintenance costs. ■

NEWS NUDGES

Hydrogen Council launched in Kobe/Kansai area

Mitsubishi Power, part of MHI, and various Japanese energy companies have set up the so-called 'Kobe/Kansai Hydrogen Utilization Council' to develop new utilization methods and establish a regional hydrogen supply chain. The aim is to help Japan shift to a carbon-free, hydrogen-powered society by 2030.

B&W sets up Asia-Pacific HQ in Perth

Babcock & Wilcox (B&W) has setup new Asia-Pacific headquarters in Perth, Australia, and named Nick Carter as managing director of the region. Headquartered in Akron, Ohio, the engineering company is also establishing or expanding operations in Indonesia, the Philippines, Vietnam, Thailand, China and India.

Worley vows to focus on sustainability

Worley, a global engineering company headquartered in Australia, has established a new emissions baseline for FY2020 after having acquired the energy, chemicals and resources division of Jacobs Engineering Group. Setting out a net zero road map, Worley said its focus is on reducing energy usage and emissions intensity through substitution with low-carbon energy options.

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