



China's gas demand unlikely to peak before mid-2040

Despite targeting Net Zero emissions by 2060, China's gas demand is expected to rise for another two decades before peaking in the mid-2040s at above 660 bcm. Around half of China's demand needs to be covered by imports which poses a massive opportunity for Gazprom, Wood Mackenzie says, considering Europe's demand is currently 520 bcm, and declining fast.

Russia's state-run Gazprom keeps investing in upstream production in Siberia as well as export infrastructure to China – supported by massive loans from Chinese state banks and long-term gas import contracts with CNPC. Today, around 7% of China's gas demand is met by flows through the 'Power of Siberia' interconnector and Russia LNG, with analysts anticipating volumes to rise rapidly.

"China's gas market is a major prize," said Gavin Thompson, Wood Mac's vice chairman Energy – Asia Pacific with reference to peak demand near 662 bcm "Around half of China's demand will be

met through imports, though this could be higher if domestic unconventional gas disappoints," he explained.

Massive task to decarbonize

However, Beijing's stated ambition reach Net Zero in less than fourth years – if realised – requires massive efforts and immedi-

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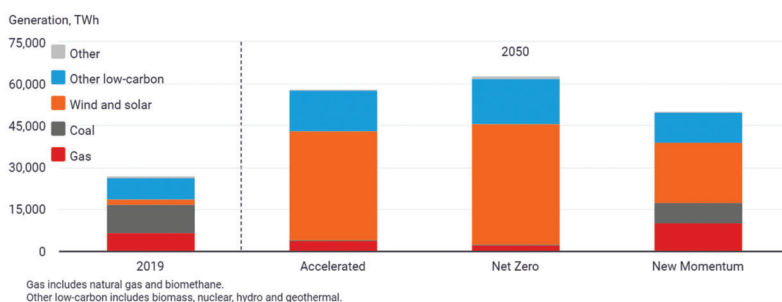
Global electricity demand to rise by over 80% by 2050, BP forecasts

Increasing prosperity in Asian economies rapidly expands energy use, BP says, as the world's final electricity demand could increase over 80% by 2050. Renewables will cover most of the demand growth, with clean power capacity forecast to reach up to 750 GW a year in the 2030s and nearly 750 GW in the 2040s.

BP's 2022 Energy Outlook describes three main scenarios – Accelerated, Net Zero and New Momentum. The first two scenarios assume a "significant tightening of climate policies" and emissions by 2050 having fallen around 75% and 95% below 2019-levels, respectively. In contrast, New Momentum replicates the current trajectory of the global energy systems, with emissions just 20% below 2019-levels over the same period.

Rapid renewables build-out and electrification

Electricity generation by fuel



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of emerging economies will lead to a gradual decline in the role of hydrocarbons, BP finds. Compiled largely the military action by Russia in Ukraine, the outlook does however not factor in Europe's reinforced drive to replace imports from

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ate action to decarbonise. Considering China's near-90% reliance on hydrocarbons, and its annual emissions of around 11 billion tons, it seems like a daunting task.

Wood Mackenzie's Accelerated Energy Transition 1.5 °C scenario (AET-1.5) suggests serious steps towards decarbonisation would make China's oil demand tumble to

under 5 million b/d by 2050, down from the base case trajectory towards 13 million b/d over the same period. In the AET-1.5 case, China's gas demand halves to just over 300 bcm by 2050 compared to the Energy Transition Outlook (ETO). Domestic production could potentially meet all this demand.

Sky-high oil and gas prices on global markets have made Chinese policy makers

rethink the role of gas in its decarbonisation strategy, making a stronger case for renewables as well as green hydrogen and bio-methane. "By doing so, China's leaders may call into question the need for future large-scale Russian oil and gas import projects: longer term, Russian hydrogen imports may be more appealing," Thompson concluded. ■

Germany to spend €200bn on clean energy in 'freedom push'

The German government wants to spend over €200 billion on clean energy sources by 2026 to reduce its dependence on imported fossil fuels, especially those from Russia. Finance minister Christian Lindner announced the funds will be used to increase hydrogen production, e-car charging infrastructure and accelerate the build out of renewables which he called "freedom energies."

Lindner promised the funding booster would pave the way to "transformation of the economy, society and the state." However, he did not elaborate on how much of the €200 billion will be additional investment.

The proceeds will be paid into a 'transformation fund', set up by the Merkel-led government to bundle projects in the energy, transport and industry sector. But throwing money at a problem does not solve it alone. Bureaucratic hurdles need to

be removed and licencing process speeded up for the higher spending rates to have the desired effect.

Debt brake stays in place

Keen to pre-empt criticism, Lindner pointed out the additional investment will not herald a change in Germany's general aim to keep government expenditures in check through its so-called debt brake. A stable budget is "our reinsurance" against economic risks and inflation, he argued.

The pledge to boost climate spending comes on the heels of the Berlin's defence policy turnaround. Critics had warned the pledge to invest 100 billion euros in the military, could lead to lower emissions reduction targets. ■



Continued from page 1

Gazprom with alternative supply and shift to green energy sources.

Electrification rises along with RES build-out

The share of fossil fuels in final energy consumption is set to decline from around 65% in 2019 to 30-50% by 2050, driven by the retirement of coal power plants and the falling use of oil in road transport. Meanwhile, role of electricity increases substantially, with electricity consumption increasing by 75-85% over the outlook, with most of the demand growth met by the rapid growth in wind and solar power.

Electrification of road transport, in the Net Zero scenario, significantly expands demand for power generation, as well as the need for renewables integration while coal and gas-burn is in decline.

Low carbon hydrogen will help decarbonize hard-to-abate industrial processes and transport modes, as well as providing feedstock used in the petrochemical and refining sectors. "The share of low-carbon hy-

drogen in final energy consumption reaches between 6% and 8% by 2050 in the Accelerated and Net Zero scenarios, with total hydrogen demand – including that used to produce synthetic fuels and generate power – nearly double this," BP analyst forecast.

Gas demand set to fall from 2030

Natural gas – a fossil fuel after all – will be in growing demand in emerging economies. But this growth is subsequently reversed in Accelerated and Net Zero, with global gas consumption declining by around 35% and 60% by 2050 respectively.

Growing declines in gas use, anticipated for the time after 2030, reflects the falling use of the fuel in industry and buildings and the increasing penetration of renewables in global power markets. However, the decline in gas consumption is partially offset by the growing use of natural gas to produce blue hydrogen. ■

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Europe could increase LNG imports by 63% this year; ING bank says

Europe is struggling to offset Russian gas due to import capacity constraints, ING bank says, estimating EU countries could boost LNG imports by about 68 bcm, or 63%, in a 'best-case scenario'. But this is still far short of the 155 bcm imported from Russia last year – hence a quick shift to green power sources is essential.

Today, Europe's annual regasification capacity stands at 204 bcm, excluding Turkey. Utilisation rates have increased drastically from just 47% last year to near full capacity since the start of this year. So, there is not much room for importing more LNG to Europe even though gas prices at the Dutch TTF trade at a premium to Asia's JKM.

Reduced Russian gas flows into Europe since the start of the heating season, and fear over how Gazprom may react to the suspended approval of the Nord Stream 2 pipeline has raised concerns over gas supply going into next winter. Dutch hub prices, TTF, have consequently rallied to record levels of €345/MWh recently, and prices were up more than 400% at one stage this year.

Scrambling for spot cargoes

LNG will be key to wean Europe off Russian gas supply, but the continent "cannot just assume that all necessary LNG supply can be diverted to Europe", analysts at ING bank cautioned. The European Commission has set out plans to reduce the bloc's dependence on Russian gas by two-thirds this year, but ING warned Europe "will need to compete aggressively with Asia for LNG supply," and buyers might fight over supply "even more aggressive given the limited spare capacity in the market."

Moreover, around 70% of LNG trade is done under long term contracts, with a large part of these having strict destination clauses. "This does significantly reduce the amount of available LNG that could make its

way into Europe," analysts warn, pointing at just 30% of LNG trade done on spot or short-term contracts.

Though investment in new regas capacity is forthcoming – two terminals are planned in Germany and one in Italy – construction and start-up will take some time so these projects will not help in the event of any shortfalls in Russian pipeline flows this year.

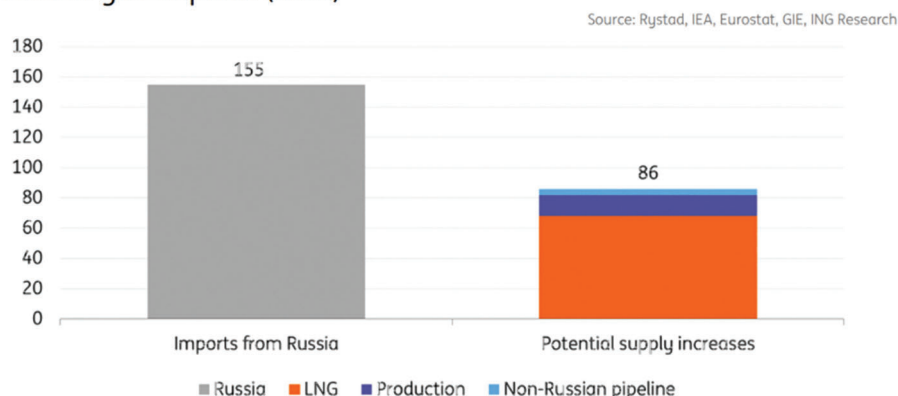
Need for fuel switching

Europe's gas import dependence makes it vulnerable for sudden supply disruptions and price spikes. EU countries in 2021 relied on Russia to cover 52% of its total gas imports of 296 bcm, while 32% was covered by LNG and the remaining 16% by supply from Azerbaijan and North Africa.

"When we take into consideration domestic production increasing by 14bcm from Norway, the Netherlands and the UK, along with increased pipeline flows from non-Russian sources of 4bcm, Europe will only be able to meet around 55% of Russian pipeline flows," analysts warn. Therefore, ING bank reckons "we would need to see fuel switching when it comes to power generation, along with the potential for demand destruction from other users in order to ensure adequate supply."

Production of gas in Europe, including Norway and the UK, totalled around 214 bcm in 2021 but demand stood around 524 bcm, leaving a domestic deficit of 310 bcm. This means that almost 60% of demand must be met by imports. ■

Increasing supply from elsewhere is still not enough to offset a loss in Russian gas imports (bcm)



Germany rejects ban on Russian gas as there are 'no fast alternatives'

Rebuking calls for a ban on Russian oil and gas imports, the German chancellor Olaf Scholz underlined Europe has "deliberately exempted" energy supply from Gazprom from sanctions given that there is no short-term alternative. EU leaders are at loggerheads over the phase-out date for Russian energy imports – some say 2030, some suggest 2027, others want it now.

At a two-day summit in Versailles, EU leaders agreed that LNG imports as well as renewables and hydrogen need to be accelerated to wean Europe off its dependency on Russian oil, gas and coal imports. However, leaders could not agree on pathways nor a phase-out date.

The German chancellor Olaf Scholz opposes an immediate and outright ban, stressing: "Europe's supply of energy for heating, mobility, electricity and industry can currently not be ensured in any other way."

Cutting gas imports now without knowing if this can be sustained next winter would mean that deliveries from Russia may have to resume at the end of the year, he argued, warning: the meantime, prices for gas would skyrocket.

But Gazprom confirmed it was continuing gas shipments via Ukraine at an unchanged volume of 109.5 million cubic metres a day. Revenues from Russia's state-dominated energy company are seemingly vital for President Putin to finance his military aggression in Ukraine.

Almost all of Germany's gas consumption needs to be imported, and around 55% of that volume comes from Russia. The European Commission has drawn up measures to curb Europe's dependence on Russian gas by 80% this year. Measures include importing more pipeline gas from Norway and North Africa and maximising the regas capacity of European LNG terminals for shipments from Qatar and the US. ■

Risk of inflation could limit Europe's drive to costly LNG; Fitch says

Inflationary pressures could limit the EU Commission's plan to replace 112 bcm of Russian gas imports by end-2022 through greater LNG purchases, Fitch Ratings reckons. Considering "extremely high" prices for spot LNG, the Commission is expected to relax windfall taxes on energy companies and recycle revenues from the EU Emission Trading Scheme to support households and small businesses.

The German government is supporting two LNG regas terminals in Brunsbüttel and Wilhelmshaven to come online by 2024, discussions with US LNG exporters as well as Norway and Algeria underway with a view to increasing supplies. But Fitch analysts warned that plans by the US and UK to ban or phase out Russian oil imports will increase global LNG demand, as well as prices.

Short-term risks for European utilities are political interventions to cap energy costs for households and small businesses as the Commission seeks to limit their exposure to price inflation. In addition, energy-intensive industries might be granted liquidity support under a 'Temporary Crisis Framework' and revisions on emission trading guidelines on state aid could alleviate pressures on the steel and fertiliser producers.

Scramble for raw materials

Rapid permitting for solar and wind power projects – designed to reduce Europe's dependence on fossil fuel import from Russia – will make developers scramble for raw materials, often at high logistical costs. "These pressures will intensify in the coming months given the dependence on Russian metal exports," Fitch analysts warn.

With prices of copper, nickel and alu-

minium at all-time highs, developers of renewables projects and battery manufacturers are hit by rising production costs and significant supply chain challenges. "A localised continental value chain will take years to develop and stable raw material suppliers with stronger environmental credentials, such as Australia, are likely to benefit in the interim," analysts suggest.

Coal vs. new nuclear

Surprisingly, the Commissions' REPowerEU policy package does not suggest to substitute gas with nuclear power. According to Fitch analysts, this reflects the continued division in the EU: while the German government vetoed proposals for life extension of its remaining operational reactors beyond the mandated closure date of end-2022, state leaders in France, Finland and Poland rush to build new nuclear power plants.

"This may mean increased dependence on thermal coal power generation in Germany and other countries to provide baseload supply in the face of gas pressures and rising renewable deployment," Fitch analysts said noting: RWE, Poland's PGE, and the Czech CEZ have been increasing the dispatch of coal-fired power stations in recent months in response to rising gas prices and constrained supply. ■

NEWS NUDGES

Russia seeks Indian investment

Russia's Deputy Prime Minister Alexander Novak is courting Indian investors to engage in the sanction-hit Russian oil and gas sector and seeks to expand sales to India. "Our oil and petroleum product exports to India have approached \$1 billion, and there are clear opportunities to boost this figure," Novak said in a statement.

Call to lift UK's fracking moratorium

The former head of MI6, Sir Richard Dearlove, has called on Boris Johnson to "immediately lift the moratorium on fracking" and help free Britain's European partners from Russian gas dependency. The sort of quality gas the Americans produce through fracking is going to be the "transfer fuel of the future," he argues, adding Britain must also develop small nuclear reactors. The technology exists.

EU braces for halt in Russian supplies

EU energy ministers are debating precautionary measures should Russia halt all deliveries of oil and gas, which are heavily upon in European countries. Western sanctions are taking effect and fears grow Russia could retaliate, though Gazprom would give up an estimated \$7.5 billion revenues per months if it halts deliveries to Europe.

Finish hydrogen for Europe

The city of Raase, on the coast of northern Finland, has identified three suitable locations to produce hydrogen on an industrial scale for exports to Sweden, Germany and beyond through the planned Baltic Sea hydrogen pipeline. Initially, most hydrogen will be produced from OX2's planned offshore wind park consisting of up to 160 wind turbines with an estimated output of 12 Terawatt-hours (TWh). Production is expected will start in 2030 at the earliest. Though most green hydrogen will be exported, some will be used to transform the SSAB steel plant into a fossil-free site.



Non-lithium batteries are catching up fast for stationary energy storage

Alternatives to lithium-based batteries – redox flow, metal-air, or sodium-ion batteries – are emerging fast. Once energy density can be de-prioritized as it can be for stationary storage, the choice of battery chemistries becomes less restrictive, IDTechEx argues, forecasting the share of non-lithium batteries will double to 10% in the stationary market by 2025.

Stationary energy storage will become a larger part of the overall battery market, although electric vehicles will remain on top. Going forward, more long-duration storage will be needed to balance higher penetration levels of variable renewable power sources. "Here, lower cost and longer-lasting technologies are needed," IDTechEx analyst underlined, suggesting:

"Li-ion batteries will likely struggle to profitably exploit electricity price variations over storage periods of 6-8 hours, let alone the days or weeks' worth of storage that may eventually be needed."

Rival technologies base on zinc or iron

Technologies for non-lithium batteries are improving fast. Several companies work on a variety of chemistries, demonstrating prototypes and rolling out battery systems for early customers. "In the stationary sector, redox flow batteries based on vanadium have been relatively well commercialized, and new finance schemes that lease the electrolyte can help ease the capital cost burden," analysts argue. To this end, various battery chemistries based on zinc, iron, and other low-cost materials are being

developed and commercialized.

Investors are interested in novel technologies for long-duration energy storage, hence developers in 2021 managed to raise substantial amounts of funding. This includes the \$200 million for Form Energy's iron-air, \$144 million for Ambri Inc's high-temperature battery, and \$100 million for Enervue's nickel-hydrogen hybrid battery.

Brace for lithium supply shortage

By the second half of the 2020s, there is a risk of supply-chain disruptions and bottlenecks in the Li-ion industry. "Lithium, cobalt, and nickel could all be in short supply and

while alternatives to nickel and cobalt exist, lithium (...) will still be needed for the vast majority of electric vehicles," analysts forecast.

Critics question the safety and sustainability of li-ion batteries which, in turn, favours battery chemistries, and energy storage technologies that utilize lower cost, more widely available materials.

Though li-ion will remain the dominant energy storage type for electric vehicles – for stationary storage, zinc- or iron-based alternatives are less costly and fit for the often less-demanding requirements on energy density in the stationary sector, IDTechEx concludes. ■

Company	Technology	2021 funding
Form Energy	Fe-air battery	\$240M
Ambri Inc	High temperature (calcium) battery	\$144M
Enervue	Nickel-hydrogen 'battery'	\$100M
Energy Vault	Gravitational	\$100M
Highview Power	Cryogenic storage/liquid air	\$70M
Malta	Electro-thermal	\$50M

Source: IDTechEx

Saft energy storage decarbonises Norway's arctic communities

Saft, a subsidiary of TotalEnergies, has been contracted to provide and install an energy storage system at Longyearbyen in Svalbard, the island group in the Norwegian Arctic. The 6 MW/ 7 MWh lithium-ion system, housed in six containers, will run on Saft's Intensium Max High Energy technology and is due to start operations in late 2022.

The lead time of getting the project set up in less than seven months is ambitious, considering the remote location and harsh environmental conditions in the Arctic region. The town of Longyearbyen is located in the high Arctic and at 78° North, with winter temperatures frequently



Longyearbyen in Svalbard

below -40°C. Commenting on the tender process, Joachim Karlsen, Longyearbyen Council's project manager said: "We selected Saft after a competitive bidding process that evaluated price, quality and capability to deliver. One aspect we particularly liked about Saft is its experience and proven high reliability with similar systems for remote communities in northern Canada and Alaska."

Largest Li-ion battery in the Arctic

The purchase of the large battery is the start of developing Longyearbyen into a

zero-emission society, Karlsen said pointing out the 6 MW/ 7 MWh system will be the largest lithium-ion battery in the Arctic.

Situated next to the town's coal-fired power station, it will provide reserve capacity and backup power for eventual black starts. When the coal power plant closes in 2023, the energy storage will integrate diesel generators and provide voltage and frequency control to balance growing grid-additions of intermittent wind and solar power sources.

Going forward, the Arctic community aims to source all its energy from renewables and integrated energy storage. ■

Five EU countries revert to coal power to curb reliance on Russian gas

Italy, Germany, as well as the Czechia, Romania and Bulgaria have suspended plans to phase-out coal power in order to wean of their reliance on Russian gas imports. Several Czech utilities already switched from gas back to coal, while RWE as well as Vattenfall, EnBW and Steag review decommissioning plans for coal-fired power plants in Germany.

The German regulator BNetzA has required peakload coal power units to remain on standby, if necessary, and called for the creation of strategic coal reserves. RWE confirmed it is inspecting its coal-fired power units to "remain ready" and the three other large operators are also reviewing decommissioning plans.

Some 26 GW of coal power capacity is currently operational in Germany and this could increase to 34 GW next winter by restarting plants that have already been taken offline or are being held in reserve, in order to partly replace Russian gas imports. Coal imports from Russia is also meant to be reduced, and plants in Germany's capacity reserve mainly run on domestically-sourced lignite.

Italy was aiming to exit coal by 2025, but soon after Russia invaded Ukraine, Prime Minister Mario Draghi made a U-turn and

announced that "the reopening of coal-fired power plants may be necessary to fill any shortfall [in gas supply] in the immediate future".

Eastern Europe boosts coal mining

The Czech government now sees a "temporary role for coal" until alternative energy sources will be found. The aim is not to indirectly finance Russia's invasion into Ukraine by buying natural gas from Gazprom, especially since the Czech Republic used to be 90% dependent on Russian gas. Initially, all Czech coal power plants were to be phased out by 2030 in a shift towards gas-fired generation and renewables.

In Bulgaria, plans for a large new gas-fired power plants were scrapped. The government seems now is prepared to subsidise



its national coal industry to provide fuel for power generation until two new nuclear reactors will be built and commissioned.

The Romanian government is also taking steps to increase its domestic coal production. Though no new mines are meant to re-open, the extraction capacity of existing one will be increased to source more comparatively cheap fuel at home for generating electricity. ■

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San Miguel builds LNG-fuelled power plant in the Philippines

San Miguel Corp. (SMC) plans to build two gas-fired power stations in central Philippines for 60 billion Pesos (\$1.14 billion). In a regulatory filing, SMC proposed a 4x75 MW combined-cycle power unit in San Carlos City, Negros Oriental province, while SMC's indirect subsidiary Prestige Power will build a 600 MW combined-cycle power plant in Leyte province.

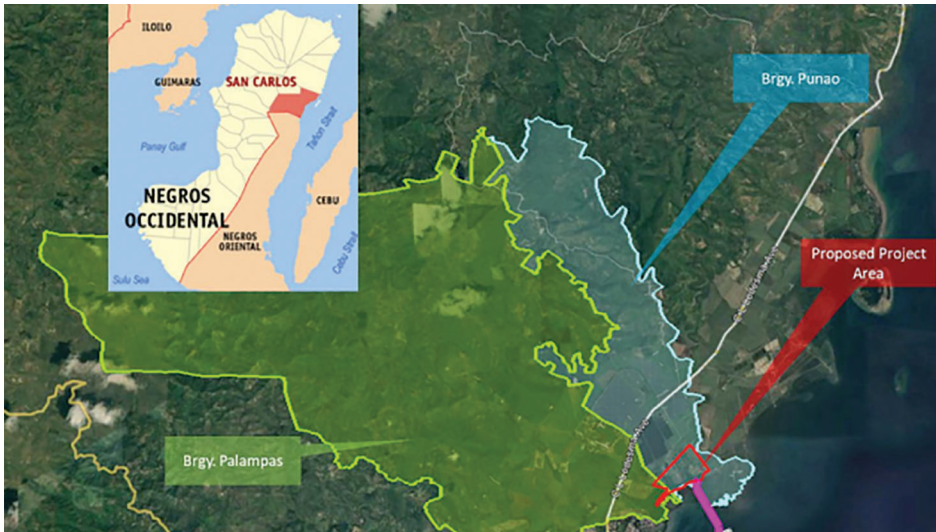
Investment into two new LNG-fuelled power projects are in line with the Philippines general shift away from coal. The Department of Energy in 2020 issued a moratorium on new coal power plant, mandating the nation's shift to cleaner fuels.

The proposed 300 MW CCGT in San Carlos City will come at an estimated cost of 18.5 billion Pesos, and is planned to be built on a 49-hectare site, leased from Grand Planters International. To ensure stable fuel supply, an on-shore LNG regas terminal will be built adjacent to the power station. Construction is scheduled to start in the third quarter of this year, with a view of completion and

commissioning in the third quarter of 2024.

The 600 MW CCGT in Leyte province will be built at a cost of 41.5 billion pesos. Construction is also slated to start in the third quarter with the aim of starting commercial operations in 2025.

As one of the Philippines' largest electricity producers, San Miguel has been extensively investing into renewables. New coal-fired capacity has been dropped completely from the utility's capacity expansion plan while 690 MW of battery-based energy storage is due to come onstream this year to balance rising volumes of intermittent wind and solar power supply. ■



Map of San Carlos CCGT site

Twenty20 Energy commissions gas power station in Papua New Guinea

Dirio Central Province Power Station was recently commissioned by Twenty20 Energy at Port Moresby, the capital of Papua New Guinea. The 45 MW flexible gas power unit will help reduce rolling blackouts that have plagued the national capital for many years as the government aims to electrify 70% of the country's territory by 2030.

For the Dirio Central plant, Twenty20 Energy provided complete turnkey EPC and is now operating the power station as part of a 20-year services contract. To deliver the project, Twenty20 Energy worked in partnership with Caterpillar, ExxonMobil and ABB-Hitachi. Situated near Exxon Mobil LNG terminal, all electricity produced at the plant will be fed directly into PNG Power's grid at Port Moresby.

The 45 MW power station comprises three Solar Turbines Titan 130 modular sets in open-cycle configuration, with 15 MW each. The modular plant design allows to add 12 MW of generation capacity in combined-cycle configuration at a later date. ■

Samsung/Lilama win \$1bn deal to build LNG-fuelled CCGTs in Vietnam

A consortium of Samsung C&T and Lilama Corp have been awarded a \$1.044 billion EPC contract to build Nhon Trach units 3&4. The two LNG-fuelled units, to be powered by combined-cycle gas turbines in 1-1-1 configuration, will have a combined capacity of 1,642 MW and are meant to be developed within 36 months.

Samsung and Lilama won the EPC package in a competitive tender, thanks to their "rich experience" in carrying out thermal power project in Vietnam and around the world. The main equipment for the Nhon Trach 3&4 units will be supplied by GE.

The two units (812 MW each) will be powered by 9HA.02 turbines, proven to have the highest efficiency in combined-cycle operations. Start of commercial operations is slated to take place between 2024 and 2025.

Most of the fuel for the Nhon Trach 3&4 units will be sourced from Vietnam's first LNG terminal, built by PetroVietnam. Construction of the regas terminal is almost complete and test runs will be carried out in the fourth quarter of 2022.

Situated in Ong Keo Industrial Park, the two new Nhon Trach CCGT units will generate enough electricity for Vietnam's south-

ern region, including Ho Chi Minh City and the provinces of Dong Nai and Ba Ria – Vung Tau. ■



Render of Nhon Trach 3&4



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