



Mitsubishi strives to launch first NH₃-fired gas turbine by 2025

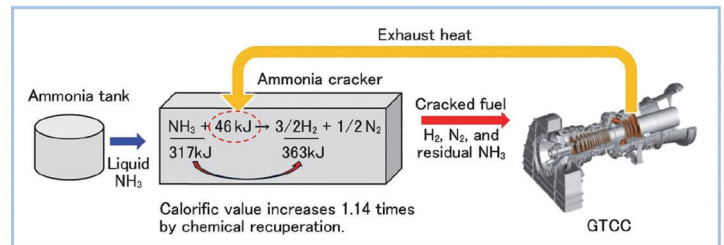
Mitsubishi Power, part of MHI Group, has started to develop a MW-class gas turbine that will be 100% fuelled by ammonia (NH₃), producing no emissions in the combustion process. The first NH₃-fired, carbon-free gas turbine will be based on the H-25 Series turbine, and is targeted to be ready for commercialization by 2025.

“Developing a method for directly combusting ammonia will further expand Mitsubishi Power’s line-up of carbon-free power generation systems,” the company said but cautioned: “A challenge that needs to be addressed with direct combustion of ammonia is the production of nitrogen oxide (NO_x) caused by oxidation resulting from the combustion of the nitrogen component of the fuel.”

Combining SCR with a new combustor

Mitsubishi Power vowed it will resolve this issue by commercializing a gas turbine system that combines selective catalytic reduction (SCR) with a newly developed combustor that reduces NO_x emissions, for installation in the company’s H-25 Series gas turbines (output: 40MW class), which has a rich operational track record spanning the globe.

Analysts expect that the early introduction of an ammonia-based



Concept of ammonia decomposition gas turbine cycle



Mitsubishi's H-25 Series gas turbine

turbine will help industry and independent power providers (IPPs) will decarbonize their processes and comply with increasingly stringent national emissions targets.

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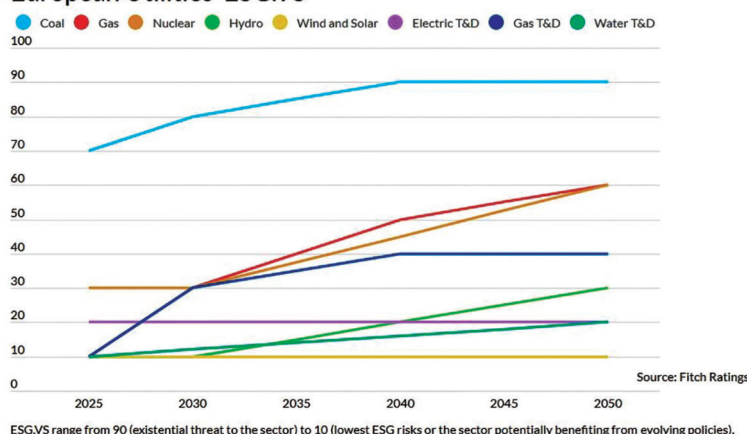
Fitch raises 'vulnerability scores' for 100 utilities in EMEA

Fitch Rating has raised its 'vulnerability scores' for 100 utilities in Europe, the Middle East and Asia (EMEA) for the period 2025-2050. Integrated utilities like Enel, Iberdrola and EDP score a moderate 15 points, while Engie and Naturgie score 30-35 points due to higher transition risk of gas-fired generation, compared to transmission and distribution (T&D) assets.

The environmental, social and governance Vulnerability Scores (ESG.VS) assess the vulnerability of entities' creditworthiness to potential credit risks arising from the clean energy transition. Baseline scores can be adjusted based on company-specific assets such as size, financing cost and the speed and scope of their low-carbon strategies.

Electric utilities – exposed to high-risk activities such as thermal generation, and coal in particular – were given a higher risk score given, Fitch said, given that energy companies in many legislations are mandated to transition to a low-carbon economy.

European Utilities' ESG.VS



Utilities with a high share of thermal coal generation in their energy mix are particularly at risk as they are faced with the write-down of assets and the need to either convert their coal

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Developed for industrial application

Once on the market, the turbine will be the world's first gas turbine to make exclusive use of ammonia as fuel in a system of this scale; MHI stressed. Electric utilities and industry can make use of the NH₃ turbine to decarbonise small to medium-scale power stations for industrial application, or generate electricity for oil and gas production or refining processes.

Under its new strategy, Mitsubishi Power is striving to reduce the environmental

impact of its turbine by increasing operational efficiency and making the equipment ready to use clean fuel sources. Until now, the Japanese manufacturer has been focused on transitioning gas-turbines in combined-cycle application to run on hydrogen.

Reconverting ammonia into hydrogen

In tandem, it is now pursuing the active use of ammonia as a clean fuel for power generation. In this context, researchers at Mit-

subishi Power have developed a system in which the waste heat from a gas turbine reconverts ammonia into hydrogen and nitrogen for use in hydrogen gas turbines.

Ammonia – a compound of hydrogen and nitrogen – is a highly efficient hydrogen carrier, and it can also be directly combusted as fuel. In recent years, attention has begun to focus on ammonia from two perspectives: achieving carbon neutrality through transition to a hydrogen society, and minimizing environmental impact caused by existing energy modes. ■

Construction of HyPER project gets going at Cranfield University

Works for the HyPER project, a 1.5 MWth pilot plant on bulk hydrogen production by sorbent enhanced steam reforming, are underway at Cranfield University. Supported by GTI and Doosan Babcock, the project will test new hydrogen production technology based on £7.4 million (\$10.35m) in UK government funding.

GTI's novel hydrogen production technology is at the centre of the project. It captures the CO₂ during the hydrogen production process and shifts the chemical reactions to favour the production of more hydrogen which can be used as a green fuel

or for energy storage.

"The process of direct production of hydrogen from natural gas that will be used in the project is compact yet scalable to very large plants," developer said, stressing the process "has the potential to produce high purity hydrogen, typically 25% lower in cost

than conventional steam methane reforming methods that require CO₂ capture as an additional expensive process step."

"Key benefits of this technology are its significantly lower capital costs, its compact size, and higher efficiency without generating excess steam," developers underlined.

The outputs of the HyPER project are high purity streams of hydrogen and carbon dioxide which can be then stored, sold or transported to where they are needed. Developers GTI and Doosan said the pilot plant is designed to demonstrate key components of the process and enable future scale-up with the aim of building commercially operating units.

With construction now underway for the HyPER project, researchers at Cranfield University are looking forward to gaining further insight in the electrolysis process. Bulk quantities of low-carbon hydrogen will be vitally important for the UK, and globally, to meet 2050 decarbonisation targets. ■



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power units to natural gas or shut them completely.

Gas T&D companies enjoy greater stability

In contrast, companies focussed on gas T&D networks enjoy a relatively low and stable 'vulnerability score'. This is due to greater energy efficiency and the substitution of natural gas by other energy sources, such as renewables or district heating or heat pumps, which can reduce utilisation of gas infrastructure in the longer term.

However, demand for gas-transporting infrastructure is unlikely to disappear as gas

will still be needed to meet peaking energy demand, analysts pointed out. Hence the existing gas grid infrastructure could be used in future to transport green gases or hydrogen, though this requires some investment and technical upgrades.

Water companies have some of the lowest baseline risk scores around 10 in 2025, increasing to 20 in 2050. The sector faces significant challenges in the next three decades from climate change, population growth and pollution, Fitch noted, forecasting the water utilities are likely to come under pressure as investment needs rise, leading to inevitable bill increases and affordability concerns. ■

Gas to Power Journal

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Virta taps €30 million debt capital to expand EV charging business

Virta, a supplier of electric vehicle chargers, has closed a €30 million investment round led by Jolt Capital and two co-investors, Tesi of Finland and Vertex Growth. The funding will help Virta expand its position in the expanding e-vehicle market which already reached over 20% market share in parts of Asia, Europe and the US.

Electric vehicles – if charged at times of low electricity demand – can help balance the power grid. Vehicle-to-grid and other demand-response technologies are available to help drivers charge their electric cars at times of cheaper power prices and provide demand flexibility to allow TSOs handle rising volumes of renewable energy.

As a growth capital investor, Jolt is looking to help scale impactful technologies such as Virta's e-vehicle charging technology.



"This is a fast growing and dynamic market, and given Virta's impressive traction and innovation to date, we're confident it will become the leading EV charging platform in both Europe and Asia," said Laurent Samama, Partner at Jolt Capital

Tailwinds in Europe thanks to gov' subsidies

Sales of e-vehicles and charging platforms keep growing worldwide. Hock Chuan, managing director of Vertex Growth sees „strong tailwinds in the global EV market amidst push by governments for EV adoption and increasing consumer awareness of environment and sustainability.

"Virta is our first investment in Europe," he said, adding "we are excited to back the company and to partner them to expand their footprint in Asia." Today, the

charging networks on Virta platform already constitute one of the largest charging ecosystems in Europe, and the company is working with Vertex Growth to build a network of partners to operate EV charging in Asia.

In terms of technology, Virta's patented e-vehicle charging platform provides a seamless digital user experience, which different companies can co-brand further to their end customers. The Virta platform is already used in more than 30 countries by nearly a thousand B2B-customers.

The Finnish co-investor Tesi (short for: Finnish Industry Investment Ltd.) is putting its money in companies that help transform economies by enhancing energy efficiency and the uptake of wind and solar power sources.

As for financing, the first closing of the funding round was in April 2020, lead by the Japanese investor ENEOS. ■

Nebras buys equity stake in Bangladeshi rLNG-fuelled power plant

Nebras Power Investment Management (NPIM), the Dutch affiliate of Qatar-based Nebras, has acquired a 24% stake in Unique Meghnaghat Power Ltd which is building an rLNG-fuelled combined-cycle power station in Bangladesh. The 584-MW plant, situated some 27km east of Dhaka, will be one of the country's largest IPPs upon completion in late 2022.

Under the deal, signed with Unique Group and Strategic Finance Ltd, Nebras will obtain a 24% stake in the Meghnaghat LNG-to-Power plant, while UHRL and SFL will jointly own a 56% share and the remainder will be controlled by UHRL, SFL and General Electric.

"The acquisition of an equity stake in Unique Meghnaghat Power Ltd serves as a vehicle for the entry of Nebras into the growing Bangladeshi power market," said Nebras board chairman Mohammed Nasser Al-Hajri. CEO Khalid M. Jolo added that "through this transaction, Nebras is delivering on a value proposition of supplying power in Bangladesh while broadening our momentum in global power investments as we continue to explore further opportunities in Asia."

Safe investment in "fully contracted project"

The acquisition is the first transaction that Nebras Power has signed in Bangladesh and is meant to enhance the investor's asset base through fully contracted projects like the Meghnaghat LNG-to-Power plant.

All electricity to be produced by the

584-MW CCGT has been sold in advance to the Bangladesh Power Development Board (BPDB), and a gas supply agreement is in place with Titas Gas Transmission and Distribution. The plant developers also signed an implementation agreement with the government of Bangladesh and the state TSO.

Prior to the sale, 62.7% in the project vehicle Unique Meghnaghat Power Ltd belonged to Unique Hotel and Resorts Limited (UHRL), a sister company of Unique Group, while GE Global Energy Investment had a 20% stake and 17.26% was held by Strategic Finance Ltd. ■



Construction site of Bangladesh Gas' rLNG-fired power plant

Marubeni and Tokyo Gas advance LNG-to-Power project in Vietnam

Marubeni and Tokyo Gas have sealed an agreement for Phase-1 development of an industrial park Vietnam's Quang Ninh Province that will include an LNG regas terminal and integrated power plant. Situated some 200km from Hanoi, the project will cost around 200 billion yen (\$1.92 billion) and the LNG-fuelled power station will have a capacity of 1,500 MW.

On the upstream side, Marubeni participates in liquefaction and export ventures in Qatar, Equatorial Guinea, Peru, and Papua New Guinea. To optimise its global LNG portfolio, the Japanese major has been actively involved in LNG import projects with integrated power plants in Indonesia and elsewhere in Asia. Such projects that span across the entire gas-value-chain allow Marubeni to source, ship and regasify natu-

ral gas and use the fuel in power plants it partially owns.

As for the LNG-to-Power project at Quang Ninh industrial park, Marubeni and Tokyo Gas have begun negotiations on power pricing given that they are close to striking a Power Purchase Agreement (PPA) with the electric power arm of PetroVietnam.

Quang Ninh venture due operational in 2026

Marubeni pointed out the overall project is a large regional development project targeting 5,800 hectares of development area. Recently, Quang Ninh has attracted a number of sizable and experienced investors, including Rent-A-Port, TCL, Foxconn, Texhong, Amata, and Thanh Cong.

"With a population of approximately 100 million, a growing middle class, and an abundant, high quality labour force, Vietnam is an attractive country for companies

looking to not only target the Vietnamese domestic market but also to establish a manufacturing base in the country," the Japanese manufacturer said, adding the integrated LNG-to-Power project is scheduled to be online by around 2026.

The Tokyo Gas/Marubeni venture is situated north of another, similar LNG-to-Power project planned for the port of Haiphong and backed by the US oil major ExxonMobil.

Electricity demand in Vietnam is rising by approximately 10% per year as the economy keeps growing despite the current challenging macro-economic environment.

"In 2020, Vietnam achieved 2.9% growth with a strong increase in exports to the United States, while most other countries recorded negative growth due to the Covid-19 pandemic," Marubeni said, underlining the country's attractiveness for foreign investors in gas and power infrastructure. ■



View of Quang Ninh's industrial zone, northern Vietnam

CB&I chosen to build Philippine LNG project, boosting gas generation

Chicago Bridge and Iron (CB&I) has been awarded a contract to build storage tanks for the Philippines LNG project at Batangas Bay on the island of Luzon. The project developer, Atlantic Gulf and Pacific Company (AG&P) said mechanical completion of Philippines LNG was expected in the third quarter of 2023.

Commissioning of the LNG import terminal will follow shortly thereafter and is set to boost the gas supply to the existing Ilijan combined-cycle power plant in Batangas City. The Ilijan CCGT currently has 1,200 MW installed capacity, but will be expanded by another 850 MW unit, according to the plant operator SMC Global Power Holdings. The expansion is due operational in 2022.

Energy demand in this densely-populated Luzon, the Filipino main island, is forecast to nearly double over the next two decades. Hence, the Department of Energy (DoE) in the Philippines strives to meet the country's growing electricity demand by incentivising the development of integrated LNG-to-Power projects – not least because domestic gas supply is in decline due to the depletion of the Malampaya field.

NTP granted in March 2021

AG&P was given Notice to Proceed (NTP) with the Philippines LNG project by the regulator in March 2021. The PLNG project will have initial capacity to deliver up to 3.0 mil-

lion tonnes per annum (mtpa) of LNG, with additional capacity for distribution in the liquid fuel market.

At a later stage, the onshore regas capacity of the PLNG facility can be scaled up to 420 million standard cubic feet per day, developers said noting approval of AG&P's project was in line with its aim of making the Philippines a regional LNG hub in Southeast Asia.

Rival ventures underway

AG&P's PLNG venture is a rival project to another LNG import facility developed in Batangas Bay by First Gen Corp, the largest provider of gas-fired power in the Philippines. First Gen's regas project is based on a floating import terminal, or FSRU which will be provided by BW LNG of Singapore. Market observers expect the FSRU vessel to be chartered for the venture is the "BW Paris" with 162,500 cubic metres capacity of storage.

The first onshore regasification terminal in the Philippines has already been mostly completed by Energy World Corp (EWC),



Philippine LNG will boost gas supplies to the Ilijan CCGT, under expansion

the Australian project developer of integrated LNG-to-Power projects in Southeast Asia.

EWC's Pagbilao terminal, in Quezon province northeast of Manila, was given its licence to operate in 2019 and construction of terminal's first LNG storage tank is aligned with the start-up of an associated 650 MW gas power station.

Meanwhile, state-owned Philippine National Oil Company has signed a memorandum with New Fortress Energy in 2020 to created "reliable, cost-competitive power and natural gas" assets for the Philippines. The current New Fortress LNG and power developments are in the Caribbean and Latin America region. ■



US electricity use rebounds in 2021, driven by industry demand

Electricity consumption in the United States is rebounding as the economy and private households are starting to get to grips with the pandemic. Government analysts expect US electricity use will rise by 2.1% in 2021 – driven by demand from industry – after having plunged 3.8% in 2020.

Sales to the industrial sector will grow by 4.2% in 2021, while retail electricity sales to the residential sector will rise by 2.3% over the same period, US government analysts said in the April Short-Term Energy Outlook (STEO), issued earlier this week. The rebound in electricity consumption is primarily a result of colder temperatures in the first quarter of 2021, but also stems from the first green shoots of the post-Covid economic recovery.

"We expect retail sales of electricity to the commercial sector will increase by 0.7% in 2021. Much of the increased electricity consumption across the sectors reflects improving economic conditions in 2021. For 2022, we forecast that U.S. electricity consumption will grow by another 1.3%," analysts at the US Energy Information Administration (EIA) wrote in the April STEO report.

Gas share rises, but stays below 2020 levels

The share of electricity produced from natural gas is seen average 36% throughout this year, and rise to 35% in 2022 – though this is still lower than the 39% share of gas power generation reached in 2020. This is

due to rising costs for feedgas. Operators of gas power stations have to factor in a 39% increase in the price of natural gas delivered to electricity generators from an average of \$2.39 per MMBtu in 2020 to \$3.31 per MMBtu in 2021.

"The higher expected natural gas prices cause the forecast share of generation from coal to rise from 20% in 2020 to 22% this year, and to 23% next year," analysts commented, adding that new-built wind and solar PV capacity will push up the renewable share in the US power mix from currently 20% to 22% by 2022.

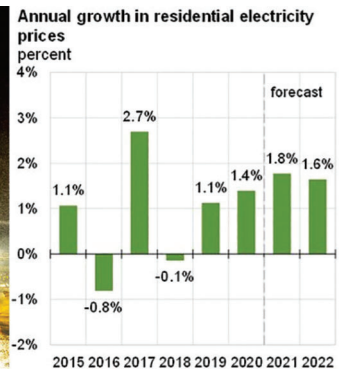
Coal power regains market share

Thermal coal continues to cater for a large and growing share of US energy demand. EIA expects U.S. coal production to total 585 million short tons (MMst) in 2021, 46 MMst or 9% more than in 2020.

Analysts say the amount of coal used



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



eia

to generate electric power will increase by 13% to 495 MMst in 2021 and by 4% to 514 MMst in 2022. Demand growth will be strongest the Appalachia region, partly as a result of metallurgical coal exports rising to 54 MMst next year, up 27% from 2020 levels.

Energy-related carbon dioxide emissions decreased by 11% in 2020, largely due to the economic contraction resulting from the Covid-19 pandemic. In 2021, EIA analysts forecast energy-related CO2 emissions will increase by about 5% as economic activity increases.

Strikingly, coal power-related CO2 emissions are set to rise by 13% in 2021 and by 4% in 2022. ■

WhiteWater holds open season for up to 2 Bcf at Waha Gas Storage

WhiteWater Midstream is holding an open season for up to 2 Bcf of firm storage capacity at the Waha Gas Storage facility in Texas. The bidding process will conclude at 5 pm local time on May 21. Services for the contracted gas storage capacity will commence on July 1, 2022.

Throughout the US, there has been growing demand for gas storage services in recent years to accommodate rising volumes of natural gas production from Texas' prolific shale gas plays. Private equity-backed WhiteWater Midstream has been striving to expand its operation in the region. It cooperated with MPLX, WGT and Stonepeak on the 450-mile Whistler pipeline to move gas from the Permian to Agua Dulce and also worked with MPLX on the interstate pipeline Agua Blanca that serves the Permian's Delaware Basin.

WhiteWater acquired its Waha Gas Storage assets, situated in northwest Texas, from Enstor Gas in early March this year. Once fully developed, the

assets will be able to store approximately 10 Bcf of natural gas and include six underground caverns and permits for five additional caverns.

Enstor Gas, the vendor, is one of the largest independent gas storage operators in the US and backed by the Capital Partners. The company's eight storage facilities are strategically located across five states

and Alberta, Canada.

Following the takeover, WhiteWater will connect the Waha Gas Storage facilities to Agua Blanca's Waha header system in order to serve customers of both the Agua Blanca and Whistler pipelines. The expanded storage facilities and related pipeline connections expected to be in service in the fourth quarter of 2021.

WhiteWater, is a management-owned, Austin-based midstream company which partnered with multiple private equity funds including but not limited to Ridgmont Equity Partners, Denham Capital Management, First Infrastructure Capital and the Ontario Power Generation Inc. Pension Plan. Since inception, WhiteWater has reached final investment decision on approximately \$3 billion in greenfield development projects. ■



Waha Gas Storage will be connected to Agua Blanca's Waha header system



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UK vows to outdo European economies with 78% emissions cuts

The United Kingdom, host of the COP26 climate summit in November, plans to announce more ambitious climate targets "in the coming days." According to the Financial Times, the UK's new pledge will be to cut emissions by 78% compared to 1990-levels by 2035. If realised, Britain would outperform other major economies, notably in Europe.

The UK's pledge will be bound into law and will cement the UK into a position of global climate leadership. Europe, meanwhile, aims to be the first climate-neutral continent by 2050 and claims it is "leading the way" with its sustainable growth strategy, the European Green Deal.

The British government indicated its new

climate target will cover the country's sixth carbon budget, from 2033-2037. For the first time, the climate law could cover international aviation and shipping, analysts noted, anticipating the UK's new emission goal will be officially announced just before the US Earth Day summit on April 22.

Need for efficiency improvements

In the run-up to COP26, the International Energy Agency (IEA) has urged policy makers to help implement "massive improvements on efficiency" to reduce fuel consumption and emissions. The energy sector is responsible for three-quarters of global emissions and IEA analysis shows efficiency enhancements could help abate

40% of the emissions needed by 2040.

Maintaining global growth and economic development in developing countries will require a significant change in consumption habits, the IEA director Dr Birol stressed. Energy efficiency is hence seen as the "first fuel" which is deemed vital at delivering net-zero energy goals at lower costs.

The 2015 Paris Agreement pledges to mobilise \$100 billion per year in investment for developing countries, but donor nations do not fully honour their commitments. "Donor countries must (...) raise their \$100 billion a year in international finance – and we must get private investment flowing," said COP26 President Alok Sharma. "Without finance, the task ahead is nigh impossible." ■



IEA calls for massive efficiency improvements in the run-up to COP26

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Renewable energy sources (RES), notably offshore wind, require substantial amounts of upfront investments that some countries are struggling to attract on a significant scale.

Enough capital out there

"We know there is enough capital out there; it's how we bring this capital to clean energy – especially where it's most needed – that's the key question," stressed the IEA director Fatih Birol. That is why the IEA is working on a report together with the World Bank and the World Economic Forum – due to be released in June – to provide practical guidance on how stakeholders can accelerate clean energy investments in emerging and developing economies.

The energy sector is responsible for three-quarters of global emissions and IEA analysis shows efficiency enhancements could help abate 40% of the emissions needed by 2040. Maintaining global growth and economic development in developing countries will require a significant change in

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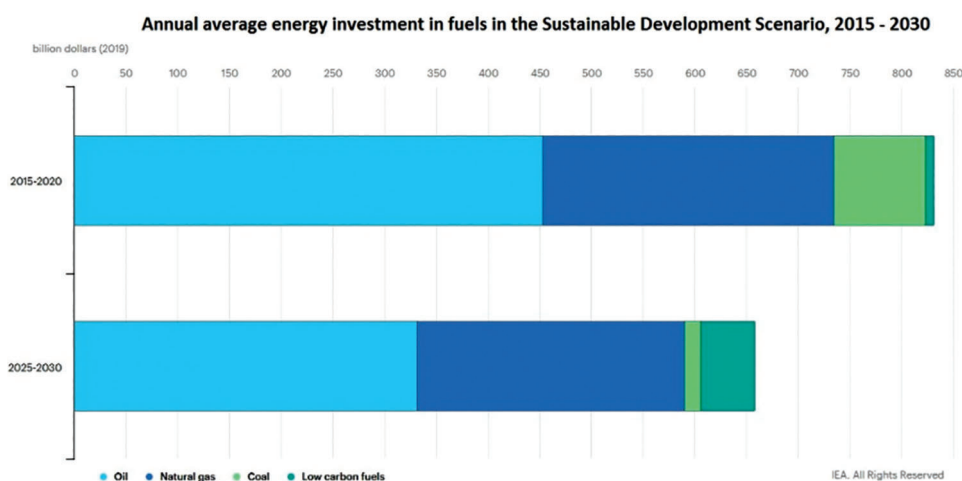
Doubling efficiency by 2040

According to the IEA Efficient World Scenario, there are enough cost-effective technologies around to double global energy efficiency by 2040. So-called 'next-generation solutions' – like digitalisation of energy systems and behaviourally informed policy-making – are opening the door to further efficiency improvements.

Leaders from more than 40 countries

who took part in the IEA-COP26 Net Zero Summit last week stressed that efforts to boost clean energy investments can help create jobs and boost local businesses as economies recover from the impact of the coronavirus health and economic crisis.

"This is the greatest economic opportunity we've ever had" said John Kerry, the US Presidential Special Envoy for Climate, during the opening session of the Summit. "We are looking at the biggest job market ever known. Every task we have – building out the grid, solar power, wind power, building out hydrogen, batteries, switching to electric vehicles – will all create jobs." ■



Gazprom boosts power supply for Amur GPP linked to China exports

Russia's Gazprom has commissioned the Svobodny thermal power plant, supplying process steam and electricity to the Amur Gas Processing Plant (GPP) which is being ramped up to process up to 42 Bcm per year for export to China. The installed capacity of the Svobodny plant is 160 MW electric and 249 Gcal/h thermal.

The natural gas process at Amur GPP will be shipped to China via the 'Power of Siberia' gas pipeline – one of Russia's largest export ventures. The start-up of the Svobodny thermal plant boost the supply of vital process steam for the Amur GPP where process steam is used both as an energy carrier in heat exchangers and for both preheating feed gas and conducting the gas separation process.

Completion in less than 2 years time

Construction of the Svobodny plant was completed in just under two years, Gazprom stated, stressing this would be a "very short period of time" considering the adverse weather conditions in Siberia and the site's geological structure and remoteness from



Construction of the Amur GPP which is powered by the newly commissioned Svobodny power plant.

equipment manufacturers.

The design of the Svobodny plant is based on two dry cooling towers, required for cooling the water used in the process cycle. The towers were winterized as to protect their and equipment during cold winters in the area of Svobodny, where temperatures can fall below minus 40 degrees Celsius.

Power transmission lines with 220/110kV switchgear were built to supply electricity from the Svobodny power plant to Russia's Unified Energy System and onwards to the Amur GPP.

CSA investment program

Gazprom Group in 2019 came up with an ambitious investment program, aimed at building new power generators under capacity supply agreements (CSAs). The CSAs-based programme has been designed to remunerate plant operator for making available capacity at short notice.

As many as 36 projects for the construction and upgrading of power plant with a 9 GW combined capacity were implemented under the CSA-based program. Gazprom stressed, however, the Svobodny TPP construction project is "the first major project carried out outside of the scope of the CSA." ■

Mitsubishi hands over world's largest IGCC to Japanese customer

A consortium led by Mitsubishi Power has completed construction of the world's largest integrated coal gasification combined cycle (IGCC) plant in Iwaki, Fukushima, and handed it over to the customer Nakoso IGCC Power. Operational since April 16, the high efficiency plant has roughly twice the scale of the Nakoso Unit 10, a former demonstration plant.

Compared to Unit 10, the power generation efficiency of the new IGCC has been substantially enhanced and now reaches 48% owing to a higher combustion temperature. Mitsubishi Power manufactured the core air-blown IGCC system, including the coal gasification furnace.

Combined-cycle methodology enhance efficiency

Technically speaking, the new IGCC plant adopts a "combined-cycle" methodology to reach higher efficiency rates. Coal is gasified in a gasification furnace at high temperature under high pressure, whereby sulphur and ash are separated out and removed. Then the refined gas is used as fuel to drive a gas turbine.

In the configuration of the Nakoso IGCC,

the gas turbine is combined with a steam turbine that utilises the steam generated by a heat recovery boiler fuelled by waste gas. This process allows IGCC plant achieve higher power generation efficiency and lower emissions, compared to conventional coal-fired power plant.

Integrating gasification and steam turbine tech

Customers benefit from the fact that MHI Group takes charge of supplying all core components: notably the gasification furnace, gas refining equipment, gas turbine and steam turbine. The Japanese manufacturer can hence design, deliver and install IGCC systems with customer-tailored and optimized performance.

The Nakoso IGCC Power was built to showcase the integration of some of the

world's most advanced power generation technologies, and to supply affordable energy to local industries, and thereby work towards Fukushima's recovery.

By participating in this project, Mitsubishi Power said it will "contribute to the effective use of resources, environmental conservation and improve decarbonization by promoting the expanded adoption of IGCC, the next-generation high-efficiency power generation systems, as well as contribute to the revitalization of local communities." ■



View of Nakoso IGCC plant

NEWS NUDGES

Fluxys takes stake in Brazilian TSO

Belgian gas company Fluxys, the operator of the Zeebrugge LNG import terminal and stakeholder in Dunkirk LNG and the TAP pipeline, has bought a minority stake in a Brazilian gas transmission system operator. The deal is for a stake in Transportadora Brasileira Gasoduto Bolívia-Brasil (TBG), the owner and operator of a 2,600-kilometres pipeline system that links the southern part of Brazil with neighbouring Bolivia. Fluxys said the equity transfer was made via the US investment fund, EIG Global Energy Partners.

Trafigura co-sponsors MAN's ammonia engine

Trafigura, a global commodity trading house, has agreed to co-sponsor the development of MAN Energy Solutions ammonia-fuelled engine for maritime vessels. The ammonia engine is expected to be commercially available for large-scale ocean-going ships by 2024, followed by a retrofit package for existing maritime vessels by 2025. In the future, ammonia-fuelled engine are also meant to be used for power generation. ■

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