



UK expected to increase electricity exports after carbon price plunge

Electricity sales from Britain to the Continent will increase this winter as a plunge in UK carbon prices gives the country's gas- and coal-fired plants a competitive edge. A government decision to release extra permits made UK carbon prices plunge 50% this year to £37 per ton – about half the level in the EU where carbon prices fell just 3%.

The price gap is a result of Whitehall's decision to ease the burden on emitters to give market participants more "time to adapt" to the energy transition in the face of persistently high inflation. Substantially lower costs for carbon permits in the UK have unravelled the merit order across Europe:

"Europe's gas plants are normally dispatched before the UK, but that order has shifted," said Jean-Paul Harri-man, a director at industry consultant EnAppSys. "That means Britain will likely be sending more power than usual to its neighbors on the continent this winter, or importing less."

Still, the UK is expected remain a net buyer of electricity with net imports to the island seen just below 4 TWh in the first quarter of next year, according to S&P Global Commodity Insights. But if continental gas supplies start to get scarce it could make sense for



NemoLink, an interconnector between the UK and Belgium

traders to import electricity from the UK and pay an extra fee for transporting it via interconnectors to France and Germany. Works on the first UK-German power cable, allowing 1.4 GW of bi-directional electricity flows, has just started in July.

Scheduled exports, in turn, could increase electricity prices in Britain although National Grid said in its early winter outlook it expects a "comfortable" supply situation this winter with more grid-

continued on page 2

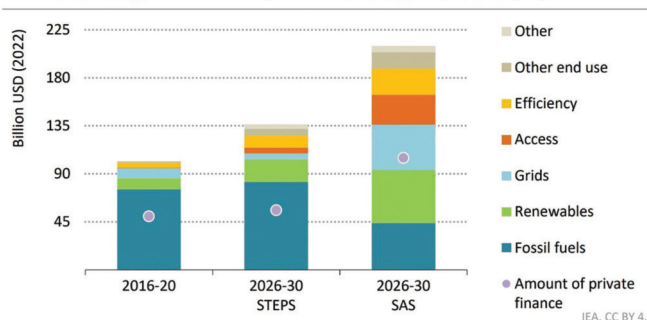
IEA calls for urgent action to double energy investment in Africa

Improving access to capital at a lower cost is essential to unlock clean energy spending in Africa, the International Energy Agency (IEA) says. Though home to 60% of the world's best solar resources, Africa has the same installed solar capacity as Belgium, with the IEA suggesting funds from development finance institutions and donors can serve as a catalyst for new projects.

Such concessional finance would have to reach \$28 billion per year in order to mobilise \$90 billion of private sector investment by 2030, a more than tenfold increase from today. The African Development Bank (ADB) is hoped to help but finance originating from or disbursed through local channels must also increase nearly three-fold by the end of the decade.

Africa's average debt-to-GDP ratio nearly doubled to 31% over the past ten years. As a result, 12 African countries are now listed by the IMF as being at high risk of debt distress which drives up the cost of accessing capital. The fact that most

Annual energy investment in the IEA's Sustainable Africa Scenario, 2016-2030



financing is done in foreign currencies but most projects earn revenue in local revenue is a mismatch which complicates downpayment, particularly in countries with a high inflation.

Today, more than 40% of the population in

continued on page 2

AGENDA

VIRTUAL POWER PLANTS

Tripling VPP capacity by 2030 can cut grid costs by \$10bn/y, DOE finds **2**

MARKETS

Saudi Aramco CEO warns of 'premature' phase-out of fossil fuels **3**

Germany faces high costs, technical hurdles for ship-based H2 imports **3**

COMPANIES

SMGPH's fossil fuel expansion exacerbates financial risk; analysts warn **5**

CARBON CAPTURE

TVA studies CCS retrofits at gas-fired plants in Mississippi and Kentucky **6**

PROJECTS

HEISCO makes lowest bid to service Sabiya power plant in Kuwait **7**

Continued from page 1, top story

scale batteries helping to balance renewable energy sources and acting as a supply buffer.

Looking ahead, investors and power plant operators in Britain are asking for clarity how carbon permits will be regulated in

the future. "While we may see cheaper power from gas power plants this winter, the government needs to be clearer about the cost of carbon going forward," said Tom Vernon, the chief executive officer of Stat-

era Energy, which is developing gas-fired plants in the UK. "More clarity will provide more certainty on the long-term viability of these plants and of low-carbon assets like batteries." ■

Tripling VPP capacity by 2030 can cut grid costs by \$10bn/y, DOE finds

The U.S. Department of Energy (DOE) recommends to deploy 80-160 GW of virtual power plant capacity – tripling current scale – to redirect investment from peaker plants to market participants and reduce grid costs by \$10 billion per year. If tripled, VPPs could meet up to 20% of peak power demand which is forecast to reach 200 GW by 2030.

Balancing the grid with peaking capacity from a VPP can be 40% cheaper for a utility than buying capacity from a utility-scale battery, and 60% lower than buying power from a gas peaking plant, the DOE said with reference to a May report by The Brattle Group.

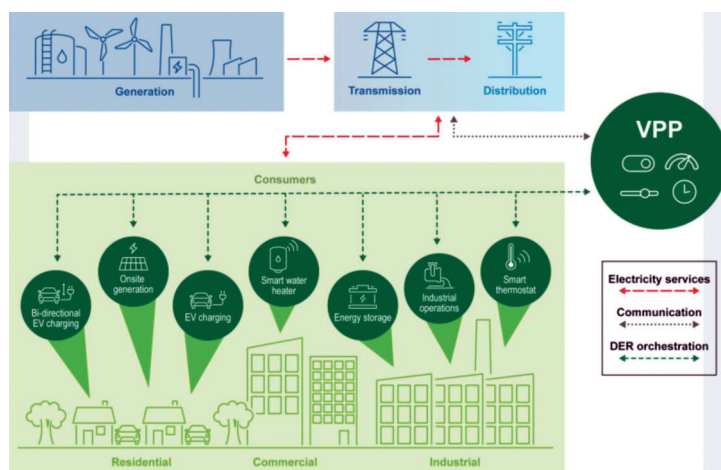
Currently there is 30-60 GW of VPP capacity available in the United States, mainly made up of demand response programs. Such VPPs bundle distributed resources, notably energy storage, rooftop solar and electric vehicle chargers, which can be utilised to balance the grid – similar to a gas peaking plant.

"Rather than viewing the massive adoption of EV and other distributed energy sources (DER) just as load to serve, utilities and regional grid operators can view this as an opportunity to increase the flexibility of the grid and more efficiently use existing resources and

infrastructure," DOE said in a recent report of entitled 'Pathways to Commercial Liftoff for Virtual Power Plants.'

Government analysts anticipate a massive increase in annual DER additions through 2030, notably 20-90 GW capacity from electric vehicles chargers and 300-540 GWh of energy storage capacity from EV batteries. Smart thermostats and water heaters could contribute another 5-6 GWh of flexible power demand. On the supply side, distributed solar and fuel-based generators will add 20-35 GW per year and around 24 GWh of capacity per year could come from new stationary batteries.

To further accelerate the VPP capacity, government analysts recommend to grant "equitable benefits" for distributed energy sources, simplify their enrolment into virtual power plants and integrate VPPs both into utility's forward planning as well as into wholesale power markets. ■



Continued from page 1

Africa live without access to electricity, and 70% without access to clean cooking fuels. Delivering modern energy to all Africans will

require nearly \$25 billion in spending per year to 2030, the IEA's latest Africa Energy Outlook report finds. "This is a small amount in the context of global energy spending – equivalent to the investment needed to build one new LNG terminal a year," analysts noted. "But it requires a very different type of finance, given the need for small-scale projects, often in rural areas and for consumers with limited ability to pay."

Higher costs of capital

A range of real and perceived risks affecting projects in Africa, as well as higher borrowing costs following the Covid-19 pandemic and Russia's war in Ukraine, mean there is a limited pool of affordable capital that energy developers in Africa can tap. According to the report, *Financing Clean Energy in Africa*, the cost of capital for utility-scale clean energy projects on the continent is at least two to three times higher than in advanced economies.

"The African continent has huge clean

energy potential, including a massive amount of high-quality renewable resources. But the difficult backdrop for financing means many transformative projects can't get off the ground," said IEA Executive Director Fatih Birol.

Institutional investors are unlikely to fund greenfield projects, he reckons, but they can invest in brownfield projects, either via government-sponsored asset recycling programmes – as seen in Gambia, Zimbabwe and Togo – or by providing refinancing via green or sustainable bonds, as seen in Egypt and Nigeria.

The IEA's latest report on Africa is based on a review of more than 85 case studies and more than 40 interviews with key stakeholders. "Yet this report is not simply a catalogue of Africa's challenges," President William Ruto of Kenya stressed. "Instead, it is an inspiring testament to the innovative spirit of our continent, with a vast array of solutions emerging from Africa's entrepreneurial minds." ■

Gas to Power Journal

Publisher
Stuart Fryer

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

Advertising
David Jeffries
Tel: +44 (0)7973 642 086
djeffries@lngjournal.com

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

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

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

Saudi Aramco CEO warns of 'premature' phase-out of fossil fuels

Global energy security could be at risk through a premature exit of fossil fuels, Saudi Aramco CEO Amin Nasser warned. In his view, the global North's drive towards sustainability and phasing out conventional power generation is ignoring affordability issues and supply-demand imbalances which could widen the North-South divide.

He dismissed projections by the International Energy Agency (IEA) that oil demand may peak this decade below 105 million barrels a day as "unrealistic," suggesting this notion is mostly driven by politics rather than market economics and technology. "Shortcomings of the transition are already causing mass confusion across industries that produce and/or rely on energy. Long-term planners and investors do not know which way to turn," the Aramco CEO told delegates at the 24th World Petroleum Congress in Calgary, Canada.

While many developed countries in the North have set out pathways to reach net zero emissions, the priority for the Global South is still economic survival. To get these countries adopt sustainability targets, there need to be distinctive solutions and attractive project finance.

Highlighting the scale and scope of the transition challenge, Nasser said it would require the "re-invention of our entire energy-based way of life in less than 30 years." The world's economic growth hinges on affordable energy but the aspiration for net zero emission would require the "complete transformation of a \$100 trillion global economy today. One that is likely to roughly double in size by 2050, with close to an additional two billion energy consumers."

Aramco invests in CCS, aims to export hydrogen

The oil giant Saudi Aramco itself is investing in projects to start capturing and permanently storing carbon dioxide from 2026. The CCS project is being implemented as part of Aramco's vision to produce hydrogen from natural gas – which requires carbon capture and storage on a massive scale to produce the hydrogen in a sustainable manner.

Converting natural gas, or methane (CH₄), into hydrogen (H₂), emits carbon dioxide (CO₂) – a polluting substance that adds to global warming. However, the CO₂ can be trapped and permanently stored, e.g. in depleted oil fields. Combined, this process leads results to what is known as blue hydrogen – H₂ produced from natural gas using CCS. The hydrogen, in turn, can be compressed or cooled and then shipped from Saudi Arabia to markets like Europe, North America or North Asia for use as a fuel for power generation, transport and the chemical industry. Alternatively, the H₂ can be converted into ammonia – another carbon-free fuel.

"On a life-cycle 'well to gate' basis we have one of the lowest carbon-intensity ammonia available for export to the various markets – whether it's for chemical, fertilizer or energy purposes," said Oliver Thorel, Aramco's vice president of chemicals. ■

“Shortcomings of the transition are already causing mass confusion across industries that produce and/or rely on energy. Long-term planners and investors do not know which way to turn”

– Amin Nasser, CEO, Saudi Aramco



Suiso Frontier, the first tanker to transport liquid hydrogen

Germany faces high costs and technical hurdles for ship-based H₂ imports

Hydrogen imports are meant to decarbonise the Germany's heavy industry and electric power sector but high costs and technical hurdles for shipping hydrogen or its derivatives to German LNG import terminals is prompting a shift to producing more hydrogen at home. The government already doubled the domestic production target from 5 GW to 10 GW.

Policy makers had initially pushed developers LNG terminals, which were set up quickly in reaction to a halt in Russian pipeline gas supplies, to make their terminals 'hydrogen ready'. Companies like Tree Energy Solutions had planned to invest €2.5 billion to import 25 TWh of methane to Germany in 2027 that could be used to produce 0.5 million tonnes of hydrogen. But the technology proves more challenging and costlier than expected.

Importing hydrogen made from wind and solar power via pipeline from neighbouring countries is the cheapest option at less than €1 per kilogram of H₂. In contrast, maritime imports of hydrogen derivatives such as ammonia or synthetic methane, for which CO₂ is added to the hydrogen – come at a substantially higher price of €2 to €5 per kilogram of H₂. Ammonia, however, has the benefit that it can be burned directly as a fuel in coal-fired power stations. So, there is no need to reconvert it into hydrogen before use. ■



MAN Energy Solutions
Future in the making



Moving big things to zero

Moving big things to zero with five key technologies

After 250 years engineering complex systems, we are ready for our biggest challenge: reducing emissions for essential industries. Our solutions are based on five technologies: producing green fuels in large volumes, making new engines to run on green fuels, retrofitting existing engines, capturing and processing CO₂, and decarbonizing heat generation with heat pumps. Moving big things to zero is a big task but we have the experience, the technology, and the passion to get the job done.

SMGPH's fossil fuel expansion exacerbates financial risk; analysts warn

San Miguel Global Power Holdings Corp's (SMGPH) shift from coal to more expensive LNG weighs negatively on its financial health, with analysts warning the Philippine utility could fail to meet debt obligations. SMGPH aims to complete 1,900 MW of new coal capacity and 1,313 MW of new gas-fired capacity which IEEFA analysts see as an "overly high fossil fuel exposure."

IEEFA, the Institute for Energy Economics and Financial Analysis, criticises that the largest power generator in the Philippines keeps largely reliant on oil and gas. In total, SMGPH has more than 10,000 MW of proposed gas-fired capacity but does not yet own any operational wind and solar assets.

"Without an immediate, material pivot to renewables, we believe the company is at risk of locking in financial instability caused by overexposure to volatile fossil fuel

prices," Sam Reynolds, LNG/Gas research lead at IEEFA commented.

The company's elevated net debt-to-earnings and potential difficulties meeting financial obligations create additional risk of devaluation, his colleague Hazel James Ilonggo added. Since 2019, SMGPH has issued more than P232 billion (US\$4.09bn) worth of perpetual securities and over P56 billion in bonds. According to IEEFA's analysis, however, just 0.1% funds from its most recent bond issuance in July 2022 went to

renewable projects, compared with 76% for fossil fuel projects.

Shift to LNG could make things worse

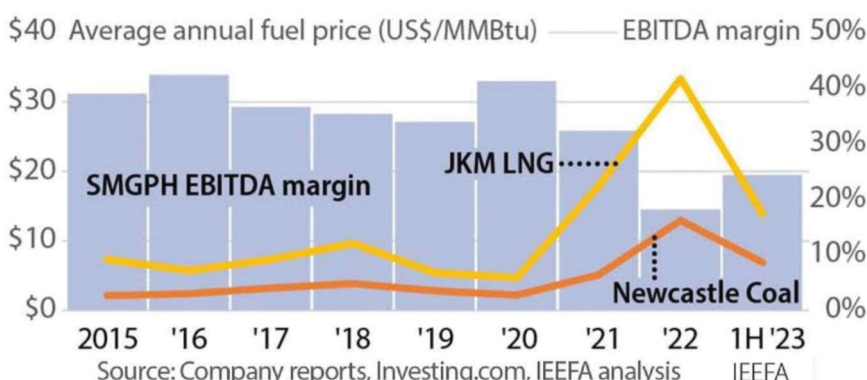
Rapidly rising costs for fossil fuels in the wake of Russia's invasion of Ukraine made SMGPH's operating income plunge 22% in the 2022 financial year. It also posted an all-time-low EBITDA margin while free cash flow fell to -P71.3 billion.

The latest shift from coal- to LNG-fuelled power plants could make matters worse as LNG is nearly three times more expensive in Asia since 2021 and the IEEFA expects LNG prices to remain above-average levels through 2030. Moreover, none of SMGPH's existing or proposed LNG-to-power plants have power offtake contracts beyond 2024 that might ensure long-term recovery of fuel costs, analysts warned.

Based on current earnings SMGPH is expected to take almost twice as long – nine instead of four years – to service its debt. Analysts hence warn the company's liquidity crunch could evolve into a longer-term funding shortfall, with US\$3.4 billion (P167 billion) of U.S. dollar-denominated perpetual securities callable through 2026. ■

SMGPH Profitability Tracks Fossil Fuel Prices

Company's shift from coal to costly LNG likely to exacerbate financial risks



CPS Energy CEO warns of gas supply shortages in Texas this winter

Rudy Garza, President and CEO of CPS Energy has voiced concerns that the gas network for supplying fuel to power generators in Texas is still not prepared for another hard winter. Similar thoughts prompted Rayburn County Electric Corp to buy a power plant that is running on gas delivered through pipelines under federal, not state, regulation.

Gas-fired power plants typically do not store their fuel on site but rely on continuous deliveries through pipelines, supplying gas across Texas sourced for example from the Permian Basin. But these flows were cut short when wellheads froze during Winter Storm Uri in February 2021, leading to widespread blackouts.

Striving ensure stable fuel supplies, Rayburn County Electric Cooperative decided to buy a gas-fired power plant in Grayson County that relies on gas delivered via interstate pipelines that are under U.S. federal regulation. "Having a plant that relies on intrastate lines and Texas regulation was almost just a non-starter for us," the co-op's President David Naylor said.

"We acquired the gas power plant really as a fallout from the Winter Storm Uri. (...) It came down to: We need to be able to control our own destiny here," he stressed, explaining the co-op's electricity demand load can vary as much as 40% during a cold freeze – so ensuring stable generation is vital.

Fast-rising renewable penetration in Texas given that solar power was vital to meet demand during this summer's record-breaking electricity consumption – but it requires dispatchable balancing capacity. "It's kind of ironic that the turn we've seen to renewables is actu-

ally increasing our reliance on natural gas," said Howard Gugel with the North American Electric Reliability Corp. "Because we need generation that can follow loads and follow that renewable generation as it goes up or down during the day." ■



CPS's Rio Nogales gas power plant

TVA studies CCS retrofits at gas-fired plants in Mississippi and Kentucky

Tennessee Valley Authority (TVA) and TC Energy will jointly invest \$1.25 million to study carbon capture retrofits the gas-fired power plant in Ackerman, Mississippi, and in Drakesboro, Kentucky. A feasibility study will determine the costs, technical challenges, and operational impacts of carbon capture technology which will determine the utilities future investment in CCS.

TVA wants to reduce emissions in an efficient and cost-effective manner, the utility's Innovation Research vice president, Dr Joe Hoagland said, explaining: "Exploring all available technologies to eliminate carbon will allow us to move faster as we work to be net-zero by 2050."

TC Energy vice president of Energy Origination and Development, Omar Khayum, added the aim of the public-private partnership with TVA is to "evaluate solutions that will lower the carbon intensity of reliable, baseload natural gas power facilities."

Carbon capture works by sending the exhaust from natural gas power facilities to a scrubber adjacent to the plant. A chemical reaction absorbs the CO₂ before the exhaust is released into the air. The CO₂ is then pumped to another vessel and treated with heat that releases the CO₂, which is



Carbon will be captured from the Ackermann CCGT

then compressed and safely stored underground or injected into hydrocarbon fields for enhance oil recovery.

The Biden Administration supports the deployment of large-scale CCS infrastructure as a way to reduce emissions and com-

bat climate change. In this context, the Environmental Protection Agency (EPA) recently set caps on CO₂ emission that most coal- and gas-fired plant operators need to meet – forcing some to retrofit their plants with CCS. ■

Large-scale Petra Nova CCS project back operational, owner says

Petra Nova, the only large-scale project in the U.S. to capture flue gas of a thermal power plant for injection into an oil field, is back operational, the owner JX Nippon announced. The \$1 billion Petra Nova CCUS project had been shut since May 2020 when low oil prices made the use of CO₂ for enhanced oil recovery unprofitable.

The post-combustion carbon dioxide (CO₂) capture system began operations had been operated for three years since January 2017, based on Mitsubishi's KM CDR Processes and KS-1 amine solvent. The system is designed as a 240 MW add-on to Unit 8 (654 MW capacity) of the existing W.A. Parish Generating Station in Texas, which runs on pulverized coal. The CCS unit receives about 37% of Unit 8's emissions, which are diverted through a flue gas slipstream.

Petra Nova's carbon-capture system is designed to capture about 90% of the CO₂ emitted from the flue gas slipstream, or

about 33% of the total emissions from Unit 8. The post-combustion process is energy intensive and requires a dedicated natural gas unit to accommodate the energy requirements of the carbon-capture process.

Pre- vs. post-combustion CCS

The Petra Nova CCS project can capture up to 1.4 million metric tons of CO₂. It had been operated for three years since January 2017, based on Mitsubishi's KM CDR Processes and KS-1 amine solvent, developed by Mitsubishi and Kansai Electric for absorbing CO₂.

By comparison, Kemper had been designed to capture about 65% of the plant's CO₂ using a pre-combustion system. The capital costs associated with the Kemper project were initially estimated at \$2.4 billion, or about \$4,100 per kilowatt (kW), but cost overruns led to construction costs in excess of \$7.5 billion (nearly \$13,000/kW). Petra Nova CCS retrofit costs were reported to be \$1 billion, or \$4,200/kW, and the project was completed on budget and on time. ■



Petra Nova, now solely owned by JX Nippon

CERius launched to track turbine emissions

GE Vernova's Digital business claims its AI-driven CERius software helps power generators to better track their gas turbine emissions. A novel reconciliation algorithm provides 33% greater accuracy for scope 1 emissions on today's gas turbines and a pilot version of the software is now available for current GE customers, with general availability expected in early 2024.

CERius' calculation accuracy has been directly validated at customer sites, Scott Reese, CEO of GE Vernova's Digital business said. The software automates the collection of greenhouse gas data and makes recommendation on how to reduce emissions. Companies can simulate and evaluate different abatement scenarios to optimize their carbon management strategies, such as renewable energy integration, energy efficiency measures, and carbon offset projects. ■

HEISCO makes lowest bid to service Sabiya power plant in Kuwait

Kuwait's Heavy Engineering Industries and Shipbuilding Company (HEISCO) has submitted the lowest bid to provide engineering services for the 2 GW Sabiya combined-cycle gas power plant in Al-Jahra, just west of the capital Kuwait City. In a disclosure on Kuwait's bourse, HEISCO said its bid for servicing the plant is worth 61.7 million Kuwaiti dinars (\$204 million).

The contract entails providing "highly efficient and continuous engineering services" for the gas turbines and auxiliaries for the Sabiya CCGT. The plant is managed by Kuwait's Electricity, Water and Renewable Energy Ministry.

Kuwait's power demand grows at about 7 to 10% per year and the government estimates peak load demand will reach 25,000 MW by 2025. Continuous operation of Sabiya is essential to meet Kuwait's rising electricity needs.

In May, Mitsubishi Power was awarded a contract to optimise the performance of the Sabiya power and water distillation station and boost its efficiency. Works include the upgrade of eight units of turbines, generators and control systems with the aim of extending the plant's lifetime by up to 20 years.

The plant's third expansion was carried out by Siemens in 2017 when two SGT5-

4000F gas turbines increased overall installed capacity by 900 MW. The CCGT is situated on the Bay of Kuwait in the country's northeast and mostly runs on natural gas but can also be operated with fuel oil as a back-up fuel.

Sabiya's first units are powered by six GE 9FA gas turbines which had been converted from simple-cycle to combined-cycle mode to increase the plant's output. GE had built the Sabiya plant in cooperation with Hyundai Heavy Industries (HHI) of South Korea. ■



Sabiya power station, situated west of Kuwait City

Gazprom completes large-scale upgrade of St. Petersburg power plant

Russia's Gazprom has commissioned the modernised unit 6 at Avtovskaya combined heat and power plant in St. Petersburg, increasing the unit's electric capacity from 100 to 123 MW and thermal capacity from 168 to 197 Gcal/h. The CHP upgrade includes a revamp of unit 7 and ensures reliable heat supply to about one and a half million consumers.

At both turbine units, Gazprom completely replaced the main and auxiliary equipment and engineering systems. A new generator with an air-cooling system and a new turbine with a modern automated control system were installed, ensuring high manoeuvrability of the equipment.

"All the equipment we installed as part of the modernization of the Avtovskaya CHPP is Russian-made equipment that has successfully passed tests and is ready to work under load," said Gazprom CEO Alexey Miller.

"We completed the work three months earlier than the deadlines established by the state program. This means that St. Petersburg is entering the new heating season with a new, even more reliable source of energy supply," he added.

Upgrade of the equipment at the Avtovskaya CHP included the first-time use of modelling technologies. Through laser scan-



View into Avtovskaya CHP's turbine unit 6

ning, accurate 3D models of all equipment being modernized were created which were used for developing novel and more efficient technical solutions. The modelling made it possible to implement the upgrade in a shorter time-frame, without stopping the plant from producing electricity and heat.

Currently, works are underway at Avtovskaya CHP to build a new cooling system with a closed water supply cycle. It will reuse process water in the power gen process and is hence more environmentally sustainable. ■

Wärtsilä signs asset performance deal for 150 MW plant in Nebraska

Finish manufacturer Wärtsilä has signed a 10-year asset performance agreement with the U.S. utility Omaha Public Power District (OPPD) for the 150 MW Standing Bear Lake Station, slated to start operation in 2024. The plant will provide dispatchable power to help balance up to 600 MW of utility-solar generation.

Ultimately OPPD's so-called 'Power with Purpose' project foresees the addition of 400 MW to 600 MW solar power and total of 600 MW balancing gas-fuelled generation as it aims to reach net-zero emissions by 2050.

The Standing Bear Lake Station operates with nine 18V50DF dual-fuel engines which can use natural gas and light fuel oil as needed. The engines can be converted to carbon neutral fuels as they become available. Today, Wärtsilä engines can use 15%-25% hydrogen blended with natural gas.

By ensuring operational reliability for the plant, OPPD can it to compensate for fluctuations in the supply of renewables. "The plant's electricity supply to the grid is assured regardless of the conditions," Wärtsilä said. ■



Standing Bear Lake Station during construction

LNG Journal Subscription Package

Your LNG Journal subscription includes broad coverage of LNG across the globe – from trade and shipments through to LNG prices, plus in-depth technical coverage. With over 20 years of LNG reporting experience, we remain the market leading source of information for decision makers in the LNG industry.

LNG Daily News

Delivered to your inbox and online



LNG Journal

The flagship LNG monthly



LNG Unlimited

Your weekly summary of LNG news



LNG Market Tracker

Weekly empirical insight into the LNG market



LNG North America

Bi-monthly report on LNG in the US, Canada



LNG Fuelling

In-depth look at LNG as a fuel



LNG Shipping News

Bi-weekly coverage of LNG shipping



LNG China

Bi-monthly review of LNG in China



LNG Monthly Markets

Key developments in LNG markets



Gas to Power Journal

Peakload Power and Energy Storage



Subscription Contacts

For new subscriptions or general subscription queries please contact:

Stephan Venter

venter@lngjournal.com

+44 207 017 3407

To renew an existing subscription or to upgrade your package, please contact:

Gabi Weck

gabi@lngjournal.com

Sign up now for an Online Subscription at only US\$1190; €920 or £830

Discount options are available for multi-users

Contact us for more information or to arrange a free trial