



Decisive vote against nuclear & gas as part of EU's green taxonomy

Legislators in two European Parliament committees have backed a proposal to stop the Commission from classifying fossil gas and nuclear power as "green investments" and "transitional energy sources" under the EU's green finance taxonomy. The resolution passed with 76 votes in favour and 62 against.

But regardless of the outcome, the motion needs to be submitted again for a final and decisive vote in the Parliament's plenary session on July 4. To take effect, the proposal against so-called greenwashing fossil gas and nuclear would have to be confirmed by an absolute majority.

Gas currently deemed "transitional investment"

As it stands today, the EU's taxonomy proposal classifies both nuclear and unabated gas-fired power plants as "transitional investments." Both will be able to increase their corporate "green scoring" by investing in gas, including outside Europe. The CO₂ cap for new power plants built by 2030, meanwhile, paves the road for hydrogen co-firing. The proposed CO₂ emission cap of 270 grams per kilowatt-hour for facilities that have a construction permit by 2030, alongside the commitment to use at least 30% of renewable or low carbon gas by 2026 and 100% by 2035. That means the use of conventional natural gas would need to reduce over time if a gas-fired power plant is to be classified as 'transitional'.



Analysts at Wood Mackenzie expect the use of unabated natural gas in Europe is set to decline, even if the EU classifies investments in gas-fired plants as transitional investments, given that more and more electric utilities are retrofitting their power stations to partially run on grey or green hydrogen, or potentially ammonia. First trials to co-fired fossil gas- and coal-fired plants with these zero-emission fuels are underway in Japan, Portugal, the Netherlands and in the United States.

Critics see "misuse" of sustainable finance

"For us it is not acceptable to qualify gas and nuclear as sustainable and allow the green finances for the future to finance those projects," Christophe Hansen, a Luxembourgish lawmaker from the

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Nord Stream gas flows constraint as sanctions leave turbine stranded

Sanctions against Russia's Gazprom make it impossible for Siemens Energy to return a turbine being overhauled in Canada to the Nord Stream 1 pipeline. Gazprom said it had to reduce supplies via Nord Stream 1 to around 100 million cubic meters (mcm) per day, down from 167 mcm. Limited supplies through Germany's key import pipeline accelerate the rush towards importing LNG.

Gazprom – once the largest gas supplier for Germany – has already reduced westward gas flows through Poland and Belarus via the Yamal-Europe pipeline. With this move, the Kremlin sought to retaliate against western sanctions against EuRoPolGaz, the owner of the Polish pipeline.

Reversed flows through Yamal-Europe pipeline

These days, flows via the Yamal-Europe pipeline are eastbound to transport gas from Germany to Poland which is struggling to avert shortages after Gazprom halted all deliveries over a row about Poland's LNG import terminal Świnoujście at the Baltic Sea.

In late May, the Polish government adopted a

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centre-right European People's Party (EPP) told a press conference.

"That is not saying that we will not need, in the next years, gas and nuclear," he added, stressing: "But we just are of the point of view that we shouldn't misuse or greenwash, the sustainable finance to do so."

The cross-party coalition that opposes classifying nuclear and fossil gas as sustainable includes a broad spectrum of political groups: Apart from the centre-right EPP, the largest party in the EU Parliament it also in-

cludes legislators from the centrist Renew Europe, the Greens, the Socialists and Democrats (S&D) and the Left.

Votes expected to be "tight"

Observers note it is highly uncertain if the cross-party coalition will have enough votes to block the Commission's proposal. The Green MEP Michael Bloss told Euractive the numbers would be "almost even," with 67 against and 68 MEPs who are ready to oppose or approve the inclusion of gas and nuclear in the taxonomy.

"If we win, I think there will be a momentum for the plenary," Bloss said. "This vote doesn't have a real meaning because even if we lose, this same objection will be put to plenary anyway."

If the objection passes today, the inclusion of nuclear and fossil gas into the EU's green finance taxonomy still needs to be ratified by the whole European Parliament in early July. But if the objection passes, it will be seen as a clear signal that could make the pendulum in the final vote swing the other way. ■

Energy efficiency measures could save equivalent of China's energy use

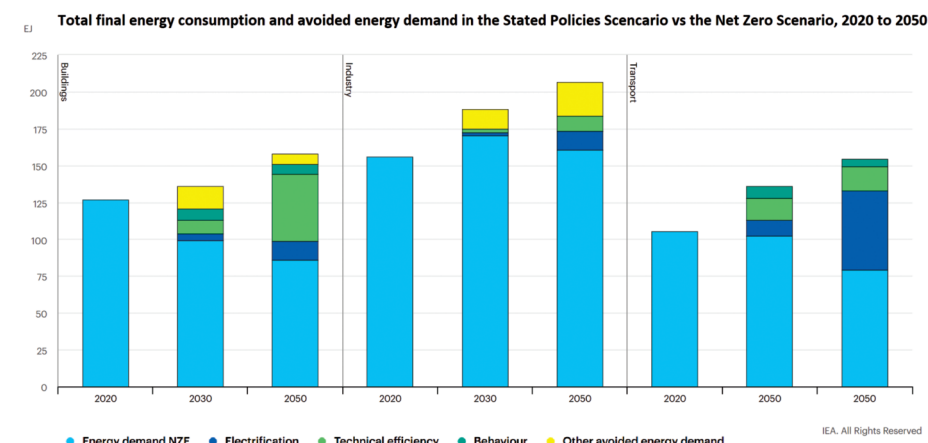
A global push on energy efficiency could save the equivalent to China's current annual energy consumption, new analysis by the International Energy Agency (IEA) shows. Doubling the current rate of improvements in energy intensity to 4% a year – from around 2% in 2010-2020 – can avoid 95 exajoules a year of final energy consumption by 2030.

With accelerated action, the global economy by 2030 could be around one third more energy efficient than in 2020, analysts pointed out. That level of savings would lower global CO2 emissions by an additional 5 billion tonnes a year by 2030, about a third of the total reduction needed this decade to move the world onto a pathway to net zero emissions by 2050.

Extra efficiency saves energy costs

Extra efforts on energy efficiency would also save costs. Households alone could save at least \$650 billion a year on energy bills by 2050, compared with what they would have spent in a pathway based on today's policies. For households alone, enhanced efficiency and related avoided energy demand could help contribute to reducing global household energy bills by at least \$650 billion a year by 2030 in the NetZero Emissions by 2050 Scenario (NZE).

Electrification of transport and industry is



paramount to save energy and emissions. In the NZE Scenario, 20% of all cars are electric in 2030. For traditional cars, strict fuel-economy standards continue to play a crucial role through to 2030 along with behavioural shifts, such as increased use of public transport, walking and cycling, as well as train travel replacing short haul flights.

Most measures pay for themselves

"Most of the efficiency measures in the Net Zero Scenario, beyond those in the current policy case, are already cost effective and pay for themselves through energy savings,

even more so at today's energy prices," IEA analysts stated.

For example, the quantity of avoided gas-use would be equal to four times what Europe imported from Russia last year, while oil consumption would be lowered substantially.

By 2030, around 55 Exajoules (EJ) per year of oil consumption could be avoided, analysts said, specifying this equates to approximately 30 million barrels of oil per day, around triple Russia's average production in 2021. These reductions would reduce energy costs by between around \$400 billion to just over \$1 trillion, depending on oil prices. ■

Gas to Power Journal

Publisher
Stuart Fryer

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

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

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

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

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resolution to terminate an agreement with Gazprom to receive Russian gas via the Yamal pipeline. Starting from January 2023, Poland will buy no more gas from Gazprom. Poland had refused to comply with the Kremlin's demand to pay for Russian gas deliveries in roubles, and climate minister Anna Moskwa said the resolution to end the so-called Yamal contract was "the natural consequence" after Russia breached the

contract by halting supplies.

On April 27, Russia's state-run Gazprom suspended supplies to both Poland and Bulgaria due to their refusal to pay in Russian roubles. Poland's state gas company PGNiG was given notice just days in advance that deliveries through the Yamal-Europe pipeline would stop. The 33 bcm/y interconnector carries Russian gas through Belarus and Poland to Germany. ■

ACWA Power, OQ and Air Products to produce green ammonia in Oman

Oman could become a hotspot for green ammonia as ACWA Power, OQ and Air Products agreed to develop a multibillion-dollar project in Salalah – on a similar size as NEOM in Saudi Arabia. Electrolysers, powered by wind and solar, are planned to produce hydrogen which would be turned into nitrogen by air separation and then into ammonia.

In Salalah, the capital city of Oman's southern Dhafar province, OQ has extensive operations focussed on producing liquefied petroleum gas (LPG) and OQ chairman Mulham Al-Jarf indicated the future green-H₂-to-ammonia plant might well be built here.

Oman's state-owned national petroleum investment company, wants to re-position itself as an "energy transition enabler, while playing on our strengths and leveraging our expertise in the downstream chemicals business," Al-Jarf said. A recent \$827 million investment in its 300,000 tonnes per year LPG Extraction plant will lead to production levels of 155 kilotons per annum (kta) of propane, 111 kta of butane, and 38 kta of condensate.

Ammonia – a carbon-free fuel

In May 2021, OQ also committed to spend \$463 million on a 1,000 metric tonnes per day (mtpd) capacity ammonia plant which will be integrated with OQ's existing 1 mt per year capacity methanol plant. The new facility will utilise hydrogen-rich purge gas

generated by the methanol plant as feedstock in order to produce ammonia – a carbon-free fuel for power generation or intermediate for synthetic fibres.

Pointing at OQ's "demonstrated ability to offtake [oil and energy-related] products, the company's chairman underlined the "project fits well with the Sultanates' renewable energy strategy and fosters investments in alternative energy resources, both of which contribute to Oman Vision 2040."

Same partners as in Saudi pilot project

ACWA Power, the co-investor in Oman's green-H₂-to-ammonia venture, is keen to advance green hydrogen projects worldwide and chairman Mohammad A. Abunayyan pointed out Oman as one of the company's key markets "We aim to leverage our proven track record, knowledge and expertise in developing sustainable global scale



Render of OQ's proposed Salalah ammonia plant

green projects including NEOM – a pioneering at-scale green hydrogen and ammonia facility – and [...] view Oman as a tremendous enabler for the production of green hydrogen," he said.

Air Products, the third partner in the Oman venture, is also involved in the Saudi NEOM pilot project. "We look forward to applying our know-how, technology and more than 60 years of experience in hydrogen to help move this project forward and take another significant step in decarbonizing the world, Air Products CEO Seifi Ghasemi commented.

JERA and IHI move up start of ammonia co-firing at Hekinan power plant

Japan's largest power producer JERA and technology company IHI Corp are working to fast-track the start of large-scale ammonia co-firing at Hekinan thermal power plant by approximately one year. Installations periods for all equipment required for the upgrade were shortened, so starting from fiscal 2023, ammonia is meant to generate 20% of heating value at Hekinan Unit 4.

With an installed capacity of 4,100 MW, Hekinan is the largest coal-fired power station in Japan, consisting of three 700 MW units and two 1,000 MW units. Works focus on Unit 4, commissioned in 2001 and equipped with a turbine and

generator from Toshiba and a boiler from IHI.

To speed up the project, delivery and installations times for burners, the tank for storing ammonia, pipes, and other equipment necessary for upgrading Unit 4 have been substantially shortened, the project

partners confirmed. The aim is to quickly establish a proven technology for ammonia co-firing in order to lower the carbon footprint of large coal-fired power units, like Hekinan, and subsequently roll out the upgrade at multiple power stations in Japan and abroad.

Under its 'Zero CO₂ Emissions by 2050' objective, JERA is promoting the adopting of greener fuels and is actively working towards low- or zero-carbon thermal power generation.

IHI has developed hydrogen- and ammonia-utilization technologies and now seeks to set up related supply chains and pilot projects. The Japanese conglomerate says it wants to contribute to a CO₂-free society by offering technologies for carbon recycling, capture and reuse.



Project Schedule

	FY 2021	FY 2022	FY 2023
Project Milestones	Small-volume co-firing of fuel ammonia at Unit 5		First receipt of fuel ammonia for the Project
Installation of the modified burners	Basic design	Detailed design	Installation work
Installation of the tank	Detailed design	Ground improvement	Civil engineering and mechanical work
Installation of pipelines and related equipment	Detailed design	Ground improvement	Civil engineering, construction and mechanical work



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Mitsubishi gears up to test CCS in gas engine gensets from July

Two Japanese sister companies, MHI Engineering and MHI Engine & Turbochargers are about to launch a demonstration test on viability and economics of capturing CO₂ from gas engine flue gas. A test series will start in July and run over a 10-month period, with the genset installed at an inhouse unit of MHIET's Sagamihara Machinery Works.

Sagamihara Machinery Works, relocated from Tokyo to the town of Sagamihara in 1970, comprises three divisions: one for engine, one for turbochargers and one for special vehicles. The demo testing will evaluate how different consistencies of flue gas from engines used for power generation impact on carbon capture performance. Tests will also look at the makeup of the captured CO₂, and options for potential sale and reuse.

Getting the system ready for mass-production

The aim is to test, verify and develop a mass-production type system for compact CO₂ carbon capture. In focus are also the system's ease of installation, e.g. through a modular approach, and applicability for smaller-scale facilities such as onsite power stations used by energy-intensive manufacturers or the petrochemical industry.

Verification will also be performed on an operation support service utilizing MHIENG's proprietary remote monitoring system.



Gas engine generator sets in MHIET's Sagamihara Plant

Plans to liquify the captured CO₂

Looking ahead, more long-term plans also call for the captured CO₂ to undergo liquefaction testing to facilitate its handling, conducted jointly with the Research & Innovation Center in charge of research and development at MHI Group. This way, the MHI Group will strive as a whole toward early realization of utilization of captured CO₂.

Once the technology is proven, MHI will put in place a customer support structure covering all aspects from CO₂ capture system introduction plans for gas engines and other facilities, to after-sale services, maintenance and operation. ■

Georgia Power achieves world's largest H₂ fuel blending at M501 turbine

Georgia Power and Mitsubishi Power have successfully carried out tests blending 20% hydrogen on the M501G gas turbine – a large, advanced-class turbine – installed at the 2,520 MW McDonough-Atkinson power plant. Dry low NO_x hydrogen blending was executed at the designed 100% natural gas firing temperature, lowering emissions by approximately 7%.

The McDonough-Atkinson power plant, located less than 10 miles from downtown Atlanta, has served electric customers for more than 80 years and was fully converted to natural gas in 2012 and expanded to power up to 1.7 million homes. It currently operates six large-capacity M501G series gas turbines, which deliver high performance and high efficiency, as well as three steam turbines running in three blocks of 2-on-1 combined-cycle configuration.

The Japanese manufacturer Mitsubishi Power completed the hydrogen blending on one M501G gas turbine unit with an approximate output of 265 MW by utilizing

some results of a project commissioned by the New Energy and Industrial Technology Development Organization (NEDO), Japan's national research and development agency.

Dry low NO_x (DLN) hydrogen blending was successful at up to 20% at the designed 100% natural gas firing temperature, within emissions compliance for the existing air permit, and without impact on the maintenance intervals. The team also confirmed improved turndown by testing up to 20% hydrogen at minimum emissions-compliant load.

"This demonstration helps pave the way for long-term clean and carbon-free use for already existing infrastructure. Making these

Wärtsilä opens green tech hub in Vaase

Wärtsilä has opened the 'Sustainable Technology Hub' in Vaasa, Finland, to advance the decarbonisation of its marine and energy business. Some of Wärtsilä's engines already run on carbon-neutral fuels, like methanol, and the manufacturer says it wants to have an ammonia concept ready next year as well as a hydrogen concept by 2025.

Methanol-fuelled engines have been deployed, for instance, to the Yantai CIMC Raffles shipyard in China for installation into a new Offshore Wind Installation Vessel (WIV), build on behalf of the Dutch company Van Oord.

The new centre, first announced in 2018, will be built at a total cost of €250 million and is designed to include a modern fuel laboratory, flexible engine testing facilities, as well as a highly automated production system. Up to 1,500 people will work under one roof, and with the new focus on sustainable fuels the Vaasa tech hub will become a cornerstone for achieving Wärtsilä's 2030 carbon neutrality targets. ■



View into Wärtsilä's STH engine assembly line

smart investments today on behalf of our customers ensures we can continue to provide clean, safe, reliable and affordable energy as Georgia grows and thrives for decades to come," said Allen Reaves, Senior Vice President and Senior Production Officer, Georgia Power.

Georgia Power, the operator of the McDonough-Atkinson CCGT the largest electric subsidiary of Southern Company, is working with Mitsubishi Power for the testing as part of a continued commitment to new R&D to reduce carbon emissions across its generation fleet. In this context, Georgia Power had already reduced its carbon emissions by more than 60% since 2007. ■



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EU plans to sell more CO2 permits could “destroy” market; RWE warns

Plans by the European Commission to sell additional CO2 emission rights can set in motion a vicious-circle that could destroy the market. A larger supply of emission rights leads to lower prices, which would require the EU to sell even more permits to generate the targeted €20 billion in earnings, RWE CEO Markus Krebber warned.

The Commission needs substantial amounts of cash to finance the exit from Russian energy imports, as stipulated in its RePowerEU plan. Fully substituting Russian oil, gas and coal im-

ports would require €210 billion in additional infrastructure investment by 2027, hence EU policy makers want to raise €20 billion by selling the surplus CO2 emission certificates that were withdrawn from the market earlier and are currently held in the EU-ETS' Markets Stability Reserve. The proposal will be discussed at a special Council meeting on May 30-31.

Industry, unsurprisingly, reacted positive to these plans given as some of them stand to benefit from lower prices for the right to pollute. The RWE CEO warned, however, the

consequences will be dramatic:

“There will no longer be a reliable path of emission reductions, the prices for pollution rights will fall and with them the incentives to switch to green technologies. The green transformation will be slowed down,” he warned in an opinion piece, co-authored by Felix Matthes from the Öko-Institute, and published by the German business daily Handelsblatt.

In his view, the EU Commission wants to “plunder emission trading” given that its plan would destroy a central instrument in lowering emissions simply because there is no agreement on alternative financing mechanisms. ■



German CDU says new gas power plants ‘imperative’ to stabilise supply

Conservative politicians in Germany call for new gas-fired power plants as a vital “bridge technology.” Exiting both coal and nuclear would not be possible „only with wind power, mandatory solar roofs, climate neutral heating and the hope that our neighbours have some energy left for us,” said Raimund Haser, environment expert for the Christian Democrats (CDU).

The CDU is the junior partner in a coalition with the Green Party in Germany's highly industrialised south-western state of Baden Wuerttemberg.

The state's grid operator Transnet, part of the utility EnBW has for long called for new incentive schemes to build gas-fired peaking power plants and Haser underlined that new gas power plants should be required to co-fire hydrogen which causes no emissions when burnt.

EnBW is currently retrofitting several of its ageing coal power stations to run on natural gas, and these modernised units could be upgraded to co-fire around 25% hydrogen at a reasonable cost. The utility has positioned itself in the gas business with the takeover of eastern German VNG in 2015/2016, and sources its gas mainly from Norway and Russia, thought the latter supply source may soon be no more option.

Need to clarify national support schemes

Green hydrogen, produced through electrolysis from excess renewable energy is meant to help wean off Europe from its dependence on imported fossil fuels, especially those from Russia. Throughout Europe, the project pipeline for new electrolyser capac-

ity has increased to over 6 GW – a staggering 375%, or 4.4 GW, rise of ventures meant to come online by the end of 2024. But analysts at Delta-EE warn that only a few projects will go ahead in the absence of firm funding schemes.

Germany, the Netherlands and the UK are the three countries to watch in 2022 when it comes to green hydrogen:

Policy makers in Berlin are preparing to support and partially fund up to 4 GW electrolyser capacity to help ensure the country gets back on track for its ‘climate neutrality by 2025’ target. Hydrogen-producing electrolyzers between 20 MW and 100 MW capacity can receive Capex support. The funding is aimed at achieving a faster cost degression and amortisation of these hydrogen plants as the government wants to see 10 GW of electrolyser capacity installed by 2030.

In the Netherlands, the new coalition government launched a €35 billion climate and transition fund, with €15 billion made available for decarbonising industry with new energy carriers which have not been



specified yet. Though big on funding, the Dutch hydrogen policy “currently lacks definition,” analysts criticised. “Despite having approximately 220 MW of uncertain projects planned to 2023, a lack of definition here will hurt project organisers,” analysts warn.

The UK Hydrogen Strategy, meant to be fully implemented by the end of 2022, sets a standard for low carbon hydrogen. Signs point to a contract for difference (CfD) style incentive for production with grey hydrogen as the benchmark. “However, it's unclear as to how the business model will treat green and blue hydrogen given the UK's focus on low carbon hydrogen,” analysts remarked. “Also, given government deadlines tend to slip, we may not see these policies put in place until 2023 – and could see uncertain project remain so in 2022.” ■

First GE 7HA.03 turbines onstream at Dania Beach Clean Energy Center

GE's first 7HA.03 gas turbines have entered commercial operation at the FPL Dania Beach Clean Energy Center, situated near Fort Lauderdale in the US. Operated by Florida Power and Light Company (FPL), the combined-cycle power plant is delivering 1,260 MW of electricity – enough to power some 250,000 homes.

The plant upgrade with 7HA turbines reduces operational emissions by 70% emissions, compared to the previous plant on the site, which helps FPL to deliver 24/7 electricity in Florida, particularly for the highly populated areas of Miami-Dade and Broward counties. Prior to installation and commissioning at the plant site in Florida, the 60-Hertz turbine was validated at GE's test stand 7 in Greenville, South Carolina.

"FPL has worked for more than two decades to systematically modernize our fleet of power plants by tearing down aging, inefficient plants and replacing them with ultra-efficient, clean energy centers like the one in Dania Beach," said FPL Chairman and CEO Eric Silagy. "For customers, it's translated to billions in fuel savings.

With GE's cutting-edge HA technology,

the Dania Beach Clean Energy Center is now one of the most fuel-efficient plants in the world, the operator stated. Flexible gas combined-cycle power plants like Dania Beach produce around-the-clock electricity, allowing FPL to continue its fast build-out of solar power sources.

Pilot H2 co-firing project in Okeechobee County

Looking ahead, FPL believes that – with some modifications – natural gas units may be fueled by hydrogen instead of by natural gas. Full hydrogen combustion would result in zero carbon emissions from the operation of these units, though the technology for this is not there yet. FPL is currently developing a pilot project that will test using green hydrogen to replace a portion of the natural gas at its power plant in Okeechobee County, Florida – which also utilizes GE technology.

GE is well positioned to help decarbonize power generation. The company's 7HA.03 gas turbine can burn up to 50% by volume of hydrogen when blended with natural gas – thanks to the DLN2.6e combustion system, also used

on 7HA.03 units installed at Dania Beach. Technical advances for H2-cofiring are hoped to reduce the carbon intensity of gas-fired power plants in the long run, turning the gas into a "destination fuel" and not just a "bridging technology."

Turbine tested and validated at Greenville

Testing of the 7HA.03 in Greenville was executed in parallel with the installation of the gas turbines at Dania Beach. GE validated the turbine control system settings and provided the adjustments to system software for improved turbine operability and reliability.

In addition, factory testing of GE's 7HA.03 gas turbine validated that it currently provides the lowest cost conversion of gas to electricity for 60 Hz grids. FPL and GE estimated savings of up to over \$330 million over the life of the project.

GE's 7HA.03 turbine benefits from a modular-based construction process—where large parts of the plant and its accessory are manufactured and shipped already assembled to the construction site. This modular approach led to enhanced plant economics and faster installation – approximately eight weeks less compared to a GE F-Class turbine. ■



Dania Beach Clean Energy Center

Wärtsilä helps Brazilian power plant meet PPA obligations

Performance guarantees, part of a full Operation & Maintenance (O&M) accord between Wärtsilä and the Brazilian utility Termocabo help a peaking plant in Cabo de Santo Agostinho, near Recife, meet its power purchase agreement (PPA) obligations. The plant is dispatched as reserve capacity to balance fluctuating renewable energy supply, with operational guarantees in effect from June 1.

Brazil first introduced Reserve Capacity auction in 2021. Based on the current rapid renewables build-out, the government's latest 10-year plan PDE2031 (Plano Decenal de Expansão de Energia) indicates the need for 14 GW of balancing capacity to be installed by 2031. The intermittency risk of wind and solar power sources can be minimised by using grid-balancing flexible power plants, hired and reimbursed through the Reserve Capacity auction.

One of these grid-balancing plants is the 48 MW plant, situated in the seaside town of Cabo de Santo Agostinho near Recife. It runs on three Wärtsilä 46 engines, which are covered by performance guarantees regarding their availability and fuel consump-

tion. These guarantees are vital for Termocabo to meet its PPA obligations, the utility said, specifying the O&M agreement remains in force until the current PPA expires in 2025.

The contract win follows on a similar agreement which ran from 2002 to 2015, showing the customers satisfaction with Wärtsilä's services. "It is very satisfying that after a gap of some years, Termocabo has once again asked us to take responsibility for operating and maintaining this plant. This renewed cooperation will enable Wärtsilä to advise and support them as they develop their plans for future developments as the energy landscape changes and modernises," said Jorge Alcaide, Energy Business Director, Region



Termocabo gas peaking plant in Cabo de Santo Agostinho

South, Americas, Wärtsilä.

Wärtsilä Brazil, established in 1990, and has operations in Rio de Janeiro and Manaus. To date, The Finish manufacturer has delivered 2.7 GW of power plant capacity in Brazil, of which 739 MW are currently covered by long-term service agreements. The company also converted 275 MW of oil-fuelled capacity to run on natural gas in Brazil. ■

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