



Blackouts across Iberia show vulnerability of 'island grids'

A countrywide blackout in Spain, as well as parts of Portugal and the South of France, on Monday has shown that so-called 'island grids' are more vulnerable. The outage was caused by anomalous oscillations in high-voltage power lines, triggered by extreme temperature variations in Spain.

A rare atmospheric phenomenon has been blamed for the power outage that disrupted industry and the daily life of over 50 million people across the Iberian Peninsula. Massive heat had led to 'anomalous oscillations in high-voltage grids which led to synchronisation failures across the interconnected European electricity network, causing successive disturbances and widespread outages.

Lack of synchronous generation

At the time of event, there was a lot of non-synchronous, renewable generation dispatching electricity in the Iberian network which made it more vulnerable. Synchronous power is normally provided



by conventional power stations, notably coal, gas and nuclear, which generate electricity at a constant feed, in synchrony with the frequency of the grid.

Analysts are not surprised by the event. "Countries that are on the edge of, and more isolated from the synchronous European grid tend to more easily see grid frequency deviations," said Montel

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Hybrid generation helps mitigate intermittency risks

Grid stability has become a key issue as EU member states push for industrial decarbonisation: Inherently intermittent power supply from wind and solar power sources could disrupt energy-intensive industries and CEOs hence increasingly resort to hybrid onsite generation to gain energy independence.

With Austria's electricity demand expected to increase by 50% by 2040, stable power supply for industrial operations of the essence. Austria currently generates over 75% of its electricity from renewables, but wind and solar power output depend on weather conditions.

As the renewables build-out progresses, grid operators face rising voltage and unplanned shutdowns of an increasingly decentralized fleet of power sources – leading to production losses in sectors like steel and chemicals. Frequent voltage



Steel-makers often resort to onsite CHP for stable electricity supply

swings can cause equipment damage and reduce the lifespan of industrial machinery.

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analytics director, Jean-Paul Harreman. "In island systems like GB and Ireland, or peninsular systems like Italy and Spain, the AC synchronous interconnectivity with other countries is much lower, leading to a more vulnerable grid as flexibility and resilience

has to mostly come from the inside," he explained.

The affected Transmission System Operators (TSOs) have not spoken out about what caused the outage. Portuguese grid operator REN said "extreme variations" in

Spain's temperature caused the power failure, though Spanish TSO Red Elctrica has so far given no reason for the blackouts, but was quick to assure customers that restoration of full power may take "6-10 hours" in Spain. ■

JERA's FY2024 revenue falls amid lower electricity prices

Japan's largest LNG importer and power producer JERA has seen revenue fall by 354.8 billion yen from the last year to 3,355.9 billion yen due to a lower income unit price in electricity sales. Profits fell by 215.7 billion yen amid a time lag in the company's fuel price adjustments as well as lower earn-

ings from overseas power generation.

Profit excluding time lag decreased by 4.9 billion yen from the last year to 143.7 billion yen, the Tokyo-based company said in a statement.

Over the past few months, JERA has entered new LNG sales and purchase

agreements with multiple Asian offtakers. Indonesia's largest utility PLN, for instance, in March started to procure LNG from the Japanese major JERA in a bid to decarbonise several decentralized power plants. Following a decade of delays, Indonesia launched a \$1.5 billion project to distribute LNG on a small scale to fuel dozens of power plants that currently run on diesel.

As for energy trading, JERA and its French joint venture partner EDF Trading will merge their Japanese power trading businesses into JERAGM, effective April 1, 2025. The new team of over 50 experienced professionals will operate out of the Coredio Nihonbashi building in Tokyo.

JERAGM has been set up as a joint venture between JERA (66.67%) and EDFT (33.33%) and the exclusive fuels optimiser for both shareholders. The integration of business draws on JERA's competencies as a leading utility in Japan, and EDFT's experience of the power and gas markets in Europe and the U.S. ■



JERA's Sodegaura thermal power station

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Many industries rely on continuous high electricity input. Even short interruptions or fluctuations can cause major financial losses: Steel makers' shift to electric arc furnaces, replacing blast furnaces, increases electricity demand and a power glitch during smelting can damage entire badges and cost up to €500,000 per incident. In the chemical Industry, processes like electrolysis require stable voltage levels. An unforeseen voltage drop or blackout can lead to product loss, with restart times of several hours.

Counting the costs

Economic costs of grid instability are immense, encompassing lost production, higher maintenance and repair cost of machinery and productivity loss. Even minor disruptions reduce efficiency, lowering output by 5-10% in some sectors. Battery stor-

age, for instance, can smooth out power fluctuations and provide backup in case of short-term outages. Smart Grids are another option, whereby real-time demand-response systems can adjust power consumption based on grid conditions.

On-site power generation has for long been used by energy-intensive industries which often built their own combined heat and power stations nearby their factories, often powered by fossil fuels. Sustainable solutions could entail industrial-scale solar, wind, or hydrogen fuel cells.

Grid modernization is urgently called for, but has often be held up by bureaucratic approval processes. Even if implemented in a timely manner, strengthening Austria's transmission network could cut instability risks by merely 40% — leaving plenty of scope for energy-intensive industries to take things into their own hands. ■

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Taurus Energy to implement first AGP XPAND upgrade in Iraq

Taurus Energy, part of privately-held Onex Group, will become the launch customer to implement the world's first AGP XPAND upgrade at the Bazyan power plant in Iraq. The upgrade will increase output and efficiency at the 1,250 MW combined-cycle plant.

Once retrofitted to all existing 9E.03 gas turbines, the technology could lead to a cumulative increase of 5 GW at a global level and more than \$100 million in fuel savings annually for the same baseline output, GE claims, assuming a fuel price of \$3/MMBtu and 4,000 hrs/yr of operation for the entire 9E fleet. Modelling indicates this could potentially raise profitability by up to \$310 million annually due to the new power generation capacity from the AGP upgrade.

The new technology is engineered to help gas plant power producers and industrial operators increase their 9E.03 gas turbines output by up to 7%, with an approximately 1 % of incremental efficiency. In addition, exhaust energy could increase by up to 2.6 percent to produce more steam or power, for combined heat and power (CHP) plants or combined cycle plants, like the Bazyan power plant.

Taurus's Bazyan CCGT is powered by four GE Vernova 9E.03 and two 9F.04 turbines,

which primarily run on natural gas and occasionally light fuel oil. The turbines have been engineered for base-load operations with an expected lifetime of 25-30 years.

The AGP XPAND upgrade is expected to enhance the current capacity and deliver additional much-needed electricity to the Kurdistan Region as well as nearby cities and governorates such as Mosul and Salahaddin.

Sheikh Saad Tayeb Hasan, founder & chairman of ONEX said the company has been utilising GE technology for over a decade. "By utilizing Kurdistan Region's natural gas resources and power generation capacity, we are laying the foundation to create an energy hub," he stressed, explaining: "Through projects like Bazyan, we can contribute to the efforts to meet local energy needs as well as transmit additional power to other parts of the country."

Built on technical improvements from the 9E.03 advanced gas path, the AGP XPAND components have evolved by making additional updates to the materials and sealing of AGP components. This enables a substantial increase the firing temperature which boosts electricity output and efficiency.

The components were engineered in Greenville, South Carolina, US and in GE Vernova's Engineering Center in Warsaw, Poland. ■



Avangrid helps restore power in Penn' State after storm

Iberdrola affiliate Avangrid is helping to restore power for more than 400,000 customers in western Pennsylvania following destructive thunderstorms and wind gusts of over 80 miles per hour (mph). Crews are helping to eliminate hundreds of thousands of outages together with the regional utility West Penn Power, part of FirstEnergy.

Avangrid is sending crews from its Connecticut subsidiary, United Illuminating (UI) after severe storms had swept the region of Western Penny on Tuesday evening, April 29.

"When severe storms impact other utilities' customers in neighboring states, while leaving our own customers unscathed, we are quick to jump into action to help restore outages as quickly and safely as possible," said Pedro Azagra, CEO of Avangrid.

A line of strong thunderstorms that stretched from Texas to New York had par-

ticularly severe impact on western Pennsylvania, where wind gusts of more than 80 miles per hour were reported. Hundreds of trees were downed at least three people were killed in connection to the storm, two of whom were electrocuted by downed power lines.

At the peak of outages, more than 500,000 customers across the greater Pittsburgh region and other areas of western Pennsylvania were with-

out power.

West Penn Power and other electric utilities in the region expect the restoration efforts to continue for several days. ■

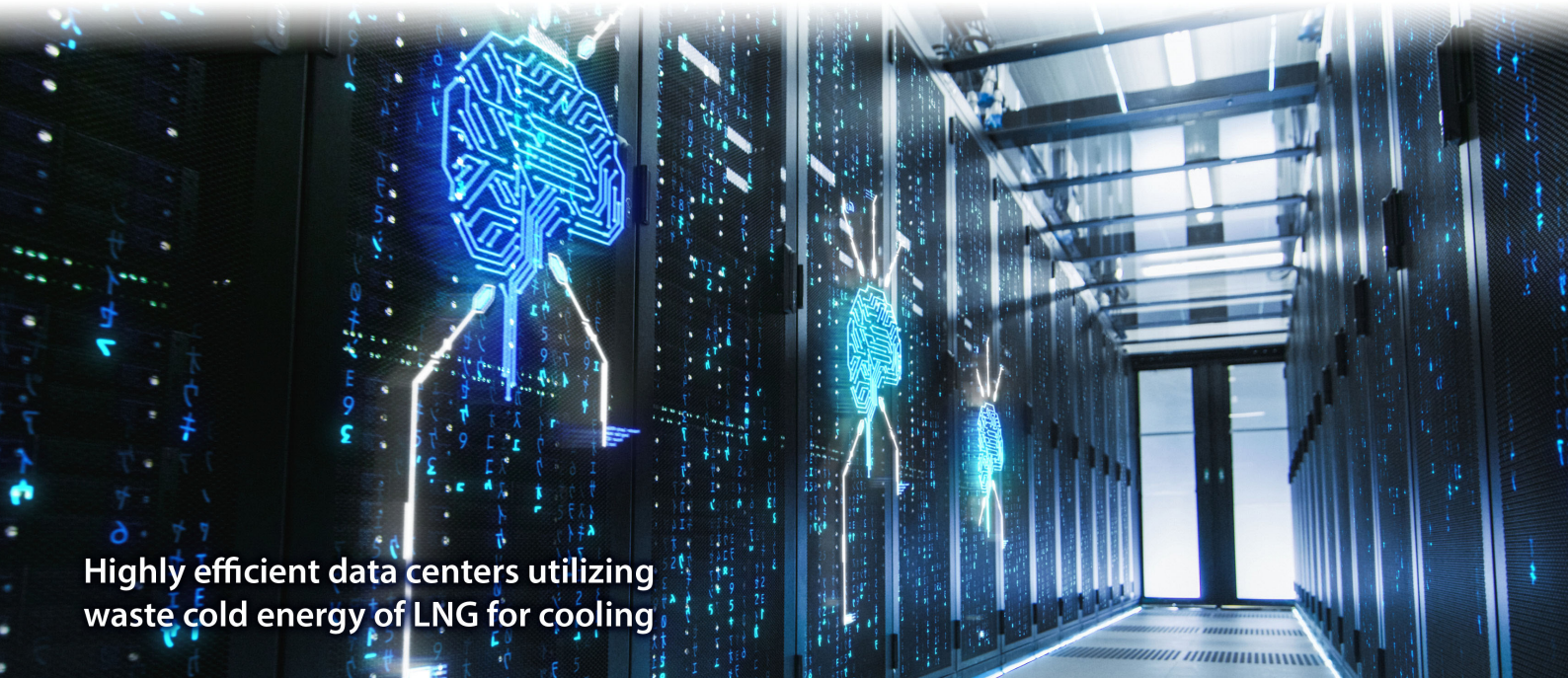




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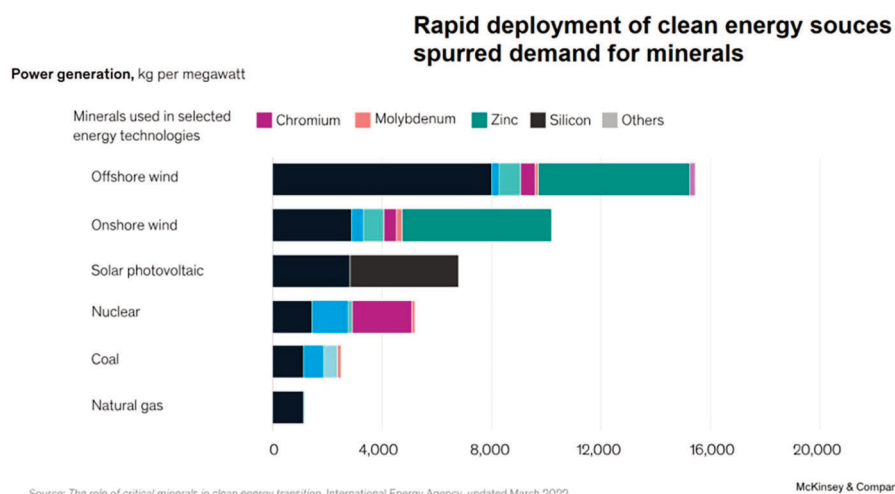
Rare earths shortage risks to undermine the energy transition

Lack of funding for new mining projects could reduce the availability of rare earth metals and minerals by 20-50%, creating shortages that impacts the production of batteries, McKinsey warns. Rising interest rates and less available finance made mining companies cut investment, with sector spending falling to around \$40 billion in 2022, despite soaring demand.

EV batteries and chargers alone are anticipated to consume over 50% of all available cobalt and rare-earth elements and 36% of nickel resources by 2030. Recycling could help recover some 10% of supply for minerals such as copper, lithium, and nickel by 2040.

McKinsey analysis shows commodity trading pools have nearly doubled year over year, reaching nearly \$100 billion in 2022 and metals and minerals will make up Mean increasing share of the value pool in the coming years. "Traders can capitalize on this opportunity by supporting increased liquidity and price discovery in rapidly evolving metals and minerals markets," Roland Rechtsteiner, partner at McKinsey said, suggesting commodity trading has grown more than 170% in value in just three years.

Yet investors are currently reducing funding for new mining projects due to low commodities prices and long lead times for new mines, exacerbating supply chain shortages for green technologies. "Mines take an average of up to 15 years to become operational and some projects planned today wouldn't begin production until about 2040," said Spencer Holmes, associate partner at McKinsey.



Concentrated supply-chains

Available supply mostly originates from China which already in 2009 reached a 98% in global supply of rare earth. Chinese company also quickly set up supply chains for other minerals vital for clean energy sources and now processes more than 40% of materials across most categories.

China's dominant position in clean energy supply chains means it could have an outsize impact on the market, analysts warn. Similarly, emerging electro states — for example, Australia (lithium), Chile (copper),

the Democratic Republic of Congo (cobalt), and Indonesia (nickel) — could influence the market for their respective minerals.

Metals and minerals producers are advised to negotiate long-term supply deals to pre-finance new mining projects, customize high quality metals to specific customer segments and differentiate their products (e.g. by offering greener alternatives). To avoid supply shortages, big energy companies could expand into the supply chain, e.g. by taking a stake in and metals and minerals producer. ■

BKV and Comstock to accelerate CCUS projects at Haynesville

BKV, one of the top 20 US gas producers, has teamed up with Comstock Resources to develop carbon capture, utilization and sequestration (CCUS) projects. The aim is to permanently sequester and store CO2 waste produced at Comstock's Bethel and Marquez gas processing facilities in Texas.

BKV Corp is the largest natural gas producer by gross operated volume in the Barnett Shale, while Comstock's operations are focused on the development of the Haynesville shale in North Louisiana and East Texas.

The agreement seeks to combine BKV's proven CCUS capabilities with Comstock's position as a leading producer in the Haynesville shale — a premier natural gas basin in Northwest Louisiana and East Texas with direct access to the LNG export corridor on the US Gulf Coast.

Terms of the prospective projects are subject to further negotiation and execution of one or more definitive agreements.

Chris Kalnin, chief executive of BKV called the collaboration with Comstock a

"compelling opportunity to showcase how our CCUS portfolio can enable other natural gas producers to utilize low-carbon infrastructure and operate more sustainably."

Carbon capture is widely seen as essential to sustainably produce and utilise natural gas, both for power generation and industry. "Industrial customers desire scalable, low-carbon energy solutions, and enhancing Comstock's infrastructure with innovative CCUS partnerships will deliver

exactly that," said M. Jay Allison, CEO of Comstock Resources. ■



Comstock rig at Haynesville Shale



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Egypt-Greece interconnector to get EBRD financing

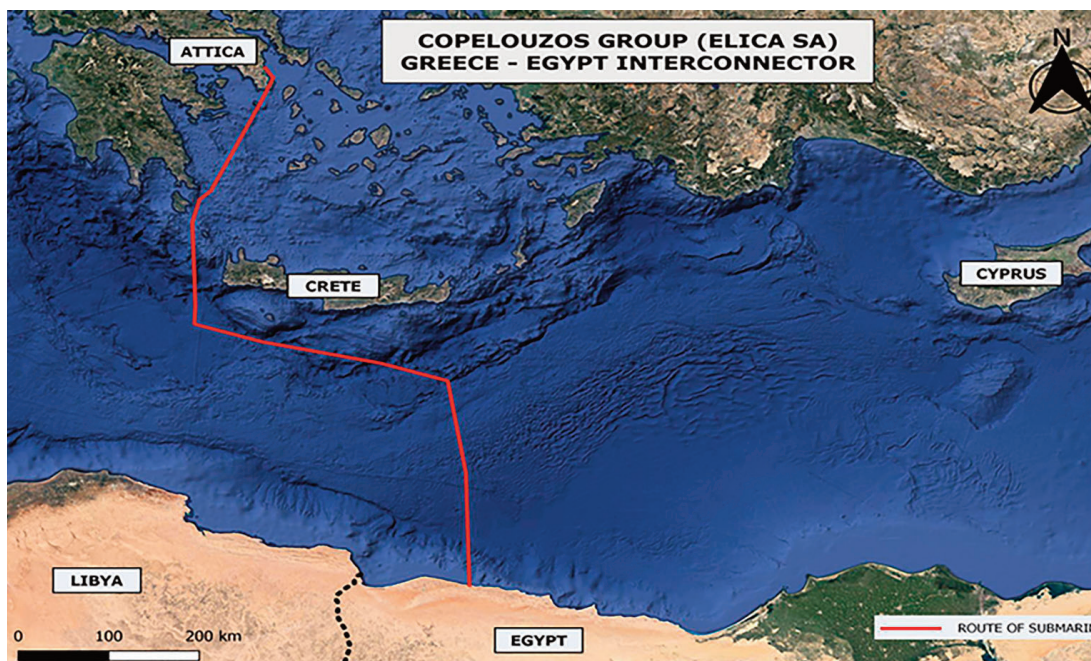
The European Bank for Reconstruction and Development (EBRD) and the European Union support the GREGY project, an electric interconnector between Egypt and Greece. A Grant Agreement was signed with ELICA Interconnectors, the developer of the power link, designated to transport renewable energy from the North African coast via Greece to northern Europe.

Egypt, as well as neighbouring countries, possesses exceptionally high-capacity factors in solar and wind energy. Part of this green energy will be transported to Europe via a submarine cable to decarbonise Greek industry and produce green hydrogen for sale to northern Europe.

The EU has set out supportive policies towards renewables and hydrogen as the bloc of states seeks to reduce its reliance on Russian natural gas. The green energy transition is meant to reduce natural gas consumption by 4.5 bcm annually and achieving a reduction in CO₂ emissions by 10 million tons each year.

CBA study and technical analysis

The Grant Agreement covers the parts of the funding for the first two studies of the GREGY project. The desktop study, determining the optimal routing of the submarine cable, and the comprehensive cost-benefit and technical analysis – both vital for fast



project implementation.

GREGY has already been recognized as a project of major geopolitical and environmental importance for the whole of Europe. Financing will come from the European Union's InvestEU Advisory Hub.

Ioannis Karydas, CEO of Copelouzos Group's renewable energy and energy storage business unit and CEO of ELICA Inter-

connector hailed the GREGY project as "a bridge of sustainable development, energy independence and peace."

"Through the Egypt-Greece interconnection, we are making a meaningful contribution to Europe's energy security, the decarbonization of our energy systems and the strengthening of the cooperation bonds between our peoples. ■

GE supplies transformers for renewables corridor in India

GE Vernova has been contracted by POWERGRID of India to supply over 70 high-voltage transformers and shunt reactors for a renewable energy corridor across India. The 765 kV class units will be manufactured at GE's Vadodara site, with deliveries starting in 2026.

POWERGRID, India's largest electricity transmission utility, has placed the order under a bulk procurement strategy. The equipment is meant to support high-capacity renewable power corridors in the states of Rajasthan, Gujarat, Karnataka, Tamil Nadu, and Andhra Pradesh.

Shunt reactors provide the grid with voltage control by absorbing excess reactive power, hence allowing for greater additions of inherently intermittent wind and solar projects. Renew-

ables are built-out at a fast pace under India's tariff-based competitive bidding framework.



GE high-voltage transformer in action

"This is one of the largest order intakes for GE Vernova's Electrification segment in India and a significant milestone for our Vadodara facility," said Ruchir Mayank, commercial leader of GE Vernova's Power Transmission business in India. Deliveries are expected to begin towards the middle of next year and continue through the end of 2027.

At Vadodara, GE has been designing, manufacturing and testing 765 kV class transformers and shunt reactors since 2009. To date, the Vadodara factory has manufactured and supplied more than 700 units across the country to ensure the reliable performance of the Indian power grid. ■

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