



## Invenergy commissions \$1 billion LNG-to-Power plant in El Salvador

US-based developer Invenergy and partners have commissioned the LNG-fuelled Energía del Pacífico (EDP) power plant at the Port of Acajutla in El Salvador. The \$1 billion project is the country's largest ever private foreign direct investment, with the 380 MW plant designated to provide 30% of El Salvador's electricity demand.

The EDP projects consists of an LNG-fuelled power station, a floating storage and regas unit – the 137,000-cbm BW Tatiana FSRU – and a 1.8-km subsea pipeline that connects the power plant to the FSRU. Developers also built two 230-kV electric transmission lines one of which connects to the Central American Electrical Interconnection System.

The LNG-fuelled plant will be dispatched for peaking power supply, enabling a rising build-out of renewable energy sources in El



Energía del Pacífico LNG-to-power plant

Salvador. EDP said it has long-term contracts with seven local electric distribution companies under power purchase agreements.

Financing for the project came from the US International Development Finance Corp, International Finance Corp, IDB Invest, Finnish Export Credit and KfW IPEX-Bank. "Bringing our Energía del

continued on page 2

## AG&P converts LNG carrier into FSU to import gas to the Philippines

Atlantic, Gulf & Pacific International Holdings (AG&P) has converted a Japan-built 137,512 cubic meter LNG carrier into a Floating Storage Unit (FSU) to facilitate gas imports for power stations at Batangas in the Philippines. The FSU will be part of the offshore-onshore PHLNG import terminal with an initial capacity of 5 mtpa, due operational in early 2023.

The floating storage unit will be docked into AG&P's land-based PHLNG regasification terminal at Batangas, home to several gas-fired power stations. The FSU will be capable of loading LNG at a peak rate of 10,000 cbm/hr and a discharge-to-shore peak rate of 8,000 cbm/hr made possible with the modifications done by Gas Entec, a subsidiary of AG&P.

Opening of the PHLNG LNG Regasification Terminal is scheduled for early 2023, capable to store natural gas onsite or sell it power generators and industrial customers.



LNG carrier ISH, converted to an FSU

"From day one, PHLNG will have scalable on-shore regasification capacity of 420 mmscf and almost 200,000 cbm of storage. The construction

continued on page 2

### AGENDA

#### COMPANIES

Wärtsilä's order intake up 36% in Q3 despite "challenging" market 2  
GE Power poised for low single-digit revenue growth in 2022 2

#### MARKETS

JERA restarts gas-fuelled Anegasaki power unit 6 to stabilise supply 3

#### POLICY

Incoming British PM urged to use remaining reserves to bridge gas gap 4

#### HYDROGEN

Chevron and partners study hydrogen project along US Gulf Coast 5

#### INVESTMENT

Green policies spur record CAPEX of American utilities; Fitch finds 7

Continued from page 1, top story

Pacifico project online during the pandemic (...) is a shining example of the opportunities that can be created when private initiatives have strong local government support."

said Invenenergy CEO Michael Polsky.

As the lead developer, Invenenergy realised the EDP project together with Grupo Calleja, VC Energy de Centroamerica and Quantum

Energy. To construct the project, Invenenergy worked with several partners, including BW LNG, BW Offshore, SAAM Towage, Boskalis, Wärtsilä, Elecnor, and Shell. ■

## Wärtsilä's order intake up 36% in Q3 despite "challenging" market

**The Finnish manufacturer Wärtsilä has grown its orderbook in the third quarter despite intensifying cost inflation and prevailing disturbances in supply chains. Total order intake increased by 36% to € 1,616 million and service order intake by 27% to €732 million, the Finnish company reported today, with CEO Hakan Agnevall highlighting "important orders for thermal balancing and energy storage solutions."**

Over 70% of thermal orders wins in the third quarter were related to grid balancing. "One of the proof points on how we integrate renewables with our flexible engine technology is the order of ten Wärtsilä 34SG gas engines to a Japanese power plant, where they will replace a 100 MW combined cycle gas turbine," Agnevall said. In addition, Wärtsilä will supply a combined 2 GWh for one of the world's largest solar-plus-storage project in California and Hawaii.

Equipment order increased due to a growing need for power plant retrofits, while the service business benefitted from a high utilisation of vessels and power plant, with customers showing increasing interest

in long-term agreements. New equipment sales grew by 49%, while services grew by 13% which resulted in a 30% rise in net sales to €1,433 million.

### Weak outlook

Looking ahead, the Wärtsilä CEO expect the demand environment in the fourth quarter to be weaker than in the pre-year period when order wins were at an all-time high. Equipment sales is rising relative to service sales, even though the company strives to boost business by moving to performance-based service agreements.

Cost inflation is anticipated to remain high, hence Agnevall vowed he will be simplifying Wärtsilä's organisation and address its cost structure. Higher prices for raw materials and supply-chain bottlenecks will lead to higher product prices in 2023 unless the Finnish manufacturer manages to substantially lower its own production costs and overheads. ■



## GE Power poised for low single-digit revenue growth, CEO says

GE Power, to be spun off into GE Vernova in early 2024, has posted a 14% rise in orders in the third quarter notably for HA and aeroderivative gas turbines. Looking into the fourth quarter, CEO Larry Culp says strong equipment and services sales sets the Power segment up to deliver its 2022 outlook of low single-digit revenue growth.

In the three months ending September 30, however, GE Powers revenues fell 12% to \$3.5 billion due to fewer turbine shipments and the continued exit of the company's coal business, the company said in its Q3 results. Price and transactional services growth helped to offset the lower-than expected volume of service outages in the Gas Power segment, allowing for an overall 6% rise in services. ■

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Continued from page 1

for two onshore tanks has already started and will be integrated into the main terminal in 2024," explained Karthik Sathyamoorthy, President of AG&P Terminals and Logistics.

### Rival import projects in the making

At Batangas Bay, several other LNG import and integrated power projects are at an advanced staged. Vires Energy is proceeding with a FLNG import unit with a capacity of 3 mtpa and an integrated 500 MW power station, which will be mounted on a barge. Targeted to be built and commissioned by January 2023, the floating power plant will be the largest units of its kind

in the Philippines.

Manila-listed First Gen is also fast-tracking an FSRU to ensure continuous gas supply for a combined 3,200 MW power generation capacity near Batangas City. For First Gen, one of the largest power providers in the Philippines, the timely start-up of the FSRU is crucial source fuel for four power stations which currently run on gas from the Shell-operated Malampaya field where production will cease by 2024.

Shell itself is also planning to deploy a leased FRSU at Tabango, Batangas, while simultaneously trying to divest its 45% operating stake in the large but fast-depleting Malampaya offshore gas field. ■

## JERA restarts gas-fuelled Anegasaki power unit 6 to stabilise supply

Japan's largest LNG importer JERA has resumed operation of unit 6 at its Anegasaki power station near Tokyo to have enough electricity generating capacity ready for the winter. The unit had been shut down in April 2021 when its utilisation rate declined due to soaring gas prices, and was initially meant to remain mothballed until February 2023.

**N**ow, JERA decided to revive the gas peaking unit and announced it will operate it as part of measures to provide additional power supply capacity for this winter. The restart was stipulated by the economy ministry's subcommittee for electricity and gas following discussions with the regional power grid operator.

Eager to keep prices down, the utility said it would "make every effort" to ensure a stable supply of affordable fuel to the 600 MW power station which is running on regasified LNG since 1979. Unit 5 at Anegasaki power station was also fired up today to supply auxiliary steam for the restart of Unit 6.

JERA will likely be remunerated for making extra capacity available at short notice.

Over the summer, Unit 5 had been on stand-by between July 1 and August 31, having won an auction to provide peakload power supply to balance for any shortfall. Inspections of Unit 6 in June had prepared the plant for resuming operations in the winter.

JERA, Japan's largest fossil fuel-based power generator, is owned jointly by Tokyo Electric Power and Chubu Electric. It is also the world's largest corporate LNG buyers with annual purchases of around 35 million tons as it provides fuel for a total of 26 power plants in Japan and imports LNG into 11 of the country's network of 37 terminals.

### LNG imports slide as generators switch to coal

Shipments of LNG to Japan have been falling as power generators replace the expensive fuel with thermal coal. Just 78 cargoes – 15 less than before – arrived at Japanese ports in September but costs came in at 878.17 billion yen (\$5.87bn) – 164.2% more than in September 2021. Provisional data published by the Japanese finance ministry shows

that Japan imported 5.32 million metric tons of LNG in September, more than 15% down month-on-months.

Generators switched to coal, with imports rising 6.2% since April. Though coal imports notched down 4.3% to 9.50 million tons in September, the finance ministry pointed out this was 200% more than in September 2021. The cost for last month's ample coal imports amounted to 506.14 billion yen (\$3.38bn).

### Gov' to buy spot LNG in case of 'emergency'

State-owned Japan Oil, Gas and Metals National Corp (JOGMEC) will buy spot LNG cargoes when private utilities cannot afford current sky-high prices. Under revised laws, the government could also mandate large industrial consumers to restrain their gas usage when supplies are scarce – prioritising the fuel for power generation.

A contingency plan, yet to be approved by Parliament, will empower the Japanese government to fund the purchase of LNG in the event of an emergency to avoid blackouts, while imposing demand-side response measures to restrict city gas consumption. With this law, Japan seeks to insulate its citizens and industry against serious disruptions in gas and electricity supply this winter.



Anegasaki power station near Tokyo

## Henry Hub gas spot price to fall below \$6/MMBtu as production rises

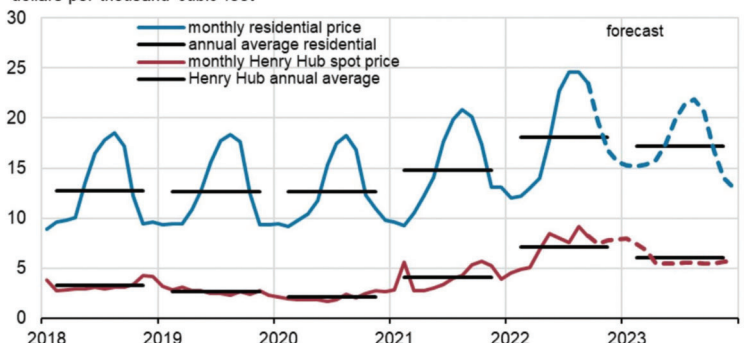
Fast rising US dry gas production will make the Henry Hub natural gas spot price fall below \$6.00 per million British thermal units (MMBtu) in 2023, down from \$7.40/MMBtu in the fourth quarter of this year, analysts reckon. More efficient fracking techniques boost marketed gas production, drive down prices and underpin LNG exports.

**I**n the third quarter, US dry gas production averaged 98.5 billion cubic feet per day (Bcf/d), up from 95.1 Bcf/d in the first quarter as horizontal drilling and hydraulic fracturing techniques become more efficient. Nearly 80% of all gas produced in the US comes from shale formations, and analysts at the US Energy Information Administration (EIA) expect production will rise to 99.1 Bcf/d in the fourth quarter, and further to 99.6 Bcf/d in 2023.

On the demand side, gas-burn in the electric power sector will decline in 2023 due to a higher renewable energy contribution. This could lead to an overall fall in consumption by 2.6 Bcf/d which would leave even more natural gas available for export. Over the past five years, US gas exports more than doubled just to increase by a further 26% in 2021 and this year.

Shipments of US LNG from the lower 48 states began in 2016 and has by now grown to over 54% of the country's total gas

U.S. natural gas prices  
dollars per thousand cubic feet



Sources: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022, and Refinitiv an LSEG Business



exports. Nearly all other gas exports go by pipeline to Canada and Mexico.

## Incoming British PM urged to use remaining reserves to bridge gas gap

Britain's incoming Prime Minister Rishi Sunak has been urged to use the country's remaining offshore gas and oil reserves in the face of Europe-wide gas shortages. "The UK needs to secure billions of pounds for offshore investments if it is to keep producing the gas, oil and offshore wind ... for the transition to net zero," said OEUK's chief executive Deidre Michie.

The trade body for the UK's offshore industries urged Sunak to "refocus attention on the crucial issues facing the nation, including helping people pay their winter energy bills, and keeping

the lights on." In 2021, oil and gas supplied 75% of the UK's total energy needs.

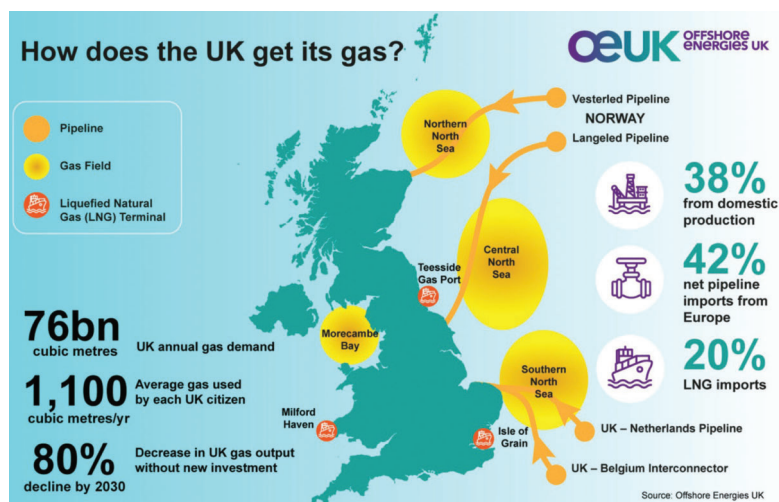
Gas remains Britain's largest energy source, with 78 billion cubic metres of gas consumed last year, supplying 43% of the

country's total energy needs. About 80% of UK homes rely on gas heating and 42% of the country's electricity is produced by burning gas.

Gas produced in UK waters, by contrast, is under the UK's control and so is a bulwark against such threats. In fact, OEUK research suggests the North Sea could produce only about half this amount even if all planned developments went ahead. The rest would be imported.

A new licensing round, announced on October 6, is meant to increase British gas supplies. NSTA, the offshore industry's regulator, has offered 898 'blocks' of the UK's seabed for exploration. Four key areas in the southern North Sea, Norfolk, Lincolnshire and Yorkshire have been identified as priorities for licensing.

Companies will now have time until January 12 to submit their bids, with results to be announced in late spring 2023. ■



## Germany to fund power price cap with windfall tax

The German economic ministry is considering a tax on power generator's "windfall profits," applicable retroactively from March 2022, to fund a cap on electricity prices. The government will estimate reference operating costs for renewables, nuclear and lignite-fired power plants, and skim off 90% of every euro earned beyond that. Gas- and hard coal-fired power plants will be exempt.

The permitted proceeds for power producers would consist of their estimated technology-specific reference cost plus a safety margin of €30/MWh, together with an additional minimum of €10/MWh for electricity sold on the futures market, a ministerial paper reads. The reference would hinge on generating technology: For offshore wind, it cost could be set at €100/MWh and for nuclear at €40/MWh.

The minister claims that levying a 90% tax on so called "coincidental profits" – amassed by power producers since the start of Europe's energy crisis in the wake of Russia's war on Ukraine – would "guarantee that market signals remain intact."

The windfall tax would be used to fund the ministry's proposed gas and electricity price brakes, to be presented at a cabinet meeting on November 18.

The relief measure is meant to grant electricity consumers a lower price for a fixed share of their estimated use in 2021, though the exact share of electricity offered at reduced rates has not been set yet. Plans are to design the power price brake on the blueprint of the existing gas price brake, which caps prices for 80% of the previous year's consumption.

Municipal utilities have dismissed proposal. "We consider a retroactive application from 1 March 2022 unacceptable," VKU head Ingbert Liebing said, warning such a

move could undermine investor trust in Germany's energy sector. The renewable power industry said the government's planned market intervention comes at a very bad time, when auctions for renewables are undersubscribed as investors are deterred by slow licensing procedures, a lack of construction sites and supply chain bottlenecks. ■



## NEWS NUDGES

### Bavaria's CSU wants nuclear extension until 2024

Nuclear backup power capacity is vital to ease Germany's tense supply situation, Bavaria's CSU party argues. Rebuking Chancellor's Olaf Scholz' nuclear run-time extension until April next year as "short-sighted," the Conservatives want to keep the remaining three nuclear plant running until at least 2024 as burning gas for power generation has become uneconomical in the face of high fuel prices.

### Iran-made turbines for Russia

The CEO Iranian Gas Engineering and Development Company, Reza Noushadi, has revealed 40 locally-made gas turbines will be exported to Russia. Iran can produce around 85% of the equipment needed in the gas and power generation business on its own, he claimed, and in spring the Kremlin exempt Iranian-made MGT-70 gas turbine units from value added tax when imported.

## Chevron and partners study hydrogen project along US Gulf Coast

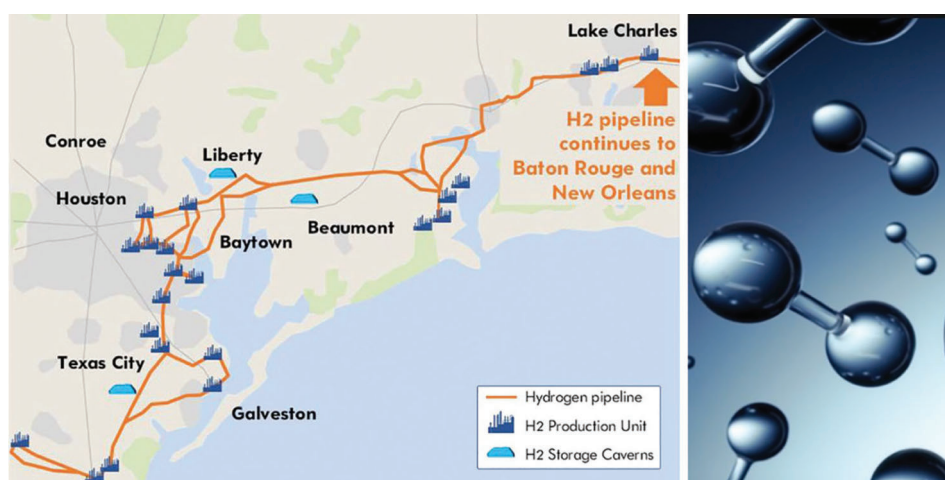
Chevron, Air Liquide, LyondellBasell, and Uniper are evaluating the development of a hydrogen and ammonia production facility along the US Gulf Coast. Uniper could become one of the first large-scale offtakers, with CEO North America Marc Merrill disclosing plans to ship about 1 mtpa of ammonia to Wilhelmshaven in Germany by 2030.

The study will look at producing hydrogen from natural gas through steam reforming with subsequent CCS, as well as renewables hydrogen via electrolysis. If realised, the project could make use of Chevron's pipeline infrastructure and Air Product's hydrogen network along the US Gulf Coast to supply lower carbon and renewable hydrogen to local industrial clusters. Likewise, ammonia infrastructure could support exports to both Europe and Asia Pacific.

Eager to ship green fuels to Germany, Marc Merrill, CEO of Uniper in North America said: "Uniper is committed to the green expansion of our Wilhelmshaven LNG receiving terminal and expects to receive and store roughly 1 mtpa of clean ammonia at the port by the end of the decade. U.S. Gulf Coast supply from this initiative can be critical to meeting that goal."

Starting from December 23, Uniper's chartered floating storage and regas unit

(FSRU) at Wilhelmshaven is meant to be ready to take deliveries of LNG cargoes, but the terminal is meant to switch to hydrogen and ammonia imports from 2028 onwards. The import terminal for green ammonia that is planned will be equipped with an "ammonia cracker" for reconversion of the ammonia to green hydrogen and nitrogen. ■



## Williams to sell H2 produced in Wyoming to Pacific Northwest from 2025

US pipeline operator Williams and clean energy investor Daroga Power are looking for offtakers of clean hydrogen produced in Wyoming, targeting deliveries from 2025. Williams also wants to use its nationwide gas pipeline network to blend hydrogen and transport it to the Pacific Northwest as the US Inflation Reduction Act offers a 10-year tax credit for clean hydrogen production units.

Incentives begin at \$0.60 per kilo for producing hydrogen in a way that captures slightly more than half of SMR process carbon emissions. The maximum tax credit, \$3 per kilo, is paid for hydrogen produced from renewable energy sources. "We expect the commercialization and cost-competitiveness of hydrogen to take hold as Inflation Reduction Act incentives seed market growth Northwest Pipeline," said Chad Zamarin, Williams' VP for Corporate Strategic Development.

The tax incentives made Williams evaluate ways to produce hydrogen in Wyoming and transport it via its 4,000-mile bi-directional Northwest Pipeline to customers along the US Pacific coast. "The potential to blend hydrogen into our existing natural gas stream is a significant advantage," he noted as "we can distribute the clean fuel



The Northwest Pipeline will transport H2-blends

to our customers without having to invest into new pipelines." ■

## Centrica and HiiROC to inject hydrogen at Brigg gas power station

Centrica, the owner of British Gas, will inject hydrogen into an emergency gas-fired power station at Brigg, Lincolnshire, as part of a UK first trial, running over 12 months from the third quarter of 2023. No more than 3% of the gas mix will initially be hydrogen, rising to 20% incrementally over the course of the trial.

The 49 MW gas power plant at Brigg is dispatched to meet demand during peak times or when generation from renewables is low, typically operating for less than three hours a day. Injecting hydrogen into Briggs' combustion process will be a first step to decarbonise peaking plants. "Longer term, the vision is to move towards 100% hydrogen [co-firing] and to deploy similar technology across all gas-fired peaking plant," Centrica said.

HiiROC will supply the hydrogen for Brigg by converting biomethane, flare gas or natural gas into clean hydrogen and carbon black, through a Thermal Plasma Electrolysis process. This technology results in a low carbon, or potentially negative carbon, 'emerald hydrogen'.

The trial is partially funded by the Net Zero Technology Centre (NZTC), which has given 20 projects a total of £8 million through its Open Innovation Programme, and ahead of the trial, Centrica has increased its stake in HiiROC to approximately 5%. ■



Brigg gas peaking plant in Lincolnshire



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## Siemens Energy supplies hybrid drives system for US LNG plant

Northeast Energy Center (NEC) and Chart have selected Siemens Energy to supply a gas/electric hybrid drive system for NEC's LNG plant being built in Charlton, in Massachusetts' greater Boston area. The facility will receive gas from the Tennessee Gas Pipeline system and liquefy the fuel for delivery by truck to LNG peak-shaving power stations across New England.

During the winter, New England depends on imported LNG. The NEC facility is expected to produce a baseload of 170,000 gallons of LNG per day for Boston Gas under a firm contract and up to 250,000 gallons per

day to other utilities. The plant has an onsite LNG storage capacity of 2 million gallons.

The hybrid drive system combines an industrial gas turbine, compressor and electric motor-generator to ensure stable to ensure stable and efficient operation of the plant's main refrigeration/liquefaction train. The gas turbine's output will decrease when LNG production increases to 250,000 gallons per day on hot summer days when the motor-generator will function as a motor to supply additional power to the compression system.



Render of NEC's LNG plant in Charlton

Available power from gas turbines decreases as the ambient temperature increases. As a result, units installed at industrial facilities are often oversized to ensure sufficient power during the hot and humid weather. But the same gas turbine may generate much more power during cold time than is required, leading to reduced efficiency and increased emissions.

Hybrid drive refrigeration compressor systems solve to this problem by combining an electric motor-generator with a gas turbine. This gives NEC an active tool in demand side management and reduces its costs and the need to purchase electricity from the grid. ■

## Green policies spur record CAPEX of American utilities; Fitch finds

Carbon-reduction policies make US utilities spend billions to retrofit fossil power stations, build-out renewables and upgrade the grid. Companies with the largest rise in capital expenditure in 2022-2024 are Dominion, with a 78% boost in CAPEX to \$30 billion, followed by NextEra Energy with a 32% increase to \$54 billion, Fitch Rating finds.

Richmond-based Dominion announced it expects to spend a total of \$72 billion from 2020 through 2035, with \$26 billion of that coming in the 2021-2025 period. In a push to clean energy sources, Dominion plans to increase investments in offshore wind to \$21 billion and spend similar amount on new solar power installation.

Energy storage, to balance intermittent renewable electricity on the grid, will cost another \$4 billion. This adds to expenses of an overall modernisation of the power transmission grid at up to \$15 billion. Costs for extending Dominion's nuclear power plants could add up to \$4 billion over a substantial short timeframe.

NextEra Energy, meanwhile, since 2000 spent nearly \$162 billion in its regulated and long-term contracted renewables businesses. Growth of the company's operating cash flow has closely tracked the growth of our capital expenditures, both rising about 11% over the past twenty years.

Balance sheet strength remains NextEra



Energy's clear focus, as reflected in its conservative use of debt – the lowest amongst its peers.

American Electric Power (AEP) plans to make a \$40 billion capital investment in the years through to 2027, of which \$9 billion will be spent on renewables. The utility also earmarked \$26 billion to upgrade its power grid.

"Nearly all of our capital will be allocated to our regulated businesses, and 90% of our future investment will focus on wires and renewables," AEP president and chief financial officer Julie Sloat explained. Over the summer, AEP disclosed plans to divest some of its contracted, unregulated renewable assets. The sales process is ongoing and set to close in the second quarter of 2023. ■

## NEWS NUDGES

### ACWA Power eyes hydrogen projects in South Africa

Saudi investor and developer ACWA Power and South Africa's state-owned development financier IDC have agreed to explore the joint development of green hydrogen and its derivatives in South Africa, where ACWA already realised two concentrated solar power projects. The potential value of the cooperation is estimated at \$10 billion.

### Cummins to manufacture electrolyzers in Spain

Cummins is about to start building a new gigawatt PEM electrolyzer manufacturing plant in Guadalajara, Spain, with construction due complete at the end of 2023. The 20,000 square-meter factory will house system assembly and testing and will initially produce 500 MW of electrolyzers per year, scalable to more than 1 GW per year.

### Gecko robots transform infrastructure inspections

Gecko's wall-climbing robots, equipped with Siemens Energy ultrasonic inspection software, are transforming how installed power gen equipment is maintained. Equipped with lasers and HD cameras, the robots scan critical infrastructure for changes in thickness, cracks, corrosion and other forms of degradation to predict when failures will occur and when repairs will be necessary.

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