

# ***WORLD POWER SYSTEMS REVIEW***

***15 July 2022***

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## **Cost of New Renewables Temporarily Rises as Inflation Starts to Bite**

The cost of new-build onshore wind has risen 7% year on year, and fixed-axis solar has jumped 14%, according to the latest analysis by research company BloombergNEF (BNEF). The global benchmark levelized cost of electricity, or LCOE, has temporarily retreated to where it was in 2019. Cost rises are linked to increases in the cost of materials, freight, fuel and labor.

BloombergNEF's estimates for the global LCOE for utility-scale PV and onshore wind rose to \$45 and \$46 per megawatt-hour (MWh), respectively, in the first half of 2022. Despite losing some ground, this still marks an 86% and 46% reduction since 2010 in nominal terms. Global benchmarks conceal a range of country-level estimates that vary according to market maturity, resource availability, project characteristics, local financing conditions and labor costs. The cheapest renewable power projects in the first half of 2022 were able to achieve an LCOE of \$19/MWh, as in best-in-class onshore wind farms in Brazil, and \$21/MWh for tracking PV farms in Chile, and \$57/MWh for offshore wind in Denmark. If the offshore transmission costs are excluded, the latter estimate falls to \$43/MWh.

Despite temporary cost rises for renewables, the gap to fossil fuel power generation continues to widen due to fuel and carbon prices rising even faster. New-build onshore wind and solar projects are now around 40% lower than BNEF's global benchmarks for new coal- and gas-fired power. The latter cost at \$74 and \$81 per MWh, respectively. While demand for low-carbon technologies in the energy sector bounced back strongly in the second half of 2021, supply has struggled to keep up. Global supply chains were weakened by investment deferrals, staff layoffs, early retirement of assets and lockdowns. Trade flows have been disrupted by challenges in logistics and transportation, trade barriers, and a re-wiring of relationships following Russia's invasion of Ukraine.

Shipping rates from Asia have fallen from their peak in September 2021 but are still five times higher than in 2019. Shipping routes from Asia are critical to deliver solar panels, inverters, batteries and other components. More recently, labor costs started to rise. In the US, labor costs 16% more than 18 months ago. Since February 2022, the price of key metals, including aluminum, copper, cobalt and molybdenum has dropped, but remains relatively high. Amar Vasdev, a co-author of the report at BNEF, commented: "These cost hikes mark a rough patch for renewables, but not an inflection point. We see a return to long-term technology cost decline trajectories as demand continues to be strong, supply chain pressures ease and production capacity, particularly in China, comes back online."

The battery storage sector is particularly sensitive to commodity price volatility. Our battery LCOE benchmark sits at \$153/MWh today, up 8.4% compared to 1H 2021. Prices for lithium carbonate, one of the key inputs for lithium-iron-phosphate (LFP) battery systems, surged 379% over the past year. Materials hedging for projects commissioned in 1H 2022 is delaying the impact of rising material costs. BNEF's sensitivity analysis shows that system costs subject to 2022 commodity prices should be 22% higher year-on-year at \$323/kWh in June 2022, compared with \$264/kWh in June 2021. However, projects commissioned over the last six months would have likely hedged their supply during 2021, before the steep rise in material costs.

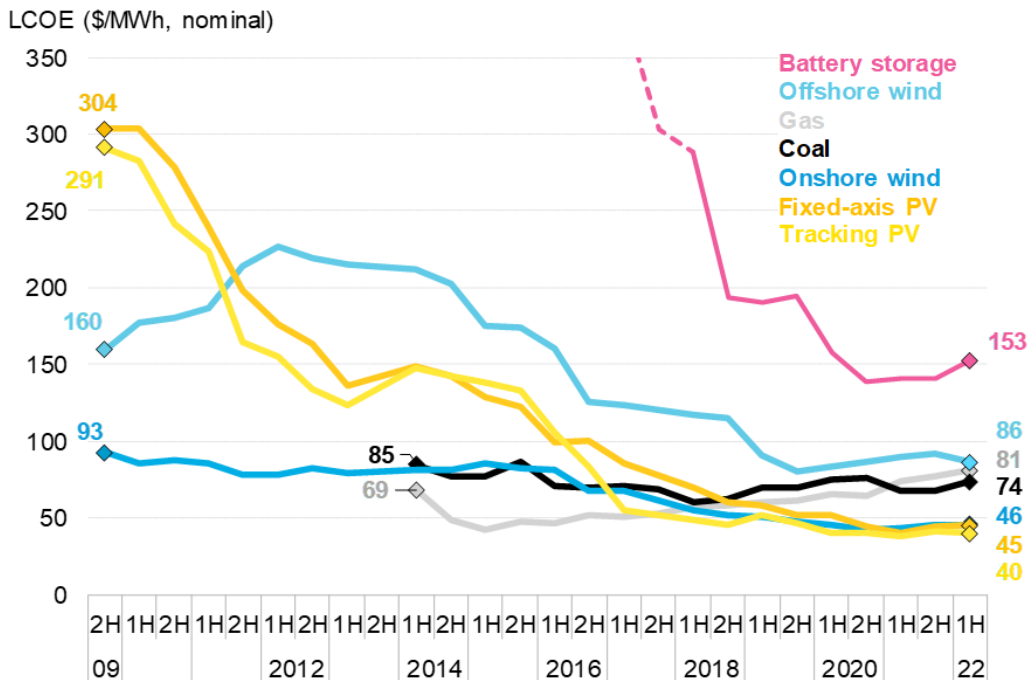
Renewables remain the cheapest source of new bulk power in countries comprising two-thirds of the world population and nine-tenths of electricity generation. David Hostert, global head of economics and modeling at BloombergNEF said: "Low-carbon technologies may be insulated from an economic downturn, but they are not isolated. There is also a risk that lesser-developed economies will be disproportionately affected by price hikes. Leading up to COP27 in Egypt in November, extra attention should be paid to these markets as it

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will be crucial to make sure they don't fall behind and lose valuable time in the race to net zero."

Figure 1: Global levelized cost of electricity benchmarks, 2009-2022



Source: BloombergNEF. Note: The global benchmark for PV, wind and storage is a country-weighted average using the latest annual capacity additions. The storage LCOE is reflective of a utility-scale Li-ion battery storage system with four-hour duration running at a daily cycle and includes charging costs.

BloombergNEF  
<http://bnef.com/>

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## UK Grid Prepares to Pay Firms Cash to Cut Power Use Next Winter

National Grid Plc is asking UK companies how much electricity demand they will be able to cut next winter to help keep the lights on.

The network manager sent a request to some firms last week, asking for details and how much they would need to be paid to reduce operations, according to a document seen by Bloomberg. It didn't disclose how many companies were asked. National Grid is exploring all the options it has available to avoid blackouts this winter as the gas crisis threatens security of supply across Europe. Britain relies on the fuel for more than a third of its power generation, which would be at risk if Russian flows to Europe stop and stores run dry. "To establish the viability of a commercial national demand service, the Electricity System Operator would like to know the likely megawatt volume suppliers could aggregate," National Grid said in the document.

National Grid floated a price range for potential payments, ranging from £100 (\$121.41) a megawatt-hour to as high as £6,000, according to the document. A service is also being worked on for households to receive payments for reducing electricity use at peak times. This would be available to 27.8 million homes and small business with smart meters. Many companies have on-site generation, like diesel generators that they use for back up in case of a power cut. These could be used temporarily reducing the demand for power from the grid. National Grid declined to comment.

Bloomberg  
<http://www.bloomberg.com>

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## **Massive pumped-hydro storage facility comes online in Switzerland**

Swiss renewable energy producer Alpiq announced last week that a 900 MW pumped-hydro storage facility built in Finhaut, in the canton of Valais, Switzerland, has started commercial operations. The hydropower station is owned by Alpiq itself (39%), Swiss Federal Railways (36%), Industrielle Werke Basel (15%), and Forces Motrices Valaisannes (10%). Its construction started in 2008 and it uses two different water reservoirs at the Émosson Dam, which was completed in 1974.

Located in a cave 600 m underground between the Émosson and Vieux Émosson reservoirs, the Nant de Drance power plant relies on six pump turbines, each with a power capacity of 150 MW. It uses the Émosson and Vieux Émosson reservoirs to operate. The water stored in the upper reservoir of Vieux-Émosson, which has a storage capacity of 227,000,000 m<sup>3</sup>, or 20 million kWh, falls into the underground power station via two vertical shafts that are 425 m high. The project was built at a cost of approximately CHF 2 billion (\$2.09 billion) and saw the participation of 60 enterprises. It required the excavation of 400,000 m<sup>3</sup> of rock and the drilling of 17 km of galleries.

*[pv-magazine](http://www.pv-magazine.com/)*

<http://www.pv-magazine.com/>

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## **Australia breaks ground on energy infrastructure digitalization**

Enzen Australia has secured its first engagement in an ambitious strategy to digitalise the energy infrastructure of Australia through smart IoT solutions. The company has announced a new partnership as operational efficacy is becoming more of a priority for utilities seeking to maximise the efficacy of infrastructure, as called for by an increasingly digitalised industry.

The collaborative moves will see Enzen Australia deploy an Internet of Things (IoT) Living Lab in East Kimberley, Western Australia. The IoT solutions will be rolled across Lake Argyle, Kununurra and Wyndham by Enzen and NNNCo. To launch headway on its planned digitalisation efforts in Australia they have entered into a three-year partnership with electricity utility Horizon Power alongside a collaboration with investee company NNNCo. According to Enzen Australia, the Horizon Power IoT Living Lab is flexible, cost-effective and can be scaled at speed, complementing and extending control systems such as SCADA.

This versatility is stated as an advantage for the utility, which reportedly has geographically dispersed customers and is in need of safe, sustainable and efficient methods to ensure resilient and reliable power supply to consumers. Dileep Viswanath, CEO of Enzen Australia, stated in announcing the partnership: "Our vision is to create the smart, sustainable networks of the future in Australia through digitalisation, innovation and collaboration. The technologies and architecture used in the IoT Living Lab will enable utilities to understand the condition and performance of their assets and surrounding environments more accurately and in real time. "We are delighted to secure our first engagement with this very exciting innovation and look forward to replicating it in new territories across Australia, accelerating the digital transformation of the country's power grids."

The aim of the three coming together is to enhance the operation, maintenance and performance of grid assets in these remote areas. Horizon Power, Enzen Australia and NNNCo will start rolling out the infrastructure across the East Kimberley region in July, with the IoT Living Lab expected to be transmitting data by September 2022.

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### **Polish PM: The green transition cannot come at the cost of European security**

*The writer is prime minister of Poland*

Russia's brutal attack on Ukraine has cast a shadow over the dreams shared by hundreds of millions of Europeans of building a secure and prosperous future based on sustainable and equitable development. Regaining stability and achieving decent living conditions for the people of Europe now requires abandoning some important assumptions, especially where energy policy is concerned. Simply put, we are witnessing the formation of a new energy order in both Europe and the wider world. And in this new order we must be able to balance many different interests.

We wanted low-cost raw materials, freedom from dictatorship, clean energy and socially inclusive economic growth. But after the Russian invasion of Ukraine, we have instead increasingly expensive raw materials, dependence on a criminal regime for them, instability and rising energy poverty. Inflation in general and the sharp rise in the price of energy in particular are the direct results of Russian aggression.

Until recently, the EU's energy policy was concerned solely with climate change. Today, other member states agree with Poland, which has long emphasised the need to diversify energy sources, build up gas reserves and wean ourselves off Russian fossil fuels. In addition to climate protection, the energy security of countries is now paramount. This is a message I have conveyed to other EU leaders on behalf of all Poles and Europeans concerned about their future.

The energy sector must be understood in a wider context and the issue of security must take priority. Poland recognises the importance of fighting climate change. However, we must do everything possible to ensure that the virus of neo-imperialism does not develop in our own backyard. Left unchecked, it will threaten our entire continent. Vladimir Putin's energy blackmail and the war in Ukraine are already contributing to a significant increase in electricity prices, and a significant increase in inflation. Europe has a very important lesson to learn. It must drastically reduce the costs of CO<sub>2</sub> emission allowances, which are a decisive factor in energy prices and which have risen considerably in recent years. Five years ago, the cost of emitting a tonne of carbon dioxide was well below €10. Currently it stands at between €80-€100. Such high costs make it difficult for manufacturing companies to invest in the development of new green technologies, such as renewable energy or hydrogen.

Rather than stimulating the development of green energy, the current Emissions Trading System (ETS) drives inflation and threatens to send millions of citizens into fuel poverty. That is why the Polish government has long called for changes that will block artificial increases in energy prices driven by financial speculators. At several European Council summits, I have argued that we must put an end to such speculation. This pressure has paid off. Today it looks as if our proposals will be implemented. But this is only a first step. It is not enough to exclude financial institutions from trading in the EU ETS. The ETS must be stabilised at a much lower level. We must introduce a mechanism to stabilise its price permanently, thereby making it far easier to plan new investments.

The next step is to revise plans to extend the ETS to other sectors of the economy. This is already a big move and yet, in the difficult conditions in which we currently find ourselves, we must do even more. The Polish proposal is to freeze the price of CO<sub>2</sub> emission allowances at €30 for at least one year, with the possibility of extending it for two. If we allow a sharp rise in the price of services, we would be adding fuel to the inflationary fire. In the



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midst of an energy crisis this could lead to the impoverishment of entire social groups, exacerbating feelings of unrest. The EU has to acknowledge that if it does not take a step in the right direction, it may compromise its energy policy completely. The green transition cannot come at the cost of basic security. And if the situation forces us to do so, then we must not hesitate to return temporarily to traditional sources of energy. Even if a short-term return to coal means postponing our ambitious climate goals, it may be a necessary condition of maintaining a strong European community capable of resisting Russia and supporting Ukraine.

A philosopher once wrote that a chain is only as strong as its weakest link. The current geopolitical situation should prompt us to strengthen every weakness in our energy system. Only in this way will we successfully overcome today's difficulties and realise the promise of a better tomorrow.

*Financial Times*  
<http://www.ft.com/>

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## **To avoid blackouts, California may tap fossil fuel plants**

Looking to avoid power blackouts, California may turn to the one energy source it's otherwise desperate to get rid of: fossil fuels. A sweeping energy proposal Gov. Gavin Newsom signed June 30 puts the state in the business of buying power to ensure there's enough to go around during heat waves that strain the grid. But some critics say the method of getting there is at odds with the state's broader climate goals, because it paves the way for the state to tap aging gas-fired power plants and add backup generators fueled by diesel.

The debate highlights the challenge some states are facing as they scramble to address heat waves fueled by climate change without compromising on their pledges to transition to non-fossil fuel energy sources like solar and wind. California gets most of its energy from renewable sources during the day, but doesn't yet have the storage to dispatch enough solar power after the sun goes down. The bill aims to speed up the building of more renewable energy and storage facilities by removing local governments from permitting decisions. Supply chain issues are also slowing down building.

Democratic state Sen. Dave Min noted the tricky position the state is in by potentially needing to rely on fossil fuels and their planet-warming emissions to deal with the heat waves driven by climate change. "That's the obvious conundrum that we're in," said Min, who represents Huntington Beach, a coastal community home to a gas-fired power plant. The problem isn't unique to California. In New Mexico, a coal-fired power plant was slated to close its last two units Thursday. But a major utility asked the state to keep one unit open through September to meet demands during hot summer months since solar and battery storage projects that were meant to replace the lost capacity have been delayed.

State energy officials warned earlier this year that the state risks an energy shortfall equivalent to what it takes to power 1.3 million homes on the summer's hottest days. Newsom and lawmakers are desperate to avoid a scenario like August 2020, when hundreds of thousands of people temporarily lost power because there wasn't enough supply to go around. Newsom's solution centers on creating a "strategic reliability reserve" run by the Department of Water Resources. The water agency has been given that role because it is a major producer and user of power through its dams and operation of the state's water pumping system. This summer, the department could reimburse utilities if they have to buy extra power and add temporary power generators, including those powered by fossil fuels. Any diesel-powered generators couldn't be used past 2023.

Beyond that, the water department would be able to build new energy storage and zero-emission generating stations. It could also spend state money buying power from

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coastal gas-fired plants that are set to close in 2023. The plants were first set to close in 2020. Likewise the department could keep buying power from the state's last remaining nuclear plant if it stays open beyond its 2025 closure. Newsom said in a signing statement that he would direct state agencies to "ensure clean energy resources are prioritized over fossil fuels." Sen. Henry Stern, a Democrat from Los Angeles County, said while the bill doesn't allow for the extension of fossil fuel plants, it's a question lawmakers will have to address. "What this bill is doing is buying time," he said. Republican state Sen. Shannon Grove, who represents fossil fuel-rich Bakersfield, said the legislation proves California needs oil and gas. "If we don't have these gas-powered plants to fire up when we need them you will not be able to flip the switch and get electricity," she said.

Environmental groups, meanwhile, said the state wouldn't need to rely on fossil fuels as a backup if it had moved faster to build up renewable resources and expressed concern that the bill doesn't put enough guardrails on the water department's power. The department would not have to comply with California's landmark environmental law to move forward with new projects. "The state is saying we need to rely on fossil power and they're not fully admitting that it's because of this lack of ambition," said Alexis Sutterman, energy equity manager for the California Environmental Justice Alliance.

Andrew Campbell, executive director of the Energy Institute at the University of California, Berkeley's Haas School of Business, said the water department's new authority to buy power is "very expansive and open ended" and something that "really deserves scrutiny." California, he said, is likely on the forefront of a challenge that will probably hit other U.S. states as they move away from fossil fuels and boost how much energy is needed from the grid. "Developing an electrical system that is very clean and doing that reliably is a challenge that hasn't been solved anywhere," he said. "And California, because it's so far along with renewable energy development, is hitting that challenge sooner than some other places."

*Power Engineering*  
<http://www.power-eng.com/>

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## **Korea's power demand hits new high in June amid hot weather**

Korea's electricity demand touched a fresh all-time high in June as the country was struck by an early heat wave, data showed Monday. The country's maximum power demand averaged 71,805 megawatts (MW) last month, up 4.3 percent from a year earlier and marking the highest tally for any June, according to the data from the Korea Power Exchange. June also represented the first time the figure has surpassed the 70,000-MW level for the month.

The power exchange said unusually hot weather combined with the economy's recovery from the fallout of the coronavirus pandemic to push up power demand in Asia's fourth-largest economy last month. An early heat spell has been gripping the country since late June, with even the nighttime temperature in the Korean capital of Seoul remaining above 25 C on June 26, the first-ever such phenomenon in June.

The heat wave prompted more offices and households to consume power for air conditioning, sending the country's reserve electricity ratio to 9.5 percent on June 23, hovering below the 10 percent level for the first time this year. Industry watchers say the country should have a reserve ratio of 10 percent or more in order to maintain a stable power supply and prepare for emergencies. But they voiced concern that Korea may have a hard time supplying electricity in a stable manner, as this summer is forecast to be hotter than a year earlier. According to the industry ministry, Korea is likely to have the season's maximum power demand of 91.7-95.7 gigawatt (GW) in the second week of August, causing the

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country's reserve electricity to drop to a range of 5.2-9.2 GW. Korea activates emergency measures, including controls on the use of air conditioners at home, offices and plants, should its power reserve fall below 5.5 GW. No such steps have been taken since August 2013.

*The Korea Times*  
<http://www.koreatimes.co.kr/>

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## **Europe power prices hit new high in wake of Russian gas supply cuts**

European electricity prices have reached the highest sustained level on record, as Russia's cuts to the continent's gas supplies ripple through energy networks and threaten to cause lasting pain for industry and households.

German baseload power for delivery next year, the benchmark European price, hit its highest-ever level on Monday and surpassed the previous record set in December after gaining 13 per cent to trade at €325 per megawatt hour. It advanced further on Tuesday afternoon, reaching more than €328. The equivalent contract in France has doubled to €366 per MWh since the start of the year.

Power prices are heavily influenced by the cost of gas, which is used to generate electricity. In Europe, gas prices have rallied to their highest level in four months and have more than quadrupled since a year ago after Moscow deepened gas supply cuts to Europe. But the situation is also being exacerbated by maintenance problems at a large number of France's nuclear plants. Neighbouring countries are burning additional gas to generate electricity for France at a time when the continent is otherwise trying to conserve supplies for the winter, fearing further cuts to Russian exports. "It's not a situation which anyone in Germany had on their charts even a year ago," said Hanns Koenig, head of commissioned projects at Aurora Energy, a research firm.

Germany exported approximately 600,000 MWh of electricity in June on a net basis to France compared with 300,000 MWh of imports from its neighbour a year earlier, according to data from Germany's Federal Network Agency. The UK is also exporting the equivalent of as much as 10 per cent of its own domestic electricity demand each day to France. William Peck, power market analyst at ICIS, a commodity analytics firm, said the higher electricity prices reflected traders increasingly predicting that extremely tight gas supplies would persist for at least another year. "Gas had under-investment in new production infrastructure during Covid and demand came back quicker than people expected. Prices started rising a year ago," he said. "The Russia-Ukraine war turbocharged everything."

Fears over gas supplies are being stoked by the shutdown of the Nord Stream 1 pipeline between Russia and Germany from July 11 for scheduled maintenance. Moscow claims sanctions have led to a decline in flows since key compressor parts are stuck in Canada, but European politicians see this as a pretext for cutting supplies and worry that flows will not even return to the current capacity of 40 per cent once the pipeline resumes. Germany has plans for up to 10GW of coal-fired power generation to return, but analysts say record-high coal prices will limit the relief to the power market. "If those two things weren't enough, you also have the issue of French nuclear availability which is historically low," said Koenig.

As a result of the rocketing cost of energy imports and a weakening manufacturing sector, Germany's trade balance turned negative in May at €1bn for the first time since 1991. Last month, Berlin put the second stage of its three-tier emergency plan into place. The third level would require the rationing of gas to industrial users and households. A local

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government official in Hamburg warned last weekend that hot water rationing might be needed over the winter if the gas shortage becomes acute.

The high power prices are already showing signs of bringing down demand. Peck said German electricity demand was down 5 per cent in the past four months compared with the previous year because of the higher energy costs, which would mainly reflect industrial users curtailing operations. European zinc and aluminium smelters are under significant pressure from rising energy costs and falling prices. Chris Heron, public affairs director at Eurometaux, the European metals association, said the sector has “been on its knees” since last September and “further plant closures are a real concern if power prices stay so high”.

*Financial Times*  
<http://www.ft.com/>

**5 July 2022**

## **Ofgem grants electricity interconnector license for Great Britain-Ireland link**

UK energy market regulator Ofgem has granted an electricity interconnector license for the MaresConnect Interconnector that will link Ireland and Great Britain. The license, granted on 27 June, authorizes MaresConnect Limited to participate in the operation of the interconnector that will link the Bodelwyddan 400kV substation in Great Britain and Maynooth 220kV substation in Ireland.

Ofgem emphasized that the license is not an authorization to operate the interconnector under any specific regime, such as the merchant-exempt route or the cap and floor regime. Furthermore, the construction of the interconnector is subject to separate planning processes including the obtaining of any consents or permits required from relevant authorities, including the relevant planning authority. To remind, MaresConnect Limited submitted the application for the license to Ofgem in April.



The MaresConnect Interconnector is an integral part of the MARES project, which aims to integrate 1,750 MW of new renewable energy sources and 6 GWh of pumped hydro energy storage (PHES) in Mayo in the west of Ireland to the GB and SEM networks, as well as provide increased interconnector capacity and voltage stability. An electricity grid connection agreement for the link is already in place between MaresConnect and National Grid’s Bodelwydden substation in Wales. The project developer is planning to start construction in 2025, with operations expected in 2027. With its nominal capacity of 750 MW, the project will be able to power 570,000 homes when fully utilized.

*Offshore Energy*  
<http://www.offshore-energy.biz/>



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## **Governments warned to get more hydropower or miss out on net zero**

The International Hydropower Association (IHA) has called on governments to speed up the development of new hydropower capacity or risk missing global net zero targets. The call was made in the latest report from the IHA, the 2022 Hydropower Status Report. The report noted that even though 26GW of new capacity was put into operation during 2021, the figure falls short of the 45GW that the International Energy Agency (IEA) says is required to meet net zero goals by 2050. Furthermore, the report highlights that while the technology and skills are ready to be deployed, the political will to make it happen is lacking.

Erik Solheim, former executive director of the UN Environment Programme, stated in response to the report: “This can’t wait – governments need to heed this call to action, or we all face an uncertain and unstable energy future.” IHA chief executive Eddie Rich refers to the report as a “stark wake-up call to governments around the world” that are simply making insufficient progress. Said Rich, “We can supercharge the progress firstly by accelerating the development of pumped storage hydropower around the world. Secondly, we need to look towards the immense untapped hydropower potential that exists in many regions of the world, particularly Asia and Africa. Finally, we need to make the most of our existing hydropower fleet by modernising it, as well as integrating hydropower facilities into non-power water infrastructure wherever suitable.”

According to the IHA, hydropower provides the flexibility and reliability needed to support the growth of other renewables sources, providing energy security without the need for fossil fuels. The report recommends certifying developments against the Hydropower Sustainability Standard, a sustainability certification scheme launched in September 2021, to ensure projects are delivered responsibly with maximum benefits to society and the environment.

Key report findings:

- Hydropower generated around 4,250TWh of clean electricity worldwide in 2021, down from the record of 4,370TWh in 2020. Lower than average rainfall in many regions contributed to this downturn in generation.
- In 2021, pumped storage hydropower totalled 4.7GW of the new additions in capacity, up on the 1.5GW added in 2020. Most of this was in China (4.5GW), including 600MW of capacity at the Fengning pumped storage facility, which will be the largest in the world at 3,600MW once it is complete in 2023.
- Only China is keeping pace with net Zero pathway for hydropower. China is the world leader for installed hydropower capacity with more than 390GW – more than three times the next largest country, Brazil.

*Power Engineering International*  
<http://www.powerengineeringint.com/>

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## **Design work starts on European commercial fusion power station**

Nuclear fusion engineers are starting to design a European power station they hope will mimic how the sun works to provide a clean, almost unlimited source of energy on Earth. Today marks the beginning of a five-year “conceptual design” phase to flesh out key technology decisions for the DEMONstration power plant (DEMO), a project backed by a Europe-wide consortium, EuroFusion, to take fusion power from the concept stage to a commercial reality. The group plans for the 300 to 500 megawatt reactor to be generating low-carbon energy by 2054.

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There has been plenty of experimental work on nuclear fusion, largely with machines known as tokamaks. These use powerful magnets to confine and control hot matter – or plasma – usually in the shape of a doughnut. The plasma is typically produced from two hydrogen isotopes: deuterium and tritium. Much of the research has focused on tweaking the materials and magnets in the walls of tokamaks, and better modelling how experiments with plasmas will play out, with the ultimate aim of getting more energy out of a fusion reaction than goes in.

That major milestone of “net gain” has yet to be achieved, though there is progress: a new global energy record was set last year. More progress may occur when an €18 billion experimental research tokamak in southern France, known as ITER, is switched on. It is due for completion in 2025 and should achieve full power in 2035. The DEMO power station will need to control and maintain the plasma for much longer than experiments to date. DEMO will also need to collect the heat from the reaction and turn it into electricity, all while working 24 hours a day. “It’s hard. But that’s why we need to start — that’s exactly the point,” says Ambrogio Fasoli, chair of the EuroFusion General Assembly, the decision-making body for the consortium, which is funded by EU member states and Switzerland. There are problems to overcome, such as generating tritium. Supplies of the isotope are limited and expensive because it decays quickly. Research projects have so far used grams of the material, but a power station will need kilograms. This will require design choices about how to create more tritium by allowing neutrons to escape the plasma and interact with lithium in the tokamak’s walls.

Other design choices include what shape of tokamak to build – an elongated design that produces a doughnut-like plasma, or a spherical one that confines the plasma in a more compact shape. There are also decisions to be made about the materials to use in the tokamak walls, which will be exposed to a huge influx of neutrons from the fusion reaction. “The dose [of neutrons] that the structure absorbs is much, much bigger than we ever had to do. It’s really orders of magnitude larger,” says Fasoli. He says work on DEMO can’t wait for the completion of ITER, but must happen in parallel. “[Otherwise] there will be a big gap of decades and then nobody will have an interest in fusion anymore,” says Fasoli. Nonetheless, he says DEMO must learn from ITER.

Where the power plant will be built remains to be seen. Juan Matthews at the University of Manchester, UK, is betting on Germany, given it has no fusion device and France and the UK have won competitions to host previous ones. Whatever DEMO’s conceptual design looks like when it is finished in 2027, the plant is unlikely to be the world’s first fusion power station. Several private fusion start-ups have claimed they will have one operating by the early 2030s, while the UK government has said its “STEP” fusion power plant will be running by 2040. China has said it will have one complete in 2035.

*New Scientist*

<http://www.newscientist.com/>

**6 July 2022**

## **France plans full nationalisation of power utility EDF**

France will fully nationalise EDF, Prime Minister Elisabeth Borne said on Wednesday, in a move that would give the government more control over a restructuring of the debt-laden group while contending with a European energy crisis.

EDF, in which the state already owns 84%, is one of Europe's biggest utilities and sits at the heart of France's nuclear strategy, which the government is banking on to blunt the impact of soaring energy prices exacerbated by the prospect of an abrupt halt to Russian gas supplies. But instead of being an ace in the government's hands, however, it has become a major headache owing to years of delays on new nuclear plants in France and

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Britain, with budget overruns in the billions of euros. "I confirm to you today that the state intends to control 100% of EDF's capital", Borne said in her policy speech in the lower house of parliament as she set out her minority's government priorities. "We need to ensure our sovereignty in the face of the war (in Ukraine) and the looming colossal challenges." At current market prices, buying out the stake the government does not already own would cost around 5 billion euros (\$5.09 billion).

EDF has faced a litany of problems this year. Half of its ageing reactors in France are currently offline, partly due to corrosion problems, forcing it to cut nuclear output repeatedly at a time when Europe is scrambling to find alternatives to Russian gas supplies. The utility has also been hurt by government moves forcing it to sell power to rivals at a discount as part of efforts to shield French consumers from a sharp increase in the cost of living. That is a big strain on EDF's finances because the group sells forward its estimated nuclear output before the end of the budget year and has to buy back sold electricity in a volatile market with prices at historic highs.

The company says output losses will reduce its core profit this year by 18.5 billion euros and the discounted power sales will cost it a further 10.2 billion euros. Its debt is projected to rise by 40% this year to more than 61 billion euros. Meanwhile, planned new-generation nuclear reactors require investments of more than 50 billion euros. The option of fully nationalising EDF had been flagged by President Emmanuel Macron earlier this year but the picture has since become more complicated as he lost his absolute majority in parliament. He already had to scrap an overhaul of EDF last year in the face of opposition from unions and doubts voiced by the European Commission. That plan envisaged placing EDF's profitable renewables business in a new company unburdened by the debt-laden nuclear assets. Borne did not specify if the nationalisation would be carried out via special legislation or through a public tender to buy out minority shareholders, and did not provide a time frame.

The CGT union said that without a radical overhaul of the way in which nuclear power prices are set, a nationalisation of EDF would not fix its woes and may be a pretext to break it up. EDF was listed on the Paris bourse in 2005 at a price of 33 euros per share. Its stock closed at just under 9 euros on Wednesday, having jumped 14.5% after Borne's announcement. Analysts and bankers have said that going straight to the market to squeeze out minorities and delist EDF would be a quicker process, while any legislation runs the risk of being held up in parliament.

*Reuters*

<http://www.reuters.com/>

**6 July 2022**

## **France prepares measures to prevent winter energy shortages**

France's government is working on measures aimed at reducing the country's energy consumption by 10% over the next two years, amid concerns that suppliers could experience shortages this winter. The bosses of France's three biggest providers – Engie, EDF and TotalEnergies – already called for businesses and individuals to reduce their consumption last month, stating that: "Acting this summer will allow us to be better prepared to face winter and in particular to preserve our gas reserves."

Government task forces have now begun meeting to address the issue, and "efforts will be asked of all businesses," the ministry in charge of energy transition has said. "Representatives from the business community should be received by the minister this week. The aim is to find around 10 measures enabling [us] to save energy each time. The priority is to not have to cut off households." The new purchasing power law, which is set to be presented to cabinet ministers soon, includes a chapter on how to deal with the situation.

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It is expected to recommend the temporary reopening of the Saint-Avold coal-fired power station, and the requisition of gas-fired power stations to shore up the nuclear shortage. Géry Lecerf, president of Afieg, an association for alternative gas and electricity providers, said: “For several weeks, we have been waiting for the government to communicate strongly, to announce measures, and raise awareness [of the problem].

“Right now, we are currently burning gas to make electricity, the very gas that we may not have enough of this winter. We need to reduce our electricity consumption now.” Yet, the government has said that it will stop short of advising individual households to save power for now, and will only raise the issue in autumn if needed. RTE has launched a ‘flash’ consultation with companies and suppliers, in a bid to find between 5 and 10 gigawatts of reduced or shifted consumption. This would be enough to get through the winter ‘peaks’ – the moments when the cold causes a surge in electricity consumption – RTE said.

European production in France is also partly dependent on the actions and situation in neighboring European nations. For example, there is a risk that gas rationing in Germany could lead to the closure of its gas-fired power plants, which France relies on for imported power, said Nicolas Goldberg, consultant at Columbus Consulting. He continued: “This creates enormous uncertainty. We are not sure what will happen on the other side of the border. [But] with clear changes that are well communicated to users, the electricity network could save the equivalent of the output of one or two nuclear reactors.” Suggestions for reducing electricity consumption include changing heating times, so that offices are not being heated during the peak hour of 08:00, or even reintroducing the old system of ‘peak hours’ and ‘low hours’ (when electricity is less expensive, or more expensive). Advertising screens and lightning around historic monuments could also be switched off when the system comes under strain.

*The Connexion*

<http://www.connexionfrance.com/>

**7 July 2022**

## **National Grid lays out plans for £54bn upgrade to UK energy network**

National Grid has laid out plans for a £54bn upgrade to the UK’s electricity network, the biggest investment since the 1960s in real terms, to facilitate a rapid expansion in offshore wind energy. The government wants 50 gigawatts of offshore wind operational by 2030, up from 10GW currently, and the new network would provide capacity for an additional 23GW. At full output this would meet almost two-thirds of current peak electricity demand. The plan marks the first time that the development of offshore connections for wind farms has been co-ordinated and will be one of the largest-ever civil infrastructure programmes in the UK.

National Grid Electricity System Operator, a subsidiary of the FTSE 100-listed National Grid, which moves electricity around the system and keeps supply and demand in balance, has proposed 15 connection points to bring energy from 18 offshore wind farms to land. The aim is to minimise disruption for coastal communities and reduce construction costs. At present most offshore wind farms build their own connection to the onshore grid, leading to a proliferation of cables, pylons and substations and provoking opposition from local communities including Tory constituencies in Suffolk.

The plan “is a key step in providing certainty to offshore wind developers and mitigating potential impacts on the environment and local communities from energy infrastructure”, said Fintan Slye, executive director of National Grid’s electricity system operator. Given it is one of three regional monopoly providers of a crucial service, the revenues for National Grid’s electricity transmission system are determined by Ofgem, the regulator, and levied on consumer energy bills. National Grid ESO said it would save



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consumers £5.5bn in costs by 2030 by increasing network capacity compared with connecting wind farms individually.

Duncan Sinclair, analyst at consultancy Baringa, welcomed the plans and said this was a “much more sensible way to connect the huge volumes of new offshore wind capacity needed and would save on costs for consumers overall”. The network upgrades will be essential to make use of the electricity from a wave of new projects that have secured leases to Britain’s seabed, including at least 8GW of projects around England and Wales and some of the 25GW of wind farm sites that Scotland leased earlier this year. Offshore wind has become the cheapest form of renewable energy in the UK, beating solar and onshore wind. In 2020 wind energy accounted for almost a quarter of total electricity generation in the UK. There is already a queue of projects waiting for connection to the grid, meaning that some renewable energy generators are waiting for up to 10 years to produce power. National Grid receives around £20 a year from each consumer bill as part of an electricity transmission charge. The network upgrade will be financed through these payments. National Grid chief executive John Pettigrew recently came under fire for receiving £6.5mn in total pay and bonuses for the year to the end of March 2022, a year in which many households are struggling to cope with soaring energy bills. National Grid ESO became a legally separate part of its FTSE 100 parent in 2019. The government confirmed earlier this week that it would be split from the company to become an independent state-owned body though parliament has yet to approve the change.

*Financial Times*  
<http://www.ft.com/>

**12 July 2022**

## **World’s largest hybrid hydropower-photovoltaic station**

Yalong River Hydropower Development, a state-owned hydropower developer, has started building the 1 GW Kela PV power station in Sichuan province, southwestern China.

The solar facility will be connected to the operational 3 GW Lianghekou hydropower station on the Yalong River. Upon completion, the new hybrid PV-hydropower complex will be the world’s largest power plant of its kind. The hydropower side of the project has an adjustable capacity of up to 6.56 billion cubic meters of water. Yalong River Hydropower Development is investing CNY 5.3 billion (\$791 million) in the solar facility, which will be built on a plateau at an altitude of 4,000 to 4,600 meters. It will be connected to the hydropower plant through an existing 220 kV transmission line and a new 500 kV line.

The solar plant will feature more than 2 million solar panels and over 5,000 inverters. The modules will be placed at a height of 1.9 meters to enable the growth of vegetation beneath them and ensure grazing space for cattle and sheep. Yalong River Hydropower Development said construction of the solar plant will be completed by the end of 2023. As the exclusive developer of energy infrastructure on the Yalong River basin, the company plans to deploy 80 GW of renewable energy capacity in the area, including 40 GW of wind and solar and 10 GW of pumped-hydro storage. Yalong Hydropower is jointly owned by government-owned China Development and Investment Corp. and Sichuan Investment Group, the main investment entity of the Sichuan provincial government.

*Pv-magazine*  
<http://www.pv-magazine.com/>

**13 July 2022**

## **Can France ensure its energy security this winter?**

Alongside the rest of the EU, France is facing serious uncertainties about the security of its energy supply for this winter. Despite government assurances that gas stocks will be

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replenished in time, many are becoming increasingly concerned about coming shortages and potential electricity blackouts.

At present, only half of France's nuclear fleet – which usually provides around 50% of its electricity production – is operational. In order to ensure that energy supply will be able to meet the demand for the approaching winter, France is seeking to fill its gas storage facilities to 100%. However, according to principles of European solidarity, the entire French electricity network could be called upon to make up for the severe shortages of vulnerable EU member states, primarily those most dependent on Russian gas imports. Major cities in France will almost certainly face power cuts this year and the next, one source working in corporate risk management told EURACTIV, speaking on the condition of anonymity. They added that all European governments “are preparing for blackouts” and “energy executives and political leaders are hoping the winter will not be too cold.”

Contacted by EURACTIV, France's electricity transmission system operator RTE said it could not confirm the certainty of power cuts claimed by the source for the time being. The network operator said that the uncertainties surrounding the current situation make it impossible to make accurate predictions for the winter at this stage. Fears of impending energy shortfalls were compounded by a recent call from the CEOs of energy giants Total, EDF and Engie for French companies and consumers to “immediately” curb their energy consumption, in an op-ed published on 26 June in the weekly Journal Du Dimanche.

## **Worst-case scenario**

“At any moment, Russia can totally interrupt its gas deliveries,” said France's Energy Transition Minister Agnès Pannier-Runacher in an interview on Sunday (10 July) with the newspaper Le Figaro. “The worst-case scenario [...] exists,” she said, adding that she would be “extremely vigilant”. Economy Minister Bruno Le Maire told broadcast LCI that “we must quickly put ourselves in battle mode,” in an interview on Sunday, adding that the country needed to “anticipate” a gas cut-off by Russia.

## **EU solidarity**

France is hoping that it will not face as many issues this winter as other EU countries that are more heavily dependent on gas. In part, however, this is down to the country's relatively high reliance on nuclear power – which is currently limited, as presently more than half of the country's nuclear reactors have suspended activities. Because of this, gas, which previously accounted for only about 20% of French energy consumption, has recently been gaining ground in the country's energy mix. Compared to their EU neighbours who, for the most part, have reduced their dependence on Russian gas since the start of the war in Ukraine, France has increased its imports of Russian gas, Phuc-Vinh Nguyen, an energy policy researcher at the Jacques Delors Institute, told EURACTIV in mid-June.

On 27 June, EU energy ministers even voted to adopt a law ensuring gas storage across the bloc is at least 80% full by November 2022. While France is looking to do better and fill its gas storage capacities to 100%, as announced by Prime Minister Elisabeth Borne during her visit to GRTgaz's dispatching centre, stores are currently at 68%, slightly higher than the EU's stocks of 62%, according to data from European gas transmission operators.

However, employees of France's second-largest storage site managed by Engie's subsidiary Storengy have been striking since 28 June. The strike was renewed on Monday.

## **New methane terminal**

To meet the need for supply diversification, France plans to install a new regasification terminal for liquefied natural gas (LNG) in Le Havre, the country's Prime Minister Elisabeth Borne announced in June. However, the terminal will only be ready in 2023, after the cold winter months. Speaking on LCI, Le Maire urged that decisions be taken “more quickly”, by lifting “a certain number of regulatory constraints”. On Friday, energy transition minister Pannier-Runacher told broadcaster RTL that the re-activation of the coal-

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fired power station in Saint-Avold is not yet ruled out, even if the “long-term strategy is to emancipate the French from fossil fuels”. “Sobriety” is the key, she urged, first for the state and companies, then for individuals. “I refuse to ask [...] French people who have neither the financial means nor the levers to do without gas or fuel to tighten their belts and get by,” she said, pointing out that a one-degree reduction in heating in winter would reduce energy consumption by 7%.

**EURACTIV**

<http://www.euractiv.com/>

**13 July 2022**

## **Baltics would switch to European grid in a day if Russia cuts power – Lithuania**

European power grid network ENTSO-E will connect to the Baltic states' grids within 24 hours if the countries were to be disconnected by Russia, Lithuanian power grid operator Litgrid said. "If Russia disconnects us, even today, we would be ready. Our analysis shows that power supply would not be rationed, no serious disruptions expected," Litgrid Chief Executive Rokas Masiulis told a news conference on Wednesday.

"Our agreement with European operators is that we get synchronised within 24 hours," he said. ENTSO-E did not immediately reply to a request for comment. In June, sources told Reuters European grid operators were ready to implement immediately a long-term plan to bring the Baltic states, which rely on the Russian grid for electricity, into the European Union system if Moscow cuts them off.

Concern about depending on Moscow for any form of energy has mounted across Europe after Russia reduced gas supplies to some countries following its invasion of Ukraine. Masiulis said Lithuania was aiming for an agreement to decouple the Baltic States from the Russian power grid in early 2024, compared to a previous plan for end-2025. He said governmental discussions with Estonia and Latvia on the matter had started, and that the European Commission was also involved. The Latvian and Estonian governments did not immediately comment.

Masiulis also said an underwater power link between Poland and Lithuania can only be completed in 2027-2028, not in 2025 as previously planned, due to shortage of materials. Three decades after splitting from the former Soviet Union and 17 years since joining the European Union, the Baltic states of Estonia, Latvia and Lithuania still depend on Russia to ensure stable power supplies. A project backed by 1.6 billion euros (\$1.61 billion) of EU funding to upgrade their infrastructure is in place to disconnect them from the grid by 2025. The Russian and Continental European systems both operate at a frequency of 50 Hertz, but while the Russian system is run from Moscow, the continental European grids are decentralised, meaning each national grid operator is responsible for maintaining the stability of its system.

**Reuters**

<http://www.reuters.com/>