

WORLD POWER SYSTEMS REVIEW

15 March 2024

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U.S. Seeks to Boost Nuclear Power After Decades of Inertia

The House this week overwhelmingly passed legislation meant to speed up the development of a new generation of nuclear power plants, the latest sign that a once-contentious source of energy is now attracting broad political support in Washington.

The 365-to-36 vote on Wednesday reflected the bipartisan nature of the bill, known as the Atomic Energy Advancement Act. It received backing from Democrats who support nuclear power because it does not emit greenhouse gases and can generate electricity 24 hours a day to supplement solar and wind power. It also received support from Republicans who have downplayed the risks of climate change but who say that nuclear power could bolster the nation's economy and energy security.

"It's been fascinating to see how bipartisan advanced nuclear power has become," said Joshua Freed, who leads the climate and energy program at Third Way, a center-left think tank. "This is not an issue where there's some big partisan or ideological divide." The bill would direct the Nuclear Regulatory Commission, which oversees the nation's nuclear power plants, to streamline its processes for approving new reactor designs. The legislation, which is backed by the nuclear industry, would also increase hiring at the commission, reduce fees for applicants, establish financial prizes for novel types of reactors and encourage the development of nuclear power at the sites of retiring coal plants.

Together, the changes would amount to "the most significant update to nuclear energy policy in the United States in over a generation," said Representative Jeff Duncan, Republican of South Carolina, a lead sponsor of the bill. In the Senate, Republicans and Democrats have written their own legislation to promote nuclear power. The two chambers are expected to discuss how to reconcile their differences in the coming months, but final passage is not assured, particularly with so many other spending bills still in limbo.

"If Congress was functioning well, this is one of those bills you'd expect to sail through," said Mr. Freed. Nuclear power currently generates 18 percent of the nation's electricity, but only three reactors have been completed in the United States since 1996. Although some environmentalists remain concerned about radioactive waste and reactor safety, the biggest obstacle facing nuclear power today is cost.

Conventional nuclear plants have become extremely expensive to build, and some electric utilities have gone bankrupt trying. Two recent reactors built at the Vogtle nuclear power plant in Georgia cost \$35 billion, double the initial estimates. In response, nearly a dozen companies are developing a new generation of smaller reactors a fraction of the size of those at Vogtle. The hope is that these reactors would have a smaller upfront price tag, making it less risky for utilities to invest in them. That, in turn, could help the industry start driving down costs by building the same type of reactor again and again.

The Biden administration has voiced strong support for nuclear power as it seeks to transition the country away from fossil fuels; the Department of Energy has offered billions of dollars to help build advanced reactor demonstration projects in Wyoming and Texas. But before a new reactor can be built, its design must be reviewed by the Nuclear Regulatory Commission. Some Democrats and Republicans in Congress have criticized the N.R.C. for being too slow in approving new designs. Many of the regulations that the commission uses, they say, were designed for an older era of reactors and are no longer appropriate for advanced reactors that may be inherently safer.

"Tackling the climate crisis means we must modernize our approach to all clean energy sources, including nuclear," said Representative Diana DeGette, Democrat of Colorado. "Nuclear energy is not a silver bullet, but if we're going to get to net zero carbon emissions by 2050, it must be part of the mix." Among other changes, the House bill would

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require the N.R.C. to consider not just reactor safety but also “the potential of nuclear energy to improve the general welfare” and “the benefits of nuclear energy technology to society.”

Proponents of this change say it would make the N.R.C. more closely resemble other federal safety agencies like the Food and Drug Administration, which weighs both the risks and benefits of new drugs. In the past, critics say, the N.R.C. has focused too heavily on the risks. But that provision updating the N.R.C.’s mission was opposed by three dozen progressive Democrats who voted against the bill and said it could undermine reactor safety. The specific language is not in the Senate’s nuclear bill.

Even if Congress approves new legislation, the nuclear industry faces other challenges. Many utilities remain averse to investing in novel technologies, and reactor developers have a long history of failing to build projects on time and under budget. Last year, NuScale Power, a nuclear startup, announced it was canceling plans to build six smaller reactors in Idaho. The project, which had received significant federal support and was meant to demonstrate the technology, had already advanced far through the N.R.C. process. But NuScale struggled with rising costs and was ultimately unable to sign up enough customers to buy its power.

The New York Times
<http://www.nytimes.com/>

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Georgia's largest hydropower plant set for upgrade with EBRD and EU Backing

The European Bank for Reconstruction and Development (EBRD) has announced it is providing a sovereign loan of €28 million to facilitate the modernization and rehabilitation of the Enguri hydropower plant, the largest electricity facility in Georgia. This initiative is complemented by a grant of €7.05 million from the European Union (EU).

The funding, directed to Engurhesi LTD, the plant's operating company, is slated to address critical issues concerning the structural integrity of the Enguri dam, alongside essential repairs to the underground tunnel and penstock. These measures aim to enhance the plant's operational reliability and ensure a more sustainable power generation and grid system. Moreover, the investment will be used to help minimize water leakages within the headrace tunnel while unlocking opportunities for additional renewable energy production. The allocated funds will also facilitate the construction of vital infrastructure, including roads for dam monitoring, improvements to electricity grid safety and reliability, and the establishment of a fish passage downstream of the Enguri dam.

Constructed in the 1970s, the Enguri hydropower plant, along with the Vardnili hydropower plants, forms a crucial energy complex that meets approximately 30% of Georgia's electricity demands, playing a pivotal role in driving economic growth and stability.

The EBRD's involvement in the Enguri hydropower plant's rehabilitation dates back to 1998. This latest financial injection builds upon previous rehabilitation phases supported by the EU, aligning with the EU's Global Gateway Strategy. This strategy, implemented through the Economic and Investment Plan, aims to fortify energy, digital, and transport connectivity in the Eastern Neighbourhood region, with particular emphasis on Georgia.

Overall, the EBRD, in collaboration with its donors, has channelled approximately €205 million into supporting the Enguri plant since 1998, signifying a sustained commitment to Georgia's energy sector. With the EBRD's cumulative investments in Georgia reaching around €5 billion across 290 projects, predominantly in the private sector, this initiative marks another significant step towards fostering sustainable development and energy independence in the region.

Waterpowermagazine
<http://www.waterpowermagazine.com>

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Energy Vault China gravity ESS project connected to grid; starts building three others

Energy Vault has connected its first commercial EVx gravity-based energy storage system to the grid in China, while construction has been launched on three others, all-in-all totaling 468MWh of capacity. The 25MW/100MWh project in Rudong, the company's first commercial grid-scale project using its proprietary EVx gravity energy storage technology, was connected to the grid in December 2023, it announced last week (29 February). It can now start full commissioning of the project.

Energy Vault didn't say when the project will be fully operational, but it will provide more updates on it when the company releases its full-year results on 12 March. Energy Vault added that its local partners – environmental services and waste management firm China Tianying (CNTY) and developer Atlas Renewable – now have nine other EVx projects underway in China totalling 3.7GWh, of which three have started construction, all 4-hour systems.

They are: a 17MW/68MWh project in Zhangye City, Gansu Province, being built adjacent to a renewable energy plant and a national grid interconnection site (pictured above); a 50MW/200MWh project in Ziuquan City, Jinta County, Gansu Province; a 25MW/100MWh project in in Huailai Cunrui Town, Zhangjiakou County, Hebei Province.

The Rudong and Zhangye projects have been designated “new energy storage pilot demonstration projects” by China's National Energy Administration (NEA). The Rudong project will charge from a nearby wind farm and discharge to the grid while its energy storage medium – composite blocks – will also provide an outlet for CNTY to utilize waste materials like concrete debris and coal ash as part of its waste remediation business.

Energy Vault CEO Rob Piconi discussed the firm's gravity-based technology – which many are skeptical about – as well as its battery energy storage system (BESS) and green hydrogen projects in a Premium interview article last year.

Energy-Storage
<http://www.energy-storage.news/>

5 March 2024

Indian firms look to bet big on coal-fired power after long absence

Private Indian firms have expressed interest in building at least 10 gigawatts (GW) of coal-fired power capacity over a decade, four sources familiar with the matter said, ending a six-year drought in significant private involvement in the sector.

Adani Power opens new tab, JSW Group and Essar Power are among the companies that have told India's power ministry they would be keen to expand old plants or develop stalled projects facing financial stress, according to the sources and a government presentation seen by Reuters. The potential investments, which have not been previously reported, could cumulatively cost billions of dollars and demonstrate renewed appetite in an industry seen by many as financially unattractive. But they also threaten to undermine progress made by the world's No.3 greenhouse gas emitter in weaning its economy off carbon. Prime Minister Narendra Modi's government, which has cited energy security concerns and low per-capita emissions to defend India's coal dependence, has been trying to attract private investment to boost its coal-fired capacity by 80 GW by 2032, opens new tab.

Coal-fired power plants currently account for half, or about 215 GW of India's total installed capacity of 430 GW, with renewables accounting for 135 GW and hydro making up 47 GW. A spokesperson for the power ministry said the private sector had agreed to invest in the coal-fired power sector "in line with the energy requirements of the nation," adding

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that India was ahead of international commitments to cut emissions. "The private sector is now expressing interest because of financial viability and assurance that payments will be made on time," he said. The companies did not respond to requests seeking comment. Among the new proposals, Adani Power plans to add 4.8 GW and JSW 1 GW, according to three sources and a government presentation dated Nov 21 reviewed by Reuters.

Essar Power plans 1.6 GW of new domestic coal-based power generation in Gujarat state by 2029, one of the sources said. Another source said Vedanta will add 1.9 GW of capacity. The sources - two government officials and two industry executives - declined to be named as the discussions are not public. The presentation, made by an arm of the power ministry in November, estimates that the plants would be commissioned by 2032.

In the five years to March 2018, private sector investments drove 56 GW, or over 60% of new coal-fired power, government data shows. That dwindled to 1.5 GW, or 5% of additions, in the next five years as projects faced financial stress, shifting the investment burden onto state and federal governments. A total of 24 private sector projects totalling over 23 GW, or over 10% of current Indian coal-fired capacity, are on hold or unlikely to be commissioned due to financial stress, according to power ministry data. However, higher coal dependence in the last three years due to slower renewable installations, heavy power demand, and new emergency laws enabling higher tariffs have made coal-fired power attractive again, boosting profits and pushing shares of generators to record highs.

APP asked the government to provide more flexibility in coal and power supply agreements and expansion of existing power plants, ease clearances, and ensure domestic credit availability to expedite investments. "It will be a big challenge for any private developer to raise funds," APP wrote in the Dec 4 letter, adding that state lenders Power Finance Corp (PFC) and Rural Electrification Corp (REC) should be asked to take the lead.

PFC and REC did not immediately respond to emails seeking comment. A senior REC executive said it was keen to fund the planned additions with 70% debt as long as lending requirements are met. "REC has made significant progress in reducing non-performing assets and we would like to keep it that way," the executive told Reuters, speaking on condition of anonymity as the matter was not public. Reporting by Sudarshan Varadhan in Singapore, Sarita Chaganti Singh in New Delhi and N R Sethuraman in Bengaluru Editing by Tony Munroe and Raju Gopalakrishnan India's Association of Power Producers (APP), which represents coal-fired power developers, told Power Minister R K Singh its members were eager to boost capacity, according to a Dec 4 letter reviewed by Reuters.

Reuters

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

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China Photovoltaic (PV) Industry Ranks First in Globe

China's photovoltaic industry absolutely ranks first in the globe in terms of not only market size, technology level, production and manufacturing, but also completeness of the industrial chain. "I'm firmly convinced that the month-on-month decline in PV product exports will not be a long-term trend, but a volatile upward growth trend," Liu Yiyang, Deputy Secretary General of China Photovoltaic Industry Association (CPIA), said in an interview.

The 2024 Government Work Report released on March 5 showed that the renewable energy power generation installed capacity across China has historically surpassed thermal power, with more than half of the world's new installed capacity throughout the year. "Considering the importance of PV to the fourth energy revolution," Liu told China Economic Net (CEN).

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“By 2030, global new energy, including PV installed capacity, will triple from the current basis, which has reached a consensus. 2030 is not far away from now, which means that global demand for PV will continue to rise. “Not long ago, the top five countries with the fastest growing PV power generation installed capacity in 2023 was released. Unsurprisingly, China still ranks first with a huge advantage, while the United States ranks second, with newly installed capacity reaching 33GW throughout the year.

Regarding the US market, Chinese PV companies, especially module manufacturers that have suffered setbacks in Europe last year, are showing an increasingly positive attitude. As Trina Solar announced on September 11 last year that it would invest USD 200 million to build a module plant with an annual production capacity of approximately 5GW in Wilmer, Texas, China’s five module giants (JinkoSolar, LONGi Green Energy, JA Solar Technology, Trina Solar, and Canadian Solar) have all established factories in the US, among which the first US production line layout of JA Solar Technology, Canadian Solar, and Trina Solar was completed in 2023.

In contrast, there has been frequent hype within the EU about desensitization with constant reports that the EU is planning to impose sanctions on Chinese PV companies. In this regard, Liu emphasized, “Through protectionism, implementing so-called import substitution and allowing local industries to replace imports is basically ineffective. History has proven that all countries that implement protectionist measures will eventually be a bitter pill to swallow. At the same time, there are also many voices of opposition within Europe, because these measures are completely unhelpful to its industrial manufacturing level up.”

“In addition, more Belt and Road countries have strong demand for photovoltaics. For example, Brazil has become our second largest module export market; the South African market has grown significantly and became one of China’s top ten module export markets in the first half of 2023. Many PV companies now attach great importance to Europe, the largest module export market, but their efforts to expand markets in developing countries are far from enough.”

Compared with developed countries, green and low-carbon transformation has stimulated hard demand for PV in developing countries. There are still many areas without electricity in the globe, where need PV companies to promote emerging markets. Liu told the reporter that if developing countries are helped to develop PV manufacturing, photovoltaic + energy storage and other industries, at least they would achieve great improvements in the application of power infrastructure, and their PV industry will also form a positive cycle. “Undoubtedly, a coin has two sides, thus there are certain risks involved. Support in terms of export credit, export exchange, financing, etc. should be provided by government departments to help companies reduce export risks.”

“What must be emphasized is overcapacity in the PV industry belongs to structural overcapacity, that is to say, insufficient advanced production capacity. The market economy is definitely a surplus economy, due to only with a surplus economy can the fittest survive, and companies would work hard to reduce costs, increase efficiency, and improve product cost-effectiveness. If PV were in a tight shortage, products would not be able to usher in rapid technological iterations. Without the hard work of companies to striving for the upper reaches, China’s global PV ranking will always be out of reach. Therefore, there is no need to be anxious about the development of the industry as soon as you hear overcapacity.

According to the forecast of the Photovoltaic Association, by 2025, the global GW-level national market will exceed 50. “That is to say, the global demand for PV will still maintain a rapid growth trend,” Liu concluded, and some of the current marginal markets, such as the United Arab Emirates, Saudi Arabia, Egypt, Pakistan, Jordan, Algeria and other North African countries are blue oceans that we urgently need to explore and expand cooperation with. Why? Sunlight is the fairest gift, through which PV could generate

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electricity, while many developing countries are still facing power shortages, high power costs of the huge trouble. There is an urgent need for low-cost, efficient clean energy in these countries.

Ewvind

<http://www.evwind.es/>

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Cuba turns off some public lighting as energy crisis worsens

Cuba has switched off nearly three-quarters of public lighting during peak hours to cope with a growing energy shortage, state media reported on Tuesday, as hopes to reverse a deepening economic crisis dim. Minister of Energy and Mines Vicente de la O Levy told a council of ministers meeting the measure was one of many that included shuttering thousands of state services and shifting production to lessen the blackouts roiling the country, according to state media. The import-dependent country has been mired in a deepening economic crisis that has seen gross domestic product decline 10% since 2019.

The government largely blames Trump-era U.S. sanctions targeting foreign currency earners tourism, medical services and remittances and compounded by the pandemic, rising shipping costs and faltering efforts to restructure a centralized and state dominated economy. The shortage of foreign exchange to import food, medicine, fuel and other essentials appears to have worsened so far this year, official figures showed.

De la O Levy said last month that Cuba has only received 46% of the planned fuel imports, causing long blackouts across the land, with the exception of the capital Havana. A phone survey of five of 14 provinces indicated residents were enduring daily six to 12-hour blackouts, broken up into two tranches. Yurkina Gracial, a 40-year-old state employee in eastern-most Guantanamo province said by phone “the power goes out for four hours twice a day and it is unbearable because of the heat.”

Reuters

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

6 March 2024

MISO’s 2023 Value Proposition estimated at nearly \$5 billion

MISO estimates that it delivered nearly \$5 billion in benefits to its operating region in 2023, continuing to build upon its vision to be the most reliable, value-creating regional transmission organization. “The electric industry is facing extremely complex challenges, and MISO continues to deliver exceptional value to help our members and states achieve their goals,” said MISO’s Chief Executive Officer John Bear. “As we continue to manage the energy transition, regional collaboration is paramount to efficiently maintain reliability.”

The Value Proposition breaks MISO’s business model into recognized categories of benefits and calculates a range of dollar values for each defined category. The annual Value Proposition increased by 20% in 2023 largely based on:

Resource Capacity Sharing: \$2.5 - \$4.1 billion – MISO’s large footprint increases load diversity and asset availability, which allows local utilities to decrease their required reserve margins.

Energy and Ancillary Services: \$795 - \$878 million – Real-time and day-ahead energy markets result in deploying the most economical resources to meet the region’s electric needs. Renewable Resource Optimization: \$402 - \$472 million – MISO’s regional planning enables lower-cost integration of renewable resources across the region, reducing overall capacity investment to meet renewable energy goals.

“MISO’s collective, region-wide approach to grid planning and management continues to deliver the greatest benefits to our region,” added Andre Porter, MISO’s senior

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vice president and Chief Strategy Officer. “Our focus on increasing collaboration to achieve our Reliability Imperative efforts will continue to add value to our members and states that could go unrealized.” MISO’s Value Proposition analysis identifies and quantifies several value drivers for the region, including more efficient use of existing resources, system management improvements, and a reduced need for additional assets. The annual Value Proposition studies reveal that MISO’s regional approach has delivered cumulative benefits of \$45 billion since this calculation was first developed in 2007. Those benefits amount to more than fifteen times MISO’s operating costs.

MISO

<http://www.misoenergy.org/>

7 March 2024

Xcel Energy admits it was ‘involved in ignition’ of Texas’s Smokehouse Creek fire

The electric utility company Xcel Energy admitted on Thursday that it appeared to have played a role in Texas’s Smokehouse Creek fire, the largest wildfire in modern US history. “Based on currently available information, Xcel Energy acknowledges that its facilities appear to have been involved in an ignition of the Smokehouse Creek fire,” it said in a statement on Thursday. Xcel said it has been cooperating with investigations into the wildfires and conducting its own review of the incident.

It also encouraged people who have lost livestock or had property damaged in the fire to submit a claim to the company through its claims process. But Xcel rejected claims that it was negligent in maintaining and operating its infrastructure, contradicting a lawsuit against it by a homeowner near Canadian, Texas, whose house was destroyed in the fire. In the lawsuit, Melanie McQuiddy claimed the fire was started by one of Xcel’s fallen utility poles.

She is also suing Southwestern Public Service Company, Osmose Utilities Services, and a Georgia contractor responsible for inspecting wood utility poles, alleging the companies “failed to properly inspect, maintain, and replace” the pole in question, which then “splintered, and snapped off at its base”, igniting the fire. Xcel also faces a lawsuit in Colorado, where a fire in 2021, the Marshall fire, killed two people and destroyed nearly 1,100 homes. The Smokehouse Creek fire has killed at least two people, burned more than 1.2m acres, and grown into the largest wildfire in modern US history since it started on 26 February in the Texas Panhandle, according to Texas A&M’s Forest Service, which is still investigating the devastating blaze. On Wednesday it said the fire had only been 44% contained.

The Guardian

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

10 March 2024

Dutch, German governments said to be near Tennet Grid Deal

In the years since Winter Storm Uri there have already been improvements to cross-sector Dutch, German governments said to be near Tennet Grid Deal the Netherlands is closing in on a deal to sell Tennet Holding BV’s power grid in Germany to the government in Berlin after months of protracted negotiations, according to people familiar with the matter.

Details of the transaction could be announced in the coming days, said the people, who asked not to be identified as the talks are private. The deal could be valued at around €22 billion (\$24 billion) comprising some €14 billion in debt and €8 billion in equity, according to the people. A final sticking point is related to the required investments to improve Germany’s grids, one of the people said. The Dutch and German governments as well as Tennet declined to comment. The discussions were complicated last year by a German court

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ruling on off-budget spending, which forced the government in Berlin to recalibrate fiscal plans. The acquisition is part of Germany's efforts to consolidate the country's power grids and bolster energy security. Europe's biggest economy has been grappling with a challenging transition to renewables.

The Dutch government said on Jan. 12 it will lend Tennet €25 billion for much needed grid investments as the sale of its German network remained up in the air. The government signaled at the time that the loan wasn't a long-term solution, but offered a bridge until Tennet's German grid is sold or another financing solution is found. The Dutch government wants to use part of the proceeds from the sale of Tennet's German grid to upgrade the Netherlands' overloaded power grid, which has posed risks to growth ambitions of some of its biggest companies, including ASML Holding NV.

Bloomberg

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

11 March 2024

Fluor to design laser fusion power plant

"Fluor will leverage its global experience in developing and constructing complex, large-scale facilities to provide preliminary design and engineering to support the development of Longview's fusion-powered plant," Longview said. The company noted that, unlike other approaches, it does not need to build a physics demonstration facility, and, with its partner Fluor, "can focus on designing and building the world's first laser fusion energy plant to power communities and businesses".

This is enabled, it says, by the historic breakthroughs in fusion energy gain at Lawrence Livermore National Laboratory's National Ignition Facility (NIF). Nuclear fusion is the process by which two light nuclei combine to form a single heavier nucleus, releasing a large amount of energy. Lawrence Livermore National Laboratory has been pursuing the use of lasers to induce fusion in a laboratory setting since the 1960s, building a series of increasingly powerful laser systems at the California lab and leading to the creation of National Ignition Facility, described as the world's largest and most energetic laser system. The facility uses powerful laser beams to create temperatures and pressures similar to those found in the cores of stars and giant planets - and inside nuclear explosions.

On 5 December 2022, the National Ignition Facility achieved the first ever controlled experiment to produce more energy from fusion than the laser energy used to drive it. The experiment used 192 laser beams to deliver more than 2 million joules (MJ) of ultraviolet energy to a deuterium-tritium fuel pellet to create so-called fusion ignition - also referred to as scientific energy breakeven. In achieving an output of 3.15 MJ of fusion energy from the delivery of 2.05 MJ to the fuel target, the experiment demonstrated the fundamental science basis for inertial confinement fusion energy - or IFE - for the first time.

Longview says it is the only fusion energy company using this proven approach. Its power plant designs incorporate commercially available technologies from the semiconductor and other industries to ensure the delivery of carbon-free, safe, and economical laser fusion energy to the marketplace within a decade. "We are building on the success of the NIF, but the Longview plant will use today's far more efficient and powerful lasers and utilise additive manufacturing and optimization through AI," said Valerie Roberts, Longview's Chief Operating Officer and former National Ignition Facility construction/project manager.

Edward Moses, Longview's CEO and former director of the National Ignition Facility, added: "Laser fusion energy gain has been demonstrated many times over the last 15 months, and the scientific community has verified these successes. Now is the time to focus on making this new carbon-free, safe, and abundant energy source available to the nation

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as soon as possible." In April last year, Fluor signed a memorandum of understanding with Longview to be its engineering and construction partner in designing and planning laser fusion energy commercialization. Longview's plan is for laser fusion power plants, with capacity of up to 1600 MW to provide electricity or industrial production of hydrogen fuel and other materials that can help to decarbonize heavy industry.

World Nuclear News

<http://www.world-nuclear-news.org/>

12 March 2024

Huge 60-foot-tall buoy uses ocean waves to create clean energy

Giant buoys over 60-feet tall may one day generate clean energy to feed into local power grids—but making it a reality isn't as simple as going with the ocean's flow. To successfully keep the idea afloat, it's all about timing.

Swedish company CorPower recently announced the completion of its first commercial scale buoy generator demonstration program off the coast of northern Portugal. Over the course of a six-month test run, CorPower's three-story C4 Wave Energy Converter (WEC) endured four major Atlantic storms and adapted to constantly shifting wave heights. Although final analysis is still ongoing, CorPower believes the technology offers a promising new way to transition towards a sustainable future.

As *New Atlas* explains, the basic theory behind CorPower's C4 is relatively straightforward. As its air-filled chassis bobs along the rolling waves, an internal system converts the up-and-down movement into rotational power for energy generation. At the same time, however, a tensioned, internal pneumatic cylinder reacts in real-time to wave phases—slightly delaying its movements behind the waves amplifies the buoy's bobbing, thus creating even more energy production. According to CorPower, using this system can boost power generation as much as 300-percent.

But what about when the sea inevitably gets choppiest, as was the case during storms that produced waves nearly as high as the C4 itself? When this happens, the pneumatic cylinder switches off its active control to allow the machine to enter "transparent" mode, during which time it simply rides out the adverse ocean conditions until it's time to spring back into action. CorPower compares this "tuning and detuning" feature to similar systems in wind turbines, which adjust the pitch of their blades in response to surrounding weather conditions.



CorPower says its team recorded as much as 600kW of peak power production during the C4 trial, although they believe it's possible for the buoy's current version to ramp that up to around 850kW. While that by itself isn't much compared to a single offshore wind turbine's multi-megawatt range, CorPower's plan is to eventually deploy thousands of more efficient WEC machines to create a much more powerful generator network. If it can scale a farm up to produce 20 gigawatts of energy, it estimates the buoys could offer something

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between \$33-\$44 per megawatt-hour. That's pretty attractive to investors, especially given C4's aquatic power source operates virtually 24/7, unlike wind or solar generators.

Right now, however, 20 gigawatts would require over 20,000 buoys, so a more economical and efficient buoy system is definitely needed before anyone starts seeing fleets of these canary yellow contraptions floating out there on the open oceans. CorPower seems confident it can get there, and is next planning a new trial phase that will see multiple C4 buoys in action.

Popular Science
<http://www.popsci.com/>

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Power restored to Tesla factory outside Berlin a week after a suspected arson attack

Power has been restored to electric car manufacturer Tesla's factory near Berlin after a nearly one-week outage believed to have been caused by arson, a network operator said. Grid operator E.DIS said in a statement that Tesla was reconnected to the network at 8:45 p.m. Monday after days of repairs. It previously appeared that the factory, Tesla's first in Europe, might remain without power until the end of the week. Production at Tesla's plant in Gruenheide, just outside the German capital, came to a standstill last Tuesday. Tens of thousands of residents, nearby hospitals, nursing homes and a big logistics center for a German grocery chain were also affected initially. Authorities in the state of Brandenburg, where the plant is located, have said they suspect that someone deliberately set fire to a high-voltage transmission line on an electricity pylon.

A far-left organization calling itself the Volcano Group said it was behind the fire, accusing Tesla of "extreme exploitation conditions" and calling for the "complete destruction of the gigafactory." The German federal prosecutor's office took over the investigation, citing an initial suspicion that a terrorist organization may have been involved in the attack. Tesla opened the factory in March 2022, launching a challenge to German automakers on their home turf. The power outage came as environmental activists have been protesting in a forest near the plant against plans to expand the facility.

AP News
<http://apnews.com/>

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UK to Allow New Gas Plants, Backtracking On Clean Grid Plan

The UK will allow new gas-fired power plants to be built into the 2030s, watering down a previous commitment to have a net zero grid by 2035. The government was aiming for totally clean power supply by the middle of the next decade, meaning that any gas stations would need to be fitted with carbon removal technology. Now, ministers say that new gas plants will be allowed to pollute because they will be crucial to keeping the lights on when it's not sunny or windy.

It's the latest sign of climate backsliding from the Conservatives after the party delayed a ban on sales of internal combustion cars and a phaseout of gas boilers. Prime Minister Rishi Sunak has been saying for months that he would slow or abandon environment policies if they led to direct costs on consumers. The strengthened support for new fossil fuel plants is in contrast to the opposition Labour party plan that aims for a clean grid by 2030. Pitting energy security against net zero is seen by the Conservatives as a potentially successful battle line in the upcoming election. Shadow energy secretary Ed Miliband reiterated Labour's 2030 clean power target on Tuesday.

"We expect that a limited amount of new gas capacity will be required in the immediate term to ensure a secure and reliable system that avoids blackouts," the

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government said in the consultation document. Under Labour, gas plants would be needed only as back up and would not be commercial for investors, Alan Whitehead shadow minister for energy security said at an event in London on Tuesday. Any new capacity would need to be low carbon, he said.

The announcement comes as part of the second consultation on the Review of Electricity Market Arrangements, published Tuesday. The process closes on May 7 with implementation from 2025, potentially after a change in government. The government will broaden existing laws that require new gas plants to be built net zero-ready or able to convert to hydrogen, according to a statement. The stations will be eligible to compete in the government's capacity auction. This year, a record price of £65 per kilowatt per year wasn't enough to bring forward any large gas plants. There will be a "glide path" for unabated gas to decarbonize by 2035, according to the consultation document but this is now couched with the words "subject to security of supply." The new gas plants must come with strict conditions to "be retrofitted with green hydrogen or carbon capture and storage in the future, to maintain the UK's clean power leadership," said Juliet Phillips, UK energy program lead at climate think tank E3G.

Global economies are returning to gas as a transition fuel with European nations striking new deals for liquefied natural gas that go beyond 2050. Qatar, one of the world's largest suppliers of LNG, is seeking more export deals in Europe and Asia as it plows investment into production. The COP28 climate talks last year ended with the inclusion of a line about transition fuels that many will see as an endorsement for the long-term use of gas.

Britain aims to be a world leader in technologies like carbon capture and storage and hydrogen, Tuesday's announcement raises questions about how achievable those ambitions are. The UK has been pushing the idea of energy independence after Russia's war on Ukraine sent gas prices to record levels causing one of the worst crises in decades. Fossil fuels will continue to be important with new oil and gas licenses in the North Sea a critical part of reducing the need for fuel imports, the government said

Germany has also recognized the need for gas to help it phase out coal-fired power plants. The nation plans to finance one of Europe's biggest expansions of gas-fired power plants, on the condition that developers convert to hydrogen in future years with about 15 to 20 new plants possible. The second consultation has dropped several proposals that were controversial with the energy industry. These included an option to create different local wholesale costs known as "nodal pricing" and a separation of gas from power price-setting.

Instead, another kind of locational pricing is under discussion. This would involve different charges based on where consumers or generators are based in the country. This could incentivize generators to build closer to where power demand is, mostly in London and the South of England. Currently a quarter of the UK's renewable power is generated in Scotland and then transported down to demand centers in the south. Changes to this could save consumers about £45 per year, the government said.

Bloomberg

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

13 March 2024

China's mountainous Yunnan adopts AI for power facility inspections

China's southwestern province of Yunnan has deployed artificial intelligence (AI) to carry out most routine inspections at 621 power substations, replacing the need for human interventions. The AI inspection, powered by cameras, drones and walking robots, is capable of completing a task in less than five minutes, down from the five hours required by human workers, according to the Yunnan branch of the China Southern Power Grid.

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A major producer of hydropower and other forms of clean electricity, Yunnan has 1,937 power substations of 35 kilovolts or above, many of which are located in mountainous areas. Access to nearly half of these substations requires travel of more than three hours by road, said Wang Xin, a senior manager of the Yunnan branch. AI-powered automatic inspections are expected to exempt human workers from lengthy road travels, thereby greatly reducing costs, according to Wang.

The China Southern Power Grid has planned to promote AI inspections to the rest of the substations in the province over the next two years. China is increasingly turning to robotic technologies to tackle the shortage of technicians in remote mountainous areas. Last year, the mountainous province of Guizhou also started using robots for the inspection of power substations that are susceptible to disruptions by extreme weather conditions.

Hinhua

<http://english.news.cn/>

13 March 2024

NREL: Hydropower Investment Opportunities Remain Vastly Untapped in US

With the clean energy transition well underway, there is plenty of exciting news about increasing deployment of renewable energy solutions like solar. Yet as more of these variable renewables connect to the grid, there is an increasing need for firm, flexible, and renewable power and storage to balance supply and demand.

One potential solution is hydropower, which has long proven it can meet that need and provides 96% of the nation's utility-scale energy storage capacity. In fact, hydropower's longstanding reputation as a reliable source of energy and storage may ironically be one of the reasons people often assume it is "tapped out" of investment opportunities, but this is not the case.

Far from being tapped out, hydropower, including pumped storage hydropower (PSH), still has enormous potential for growth, particularly for small- and medium-sized projects (or those that produce up to 30 megawatts of power). In fact, less than 3% of the more than 90,000 dams in the United States produce power, with thousands of nonpowered dams offering excellent opportunities for investment. In addition, dams that do currently produce power can often be updated to increase capacity. There are also millions of miles of waterways, including both rivers and canals, that can be utilized for in-stream hydropower.

A new [report](#), Hydropower Investment and Public-Private Ecosystem Assessment, developed by the National Renewable Energy Laboratory (NREL), provides a comprehensive analysis of both the risks and opportunities for investing in small- to medium-sized hydropower and PSH projects. Key findings from the study, which was funded by the U.S. Department of Energy's Water Power Technologies Office (WPTO), include:

- Medium-sized projects offer significant opportunities for low-impact hydropower development. The current medium-sized project pipeline includes projects that would constitute a total capacity of more than 1 gigawatt and involves capacity additions, nonpowered dam retrofits, hydropower generation in conduits, PSH, new stream-reach development, and hybrid projects that combine multiple renewable technologies.
- New technology innovations and the variety of sites on which hydropower could be developed present potential opportunities for future investment. Top areas of interest include:
 - Modular conduit hydropower: In the last decade, developers have begun designing and deploying small modular conduit systems, which can be manufactured off-site and then assembled on-site. This approach can decrease construction costs, reduce project timelines, and increase flexibility to expand the size of a hydropower system in the future. One example highlighted in the report of a company pursuing

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modular conduit hydropower is Emrgy, which raised several million dollars in private investment.

- Nonpowered dam resources: Because about 97% of U.S. dams do not have power-generating infrastructure, nonpowered dams represent an attractive development opportunity with a potential capacity of 2 gigawatts or more within the medium-sized range.
- Hybrid plant configuration: Utilizing hydropower in a hybrid configuration with other renewables and battery storage can unlock new revenue streams by providing power during peak demand or ancillary services such as the ability to adjust quickly to ensure grid reliability.
- Closed-loop PSH innovation: Closed-loop PSH systems feature two reservoirs that are not connected to a naturally flowing water feature like a river. These projects, which can offer siting flexibility, account for the majority of PSH projects in the pipeline. These projects would be the first closed-loop facilities in the United States.

Investors surveyed for this study generally expressed the greatest level of interest in supporting capacity additions at existing facilities. With a connection to the grid already established, these existing facilities offer critical opportunities to increase clean energy production.

NREL

<http://www.nrel.gov/>

14 March 2024

Transatlantic collaboration on SMR regulation expanded

The Memorandum of Cooperation (MoC) between the Canadian Nuclear Safety Commission (CNSC), the UK's Office for Nuclear Regulation (ONR) and the US Nuclear Regulatory Commission (NRC) was signed during the NRC's Annual Regulatory Information Conference in Maryland, USA, on 12 March. It was signed by CNSC acting CEO Ramzi Jammal, NRC Chair Christopher Hanson and ONR Chief Executive and Chief Nuclear Inspector Mark Foy.

The partners said the MoC underscores their commitment to share best practices and regulatory experience as new technologies move toward standardisation that facilitates international deployment. The agreement is expected to aid development of shared approaches for reviewing common technical safety issues to meet each country's regulatory requirements. The agencies will also collaborate on pre-application activities, research, training, and emerging novel technical issues. "Importantly, the trilateral agreement signals a partnering approach that will improve both regulatory effectiveness and efficiency, essential given the rapid growth in reactor technologies that are seeking regulatory consideration and approval," ONR's Foy said. "The agreement will ensure the efficient use of regulators' time and resources through a willingness to share technical knowledge and judgements, streamlining regulation while maintaining safety standards, acting as an exemplar of how regulators should work together in today's modern world."

"This agreement shows the great progress we've made with our international counterparts to ensure advanced reactor technology can be safely and efficiently deployed," added NRC Chair Hanson. "We've seen our work with CNSC on joint reports support significant licensing activities on several advanced designs over the past couple of years. We look forward to ONR's contributions as we all consider applications to build SMRs and advanced reactors."

CNSC's Jammal said: "The CNSC is pleased to sign our first trilateral MoC with longstanding partners, the US Nuclear Regulatory Commission and the UK Office for

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Nuclear Regulation. This provides a framework for the three nuclear regulators to work together to optimise collective skills, experience and knowledge. The agreement will help us discover greater regulatory efficiencies, and strengthen the effectiveness of our reviews of advanced reactor technologies."

The agreement builds on the information-sharing aspects of several previous agreements, as well as recent bilateral memorandums of cooperation on small modular reactor (SMR) and advanced modular reactor (AMR) technology. International collaboration and initiatives to harmonize the regulatory process are seen as vital for the safe and successful deployment of new reactor designs such as SMRs. The CNSC and NRC have been working together on this for several years, and in 2019 signed an MoC covering technical reviews of advanced reactor and SMR technologies.

In January 2023, Terms of Reference were signed and published between the CNSC and the ONR for an MoC between the two organisations on sharing best practice and experience around reviewing AMR and SMR technologies. The agreement also allowed for future working to facilitate a joint technical review of AMR and SMR technologies and to cover pre-application activities to ensure mutual preparedness to review them effectively and efficiently.

World Nuclear News

<http://www.world-nuclear-news.org/>

14 March 2024

1-GWh Battery now operational in Arizona for solar site powering Google data center

Salt River Project (SRP) and NextEra Energy Resources announced Arizona's largest operational battery energy storage system is now online. Sonoran Solar Energy Center is a 260-MW solar facility with the ability to charge a 1 gigawatt-hour GWh battery energy storage system, located south of Buckeye, Arizona. The solar and battery storage system will help match the electricity consumed by Google's forthcoming data center campus in Mesa, Arizona. Energy not needed by the data center will be used to meet other SRP customer needs.

Also supporting Google is the newly developed Storey Energy Center, an 88-MW solar and battery storage system, located in Coolidge, Arizona. Both facilities are operated by subsidiaries of NextEra Energy Resources. SRP and NextEra Energy Resources' under-development wind facility, Babbitt Ranch Energy Center, will also support Google. This is a 161-MW wind project, on Babbitt Ranches property in Coconino County, north of Flagstaff.

"We're aiming for every Google campus to operate on clean electricity every hour of every day by 2030, including in Arizona where we are excited to put down roots with our first data center in the state currently under construction," said Amanda Peterson Corio, Global Head of Data Center Energy, Google. "The collaboration with Salt River Project and NextEra is accelerating decarbonization in Arizona and our own carbon-free journey in the region." Through its Integrated System Plan, SRP found it will need to at least double the number of power resources on its power system in the next 10 years as it completes the planned retirement of 2,600 MW of coal resources, and amid growing energy demand.

"These renewable energy centers will generate low-cost, homegrown energy and provide millions of dollars in additional revenue to both Maricopa and Pinal counties over the life of the projects," said Anthony Pedroni, Vice President of Renewables and Storage Development at NextEra Energy Resources. "We are pleased to work with SRP and Google to bring online Arizona's newest renewable energy centers."

Renewables Energy World

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