

WORLD POWER SYSTEMS REVIEW

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Produção de energia renovável bate recorde em 2023

A produção renovável abasteceu 61% do consumo de energia elétrica em Portugal em 2023, num total de 31,2 TWh, o valor mais elevado de sempre no sistema nacional.

A energia eólica abasteceu 25% do consumo em Portugal, a hidroelétrica 23%, a fotovoltaica 7% e a biomassa 6%. Houve um crescimento homólogo de 70% na produção hidroelétrica, face ao ano particularmente seco que se tinha registado em 2022, bem como também um crescimento de 43% na produção fotovoltaica, devido ao aumento progressivo da capacidade instalada. Os índices de produtividade das fontes de energia renováveis ficaram praticamente em linha com os regimes médios, com um índice de 0,99 (média histórica igual a 1) para a hidroelétrica, o mesmo valor para a eólica e 1,01 para a produtividade solar.

A produção não renovável abasteceu apenas 19% do consumo, totalizando 10 TWh, o valor mais baixo desde 1988. Isto deve-se não só à maior disponibilidade de energia renovável, mas também ao elevado saldo importador, que abasteceu 20% do consumo, tratando-se do valor mais elevado de sempre e da sua maior quota no abastecimento do consumo desde 1981.

O consumo de energia elétrica abastecido a partir da rede pública em 2023 alcançou os 50,7 TWh, um crescimento de 0,8% face ao ano anterior, ou de 0,6% contando com a correção dos efeitos temperatura e número de dias úteis. É o consumo mais alto desde 2018, ficando a cerca de 3% do máximo histórico registado no sistema nacional, em 2010.

No que toca ao mês de dezembro, o consumo registou um forte crescimento de 6,9% ou 5,6%, com a correção dos efeitos de temperatura e dias úteis. A produção renovável abasteceu 73% desse consumo, a não renovável abasteceu 11%, enquanto os restantes 16% corresponderam ao saldo importador. Durante esse período, as condições foram favoráveis para a produção hidroelétrica, com um índice de produtividade de 1,09, ao contrário da produtividade eólica e solar, que registaram índices de 0,83 e 0,91, respetivamente.

No mercado de gás natural, em 2023, o consumo global foi o mais baixo desde 2014. Registou-se um consumo de 49 TWh, significando uma contração de 21% face ao ano anterior, resultado de uma redução de 42% no segmento de produção de energia elétrica e de uma diminuição de 3% no segmento convencional.

O aprovisionamento do sistema nacional em 2023 foi feito fundamentalmente a partir do terminal de GNL de Sines, com 95% do total do gás entrado em Portugal, recebendo-se os restantes 5% através da interligação com Espanha. O gás descarregado em Sines teve origem sobretudo na Nigéria e nos Estados Unidos, que representaram, respetivamente, 42% e 40% do aprovisionamento nacional.

Em dezembro, o consumo de gás manteve a tendência negativa que se registou ao longo do ano, com uma contração homóloga global de 11,5%. Trata-se de uma quebra de 51% no mercado elétrico, parcialmente compensada por um crescimento de 10% no segmento convencional.

REN

<http://www.ren.pt/>

3 January 2024

Germany turns net power importer for first time in 17 years

Germany became a net commercial power importer last year for the first time since records began in 2006, a spokeswoman for the BNA network regulator told Montel on Wednesday.

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The country saw net commercial power imports of 11.7 TWh in 2023, the BNA added in a statement. For the entire year, Germany imported 54.1 TWh, while it exported 42.4 TWh, said. The country imported the most power from Denmark at 13.1 TWh, while the latter imported 2.4 TWh of German power.

Montel

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

3 January 2024

2023 in Review: Planning for the Reliability of the Future Grid Amid Dynamic Change

PJM and stakeholders focused their planning efforts in 2023 on the core challenge of ensuring a reliable grid amid the retirement of traditional generators, increasing demand for electricity and the addition of renewable resources that behave differently from traditional fuel-burning generators.

The year began with a long-term load forecast projecting growth in energy demand over the next decade, primarily fueled by data centers being sited in Virginia, Maryland, Ohio and Illinois. Using improved modeling techniques, the forecast predicted estimated annual growth in customer demand of 0.8% per year for summer peaks, 1% for winter peaks and 1.4% for net energy over a 10-year planning horizon starting in 2023.

This landscape was reflected in the study PJM released in February, *Energy Transition in PJM: Resource Retirements, Replacements & Risks* (PDF). This analysis was the latest in a multiphase review of the potential impacts of the energy transition, and it contained a number of implications for how PJM plans the grid. The paper documented PJM's concerns over the combined forces of new electricity demand growth, accelerating retirements of existing generators, and the slow pace of new generation construction.

Largely precipitated by clean energy policies, retirements of traditional generators are at risk of outpacing the construction of new resources. Due to siting, financing, supply-chain and other factors outside of PJM's control, a number of projects are passing through PJM's study process but not being built. At the end of 2023, about 40,000 MW of qualified projects had yet to move to construction.

To accelerate the process through which new generation resources connect to the grid, in July, PJM began implementing landmark interconnection process reform, which was approved by the Federal Energy Regulatory Commission in November 2022. These changes are critical for PJM to help states advance their decarbonization goals because it will move requests through the interconnection queue more efficiently and focus on projects that are more likely to get built.

PJM's reformed interconnection process is expected to clear about 300 new generation projects totaling 26,000 MW in 2024, marking significant progress in the integration of renewables and other generation in the nation's largest electric grid. PJM also identified another 46,000 MW of nameplate generation capacity in projects that should clear PJM's study process and be ready for construction by mid-2025, for a total of 72,000 MW of projects, mostly renewable and battery resources, expected to complete the process by that time. An additional 100,000 MW of projects is expected to be cleared by the end of 2026.

The transition plan will process enough interconnection requests to make up for retiring thermal generators – and the vast majority of these projects are renewables (wind or solar) or battery, or a hybrid combination of both.

To further simplify the interconnection process for developers of new generation resources, PJM in December updated its public Queue Scope planning tool that lets users visually evaluate the potential impacts of new generation on the power grid.

Queue Scope allows prospective generation developers or other users to assess the location of future generators before they formally enter PJM's interconnection queue. The

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new version is integrated with the PJM system map, meaning that users can now visualize how a generator impacts congestion on lines, as well as the potential transmission upgrades that would be needed to interconnect a project.

PJM in April reached the next milestone in its historic collaboration with New Jersey, using the State Agreement Approach to advance that state's offshore wind goals through PJM's competitive transmission planning process. The New Jersey Board of Public Utilities formally requested that PJM solicit transmission solutions serving 3,500 MW of offshore wind energy to New Jersey customers by 2040. This is in addition to the 7,500 MW of energy by 2035 that PJM previously incorporated into its competitive Regional Transmission Expansion Plan (RTEP), also under the State Agreement Approach. PJM is also working with officials in Maryland and Delaware to study the prospect of offshore wind energy.

Increasing demand for electricity and the drive to decarbonize the grid with the connection of many smaller new resources require an upgraded transmission system.

This challenge was exemplified by the immediate-need projects approved by the Board of Managers in July to begin addressing reliability issues in the Mid-Atlantic region that will be triggered with the deactivation of Brandon Shores 1 and 2 coal units outside of Baltimore. Further projects were approved in October. Also in October, PJM and stakeholders focused on the results of the 2022 Regional Transmission Expansion Plan (RTEP) Window 3, which ran Feb. 24 to May 31, soliciting competitive proposals to address significant impacts to the grid expected in the near future from new electricity demand combined with the retirement of fossil fuel generators.

The 2022 RTEP Window 3 proposal, approved by the PJM Board Dec. 11, aims to expand the regional transmission system to meet the needs of load growth, generator retirement and future new generation resource capacity in the Mid-Atlantic region. The grid enhancements are required to maintain reliability as PJM prepares for significant impacts to the grid from up to 7,500 MW of new data centers to be sited in Virginia and Maryland, combined with widespread effects from the deactivation of more than 11,000 MW of generation. The estimated cost of the combined Window 3 upgrades is approximately \$5 billion. PJM's emphasis on planning in 2023 reflects a government and industry-wide focus on preparing for the grid of the future. In step with this movement, PJM has revived its Long-Term Transmission Regional Planning Reform Workshops and looks forward to extensive stakeholder engagement in the New Year on planning a reliable grid.

PJM Insidelines
<http://insidelines.pjm.com/>

3 January 2024

"Largest clean energy project in U.S. history" secures \$11B in financing, starts full construction

SunZia to supply 3,000 MW of clean energy to Arizona and California. After more than 17 years of navigating permits and approvals, Pattern Energy Group has closed \$11 billion in non-recourse financing and started full construction of SunZia Transmission and SunZia Wind. The tandem is being billed by the company as the largest clean energy infrastructure project in U.S. history.

SunZia Transmission is a 550-mile ± 525 kV high-voltage direct current (HVDC) transmission line between central New Mexico and south-central Arizona with the capacity to transport 3,000 MW across Western states. SunZia Transmission will deliver power generated by Pattern Energy's 3,515 MW SunZia Wind facility (the largest wind project in the Western Hemisphere), which is being constructed across Tarrant, Lincoln, and San Miguel Counties in New Mexico.

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SunZia Wind and Transmission will employ more than 2,000 workers on-site during construction, including heavy equipment operators, electricians, laborers, and others. The EPC Contractor of the transmission line is Quanta Infrastructure Solutions Group and the HVDC supplier is Hitachi Energy. The EPC contractor for the wind project is Blattner Energy, a Quanta-affiliated company. The wind turbines are being supplied by GE Vernova and Vestas. The project's financing includes an integrated construction loan and letter of credit facility, two separate term facilities, an operating phase letter of credit facility, a tax equity term loan facility, and a holding company loan facility.

"Our hope is this successful financing of the largest clean energy infrastructure project in American history serves as an example for other ambitious renewable infrastructure initiatives that are needed to accelerate our transition to a carbon-free future," said Hunter Armistead, CEO of Pattern Energy in a press release. "We are very grateful to all of our financial partners who are backing SunZia as part of this record-setting project financing. Construction is well underway on this historic project that will deliver clean power with a generation profile that complements abundant solar generation available across the Western United States."

Construction began on the project in late 2023, after the Bureau of Land Management, U.S. Department of the Interior, issued its Notice to Proceed. However, work came to a halt in southwestern Arizona last November, as Native American tribes argued the federal government ignored concerns about how the transmission line may impact religious and cultural sites. Federal land managers temporarily suspended work on the SunZia transmission project along a 50-mile segment after the Tohono O'odham Nation asked for immediate intervention, saying bulldozers were clearing a stretch of the San Pedro Valley and that one or more historic sites were demolished.

Renewable energy advocates have said SunZia will be a key artery in the Biden administration's plan for boosting renewables and improving reliability along the nation's power grids. The line will stretch about 550 miles (885 kilometers) from central New Mexico, transporting electricity from massive wind farms to populated areas as far away as California. Developer Pattern Energy has billed the SunZia project as an energy infrastructure undertaking bigger than the Hoover Dam. Executives and federal officials gathered in New Mexico in September to officially break ground on the project. SunZia Transmission and Pattern Energy have partnered with the New Mexico Renewable Energy Transmission Authority (RETA) on the development of the transmission line in New Mexico.

Renewable Energy World

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

4 January 2024

Bangladesh's 2023 coal-fired power output tripled, easing shortages

Bangladesh nearly tripled its coal-fired power output in 2023, a Reuters analysis of government data showed, helping it tide over the worst power shortages in over a decade and slash rising generation costs.

Coal rose to prominence in Bangladesh's power mix in 2023 at the expense of cleaner fuels, as the government struggled to pay for costly natural gas, furnace oil and diesel imports because of shrinking dollar reserves and a weakening currency. Power generation from coal surged to a record 21 billion kilowatt-hours (kWh) in 2023, up from the 7.9 billion kWh of electricity produced from coal in 2022, an analysis of daily operational reports by the Power Grid Company of Bangladesh (PGCB) showed.

"The share of coal is expected to increase further this year as a new unit is expected to get commissioned. Dependence on gas is expected to remain steady and use of liquid fuels will fall," a senior energy ministry official said. Coal's share of the power generation

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fuel mix rose to 14.2% in 2023, from 8.9% in 2022, the PGCB data showed, while the share of natural gas rose to 55.2% in 2023, the first increase in four years and up from 51% in 2022.

However, natural gas's share last year was much lower than the average of about 66% in the ten years to 2022 as high international prices for the fuel limited its usage. Dwindling local gas reserves and LNG, mainly from Qatar, are the main gas sources for the country. Coal and natural gas gained mainly at the expense of liquid fuels such as fuel oil and diesel, whose share in power generation slipped to 20.1% in 2023 from 29.6% in 2022, the data showed.

Bangladesh, home to over 170 million people and the world's second-largest garments exporter, supplying global retailers including Walmart (WMT.N), H&M and Zara, faced unscheduled power cuts during three out of every four days in 2023. Overall shortages surged nearly 40% year-on-year to 2.7 billion kWh in 2023, or 2.8% of demand, PGCB data showed, with shortages easing in the second half of the year because of higher coal-fired output.

Along with other major Asian economies India and Vietnam, Bangladesh boosted its use of relatively inexpensive coal to meet its surging power demand growth, which rose over 5% in 2023. Higher coal-fired generation also put the south Asian nation on track to cut average generation costs for the first time in four years.

The cost of power generation averaged 5.23 Bangladesh Taka (4.78 U.S. cents) per kWh during the 11 months ending November, about 9% lower than in 2022. Bangladesh, among the top ten economies most dependent on fossil fuels for power generation, hopes to boost its green credentials this year by doubling its solar capacity additions and commissioning a long-delayed nuclear power plant. However, fossil fuels will continue to dominate power generation in the coming years and renewables are not expected to make up more than 5% of overall output this decade, industry officials say.

Reuters

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

5 January 2024

South Africa opens draft IRP energy plan for public comment

"The purpose of this publication is to solicit public comments on the assumptions, input parameters, scenarios, and observations made," the Department for Mineral Resources and Energy (DMRE) said on X. "Comments submitted will be considered in drafting the final policy adjusted plan which will map out the future energy mix for the country."

The 52-page document has been published in the South African Government Gazette and considers several scenarios and latest developments in the country's electricity industry, DMRE said. It considers two time horizons: the period up to 2030, focusing on addressing prevailing generation capacity constraints and system requirements to close the supply gap; and the period from 2031 to 2050, focusing on long-term electricity generation planning with pathways to achieve a net zero electricity sector by 2050.

South Africa's previous IRP, published in 2019, recognized the need to retain nuclear power in the country's energy mix and supported utility Eskom in pursuing a licence for the long-term operation of the Koeberg nuclear power plant. The plant's life extension is currently being reviewed by the National Nuclear Regulator, the new document notes.

Over the longer horizon, pathways comprising dispatchable technologies with high utilisation factors - including different combinations of nuclear, renewables, clean coal and gas - will provide security of supply as well as supporting carbon reduction commitments, the report finds.

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Firm decisions based on system requirements are "crucial", the plan concludes, but final policy decisions "must be taken on the basis of a longterm decarbonisation trajectory" while improving South Africa's competitiveness and economic growth, the IRP concludes.

The DMRE recently confirmed it intends to start the procurement process for 2500 MWe of new nuclear capacity, with plans to issue requests for proposals by March 2024.

World Nuclear News

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

5 January 2024

Ethiopia completes 94% of controversial Renaissance Dam

Ethiopia has completed 94% of the Grand Ethiopian Renaissance Dam (GERD), state-affiliated broadcaster Fana TV reported Thursday. Following a meeting, the National Council for the Coordination of Public Participation on the Construction of GERD announced that the final stages of construction were underway. The council called for continued meetings between Egypt, Sudan and Ethiopia to address disagreements over the dam, which is located on the Blue Nile River in Ethiopia, close to the border with Sudan.

The first filling of the dam took place in July 2020 and Ethiopia began producing electricity from GERD on Feb. 20, 2022. A dispute between Ethiopia and downstream nations Egypt and Sudan over the construction of the dam has dragged on for 12 years. The three countries failed to reach a resolution in a fourth round of negotiations last month. The last four rounds of negotiations took place following a hiatus that lasted for more than two years after talks between the three countries broke down in April 2021.

This followed the failure of an African Union initiative to reconcile the viewpoints of the three countries. Egypt and Sudan insist on first reaching a binding agreement with Ethiopia regarding the filling and operation of the dam to ensure the continued flow of their shares of Nile River water. On Sept. 10 last year, Ethiopian Prime Minister Abiy Ahmed announced the success of the fourth stage of filling the dam, a move that Cairo considered a "new violation" by Addis Ababa.

AA

<http://www.aa.com>

6 January 2024

Temper tantrum

A worrying trend is emerging in large-scale PV as project owners report high levels of broken module glass. Few of them are willing to share details from specific projects at this stage but quality experts say reports have been received relating to hundreds of megawatts of installed PV generation capacity. And the problem could be much bigger.

Broken glass details vary but appear to share factors in common: All concern dual-glass-module projects featuring 2 mm glass on both sides of panels. None have been exposed to strong wind, hail, heavy snow loads, or other events that might explain the broken glass. Data thus far suggest the problem is not confined to any region or solar technology. "We have seen reports of unexplained broken glass coming from Brazil, Chile, Australia, the US, and elsewhere," said Tristan Erion-Lorico, vice president (VP) of sales and marketing at solar equipment testing lab PVEL. "This isn't region specific, isn't system-type specific, and it isn't manufacturer specific. That's why this is so concerning."

Manufacturers, quality assurance providers, certification bodies, and the PV research community have noted the issue. Theories exist about the root of the problem and best course of action. One module manufacturer described a project where owners of a PV plant approached it to report of widespread broken glass.

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The manufacturer began an investigation at the project site and was able to prove the breakage was caused by lawn-mowing robots that flicked up rocks from the ground hard enough to damage module glass. In a recent pv magazine webinar, Thomas Weber, of quality assurance experts PI Berlin, shared details of multiple investigations where it was able to identify causes including improper installation and use of the wrong clamps.

In other cases, investigations have not been able to reach such a clear conclusion and there is likely a combination of causes out in the field. Most of the possibilities boil down to two things – weaknesses stemming from the use of larger modules with thinner glass, and a possible gap in testing and certification standards which modules that are highly susceptible to glass breakage have slipped through.

With most modules now generating power from both sides, and a long history of reliability problems with polymer backsheets, many manufacturers have made the switch to using glass on both sides. This has plenty of advantages but also necessitates a switch to thinner glass in order to keep the weight down – glass-backsheet modules typically use 3.2 mm thick glass, while glass-glass products slim this down to 2 mm per sheet.

The thicker glass can be fully tempered, greatly increasing its strength but the tempering process relies on a temperature difference between the outer surface and inner portion of the glass. A thickness of just 2 mm does not leave enough of an inner portion between the two surfaces for the glass to be fully tempered (at least cost-effectively).

At the same time as glass has been getting thinner, frame designs have also been shrinking while the modules themselves get larger, leading to a significant change in module design that appears to have been widely overlooked: That glass is now playing a much more significant role as a load-bearing material in panels.

“If you’re using the glass as part of the support structure that’s actually bearing significant load, the failure mechanism you’re confronting is brittle fracture,” said Henry Hieslmair, principal solar engineer at DNV. “Preventing that depends on how well you control defects along the edges and surfaces, and that can have a huge variation. So you could easily pass a few modules in a load test but then have something like 1% fail in the field.”

Module manufacturers state that they carefully qualify glass suppliers and test products before using them in mass production. “We qualify glass from many aspects such as size, durability, reliability, bending strength, the drop-ball test, hail test, appearance, etc,” a representative of module manufacturer Trina Solar told pv magazine in a statement. “With each glass type from each supplier, we go through comprehensive reliability tests beyond [the] industry standard within Trina Solar’s own lab as well as third party labs for certification. We do regular quality checks for incoming glass deliveries from suppliers. We also do regular quality and reliability test checks for our modules in mass production. It is a fully controlled process.”

There are signs that the move to thinner glass and larger modules may mean current testing standards don’t take the role of glass into account well enough. “In my mind, the root cause is that, as an industry, we’ve been treating glass as a commodity,” said PVEL’s Erion-Lorico. He explained that International Electrotechnical Council (IEC) standards currently allow for module makers to switch glass manufacturers without a need to retest for certification as long as the thickness and high-level strengthening process haven’t changed. With thicker, fully tempered glass, this may have made sense as there was very little difference between manufacturers but with various types of “heat strengthening” on the market, that may no longer be the case. “Now we’re seeing that glass from different manufacturers could have significantly different strength and mechanical properties,” added Erion-Lorico.

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The way modules are attached to trackers and fixed racking is another topic that pops up regularly in discussions about glass breakage. The issue here seems similar to that related to glass thickness:

Module designs have changed without an accompanying update covering how they are attached to racking. “In the last 10 years, a lot of systems have been attached only with edge clamps,” said DNV’s Hieslmair. “The glass was thicker, the frames were thicker, and we didn’t see a lot of glass breakage. Now, with these really large modules, the ratio of load bearing glass to frame is not the same.”

Module manufacturers provide a letter of compatibility for specific racking systems, which should be the result of rigorous testing. The signs are that small sample sizes and limited parameters for these tests mean they haven’t always picked up on susceptibility to glass breakage. “If any evidence of the ‘compatibility’ is provided, the evidence is one successful result of a single static mechanical load test with the module on the tracker mount, followed by a visual inspection,” wrote DNV in a blog post on the issue. “The tested load is then de-rated 1.5 times to obtain the design load. No additional information is provided in the compatibility letter, or elsewhere, describing any potential additional testing or analyses that may have been performed by the manufacturer to certify compatibility.”

Whatever root causes are eventually found for glass breakage, the next step is to find tests that can reliably spot the problem before systems are installed. That is something the solar industry is only just waking up to. “If a module-tracker combination passes the static load test according to IEC standards, we say our module is compatible,” said CJ Fu, director of product solutions at Longi Solar US. “But, based on my personal experience, this may not be adequate to reflect compatibility in the field. There you can have some surprises, multiple stresses happening at once. We do feel that there is room for improvement in developing a more thorough compatibility testing sequence.”

Tracker manufacturers also confirm that they see interest in more detailed compatibility testing, thought not necessarily from all players.

“Some have requested supplemental tests to the IEC and UL standards, but ultimately that is at the discretion of the module supplier,” said Greg Beardsworth, senior director of product marketing at Nextracker. “It’s up to them to define the maximum loads they are comfortable with while our job is to define the loading for each application as accurately as possible. The standard is based on the static mechanical load test and it varies by manufacturer whether there is anything supplemented on top of that.”

Members of the PV research and reliability community have also noted the increase in reports of broken glass at solar projects and are looking for the right set of tests to address the issue but that will take time. “These codes and standards committees can take a long time to evolve but I wouldn’t be surprised if we see additional testing requirements on top of what we have at present,” added Beardsworth. In the United States, researchers at the National Renewable Energy Laboratory (NREL) have begun investigating new tests and additions to standards, both for separate testing of glass quality and for module-tracker compatibility.

“Products are changing faster and faster and it’s hard to get ahead of the game,” said Ingrid Repins, senior research fellow in the photovoltaics reliability group at NREL. “This glass breakage has caught us by surprise, though I think we knew to some extent there were weaknesses and holes in the testing. Now we’ll try to understand root cause and design tests so that this doesn’t happen again.” The lab is currently designing tests to investigate various hypotheses concerning glass breakage. Firstly, by looking into glass manufacturing. NREL scientists have begun using optical techniques to measure the temper and heat strengthening of glass, aiming to spot differences in module glass that has cracked.

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“There is a hypothesis that it’s really the heat strengthening that’s varying across these different modules and that’s what our scientist will measure when we look at these modules that have cracked,” said NREL’s Repins. “Are they less heat strengthened than they should be? And is that varying across the modules that break or don’t break?”

In another project, NREL scientists are studying the way that cracks form in the glass, aiming to build this into existing models of the whole module. That way, they can model different scenarios and guide the most effective testing strategies – also an important factor given the number of possible component and material combinations and the need for larger test samples. “At this point we have research and we have questions but we don’t yet have answers,” added Repins.

pv-magazine

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

8 January 2024

The Commission has approved a €2.9 billion French State aid scheme for supporting investment in green industries to foster the transition towards a net-zero economy

The European Commission has approved a €2.9 billion French scheme for supporting investment in green industries (tax credit for investment in green industries) to foster the transition towards a net-zero economy, in line with the Green Deal Industrial Plan. The scheme was approved under the State aid Temporary Crisis and Transition Framework, adopted by the Commission on 9 March 2023 and amended on 20 November 2023, to support measures in sectors which are crucial for accelerating the green transition and reducing fossil fuel dependencies.

France has notified to the Commission, under the Temporary Crisis and Transition Framework, a €2.9 billion scheme for supporting investment in green industries to foster the transition to a net-zero economy.

Under this measure, the aid will take the form of a tax credit. The measure will be open to companies which plan projects to invest in the production of solar panels, batteries, wind turbines and heat pumps, as well as key components for producing this equipment and critical materials required for their production.

The Commission found that the French scheme is in line with the conditions set out in the Temporary Crisis and Transition Framework, in particular (i) the aid is expected to encourage the production of strategic equipment for the transition to a net-zero economy; ii) the amount of aid per beneficiary will not exceed the ceilings set out in the Temporary Crisis and Transition Framework; and (iii) it will be granted until 31 December 2025 at the latest.

The Commission concluded that the French scheme is necessary, appropriate and proportionate to accelerate the green transition and facilitate the development of certain economic activities, which are of importance for the implementation of the REPowerEU Plan and the Green Deal Industrial Plan, in line with Article 107(3) (c) TFEU and the conditions set out in the Temporary Crisis and Transition Framework. On this basis, the Commission approved the aid measure under EU State aid rules.

EU

<http://ec.europa.eu/>

8 January 2024

PJM Publishes 2024 Long-Term Load Forecast

PJM has released its new long-term load forecast, and it predicts estimated electricity demand growth of 1.7% per year for summer peaks, 2% for winter peaks, and 2.4% for net energy over a 10-year planning horizon starting in 2024.

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The 2024 summer forecast peak demand, or load, is 151,254 MW, according to the 2024 PJM Load Forecast Report (PDF), with summer peak load increasing to 178,895 MW in 2034 and 193,123 in 2039, an increase of nearly 42,000 MW. Peak winter load for the 2024 winter is forecast at 134,663 MW for the 2023–2024 winter, going to 164,824 MW in 2034 and 178,241 in 2039, an increase of more than 43,000 MW.

Total annual energy use throughout the PJM footprint is expected to increase nearly 40% by 2039, from 800,000 gigawatt-hours (GWh) to about 1.1 million GWh.

“This forecast reflects the accelerated growth that we discussed with our stakeholders throughout 2023, driven by the electrification of multiple sectors combined with consumer demands for technology,” said Kenneth S. Seiler, Sr. Vice President – Planning. “It also underscores the need to maintain and develop enough generation resources to serve that growing demand.” Through its Ensuring a Reliable Energy Transition initiative and related research, PJM has noted that increased electricity demand, combined with accelerated generator retirements and the slow pace of replacement generation, will challenge reliability in the PJM footprint by 2030 if not addressed.

Rising energy demand in the region PJM serves is increasingly driven by the development of data centers throughout the PJM footprint, combined with the accelerating electrification of transportation and industry. The 2024 PJM Load Forecast Report was derived using an electric vehicle forecast by S&P Global with projected counts by zone and impacts for passenger and freight vehicles.

Year	Summer Peak (MW)	Change From 2024 (MW)	Winter Peak (MW)	Change from 2023-2024
2024	151,254	N/A	134,663	N/A
2034	178,895	27,641	164,824	30,161
2039	193,123	41,869	178,241	43,578

The forecast uses historical weather data from 1994 to 2022 as the basis for constructing forecasts. PJM added an extreme cold weather variable that allows the PJM forecast model to better calibrate at colder temperatures in response to Winter Storm Elliott and other extreme weather events. The 2024 Load Forecast Supplement (PDF) provides an overview of the methods of assembling the forecast and the various factors that contribute to it.

“These are useful numbers for lawmakers to understand as they craft policies for this energy transition we are experiencing,” said Asim Z. Haque, Sr. Vice President – State & Member Services. “As we speed up the development of resources that are coming through our study process in large numbers, we will have to look hard at how to make sure our generation supply matches the increase in demand expressed here.”

PJM has engaged with states and cities to incorporate public policies related to electrification, with extensive discussions at the Long-Term Regional Transmission Planning stakeholder workshops. Some of the policies, such as the goals for electrification of home and building heating systems, can be found in this presentation (PDF) to the PJM Load Analysis Subcommittee in November.

The PJM load forecast is constructed using 24 hourly models for each transmission zone. In each model, load is the dependent variable, considered alongside weather, calendar events, economic data and end-use variables. In the history, PJM starts with

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metered load and then reconstitutes total load with load-management addbacks, load drops associated with peak-shaving programs, and distributed solar generation estimates.

For the 2024 Load Forecast, PJM contracted with S&P Global to provide an electric vehicle (EV) forecast for the number of light-, medium- and heavy-duty vehicles across our footprint. The PJM footprint has about 500,000 light-duty EVs in 2024, and S&P Global is forecasting about 23 million light-duty EVs by 2039, a growth rate of just under 30% annually during that period.

PJM has about 25,000 medium- and heavy-duty EVs in 2024, and S&P Global is forecasting about 1.45 million medium- and heavy-duty EVs by 2039, which is again about 30% per year for a 15-year growth rate. S&P Global considered a number of state- and regional-level key drivers in their EV forecast, including zero-emission vehicle (ZEV) states and internal combustion engine (ICE) bans. They have models for which households they predict will purchase an EV.

PJM annually solicits information from its member electric distribution companies (EDCs) for large load shifts (either positive or negative) that are known to the EDCs but may be unknown to PJM. For the 2024 Load Forecast, these include:

- Expanding data center load and a large Intel computer chip plant outside of Columbus, Ohio, in the AEP service area
- Adjustment for data center load by FirstEnergy in the Allegheny Power System transmission zone, primarily the Quantum Frederick campus in Maryland
- PSE&G adjustment for data centers and electrification of New Jersey ports of Bayonne, Elizabeth and Newark, funded by the Inflation Reduction Act
- Dominion adjustment for data center load in Virginia

East Kentucky Power Cooperative (EKPC) requested a peak-shaving adjustment that began with the 2023 Delivery Year. EKPC provides PJM with weather triggers as well as program response matrixes for their three programs (smart thermostats, air conditioning switches and water heater switches), resulting in forecasted peak reduction of 5 MW to 10 MW.

This report presents an independent load forecast prepared by PJM staff. The load forecast process considers residential, commercial and industrial sectors, each with its own set of models and inputs, including input variables for end-use saturation and efficiency as well as for economic drivers.

Insights from this process, combined with data on historical weather, are the starting point for determining peak and energy forecasts. PJM staff then makes adjustments based on forecast growth in behind-the-meter solar generation, battery storage and plug-in EVs, and also considers information from electric distribution companies on non-modeled trends, such as data centers.

PJM Insidelines
<http://insidelines.pjm.com/>

8 January 2024

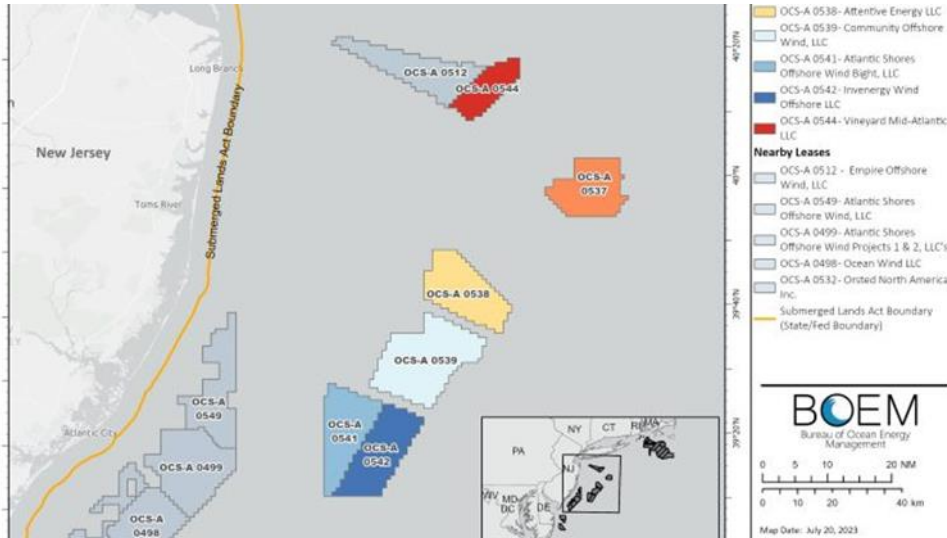
BOEM Announces Draft Environmental Review of Future Development of Wind Lease Areas Offshore New York and New Jersey

As part of the Biden-Harris administration's goal of deploying 30 gigawatts (GW) of offshore wind energy capacity by 2030, the Bureau of Ocean Energy Management (BOEM) is inviting the public to review and comment on a draft potential development of six wind lease areas offshore New York and New Jersey, in an area known as the New York Bight. BOEM estimates that full development of leases in this area, totaling over 488,000 acres, has the potential to create up to 5.6 to 7 GWs of offshore wind energy, enough to power up to two million homes.

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“We look forward to receiving additional public comment to inform this first ever regional environmental review of offshore wind energy development on multiple leases. We are confident that this comprehensive approach can create efficiencies for future project-specific wind energy reviews in a manner that protects the ocean environment and marine life,” said BOEM Director Elizabeth Klein.



In February 2022, BOEM held an auction that brought in over \$4.3 billion for the rights to six lease areas in the New York Bight – a record amount for any U.S. offshore renewable or conventional energy lease sale. This is the first time BOEM has conducted a regional analysis of offshore renewable energy development and operations over multiple lease areas. BOEM decided to take this additional step to complete a Programmatic Environmental Impact Statement (PEIS) because of the close proximity of the six lease areas and the timing of when BOEM expects to receive future project plans for review.

The Draft PEIS analyzes programmatic avoidance, minimization, mitigation, and monitoring measures that BOEM may require as conditions of its approval for any proposed offshore wind projects in the New York Bight. This new regional approach is an evolution of BOEM’s process to help ensure timely decisions that advance offshore wind energy development while safeguarding the ocean environment and marine life and reducing conflicts with other ocean uses.

Additional environmental analyses specific to each proposed wind energy project will build off this programmatic review once BOEM receives individual proposed project plans from the leaseholders.

BOEM
<http://www.boem.gov/>

9 January 2024

French unions threaten strike action at EDF

French power sector unions posted a strike notice at French energy provider EDF that will run from the morning of Jan. 15, an EDF spokesperson said on Tuesday, which could lead to production cuts. State-owned EDF is France's main electricity provider. It has made an offer for annual wage increases and unions have until Jan. 12 to agree to it, the spokesperson said, adding however that it was unlikely unions would sign as the strike call came after the initial offering of the proposal. The proposal offers an overall rise in remuneration of about 4% for 2024, which includes a general increase of 2% for electricity and gas workers, according to an internal EDF document, seen by Reuters.

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"This proposal is in line with the measures taken by the company to ensure the guarantee of purchasing power and the increase in employee compensation, in a context of the Group's high debt and investment needs," the document said. While EDF might have to cut production during a strike, homes and businesses will probably not be affected as the company usually during strike action has sufficient cover or could import energy. Staff meetings are expected to take place over the next several days to determine the details of the planned strike, a representative of energy and mining union FNME-CGT said. "It is time to organise a strike to win a salary increase," Sophie Binet, general secretary of the hard-line CGT union, said on FranceInfo. Cold weather currently gripping France is expected to ease in the coming days, LSEG data showed, but temperatures are expected to remain below average for January. French nuclear availability stood at 86% of capacity on Tuesday.

Reuters

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

10 January 2024

EDF to invest additional £1.3bn in UK generating nuclear power plants

French electric utility EDF has unveiled its plans to invest an additional £1.3bn in the five generating nuclear power plants in the UK between 2024 and 2026.

EDF manages a total of eight nuclear power stations in the UK, of which five are generating, and the remaining three are defuelling, the first stage of decommissioning. The Sizewell B, Torness, Heysham 2, Heysham 1, and Hartlepool facilities are generating, and the Hunterston B, Hinkley Point B and Dungeness B are defuelling.

EDF's new investment, which brings the total investment in the fleet to nearly £9bn since 2009, will help sustain output at current levels, enhance energy security, and reduce carbon emissions. The company will hire more than 1,000 people in 2024 across several UK nuclear plants. EDF nuclear operations business managing director Mark Hartley said: "EDF has built a strong track record of safely operating the UK's existing nuclear fleet, delivering over 35% more clean power than initially forecast. "Looking ahead, we aim to maintain output from the four AGR stations for as long as possible and extend Sizewell B by a further 20 years, out to 2055. "Maximising output also helps preserve the critical nuclear skills and capabilities that will be valuable for future nuclear projects."

After the scheduled termination of power generation at three stations across 2021-22, the total nuclear power generation in the UK was 37.3TWh in 2023. EDF said that it aims to maintain the same level of generation until at least 2026, driven by the extension of generating lifetimes for Heysham 1 and Hartlepool facilities in March 2023. Currently, Heysham 2 and Torness power stations are allowed to generate until March 2028, whose lifetimes will be reviewed again by the end of 2024. EDF said that its Sizewell B power station in Suffolk can generate at least an additional 20 years beyond its current end-of-generation date of 2035. The company is also responsible for defuelling the advanced gas-cooled reactor (AGR) power stations, where the three UK power stations have entered this phase since mid-2021.

NS Energy

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

10 January 2024

Hyundai Unveils Its Electric Air Taxi at CES, Which Could Be Powered by Solid-State Batteries

Would you ride in Hyundai's electric flying taxi? Hyundai's advanced air mobility company, Supernal, unveiled its electric flying taxi at CES Tuesday. The four-passenger eVTOL will "operate as quietly as a dishwasher" and could be powered by solid-state

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batteries. Hyundai debuts electric air taxi at CES. The S-A2 is an electric vertical takeoff and landing (eVTOL) vehicle that builds on its first concept that debuted at CES in 2020. Hyundai says it has fused its auto design with innovative aerospace engineering to create a new method of travel. The electric air taxi is designed to make getting around cities easier.



“Supernal is ready to deliver a new era of flight,” Hyundai Motor Group president and Supernal CEO Jaiwon Shin said at the event. Shin explained that the company is on a mission to deliver “the right product” at the right time. The S-A2 is a V-Tail electric aircraft designed to cruise 120 miles per hour at 1,500 feet. Hyundai’s electric air taxi is designed for city travel with 25 to 40-mile trips. It includes eight tilting rotors and a distributed electric propulsion system. The company says it will “operate as quietly as a dishwasher” with 65 dB in vertical takeoff and landing and 45 dB while cruising. Hyundai focused on sustainability and comfort while designing the aircraft. It includes an airframe structure with included powertrain, flight controls, and avionics.

The tilting rotor will power the vehicle’s vertical and horizontal cruise stages while flying. To keep costs down while maintaining quality, Hyundai will use its mass production network to build the vehicle. Ben Diachun, CTO at Supernal, said the electric air taxi is “designed to take full advantage of emerging electric powertrain advancements.” Shin said the company will apply for a certification in the US in mid-2024 with plans to begin flight tests by the end of 2024. Supernal plans to officially launch the vehicle in 2028. Hyundai is exploring different battery options, including lithium-metal and solid-state batteries, Shin explained in an interview with Bloomberg TV. The automaker has been exploring solid-state batteries through various patents. Most recently, Hyundai filed a patent for a pressurized all-solid-state EV battery system in the US.

Electrek
<http://electrek.co/>

10 January 2024

Top US Grid Operator Sees Electric Vehicles, Industry Driving up Peak Power Demand

PJM Interconnection, the biggest U.S. power grid operator, has predicted that mounting electrification of transportation and industry will drive an increase in demand this year. The grid operator in a report on Monday said it expected a load of 151,254 MW and 134,663 for 2024 summer and winter respectively. It also sees electricity demand growth at 1.7% per year for summer peaks and 2% for winter peaks.

“The PJM footprint has about 500,000 light-duty EVs in 2024, and S&P Global is forecasting about 23 million light-duty EVs by 2039, a growth rate of just under 30% annually

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during that period," the company said in a release. PJM sees summer peak load increasing to 178,895 MW in 2034 and 193,123 in 2039. Similarly, the winter peak is expected to rise from 164,824 MW in 2034 to 178,241 MW in 2039.

"It also underscores the need to maintain and develop enough generation resources to serve that growing demand," said Kenneth S. Seiler, Senior Vice President of planning. The U.S. eastern grid operator expects to clear 300 new power generation projects totaling 26,000 Megawatt (MW) in 2024 under its overhauled review process. The grid operator, which coordinates transmission across all or parts of 13 states from Indiana to Virginia, also identified an additional 46,000 MW of projects that should be able to clear its study process and be ready for construction by mid-2025. Meanwhile, a settlement of \$1.2 billion between PJM Interconnection and over 80 parties was accepted by the Federal Energy Regulatory Commission (FERC) in response to complaints regarding a significant outage that occurred during a winter storm in 2022.

Reuters

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

11 January 2024

IEA: Massive expansion of renewable power opens door to achieving global tripling goal set at COP28

World added 50% more renewable capacity in 2023 than in 2022 and next 5 years will see fastest growth yet, but lack of financing for emerging and developing economies is key issue

The world's capacity to generate renewable electricity is expanding faster than at any time in the last three decades, giving it a real chance of achieving the goal of tripling global capacity by 2030 that governments set at the COP28 climate change conference last month, the IEA says in a new report.

The amount of renewable energy capacity added to energy systems around the world grew by 50% in 2023, reaching almost 510 gigawatts (GW), with solar PV accounting for three-quarters of additions worldwide, according to *Renewables 2023*, the latest edition of the IEA's annual market report on the sector. The largest growth took place in China, which commissioned as much solar PV in 2023 as the entire world did in 2022, while China's wind power additions rose by 66% year-on-year. The increases in renewable energy capacity in Europe, the United States and Brazil also hit all-time highs.

The latest analysis is the first comprehensive assessment of global renewable energy deployment trends since the conclusion of the COP28 conference in Dubai in December. The [report](#) shows that under existing policies and market conditions, global renewable power capacity is now expected to grow to 7 300 GW over the 2023-28 period covered by the forecast. Solar PV and wind account for 95% of the expansion, with renewables overtaking coal to become the largest source of global electricity generation by early 2025. But despite the unprecedented growth over the past 12 months, the world needs to go further to triple capacity by 2030, which countries agreed to do at COP28. Alongside the report, the IEA also released a new Renewable Energy Progress Tracker, which allows users to explore historical data and forecasts at the regional and country level, including tracking progress towards the tripling goal.

"The new IEA report shows that under current policies and market conditions, global renewable capacity is already on course to increase by two-and-a-half times by 2030. It's not enough yet to reach the COP28 goal of tripling renewables, but we're moving closer – and governments have the tools needed to close the gap," said IEA Executive Director Fatih Birol. "Onshore wind and solar PV are cheaper today than new fossil fuel plants almost everywhere and cheaper than existing fossil fuel plants in most countries. There are still

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some big hurdles to overcome, including the difficult global macroeconomic environment. For me, the most important challenge for the international community is rapidly scaling up financing and deployment of renewables in most emerging and developing economies, many of which are being left behind in the new energy economy. Success in meeting the tripling goal will hinge on this.”

What is needed to triple renewables by 2030 varies significantly by country, region and technology. The report lays out an accelerated case in which more rapid policy implementation drives renewable power capacity growth 21% higher than in the main forecast, which would push the world towards being on track to meet the global tripling pledge. In advanced and large emerging economies, this would mean addressing challenges such as policy uncertainty in a fragile economic environment, insufficient investment in grid infrastructure to accommodate greater shares of renewables, and cumbersome administrative barriers and permitting delays. In other emerging and developing economies, access to finance, strong governance and robust regulatory frameworks are essential to reduce risk and attract investment, including establishing new targets and policies in countries where they do not exist yet.

Solar PV and onshore wind deployment through 2028 is expected to more than double in the United States, the European Union, India and Brazil, compared with the last five years. Prices for solar PV modules in 2023 declined by almost 50% year-on-year, with cost reductions and fast deployment set to continue. This is because global manufacturing capacity is forecast to reach 1 100 GW by the end of 2024, significantly exceeding demand. By contrast, the wind industry (outside of China) is facing a more challenging environment due to a combination of ongoing supply chain disruption, higher costs and long permitting timelines, which require stronger policy attention.

The report also provides a reality check on the momentum behind renewable-based hydrogen, assessing how many announced projects are likely to go ahead. Of all the projects announced worldwide to use renewables to produce hydrogen this decade, only 7% of the proposed capacity is expected to come online by 2030. The slow pace of projects reaching an investment decision combined with limited appetite from off-takers and higher production costs have led to slower progress on many projects. To fully convince investors, ambitious project announcements will have to be followed by consistent policies supporting demand.

In 2023, the role of biofuels has also come to the fore. Emerging economies, led by Brazil and India, are expected to drive 70% of global demand over the next five years as biofuels start to show their true potential in hard-to-abate sectors such as air travel and as a replacement for highly polluting fuels like diesel. While biofuels deployment is accelerating, the report shows that this is not happening quickly enough, with a significant increase required in demand by 2030 needed to align biofuels with a net zero pathway.

IEA
<http://www.iea.org/>