

# ***WORLD POWER SYSTEMS REVIEW***

***1 December 2024***

**15 November 2024**

## **Voltaia, Taqa Arabia to develop Egyptian 3 GW wind-solar facility**

French developer Voltaia and Egyptian energy distribution company Taqa Arabia have signed a memorandum of understanding to turn an existing 545 MW wind farm into a 3 GW hybrid wind-solar site.

An existing 545 MW wind farm in Egypt is set to be repowered into a 3 GW solar-plus-wind project. The Egyptian Electricity Transmission Company (EETC) has entered into a memorandum of understanding (MoU) with a consortium of Voltaia and Taqa Arabia to permit the repowering of the Zafarana wind farm, located 130 km southeast of Cairo. The plan will combine 2.1 GW of solar with 1.1 GW of wind, making it the first project in Egypt to merge both renewable energy sources.

Voltaia and Taqa Arabia say they have jointly developed a modern hybrid renewable energy solution to maximize land utilization on existing plots of Zafarana, with an expected first commissioning in 2028. The partners will first conduct preliminary technical and environmental measurements and studies. A statement from Voltaia says key studies will include wind speed and direction measurements, bird migration patterns, solar irradiation levels and geotechnical, topographic and environmental evaluations.

The MoU was signed on Thursday, alongside a second between EETC and Dubai-based independent investor Alcazar Energy Partners for a further 2 GW of wind. The two agreements support Egypt's national strategy for integrated and sustainable energy, which has set a target of increasing the country's share of renewable energy in the national energy mix up to 42% by 2030 and over 60% by 2040.

In September, Norwegian developer Scatec revealed plans for Egypt's first hybrid solar-plus-battery project, shortly followed by Dubai-based developer Amea Power's plans to build 1 GW of solar and 900 MWh of storage across two projects in the country. The same month, Singapore-headquartered EliTe Solar announced it will establish an 8 GW manufacturing hub in Egypt.

*Pv-magazine*

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

**15 November 2024**

## **Japan continues to restart its nuclear reactors**

Chugoku Electric Power will restart the second power unit of the Shimane nuclear power plant (NPP) on December 7, years after the plant was shut down in 2012. The power unit is equipped with a 789-megawatt (MW) boiling water reactor, which generates steam in the core and sends it to a turbine to produce electricity. Reactors of this type were used at the Fukushima Daiichi NPP, where an accident forced Japanese regulators to temporarily shut down all NPPs that were in operation at the time.

While prior to the Fukushima Daiichi accident, nuclear reactors accounted for 25% of Japan's power output, their share dropped to zero by 2014, following the regulators' decision to shut down all of the country's nuclear power units. The process of restarting the reactors began in 2015. According to the IAEA, there are currently 12 nuclear power units with a total net capacity of 11 gigawatts (GW) regularly operating in the country. The remaining 48 reactors can be divided into two categories: 27 units with an aggregate capacity of 17.1 GW that were permanently decommissioned and 21 reactors with a total capacity of 20.6 GW that can resume operation subject to regulatory approval.

New safety requirements established in 2013 prohibit reactors and other nuclear infrastructure facilities from sitting above active faults within Earth's crust, of which there are tens of thousands in Japan. Since these faults can cause devastating earthquakes,

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regulators take this factor into careful consideration when issuing permits to restart power plants. This is why the Nuclear Regulation Authority of Japan refused in November 2024 to restart the second power unit of the Tsuruga NPP on the island of Honshu by the Sea of Japan.

Thanks to the gradual restart of nuclear reactors, the share of NPPs in Japan's energy mix rose from 0.4% in 2015 to 7.6% in 2023. The share of gas-fired power generation over the same period fell from 40.5% to 34.3%, with liquefied natural gas (LNG) imports going down by more than 20% (from 115.9 billion cubic meters to 90.3 billion). Japan plans to increase the share of NPPs in its energy mix to 20% by 2030, including through the introduction of new reactors. These include the single-unit Ōma NPP on Honshu and the third power unit of the aforementioned Shimane NPP, which are currently under construction. Last year, a policy document of Japan's Cabinet called for the construction of innovative reactors to replace power units that had been completely decommissioned.

*Global Energy*

<http://globalenergyprize.org/>

**18 November 2024**

## **EIA: Distribution, Transmission Led to Higher Utility Capital Spending**

Data collected over the past 20 years shows an increase of 12% in utility capital spending, rising from \$287 billion in 2003 to \$320 billion in 2023. Spending on generation has declined, while spending on transmission and especially distribution has surged and more than made up for declines in cheap generation, according to data from the U.S. Energy Information Administration.

The sector spends 24% less on producing electricity than it did in 2003 due to lower fuel costs and the closure of older power plants that were costly to maintain. But spending on generation jumped 23%, or \$4.7 billion, from 2022 to 2023 due to one project coming online — Southern Co.'s Vogtle nuclear plant expansion, which started commercial operation in April.

Spending on transmission nearly tripled over the two decades, hitting \$27.7 billion in 2023, with some of the increase coming from transmission station equipment (\$1 billion), poles (\$1.1 billion) and computer software (\$400 million) needed for operating regional transmission markets. The distribution system was the main driver for overall increases in the utility sector as capital investments in that level of infrastructure were up by \$31.4 billion, or 160%. More than 20% of the increase in distribution spending happened between 2022 and 2023, when utilities spent \$6.5 billion more for a total of \$50.9 billion to replace and upgrade aging equipment and install new distribution infrastructure to help neighborhood grids withstand extreme weather and manage renewable intermittency.

The biggest categories for distribution system spending were on overhead lines, poles and towers as utilities spent \$17.4 billion on overhead infrastructure in 2023. That marks an 11% increase from a year earlier, and 220% more than in 2003. Spending on underground lines also ramped up significantly over the past 20 years to reach \$11.8 billion in 2023. It was for new developments, as well as undergrounding old lines to mitigate power outages from storms and wildfires or improve neighborhood appearance. Supply chain and manufacturing issues led to utilities spending 23% more for a total of \$7.5 billion in 2023 on "line transformers," which drop voltage to household levels.

Utilities spent \$6.1 billion on distribution substations in 2023, which marks a 184% increase from 2003 and 15% from 2022. More substations allow utilities to better withstand extreme weather, manage renewable intermittency and allow for greater voltage control during emergencies. Another major increase was spending on infrastructure located on or

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near customers' property, which includes meters, leased property and rooftop solar. Utilities spent \$5.1 billion on that in 2023, up 84% from 2003 and up 25% from 2022.

Although energy storage remains a relatively small portion of the total budget for distribution infrastructure, spending increased from \$97 million in 2022 to \$723 million in 2023. Energy storage at the substation or customer site enhances power quality and provides backup power in areas where lines and transformers cannot handle additional capacity, especially as more intermittent renewable resources come online. The "other" spending category increased by 30% or \$8.6 billion over the 20 years. It includes intangible plant expenses like licenses and general plant expenses like office space and storage buildings.

*RTO Insider*

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

**19 November 2024**

## **World's largest onshore wind turbine powers up for first time**

Chinese wind energy giant Sany Renewable Energy has reportedly powered up the world's largest onshore wind turbine, a 15 megawatt (MW) behemoth capable of powering 160,000 households with turbine blades nearly the length of the Melbourne Cricket Ground.

Sany Renewable Energy successfully hoisted its 15MW wind turbine back in early October, breaking two world records as it did so, as it is the world's largest single-unit capacity turbine and the largest rotor diameter for an onshore turbine.

The imaginatively named SI-270150 boasts a rotor diameter of 270 meters and blades measuring 131 metres in length – which rolled off the production line earlier this year. For comparison, a single blade could be laid down the length of the Melbourne Cricket Ground (MCG) and there would be less than 15 metres spare on each end before you run into the goalposts.

The three turbine blades, however, boast a massive 57,256 square meters – nearly three times the area of the MCG's playing surface. According to several reports this week, Sany Renewable Energy announced on Sunday that it had powered up the SI-270150, marking yet another milestone for the company.

*Renew Economy*

<http://reneweconomy.com.au/>

**20 November 2024**

## **India, donor countries give up on Just Energy Transition Partnership**

India and a group of countries including the U.S. and Germany will not agree on a so-called Just Energy Transition Partnership (JETP), a key international deal that was meant to promote the South Asian nation's climate-friendly transition.

A German government official said that the two sides had agreed to not pursue the JETP any further, which would have included financial and technical support to help India move away from fossil fuels like coal. Experts said that years of difficult negotiations had shown that India, the world's most populous and increasingly energy-hungry country, was not interested in a deal focused on a coal phase-out, which could have pushed it to take on more debt. Instead, future cooperation should prioritise financing for renewable energy expansion.

"In the end, we are not following this track, in agreement between India and us," said Jochen Flasbarth, state secretary in the German ministry for economic cooperation and development. "We realised that the approach is not attractive for India," he told Clean Energy Wire in an interview at the UN climate change conference COP29 in Baku, capital of Azerbaijan.

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It has been clear for some time that the agreement is unlikely to materialise, but the governments have never been as clear as the state secretary about the end of the talks. “I can speak openly about it because I openly discussed it with my Indian friends,” Flasbarth said. To push forward the climate-friendly transition in emerging nations through financial as well as technical support and capacity building, the COP26 UN climate change conference in Glasgow in 2021 birthed the world’s first JETP. The U.S., the UK, France, Germany and the European Union had joined together and made a deal worth 8.5 billion U.S. dollars with South Africa to help the country move away from coal.

Under Germany’s presidency, the large economies in the Group of Seven (G7) agreed to establish similar partnerships with Indonesia, Senegal, Vietnam – and India. India’s prime minister Narendra Modi attended the summit in southern Germany in 2022.

The other partnerships came through, but a little over two years later, negotiations on a JETP for India are discontinued

India, the world’s most populous nation with an ever-growing energy demand, has resisted a coal-focused JETP from the time conversations with wealthy countries began, seeking instead one focused on renewable energy and investment in skills

The country remains heavily dependent on coal to meet its energy demand and increased coal production by 12 percent in 2023-24 (compared to 2022-23), with the government aiming for an up to seven percent annual rise in production over the next six years to reach 1.5 billion tonnes in domestic coal production by 2030

The country is also investing big in renewable energy projects, aiming to achieve 500 GW in clean energy capacity by 2030.

Flasbarth’s statement has not come as a surprise for analysts tracking dialogue on JETP, though they said this was the first official statement on the matter.

An Indian analyst familiar with the country’s reluctance with a JETP said the United States and Germany were leading the discussions, but India had not shown much interest. “But this has never been spoken about,” the analyst said, who asked to remain anonymous, because they were not authorised to speak to the media on behalf of their organisation. The analyst added that the International Partners’ Group (IPG) of donor countries, which was trying to get India to the table, will not pursue a JETP anymore.

A coal-focused JETP, like the one with South Africa and Indonesia, would not have worked for India as the fossil fuel not only remains a stable source of energy but is also an income source. Analysts say that a JETP arrangement does not capture the complexities of the transition of a coal-dependent nation like India, where at least five states have coal-dependent economies and where ten to 15 million people depend directly or indirectly on the planet-heating fossil fuel, according to researchers.

Trade unions had also feared that a JETP focused largely on technical and financial issues would ignore the social aspect of transition.

“For G7 countries India was a key country under consideration for striking a JETP. However, the momentum has faded over the past year,” said Srestha Banerjee, director of just transition at the International Forum for Environment, Sustainability & Technology (iFOREST), a global research and policy think tank. “The Indian government has been measured about entering into a JETP given their nature, which has been loan heavy.”

While India is “cautious about taking on additional loans through these partnerships,” it remains open to international engagement and also financial support, which must not increase the debt burden of developing countries, Banerjee said. Germany’s Flasbarth argued that the architecture of the JETPs has the advantage that donor countries coordinate well. “It means that the different donor countries do not knock on the recipient’s door every few days with a slightly different approach on how to achieve a climate-friendly economy,” he said. “I see this as an advantage, as do many of our recipient countries. India does not.”



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Flasbarth sees a key reason for the end of the talks in “some kind of suspicion over whether the country remains in the driver’s seat” on its plans for a just transition. He said donor governments had repeatedly tried to assure that the worries were unfounded, “because you cannot organise a transition in your own country without ownership over the essential decisions.”

“As there was a lot of this suspicion, we put the approach aside, and discussed other ways with India,” said the state secretary. Instead of the coal exit, a key focus of cooperation could be renewable energies. “India targets 500 gigawatts of solar power, but the country is not on track,” said Flasbarth. “We talked about what we could do together to get this done.” Germany had helped organise an investors’ conference on renewable energy with a focus on India, as well as started a joint discussion on diversifying global supply chains, he said.

“We as Germans have learned our lessons about where you end up with mono-dependencies, in our case with gas,” said Flasbarth. “We do not want that to happen again in the transformative industries, and countries like India also do not desire that.”

Putting a pause on the JETP is not necessarily a “negative thing,” said Madhura Joshi, a senior associate with climate change think tank E3G, where she leads the work on India’s energy transition, as it opens an avenue for taking forward conversation on renewable energy. India, she said, was pursuing a long-term transition plan with more ambition expected on renewable energy and storage. The transition could now be strategically planned to align with the country’s adaptation plans and also to finance flow, she said.

India could use this opportunity to consider developing a country platform in partnership with multilateral development banks to garner public, private and international investments to finance action, she said.

*Climate Home News*

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

**20 November 2024**

## **Intense West Coast Wind and Snow Knock Out Power and Close Roads**

A wind-whipped storm was bringing heavy rain and snow to Northern California early Thursday, after knocking down trees, snarling highways and transit and leaving tens of thousands of people without power.

More intense rain and snow was forecast for Thursday evening, raising the risk of flash floods and landslides in the region, meteorologists said. The Weather Prediction Center said the total rainfall in Northern California could reach 12 to 16 inches by Friday morning.

The deluge, which has killed at least two people in the Pacific Northwest, was expected to stretch into the weekend. It was the season’s first major atmospheric river, a type of storm that can deliver large amounts of water from the Pacific Ocean.

The National Weather Service warned of a high risk that 210,000 people in Eureka, Calif., and the area south of the city were in a zone that would receive excessive rainfall, with possible flash floods Thursday evening.

The storm brought some of the worst damage to the Seattle area, where heavy wind gusts tore down power lines and knocked out substations late Tuesday, leaving half a million customers without electricity. “This is a major storm the likes of which we haven’t seen in over a decade,” said Melanie Coon, a spokeswoman for Puget Sound Energy.

The heaviest rain on Wednesday soaked a strip of the California coast that starts at the Oregon border and stretches hundreds of miles south to the North Bay region, just across the Golden Gate Bridge from San Francisco. Wind gusts in some places exceeded 90 miles per hour — equivalent to the winds of a hurricane.

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Amtrak canceled trains across the Pacific Northwest, and the storm slowed service on Bay Area Rapid Transit, the San Francisco region's major transportation system. Gusty winds forced Northern California drivers off roadways, where they crashed into other vehicles and struck power poles. A truck tipped over on U.S. 101 in Marin County, just north of San Francisco, and temporarily blocked traffic, according to the California Highway Patrol. And a large S.U.V. overturned on a highway near the Napa Valley winery town of Calistoga.

Before surging into California from the north, the storm felled trees that killed at least two people in Washington. A tree crashed through the roof of a home in Bellevue, on the outskirts of Seattle, killing a woman who lived there, officials said. Another woman died after a tree fell on a homeless encampment in Lynnwood, Wash.

The storm also dumped snow at higher elevations, and blizzard conditions were a possibility in the Cascade mountain range, as well as other parts of the Pacific Northwest. Snow forced the authorities to temporarily close Interstate 5 just south of the Oregon-California border for a stretch of more than 50 miles.

Electricity was still out for about 364,000 customers in Washington and California early Thursday, according to poweroutage.us, which tracks utilities. Officials warned that some of the outages could last for days because of the extent of the damage.

The storm led to more than 60 flight cancellations and 450 delays at San Francisco International Airport on Wednesday, according to data from FlightAware, a flight tracking website. Delays there were averaging at least an hour late Wednesday. Utilities in the Seattle area flew helicopters to locate damaged lines, and crews worked to clear trees and debris. The storm caused the most outages in almost two decades, said Jenn Strang, a spokeswoman for Seattle City Light, a local utility.

California's ski resorts are in for a bounty of snow. The Sierra Nevada peaks near Lake Tahoe could receive as much as five feet over the next week, said Matthew Chyba, a meteorologist with the National Weather Service office in Reno, Nev.: "Our first good snow, I'd say." The impact of an atmospheric river can be most extreme when it stretches on for several days, or is immediately followed by another, as has happened in recent winters. Heavy rainfall saturates the ground so much that hillsides and highways can be swept away.

Climate change can make storms of all types more intense, because warmer air can hold more moisture. When it comes to atmospheric rivers in particular, scientists are studying whether global warming may be affecting the number that sweep through California each year and how long they last, though they don't have clear answers yet. The atmospheric river drenching the region this week was also made more destructive by its connection to another storm system off the coasts of Oregon and Washington. Called a "bomb cyclone" — a storm whose atmospheric pressure drops quickly over a short period — that system reached the lowest pressure reading ever recorded in the northeastern Pacific Ocean.

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

**21 November 2024**

## **Ørsted Celebrates Commencement of the Mockingbird Solar Center and Completion of Land Donation to The Nature Conservancy**

Ørsted, a leading developer of U.S. renewable energy, today celebrated the commencement of the Mockingbird Solar Center in Lamar County, Texas. With a capacity of 468 MW, the Mockingbird Solar Center is Ørsted's largest solar project to date, generating domestic energy that will help meet growing demand. The company is also celebrating the completion of a 953-acre land donation to The Nature Conservancy (TNC) for conservation. This donation establishes the Smiley Meadow Preserve, a new protected area that

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conserves vital tallgrass prairie habitat, supporting biodiversity and ecosystem health in the region.

"We are delighted to commission Ørsted's largest solar project and deliver domestic and reliable energy to the Texas grid," said Melissa Peterson, Head of Onshore Development and Origination at Ørsted. "We are very proud of this transformative project. In addition to progressing our goal of building out more American energy, we were able to form a meaningful partnership with The Nature Conservancy, advance our biodiversity commitment and preserve an important piece of Texas' land and heritage for future generations."

To celebrate this important conservation initiative and the economic benefits the project will bring to the local community, Ørsted hosted a celebration attended by The Nature Conservancy, corporate partners, landowners, community members, and local and state elected officials. Ørsted hosted the event at the site of the newly established Smiley Meadow Preserve.

"Through the power of partnership, Ørsted has helped The Nature Conservancy protect an irreplaceable landscape that might otherwise have been lost to development," said Suzanne Scott, The Nature Conservancy's Texas State Director. "We are deeply grateful for Ørsted's willingness to work with us in preserving this pristine prairie, advancing beneficial outcomes for Texas' ecology and our economy. This project exemplifies the value of collaborative conservation in our state."

Prairies are hardworking ecosystems that provide a host of environmental benefits – including carbon storage, flood prevention, and boosting pollinator habitat. Less than one percent of the original Texas tallgrass prairies survive today, and less than five percent remain nationally. The Ørsted-TNC conservation agreement is the largest preservation effort for a rare type of native prairie found only in Texas. The Smiley Meadow Preserve contains more than 400 species of grasses and wildflowers.

"Native prairies are the rarest landscapes left in Texas – so much so that many people have never seen one," said David Bezanson, Land Protection Strategy Program Director for The Nature Conservancy in Texas. "Smiley Meadow is one of the best remnants left. Saving a significant portion of it will help us restore other prairies, hold onto our land heritage, and reestablish biodiversity that we've lost."

The Mockingbird Solar Center represents a half billion-dollar investment in Texas, part of Ørsted's \$20 billion investment to build out U.S. domestic energy generation. The project will power the equivalent of 80,000 homes and businesses in Texas, providing additional capacity needed to power the ERCOT grid. In addition, the project will contribute \$75 million in local property tax revenue for the local school districts and other public services.

"This project and partnership is something everyone in our community can be proud of," said Mihir "Mark" Pankaj, Mayor of Paris. "Preserving natural habitat and generating clean energy is a win-win situation, and we appreciate Ørsted's efforts to source from local businesses and support our local economy."

In line with Ørsted's commitment to being a good neighbor in host communities, the project provided many local benefits. Construction of the Mockingbird Solar Center created over 550 jobs, and the project will be supported by long-term operations and maintenance staff. Ørsted worked with American companies, such as First Solar, in procuring panels, as well as local businesses, such as Drake Construction and Pfifer Farms, in purchasing materials for construction of the project. In addition, Ørsted donated over \$50,000 to the Roxton and Brookston Volunteer Fire Departments, volunteer organizations that protect and serve the greater Lamar and Fannin Counties.

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"On behalf of the Roxton and Brookston Volunteer Fire Departments, we want to thank Ørsted for their support," said Robert Patterson, Fire Chief of the Brookston Volunteer Fire Department. "The contributions toward the bay extension for housing our new ladder truck in Roxton, currently under construction, and the purchase of a utility vehicle in Brookston are invaluable to our efforts. This support strengthens our departments and helps us better serve our communities."

With Mockingbird Solar Center officially online, Ørsted now has a portfolio of over 6 GW of onshore wind, solar, and battery storage projects in operation or under construction across the US.

*PR Newswire*

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

**25 November 2024**

## **As bitcoin's price and energy demand surge, Texas requires some miners to register with utility commission**

Amid a surge in the price of Bitcoin and associated electricity demand, the Public Utility Commission of Texas on Thursday voted to require cryptocurrency miners to register with regulators.

The rules require mining facilities located within the Electric Reliability Council of Texas footprint that consume more than 75 MW to register with the commission and to provide information annually about the facility's location, ownership and electricity demand.

Registration is necessary to ensure the electric grid remains reliable, commission Chairman Thomas Gleeson said in a statement. "This is another example of the PUCT and ERCOT adapting to support a rapidly changing industrial landscape," he said. ERCOT anticipates about 152 GW of new load by 2030, driven by data centers and electrification. While crypto is only part of that, observers say miners can help drive increases in reliability risks and electricity prices. Electricity demand from crypto mining in Texas has "grown rapidly over the last several years," the PUCT said.

"The rule approved today will give the PUCT and ERCOT better awareness of virtual currency mining operations around the state, which have unique power consumption characteristics," the commission said. "The information provided in the registration will help ERCOT manage the grid reliably as more virtual currency mining facilities connect to the grid."

Failure to register can mean penalties of up to \$25,000 penalty per violation, per day, the commission said. Miners had expressed concerns that registration data will include proprietary and commercially sensitive information, and asked the rule to be amended to explicitly identify the information provided as confidential. The commission declined to make the change, noting the information will be collected via an internal-facing online tool that will not be public.

*Utility Dive*

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

**25 November 2024**

## **LPO announces conditional commitment to Grain Belt Express to construct High-Voltage Direct Current Transmission Project**

As part of the Biden-Harris Administration's Investing in America agenda, the Department of Energy (DOE), through its Loan Programs Office (LPO), today announced a conditional commitment for a loan guarantee of up to \$4.9 billion (\$4.4 billion in principal and \$470 million in capitalized interest) to Grain Belt Express LLC to help finance a high-voltage direct current (HVDC) transmission project (Grain Belt Express Phase 1). If finalized, the



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2,500-megawatt (MW) interregional transmission line would run approximately 578 miles from Ford County, Kansas, to Callaway County, Missouri. Today's announcement reinforces the Biden-Harris Administration's efforts to increase transmission capacity throughout the United States, which will strengthen grid resilience and bring clean, reliable, and affordable power to more American families and businesses when and where they need it most.

Grain Belt Express Phase 1, a project covered by FAST-41, will unlock access to new domestic energy and transmit it to customers across the central United States. The line's use of HVDC transmission technology and interregional configuration will promote the reliability and resilience of electric delivery. The states of Kansas and Missouri have approved Grain Belt Express Phase 1 based in part on the economic development benefits the project will bring to both states.

The project will connect three regional grids: the Southwest Power Pool (SPP), the Midcontinent Independent System Operator (MISO), and Associated Electric Cooperative Incorporated (AECI). Grain Belt Express Phase 1 will significantly expand import and export capabilities between these areas. MISO, which is already a net importer of electricity, is expected to have a growing electricity supply gap as electricity demand grows.

Grain Belt Express Phase 1 would unlock access to low-cost energy in Kansas to help bridge this gap. The National Transmission Needs Study, published by DOE's Grid Deployment Office, estimates interregional transmission capacity between SPP and MISO regions may need to increase by up to 1000% to meet demand by 2035. As a merchant line, Grain Belt Express Phase 1 will contract with customers through voluntary agreements. In Missouri, 39 municipal utilities across the state have already contracted for transmission service on Grain Belt Express Phase 1.

Developing HVDC transmission is essential to helping us add more energy to the grid faster and expanding transmission capacity across the nation. HVDC transmission's higher efficiency and lower line losses compared to traditional alternating current (AC) transmission lines make it ideal for moving large amounts of power over long distances and between grid regions. Innovative technology such as voltage-sourced converters with multi-level modular converter topology improves grid performance, flexibility, power quality, and grid access for renewable power sources. Grain Belt Express Phase 1 will also have bidirectional capabilities, allowing power to be transmitted in either direction, which will also improve the grid's resilience and flexibility.

Today's announcement helps ensure that, in support of the Justice40 Initiative, 40% of the overall benefits of certain federal investments in climate, clean energy, and other areas flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution. LPO borrowers are required to develop and ultimately implement a comprehensive Community Benefits Plan (CBP). CBPs ensure borrowers meaningfully engage with communities and labor groups to create good-paying jobs and improve the well-being of the local community and workers. Grain Belt Express LLC values collaboration with local communities and labor unions and is committed to establishing agreements to support its workforce strategy. As a part of LPO's financing, the construction of Grain Belt Express Phase 1 is expected to create at least 1,110 direct jobs through the onsite prime construction workforce, as well as numerous additional jobs in construction management, engineering, procurement, commissioning, logistics, and other scopes.

The loan guarantee would be offered through LPO's Title 17 Clean Energy Financing Program, which includes financing opportunities for innovative energy and supply chain projects and projects that reinvest in existing energy infrastructure. The Grain Belt Express Phase 1 project is estimated to reduce greenhouse gas emissions by 3.1 million tons of CO<sub>2</sub> equivalent annually.

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While this conditional commitment indicates DOE's intent to finance the project, DOE must complete an environmental review, and the borrower must satisfy certain technical, legal, environmental, and financial conditions before the Department enters into definitive financing documents and funds the loan guarantee.

***ENERGY.GOV***  
<http://eadaily.com/>

**25 November 2024**

## **Finland blew out: electricity is distributed almost for free**

A strong storm broke out off the coast of Finland and a gale blew. The market price of electricity has collapsed tenfold.

The wind speed off the coast of Finland has reached 25-30 meters per second in the last two days. According to the operator of the Fingrid power grid, this turned out to be enough for the capacity of wind farms to grow to 6.7 GW in some hours. This is almost a record figure. It is second only to the figures of November 20, when the power of wind generation increased to 6.9 GW.

This turned out to be enough so that on November 24 and 25, the cost of electricity on the wholesale market fell from an average of 43 euros per MWh to 4.28-3.73 euros per MWh. In some hours at night, the cost drops to minus 1 euro. The operator of the Finnish power grid predicts that the capacity of wind power will decrease in the next few days. Therefore, the price will also rise. On November 26, it is already projected at 18 euros per MWh.

According to Nord Pool, there were 14 days in Finland this year when the average electricity price on the market was negative, and 45 days when it did not exceed 5 euros per MWh. However, green generation is not stable. Therefore, there were days in the country when the average price reached 890 euros per MWh.

"In the winter of 2024-25, Finland's electricity supply looks stable if significant disruptions at power plants can be avoided and electricity imports can be adjusted," Fingrid reports. According to him, on the coldest windless winter day, the consumption capacity can grow to 15 GW. At the same time, the country's power plants can provide a maximum of about 12 GW. And another 3 GW is possible with the help of imports from Sweden and Estonia.

"To ensure the sufficiency of electricity, it is extremely important that there are internal production facilities. According to Fingrid's analysis, the electric power system can withstand one significant malfunction at a large production facility or in a cross—border connection, but if several malfunctions occur simultaneously, the situation with electricity is significantly tightened," the operator reports.

As EADaily reported, the main failures in the country's power system occur at nuclear power plants, including the most powerful third power unit of the Olkiluoto station — 1.6 GW. This year, the reactor has been forced to reduce power several times, thereby causing both a shortage of electricity and a rapid rise in prices.

***EADaily***  
<http://eadaily.com/>

**26 November 2024**

## **100th 'duck curve' day marks New England solar power milestone**

As Thanksgiving approaches, power grid operators at ISO New England aren't thinking about turkey. This year, it's all about the duck. That's because the region recorded its 100th "duck curve" day of 2024 on Monday, November 25. Duck curve is a term used to describe the once-rare phenomenon of demand on the electric grid being lower at midday

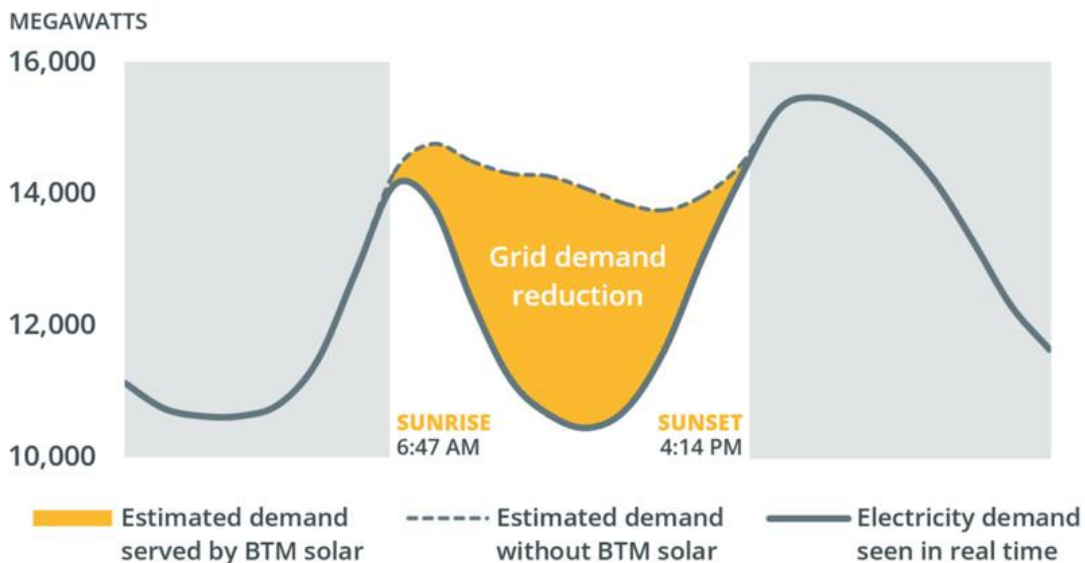
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than it is overnight. When represented as a line graph, the ebb and flow of demand somewhat resembles the profile of a waterfowl.

The phenomenon is most common during weekends in the spring, but it can happen anytime there's a sunny day with relatively mild temperatures. Duck curves happen when behind-the-meter photovoltaics (BTM PV) serve a large portion of the region's demand for electricity, reducing demand for electricity that's transmitted over the regional power grid. If New Englanders aren't using much electricity for heating or cooling, grid demand can drop significantly.

## Grid demand reduction from BTM PV, November 25



Duck curve days are becoming more frequent as more New England homeowners and businesses install solar power systems. But duck curves are not disruptive from a grid operations perspective. Staff in the ISO's control room keep the entire system in balance by instructing the region's other energy resources to decrease production when BTM PV output is high, and to increase production when BTM PV output is low.

At 100 duck curve days, 2024 already far outpaces previous years. In 2023 there were 73 duck curve days, and there were 45 the year before that. Duck curves have been steadily increasing since ISO New England first observed the phenomenon in 2018.

In addition to the 100 days milestone, three of 2024's duck curves were remarkable for their record-setting attributes.

New England saw its lowest recorded midday load on Saturday, April 27, when demand for grid electricity plunged to 6,596 megawatts (MW). For comparison, demand in April averaged about 11,000 MW.

The greatest estimated output from behind-the-meter solar came to 6,092 MW on April 25. That represents an hour during which nearly all of the region's estimated BTM PV capacity was operating at close to maximum output. And the greatest difference between midday and overnight demand was observed on Saturday, March 30, at 3,134 MW.

So far this year, February had the most duck curve days, 19. March and April both had 16. On the other end of the spectrum, August had only one duck curve day, and July had none. November has had 10 duck curve days so far. There is the potential for several more duck curve days before the year is out.

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# **WORLD POWER SYSTEMS REVIEW**

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## **Zambia says power outage caused by fault in interconnected network with Zimbabwe**

Zambia said Monday that a 30-minute nationwide power outage over the weekend was due to a technical fault in the interconnected power networks between it and Zimbabwe. A similar occurrence was experienced in the neighboring state, a senior government official told reporters in the capital Lusaka.

Peter Mumba, permanent secretary in the Ministry of Energy, said state power utility Zesco worked diligently to resolve the outage, which occurred Sunday evening. "During the power outage, there were two mines that had people trapped underground. These mines included a Chinese mine in Chambishi and Mopani Mine at Mindolo shaft," said Mumba.

Thabo Kawana, the permanent secretary in the Ministry of Information and Media, said during the same engagement that no loss of life occurred in hospitals as a result of the outage, with institutions such as the University Teaching Hospital in Lusaka, the country's largest referral health facility, having power restored within 30 minutes and equally equipped with a backup source. Zesco acting managing director Justin Loongo said the Southern African Power Pool was investigating the source of the outage.

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**29 November 2024**

## **First Zhangzhou Unit begins supplying power**

The reactor began supplying electricity to grid at 7.46am on Thursday, CNNC said, marking "major progress in the mass production of Hualong One by China National Nuclear Corporation, and makes new contributions to the optimisation of the national energy structure and the realisation of the 'dual carbon' goals". It added: "A series of tests will be carried out as planned to further verify the performance of the unit to meet commercial operation conditions." In May 2014, the local government gave approval for Phase I of the Zhangzhou plant, comprising two AP1000 units. The National Nuclear Safety Administration gave approval in December 2015 for the AP1000 units and confirmed site selection in October 2016. Construction of Phase I had originally been expected to start in May 2017. However, CNNC subsequently decided to use the HPR1000 (Hualong One) design instead. Two more Hualong One units are planned for Phase II of the plant and a further two proposed for Phase III.

Construction of Zhangzhou 1 began in October 2019, with that of unit 2 starting in September 2020. In September 2022, China's State Council approved the construction of two further Hualong One unit as Phase II of the Zhangzhou plant. First concrete for the nuclear island of unit 3 was poured on 22 February this year. First concrete for unit 4 was poured last month.

The Zhangzhou project - with a total investment of over CNY100 billion (USD14 billion) - is owned by CNNC-Guodian Zhangzhou Energy Company, a joint venture between CNNC (51%) and China Guodian Corporation (49%). CNNC said the Zhangzhou plant is the starting point for the mass construction of Hualong One reactors and "is currently the world's largest Hualong One nuclear power base". It plans to construct a total of six Hualong One nuclear units at the site. Currently, four Hualong One units are under construction there. At present, the total number of Hualong One units in operation and under construction at home and abroad has reached 33, making it the third-generation nuclear power technology with the largest number of units in operation and under construction in the world

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