

# WORLD POWER SYSTEMS REVIEW

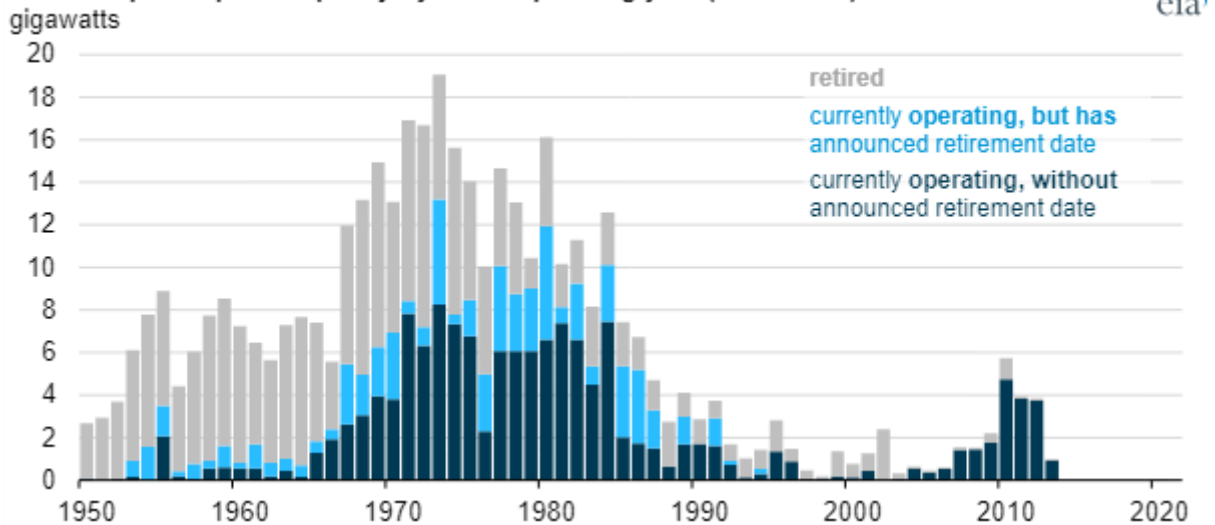
1 January 2022

15 December 2021

## Of the operating U.S. coal-fired power plants, 28% plan to retire by 2035

Although coal-fired power plants have no mandatory retirement age, power plant owners and operators have reported to EIA that they plan to retire 28%, or 59 gigawatts (GW), of the coal-fired capacity currently operating in the United States by 2035. As of September 2021, 212 GW of utility-scale coal-fired electric-generating capacity was operating in the United States, most of which was built in the 1970s and 1980s, according to our Preliminary Monthly Electric Generator Inventory.

U.S. coal power plant capacity by initial operating year (1950–2021)



The average operating coal-fired generating unit in the United States is 45 years old. The units that have reported plans to retire are not necessarily the oldest ones operating; some units built in the 1980s and 1990s are also scheduled to retire. When they retire, the retiring units will have approximately 50 years of service, based on their planned retirement dates.

Planned retirement dates for these plants were reported to us by power plant owners and operators. Planned retirement dates within the next four to five years are considered relatively firm; retirements further in the future are subject to more regulatory and economic uncertainty.

Our Preliminary Monthly Electric Generator Inventory categorizes generating units that are installed and available to generate electricity as operating, regardless of how often they actually run during the year. The data also include a comprehensive list of coal-fired generators that have retired since 2002. Since 2002, around 100 GW of coal capacity has retired in the United States; the capacity-weighted average age at retirement was 50 years.

Coal plants usually aren't built with a specific planned or enforced retirement age. Retirements largely occur either when the cost of operating a plant exceeds expected revenue or when operating costs exceed the plant's value to the power system, such as its value in providing reliability to the electric grid.

These situations can occur when lower-cost or more efficient technologies enter the market, when fuel prices change, or when new regulations require additional investment in the unit to remain in compliance.

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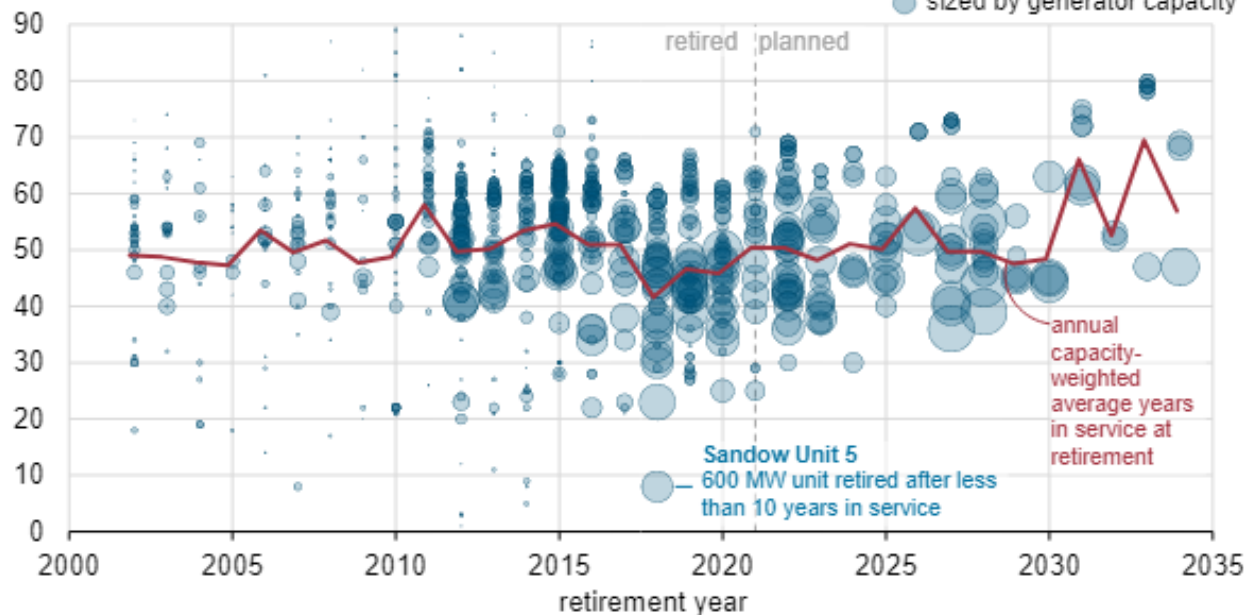
Coal-fired plants in particular have been identified as a large source of CO2 emissions. As a result, many states with clean energy standards have required a reduction or complete phase-out of coal-fired generation, even though some units may still be economically viable. As a result of continued pressure on coal generation to reduce CO2 emissions, the number of coal plants planning to retire between now and 2035 is likely to increase.

U.S. coal-fired electric generating unit retirements and planned retirements



years in service at retirement

● sized by generator capacity



As of September 2021, developers have not reported plans to install any new utility-scale coal-fired power plants in the United States, according to our Preliminary Monthly Electric Generator Inventory.

EIA

<http://www.eia.gov>

15 December 2021

## PJM Releases Initial Results of Renewable Energy Transition Study

PJM Interconnection, grid operator for 65 million people across 13 states and the District of Columbia, today released the initial results of a multiphase, multiyear effort to study the potential impacts of an evolving resource mix, including the accelerating integration of renewable resources.

The “Energy Transition in PJM: Frameworks for Analysis” paper reflects PJM’s five-year strategy, which is built on three pillars – enabling state and federal decarbonization policies, planning for the grid of the future, and fostering innovation. This “living study” will help PJM identify gaps and opportunities in the current market construct and provide insights into the future of market design, transmission planning and reliable system operations.

In the study, PJM synthesized the diverse set of state policies within its footprint into three scenarios in which an increasing amount of energy is served by renewable generation on an annual basis (10%, 22% and 50%), up to 70% carbon-free generation when combined with nuclear generation. Currently, renewables represent approximately 6% of the annual energy, a total of over 40% carbon-free when combined with nuclear’s contribution to the

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energy mix in 2020. The study's initial findings suggest five key focus areas for PJM's stakeholder community and delineate the subsequent phases of the study:

- Correctly calculating the capacity contribution of generators is essential: A system with increased variable resources will require new approaches to adequately assess the reliability value of each resource and the system overall.
- Flexibility becomes increasingly important with growing uncertainty: The study reaffirmed the need for operational flexibility to address the uncertainty of variable resources. Findings include 50% steeper net-load ramping periods, frequent dispatch of generators to their economic minimum, and lower capacity factors for thermal resources.
- Thermal generators provide essential reliability services today and an adequate supply will be needed until a substitute is deployed at scale: PJM and stakeholders must ensure that the market structure provides the right incentives to maintain these reliability services.
- Regional markets facilitate a reliable and cost-effective energy transition: The economies of scale, geographical diversity and robust transmission system of PJM Interconnection can serve to facilitate the reliable and cost-effective integration of renewable resources. Expected increases in congestion, renewable curtailments and interchange with other regions suggest opportunities for strategic regional transmission expansion as well as storage and grid-enhancing technologies.
- Reliability standards must evolve: As the penetration of distributed energy resources (DER) increases on the grid, further blurring the conventional boundaries between transmission and distribution systems, it will be critical to establish appropriate standards for performance, cybersecurity and reliability for DER. As PJM's markets, operations and transmission planning functions evolve to facilitate renewable resource integration, so should reliability standards across interdependent infrastructure such as gas, water and telecommunications.

This exploration of renewable integration is one of multiple, concurrent initiatives in which PJM is serving as an independent authority for data and analysis to help facilitate decarbonization and build the grid of the future. It includes PJM's ongoing work with stakeholders in 2021 to:

- Identify reliability challenges (Reliability in PJM: Today and Tomorrow white paper);
- Address resource adequacy, interconnection and planning process reforms through the stakeholder process;
- In collaboration with stakeholders, develop landmark proposals to the Federal Energy Regulatory Commission on the planning of the future grid and the regulation of distributed energy resources;
- Work with coastal states on potential regional solutions to offshore wind buildout (Offshore Wind Transmission Phase 1 study).

All of this work will continue in 2022.

***PJM Inside Lines***  
<http://insidelines.pjm.com>

**15 December 2021**

### **Luz verde al primer gran proyecto de almacenamiento energético de Red Eléctrica en las islas**

La Dirección General de Energía de la Consejería de Transición Ecológica, Lucha contra el Cambio Climático y Planificación Territorial del Gobierno de Canarias ha emitido la autorización administrativa del proyecto de la central hidroeléctrica de bombeo reversible (CHB) de Salto de Chira, en la isla de Gran Canaria. Se trata del primer gran proyecto de almacenamiento energético en Canarias. La aprobación de las autorizaciones administrativas previas y de construcción, así como la declaración de Utilidad Pública del proyecto por la Dirección General de Energía del Gobierno de Canarias permitirá iniciar los trabajos de construcción de la infraestructura de almacenamiento energético

El proyecto autorizado aprovechará la existencia de dos grandes embalses (las presas de Chira y de Soria) situados en el interior de la isla para construir entre ambos una central hidroeléctrica de bombeo de 200 MW (equivalente aproximadamente al 36% de la punta de demanda de Gran Canaria) y 3,5 GWh de almacenamiento. Además, el proyecto incluye una estación desalinizadora de agua de mar y las obras marinas asociadas, así como las instalaciones necesarias para su conexión a la red de transporte.

El agua será un elemento esencial para el funcionamiento de la nueva infraestructura pero también es un recurso escaso en el archipiélago. Por eso, el proyecto garantizará el caudal necesario en los embalses en todo momento a través de la planta desaladora de agua que se instalará en el término municipal de Arguineguín, para cumplir con su objetivo de almacenar energía. Red Eléctrica de España invertirá más de 400 millones de euros en la construcción de Salto de Chira, un proyecto que ha sido declarado de interés general por el Gobierno de Canarias. La duración prevista en el proyecto ejecución es de 70 meses desde el inicio de los trabajos.

El Salto de Chira reforzará la garantía de suministro de Gran Canaria, al aumentar la potencia instalada en el sistema, y aportará una mayor seguridad de suministro. Esto es, sin duda, un elemento fundamental para un sistema eléctrico como el canario, aislado y, por lo tanto, más vulnerable. Así, en caso de interrupción del suministro, la central permitirá agilizar y reducir drásticamente los tiempos de reposición.

El proyecto permitirá incrementar la integración de energías renovables en el sistema, al aprovechar los excedentes de energías renovables gracias a su capacidad de almacenamiento. De esta manera, se estima que, en 2026, la CHB conseguirá que la producción renovable sea un 37% superior a la que se tendría sin la existencia de la instalación, elevando la cobertura media anual de la demanda con generación renovable al 51%, pudiendo en momentos puntuales ser mucho mayor. Adicionalmente, esto permitirá una reducción de emisiones de CO<sub>2</sub> de un 20%. La mayor capacidad de integración de energías renovables supondrá una mayor independencia energética y una reducción de las importaciones de combustibles fósiles, más caros y contaminantes, lo que permitirá un ahorro estimado en los costes de generación de 122 millones de euros anuales.

El proyecto se enmarca en el cumplimiento de la Ley 17 /2013, que establece que en los sistemas eléctricos insulares y extra-peninsulares las instalaciones de bombeo que tengan como finalidades principales la garantía del suministro, la seguridad del sistema y la integración de energías renovables no gestionables serán de titularidad del operador del sistema, es decir de Red Eléctrica de España.

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Además, se estima que el proyecto genere 4.366 puestos de trabajo, de los cuales, 3.518 se generarían en Gran Canaria (1.423 puestos directos, 1.987 indirectos y 109 inducidos), contribuyendo a la recuperación económica del archipiélago canario de forma sostenible y alineada con los principios del Pacto Verde europeo y con las líneas estratégicas y principios básicos del Pacto para la Reactivación Social y Económica de Canarias.

**REE**

<http://www.ree.es>

**15 December 2021**

## **Political agreement reached on revised TEN-E rules for cross-border energy infrastructure**

New EU rules for cross-border energy infrastructure and future Projects of Common Interest (PCIs) have been agreed in principle, following the political agreement reached by Council, European Parliament and Commission negotiators at their trilogue meeting last night. Based on the Commission proposal for renewing the Trans-European network for Energy (TEN-E) Regulation, tabled in December 2020, the agreement backs the main thrust of the Commission approach, namely to modernise the existing regulation (which dates back to 2013) and to fully align it with the Green Deal objectives.

Key elements of the political agreement include a strengthened framework for the cross-border cooperation to accelerate the implementation of offshore grids as key element of the energy transition, a strengthened focus on infrastructure categories such as smart electricity grids, a widened scope to include hydrogen networks as well as a mandatory sustainability assessment for all eligible projects. Another change is new provisions on support for projects connecting the EU with third countries, called Projects of Mutual Interest (PMIs), that contribute to the EU's energy and climate objectives in terms of security of supply and decarbonisation acknowledging their increasing role in the energy transition.

While the political agreement accepts the general principle that the regulation should no longer provide support for fossil fuel infrastructure, as proposed by the Commission, the co-legislators agreed to allow for blending projects during a transitional period that will end in 2029.

The new rules also foresee a revised governance framework to enhance the infrastructure planning process and ensure it is aligned with our climate goals and energy system integration principles, through increased stakeholder involvement throughout the process, a reinforced role of the EU Agency for the Cooperation of Energy Regulators (ACER) and improved oversight by the Commission. Furthermore, measures aim to simplify administrative procedures, accelerating project implementation, shortening permitting procedures for PCIs to avoid delays in projects that facilitate the energy transition, and strengthening transparency and participation in consultations.

Following last night's political agreement, the text must now be approved by the Council and the European Parliament before it is formally adopted. It will be the first piece of new energy legislation agreed under the Von der Leyen Commission. These will therefore be the rules that apply when it comes to the Commission drawing up the 6th PCI list, due for publication in autumn 2023.

**EC**

<http://ec.europa.eu>

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## **Wind overtakes nuclear power as leading source of electricity in Spain**

Even if the wind stops blowing in the next three weeks, wind power will end the year as the leading source of electricity in Spain. This will mean wind overtaking nuclear in the national energy matrix for the first time since 2013, the only year since records began in which wind turbines were the main source of power. That year was particularly good in terms of wind resources while nuclear was affected by the closure of the Garoña plant in Burgos. Since then, however, wind power has continued to grow as a percentage of total energy generated both in absolute and relative terms, a trend that looks to continue in the near future.

The milestone, advanced by Spanish news site Nius, is just a taste of things to come. “Wind power is going to dominate the Spanish electricity grid for a long time,” says Francisco Valverde, a consultant at the energy company Menta Energía.

According to the National Integrated Energy and Climate Plan (PNIEC), released by the Spanish government last year, the installed capacity of wind turbines will almost double between now and 2030. During this period, the rate of growth of solar photovoltaic will be even greater as installed capacity more than quadruples, making it the second most important electricity source, though it will still lag far behind wind power, even when solar thermal is taken into account.

Meanwhile, installed nuclear power will fall to less than half its current level. And both combined-cycle plants, which use natural gas, and hydroelectricity will maintain their weight in a mix in which coal will no longer be included.

**IEEFA**

<http://ieefa.org>

**16 December 2021**

## **Estonia: Security of supply guaranteed for the short and long term despite uncertainty**

According to Elering, security of supply of power is guaranteed this winter as well as for the next 10 years despite the increased uncertainty about the adequacy of generation capacities and energy policy choices.

The analysis carried out by Elering indicates that the Estonian power system with the international connections is sufficient to cover power consumption now and in the next decade with the support of local and regional production, storage and consumption management capabilities. “However, the situation in energy economy is changing fast and if any of the low risks materialised, we’d be immediately ready to take the prepared measures to secure security of supply to Estonian consumers in terms of system management and adequacy alike,” said CEO of Elering Taavi Veskimägi.

The risk of the premature and unplanned separation of the Baltic States from the Russian power system, for example, has increased. It’s also possible that although the transition from power stations using fossil fuels to renewable energy is going to take decades in Europe and the rest of the world alike, some old power stations may be closed sooner than expected due to the lack of economic viability.

“However, the analysis carried out by Elering does not indicate a possible shortage of generation capacity in winter 2021/2022 and until 2030 for ensuring power supply to Estonian consumers,” said Veskimägi. According to Veskimägi, Estonia has enough power

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plants to cover peak consumption in Estonia even without international connections over this winter and although Europe is suffering from a shortage of gas supplies, the Incukalns gas storage facility is well filled with gas belonging to European market participants.

Veskimägi explains that the Estonian government has established a security of supply standard, which makes it possible to routinely assess the level of security of supply. Although constant analysis indicates that security of supply has dropped below the standard in the 10-year view, Elering applies a strategic reserve as a quick measure to keep the volume of secure generation capacities in Estonia at least at the level of 1,000 megawatt. In addition to secure capacities, emergency capacities as well as renewable energy solutions also contribute to security of supply.

As the strategic reserve or the additional capacity that can be reserved for a subsidy required administrative intervention and means extra costs to power consumers, it's important to establish the preconditions for the addition of market-based production capacities on the market, which in addition to daily energy quantities can also offer the reserves required for the management of the power system.

One such option is the establishment of three Baltic markets for the purchase of fast reserve capacities to connect to the continental European electricity system, which should provide additional profitability for power plants and hopefully also bring new investment in leading power generation, storage and consumption management solutions.

Security of supply needs to be achieved in a climate-neutral manner and in a way that is affordable for consumers and supports the competitiveness of the Estonian economy. We are moving towards climate neutrality through the development of onshore dispersed generation, the development of large offshore wind farms in the Estonian coastal waters, the implementation of storage and consumption management options, energy savings and the transition of the transport sector to carbon-free fuels.

However, security of supply achieved in a climate-neutral way must increase the well-being of the Estonian people. The green transformation offers the opportunity to implement new technologies and business models.

*Elering*

<http://www.elering.ee>

**17 December 2021**

## **Netherlands' plan for 2025 supports nuclear newbuild**

The Netherlands' new coalition government on 15 December released the coalition's plans for the period to 2021-2025 as the result of negotiations that began after the general election in March. The 50-page document, "Omzien naar elkaar, vooruitkijken naar de toekomst (Looking after each other, looking forward to the future)" covers a wide range of political and social issues, one of which is "Climate and Energy" including a sub-section on the energy mix.

The document notes the importance of switching to energy sources that do not emit greenhouse gases and also save energy. "In this way, after 2030, we will quickly work towards a fully climate neutral energy supply. This will allow us to quickly eliminate fossil fuels and at the same time guarantee security of supply and affordability."

The coalition notes: We will stimulate the supply of renewable energy sources by focusing on extra offshore wind, roof-based solar, geothermal, green gas and aqua thermal. At the same time, we will increase the production and import of hydrogen. We will phase out

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the use of wood biomass as soon as possible, taking into account cost-effectiveness. Biomass becomes so high-quality. We only allow the use of wood biomass produced in the EU so that we can ensure compliance in monitoring sustainability criteria. We will ensure that sustainable alternatives for heat is developed quickly.

Nuclear energy can supplement solar, wind and geothermal energy in the energy mix and can be used for hydrogen production. It also makes us less dependent on imports of gas. Thus, the Borssele NPP will continue operation while ensuring safety. In addition, this cabinet is taking the necessary steps for the construction of two new NPPs. These include facilitating investment, support innovation, issue tenders, review government finance, develop the necessary regulations and provide safe, permanent storage of nuclear waste.

There will be clear distance standards for the construction of wind turbines on land and we are encouraging (financial) participation of local residents. Given the scarce available space, we will mainly focus on large-scale installation of solar panels on roofs, including standardisation. We will only allow solar panels on land if the multifunctional use of that land is possible, for example on government land

In accordance with plans, gas extraction in Groningen will be phased out as quickly as possible because the safety of Groningen residents is paramount. Importing foreign gas will continue as necessary for our energy needs for years to come. We will not issue new permits for gas extraction under the Wadden Sea. We support the gas extraction in the North Sea and mandatory filling percentages for the gas stocks will be introduced to reduce dependence on other countries.

We are investigating the possibilities of reducing financial incentives for fossil fuels as much as possible in co-operation with other countries. In order to achieve the objectives of the climate agreement, we are increasing the scope for carbon capture storage (CCS).

A detailed appendix on financing the plant notes that the government will provide financial support for the construction of new NPPs including €50 million (\$56m) in 2023, €200 million in 2024 and €50 million in 2025. The cumulative support for new nuclear would total €5 billion by 2030, without assuming the plants would be online by that date.

*Nuclear Engineering International*  
<http://www.neimagazine.com>

**17 December 2021**

## **NPC Ukrenergo has been certified as the European-style transmission system operator in accordance with the ISO model**

Today, on 17 December, the National Energy and Utilities Regulatory Commission certified NPC Ukrenergo as the European-style transmission system operator in accordance with the ISO model. The Energy Community Secretariat confirmed the compliance of this decision with the EU's Third Energy Package.

Certification of the transmission system operator (TSO) is specified by the Law of Ukraine "On Electricity Market" and EU Directive 2009/72/EC3, mandatory for implementation into the Ukrainian legislation.

Obtaining a certificate of compliance with the rules of the EU's Third Energy Package is a process that all European operators in Continental Europe went through with no exception. It is certification that becomes an unconditional sign for our European partners and stakeholders that NPC Ukrenergo is completely free of any political pressure or business influence.



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To reach this conclusion, the Regulator and the Energy Community Secretariat carefully checked NPC Ukrenergo's documents for their compliance with European rules and regulations. In particular, they analysed the documents regulating the Company's rights to use assets, interaction with shareholders and market participants, as well as defining the activities of NPC Ukrenergo as a business entity and its financial condition.

Therefore, the certification proves that the unbundling of NPC Ukrenergo in accordance with the ISO model, specified by both European and Ukrainian legislation, has taken place. In fact, the issued certificate confirms that the decisions on the activities of the transmission system operator do not depend on the functions of generation and supply of electricity. The governing body, the Ministry of Energy, has no assets in these segments of the industry, while the Company's corporate governance is fully in line with international standards.

The certification paves the way for NPC Ukrenergo's official membership at ENTSO-E, which unites 42 transmission system operators from 35 European countries. This certificate constitutes the main prerequisite for obtaining the membership. Interconnection of the IPS of Ukraine and ENTSO-E in 2023 is a strategic goal aimed at allowing our country to gain energy independence, ensure further development of renewable energy sources, decarbonise our economy and increase security of electricity supply.

"In the near future, NPC Ukrenergo will apply for observer membership at ENTSO-E. In particular, this status will allow the Company to participate in the meetings of ENTSO-E Regional Group Continental Europe. Our representatives will also be able to join ENTSO-E working and expert groups dealing with electricity market development, balancing, ancillary services, electronic data exchange, RES integration, etc. This means that before the transition to parallel operation with the European grid, NPC Ukrenergo will have the opportunity to become involved in the development of ENTSO-E internal policies," said Volodymyr Kudrytskyi, Chairman of the Management Board at NPC Ukrenergo.

Moreover, NPC Ukrenergo's specialists will be able to access information platforms and IT tools used by ENTSO-E transmission system operators. They include the platforms for real-time data exchange – the systems that allow TSOs to quickly respond to changes in network conditions, effectively conduct operational planning and more.

All these opportunities will greatly facilitate and accelerate the process of integration of the Ukrainian power system into the European grid in 2023.

***Ukrenergo***  
***<http://ua.energy>***

**17 December 2021**

## **France's EDF takes more nuclear reactors offline after faults found**

French power giant EDF said on Wednesday it had found faults on pipes in a safety system at its Civaux nuclear power station, and it would shut down another plant because it used the same kind of reactors.

The setback comes as France plans a major nuclear power station building program, diverging from neighbour Germany which retreated from nuclear power after the Fukushima nuclear disaster in Japan in 2011.

France's biggest electricity supplier said some faults were detected close to the welds on the pipes of the safety injection-system circuit in the two reactors of the Civaux power plant in western France. A source close to the matter told Reuters the flaws were linked to

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corrosion. As a result of the discovery, an outage at the Civaux plant will last longer than expected, the company said.

EDF said it would stop its plant in Chooz in eastern France because it uses the same kind of reactors. The decisions will result in a loss of about 1 Terawatt-hour by the end of 2021, EDF said, adding that this would lead to a downward revision of its EBITDA estimate to a range of 17.5 to 18 billion euros, against the previous target of more than 17.7 billion euros, based on current market prices.

EDF had stopped one reactor at the Civaux plant for a routine 10-year checkup in August. In November it also halted its second reactor at the site protectively, previously planning to restart it on Dec. 24.

The extended outage could turn into a headache for President Emmanuel Macron as France pushes for nuclear energy to be included in an EU-wide list of favoured green and sustainable investments. It will place more pressure on France's nuclear-reliant power network, after grid operator RTE warned that cold weather over the winter could strain tight winter supply margins.

Nuclear accounts for around 70% of France's electricity mix and the pandemic has delayed maintenance work on some nuclear reactors.

*Reuters*

<http://www.reuters.com>

**19 December 2021**

## **East China fish farm combines photovoltaic power generation**

Power generated from photovoltaic (PV) modules in water at a fish farm in Wenzhou City, east China's Zhejiang Province, has been connected to the grid, combining offshore aquaculture with clean-energy power generation.

More than 1.4 million photovoltaic modules covering a water area of about 4.7 square km turn the tidal flat area into a power station with an installed capacity of 550 MW.

The project contributes to an increase of 26 percent clean energy power generation in the Wenzhou Power Grid, equivalent to cutting 648,000 tonnes of carbon dioxide emissions a year, otherwise made from thermal power generation.

The fish farm power station is expected to send 650 million kilowatt-hours of electricity to the grid on average each year, enough to supply power for 130,000 households.

"PV modules can also be used to help regulate water temperature and oxygen content in the water area, making it more suitable for sea-water aquaculture," said Wang Hairong, manager of Wenzhou Taihan fishery and photovoltaic complementary project. He said that another PV power station will be put into use in the tidal flat area next year.

*Xinhuanet*

<http://www.news.cn>

**21 December 2021**

## **USA: New Virtual Power Plant to Offer Ancillary Services**

PJM signed an agreement with Delmarva Power last week to explore how the new Elk Neck Battery Storage "virtual power plant" will participate in the region's wholesale market for ancillary services beginning in 2022.

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The project involves a residential community located on the Elk Neck Peninsula in the Chesapeake Bay in Cecil County, Maryland. Each of 110 homes involved will be equipped with battery storage that can both serve the energy of the individual homeowners or, aggregated and controlled together, provide reliability services to the local distribution system – as well as the RTO – by both charging and discharging from the grid

Sunverge, a San Francisco-based provider of distributed energy resource (DER) control, orchestration and aggregation platforms, is collaborating with Delmarva on the project. The project will serve as a virtual power plant (VPP), as described by Sunverge in a presentation to PJM stakeholders in June – the first battery energy storage residential VPP to participate in PJM’s wholesale markets.

The project was approved by the Maryland Public Service Commission under the Maryland Energy Storage Pilot Program and was subsequently introduced to PJM stakeholders through the Emerging Technologies Forum, a stakeholder group established to support PJM’s Advanced Technology Pilot Program. PJM’s pilot program provides a transparent testing ground to study the viability of integrating emerging technologies that enhance system reliability, operational and market efficiency, and resilience.

“The Elk Neck Battery Storage Pilot Project will allow aggregated DER to test the markets under real-world conditions, providing lessons for PJM and all its stakeholders in alignment with the spirit of FERC Order 2222,” said Eric Hsia, Senior Manager – Applied Innovation. “Pilot projects like Elk Neck give all of our stakeholders a window into the innovative work going on among our members.”

The VPP will participate in the ancillary services markets under PJM’s demand response model, through which resources are paid for their ability to modify load in response to instructions from the grid operator (PJM).

Lessons learned will be critical, because PJM is currently working with stakeholders on proposed rules for DER aggregation market participation rules under Order 2222.

Order 2222 will establish the rules for the grid of the future – how all customers, including the smallest residential customers, will interact with PJM, their local utility and the markets, and how they can be appropriately compensated for their contributions to system reliability. The project is scheduled to be fully operational in Q1 2022.

The pilot program provides a unique use case for the PJM footprint. It will offer operational coordination with the aggregator and utility, locational modeling of DER, and retail customer load interactions.

When/if coupled with solar, it could help with understanding load impacts, and the data could improve PJM’s behind-the-meter generation solar forecast. The Emerging Technologies Forum provides a centralized, open forum for education on emerging grid technologies; identification of issues that should be explored concerning operations, planning and markets; and recommendations for addressing those impacts.

***PJM Inside Lines***  
<http://insidelines.pjm.com>

**21 December 2021**

## **World's largest offshore wind farm generates its first power**

The switch has been flicked on a wind farm off the shore of the UK of unprecedented scale, with Danish energy firm Orsted announcing that Hornsea 2 has produced its first

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power. It is expected to become fully operational next year as the world's biggest offshore wind farm, and provide enough power for more than 1.3 million homes in the UK.

The Hornsea 2 project was approved back in 2016 as an addition to the Hornsea 1 project, which became commercially operational last year as the largest offshore wind farm in the world, with 174 turbines and a 1.2-GW capacity that provides power to over one million UK homes.

Taking the "world's largest" title with its 1.32-GW capacity, Hornsea 2 is located 89 km (55 miles) off the east coast of the UK and features 165 of Siemens' Gamesa 8-MW wind turbines. The offshore substation and reactive compensation station were installed in October this year, allowing operator Orsted to achieve the farm's first power.

When fully completed, Hornsea 2 will send wind power back to shore via more than 800 km (497 miles) of cabling, connecting to the national grid at the village of Killingholme. Together with its sibling Hornsea 1, the farms are expected to provide enough power for more than 2.3 million homes. Also, in the works is Hornsea 3, which received a Development Consent Order last year and will power more than two million homes, and Hornsea 4, which is currently in the planning phase.

While these farms at Hornsea are the biggest of their type, the world of offshore wind is a fast-moving one, with the "world's largest" title changing hands a number of times over the past decade or so. The 630-MW London Array came online in 2013 to take the mantle from the 500-MW Greater Gabbard Offshore Wind Farm, before the 659-MW Walney offshore wind farm then claimed it in 2018.

Last year, we saw construction kick off on the Dogger Bank Wind Farm near the coastal village of Ulrome in England. It will feature the world's largest offshore wind turbine, the 853-ft-tall (260-m), 14-MW Haliade-X, built by GE Renewable Energy, and have a capacity of 3.6 GW after its completion in 2026, when it is expected to become the largest wind farm in the world and provide the UK with five percent of its total energy needs.

*New Atlas*

<http://newatlas.com>

**22 December 2021**

## **Plan on table to halt new coal-fired power plants**

India is considering a proposal to halt new coal-based power units as the country works out a plan to meet commitments made at COP26. An expert committee tasked by the Union power ministry to update the National Electricity Policy (NEP) has recommended that no new coal-based capacity be considered, said people with knowledge of the matter. Replacement of old coal-based units should only be taken up when it is "convincingly established that it is not viable to meet the projected demand from alternate non-fossil fuel sources", according to its suggestions, said one of the people aware of the details.

At the UN climate change summit COP26 in Glasgow last month, Prime Minister Narendra Modi announced India's aim to achieve net-zero emissions by 2070 and also pledged to attain 500 GW of installed electricity capacity from non-fossil fuel sources by 2030.

The committee, headed by Gireesh Pradhan, former chairman of the Central Electricity Regulatory Commission, framed its recommendations after consulting all stakeholders, including states. The National Electricity Policy lays down the guidelines for the optimal utilisation of resources such as coal, natural gas, nuclear substances, hydro and

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renewable sources of energy and was last tweaked in 2005. The Electricity Act provides for its periodic revision.

"With growing penetration of renewable energy, about 60 GW of thermal capacity under construction and average thermal PLF (plant load factor) around 55%, we certainly do not need any more thermal," said Association of Power Producers director general Ashok Khurana. "As power demand increases, our first priority should be to get stranded coal and gas projects on stream." The committee has suggested replacement of coal-based capacity should only be based on technology that's flexible in ramp-up and ramp-down and has higher efficiency rates, said the people cited above. The committee has also recommended that inefficient generating units with a heat rate of over 2700 Kcal per kWh must be retired before March 31, 2023.

Experts said the days of thermal energy in India seem to be numbered given the country's surplus installed base, coupled with the push toward non-fossil energy and emerging energy storage technologies that will make renewable energy available round the clock. In September, seven UN member countries launched a no-new-coal-energy compact at the UN High-Level Dialogue on Energy in their bid to achieve net-zero emissions by 2050.

*The Economic Times*

<http://economictimes.indiatimes.com>

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## **Europe's Power Crunch Shuts Down Factories as Prices Hit Record**

European power climbed to a fresh record as France faces a winter supply crunch, with heavy industries forced to curb production across the region. Electricity for delivery next year jumped to an all-time-high in both Germany and France, two of the biggest economies in the European Union. France, facing outages at nuclear plants, will need to suck up supplies instead of exporting power to neighboring countries.

The situation is so severe that it is forcing factories to cut output or shut down altogether. Aluminium Dunkerque Industries France has curbed production in the past two weeks due to high power prices, while Trafigura Group's Nyrstar will pause its zinc smelter in France in the first week of January. Romanian fertilizer producer Azomures SA temporarily halted output. Electricite de France SA said last week it will halt four reactors accounting for 10% of the nation's nuclear capacity, straining power grids already faced with the prospect of a spell of cold weather. At the beginning of January, almost 30% of France's nuclear capacity will be offline, increasing the country's reliance on gas, coal and even oil.

"If we have a very, very cold day, it could be problematic, especially if we have to import and our neighbors have problems as well," said Paris-based Anne-Sophie Corbeau, a research scholar at the Center on Global Energy Policy at Columbia University. "This is the domino effect we need to fear. But electricity will be expensive, there's going to be a cost to pay."

German power for next year jumped to a high of 335 euros a megawatt-hour, following a 25% rally on Tuesday, before slipping back. The French equivalent rose as much as 2.5% to record of 408 euros. Prices gained amid thin holiday trading even as gas declines. There was also speculation some traders may be closing short positions due to rising capital requirements from exchanges.

Soaring gas and power prices have already forced European utility giants from RWE AG to Uniper SE to boost liquidity requirements. Many smaller suppliers didn't have the

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same option, with more than 20 going out of business in the U.K. alone. Electricity supplies in France are so tight that the nation is resorting to burning fuel oil. Power produced using the fuel surged to the highest in more than a month, data from grid operator RTE showed.

Supplies will be so tight in the winter that French power for February is trading at 1,000 euros a megawatt-hour. Prices have been rising so fast that the European Energy Exchange on Tuesday raised the maximum price for order entry, trade matching and trade registration of power futures to 3,000 euros a megawatt-hour from 999.98 euros previously.

*Bloomberg*

<http://www.bloomberg.com>

**22 December 2021**

## **Largest Offshore Wind Farm in China Fully Grid Connected**

The 802 MW Jiangsu Qidong, China's largest offshore wind farm, achieved a full capacity grid connection on Saturday, 25 December.

The Jiangsu Qidong offshore wind farm comprises three projects; H1, H2, and H3, each with an accompanying offshore booster station. The wind farm is located between 31 and 40 kilometres off the coast of Qidong, Nantong Province, covering an area of 114.5 square kilometres. It comprises 134 wind turbines of seven different models from four different domestic manufacturers. The first turbine was installed at the site in early February and the final unit was erected in early December.

The project, valued at over EUR 2 billion, is owned and developed by Jiangsu Huawei Wind Power Co, and Qidong Hua Er Rui Wind Power Technology Co. The wind farm's engineering, procurement, and construction (EPC) contractor is PowerChina Huadong. The groundbreaking ceremony marking the start of the wind farm's construction was held in April 2020.

*Offshorewind.biz*

<http://www.offshorewind.biz>