WORLD POWER SYSTEMS REVIEW

15 June 2023

1 June 2023

In a First, Caltech's Space Solar Power Demonstrator Wirelessly Transmits Power in Space

A space solar power prototype that was launched into orbit in January is operational and has demonstrated its ability to wirelessly transmit power in space and to beam detectable power to Earth for the first time.

Wireless power transfer was demonstrated on March 3 by MAPLE, one of three key technologies being tested by the Space Solar Power Demonstrator (SSPD-1), the first space-borne prototype from Caltech's Space Solar Power Project (SSPP). SSPP aims to harvest solar power in space and transmit it to the Earth's surface.

MAPLE, short for Microwave Array for Power-transfer Low-orbit Experiment and one of the three key experiments within SSPD-1, consists of an array of flexible lightweight microwave power transmitters driven by custom electronic chips that were built using low-cost silicon technologies. It uses the array of transmitters to beam the energy to desired locations. For SSPP to be feasible, energy transmission arrays will need to be lightweight to minimize the amount of fuel needed to send them to space, flexible so they can fold up into a package that can be transported in a rocket, and a low-cost technology overall. MAPLE was developed by a Caltech team led by Ali Hajimiri, Bren Professor of Electrical Engineering and Medical Engineering and co-director of SSPP.

"Through the experiments we have run so far, we received confirmation that MAPLE can transmit power successfully to receivers in space," Hajimiri says. "We have also been able to program the array to direct its energy toward Earth, which we detected here at Caltech. We had, of course, tested it on Earth, but now we know that it can survive the trip to space and operate there."

Using constructive and destructive interference between individual transmitters, a bank of power transmitters is able to shift the focus and direction of the energy it beams out—without any moving parts. The transmitter array uses precise timing-control elements to dynamically focus the power selectively on the desired location using the coherent addition of electromagnetic waves. This enables the majority of the energy to be transmitted to the desired location and nowhere else.

MAPLE features two separate receiver arrays located about a foot away from the transmitter to receive the energy, convert it to direct current (DC) electricity, and use it to light up a pair of LEDs to demonstrate the full sequence of wireless energy transmission at a distance in space. MAPLE tested this in space by lighting up each LED individually and shifting back and forth between them. The experiment is not sealed, so it is subject to the harsh environment of space, including the wide temperature swings and solar radiation that will be faced one day by large-scale SSPP units.

MAPLE also includes a small window through which the array can beam the energy. This transmitted energy was detected by a receiver on the roof of the Gordon and Betty Moore Laboratory of Engineering on Caltech's campus in Pasadena on May 22. The received signal appeared at the expected time and frequency, and had the right frequency shift as predicted based on its travel from orbit.

Beyond a demonstration that the power transmitters could survive the launch (which took place on January 3) and space flight, and still function, the experiment has provided useful feedback to SSPP engineers. The power transmission antennas are clustered in groups of 16, each group driven by one entirely custom flexible integrated circuit chip, and Hajimiri's team now is assessing the performance of individual elements within the system by evaluating the interference patterns of smaller groups and measuring difference between various combinations. The painstaking process—which can take up to six months to fully

complete—will allow the team to sort out irregularities and trace them back to individual units, providing insight for the next generation of the system.

Space solar power provides a way to tap into the practically unlimited supply of solar energy in outer space, where the energy is constantly available without being subjected to the cycles of day and night, seasons, and cloud cover—potentially yielding eight times more power than solar panels at any location on Earth's surface. When fully realized, SSPP will deploy a constellation of modular spacecraft that collect sunlight, transform it into electricity, then convert it to microwaves that will be transmitted wirelessly over long distances to wherever it is needed—including locations that currently have no access to reliable power.

SSPP got its start in 2011 after philanthropist Donald Bren, chairman of Irvine Company and a lifetime member of the Caltech Board of Trustees, first learned about the potential for space-based solar energy manufacturing as a young man in an article in the magazine Popular Science. Intrigued by the potential for space solar power, in 2011, Bren approached Caltech's then-president Jean-Lou Chameau to discuss the creation of a space-based solar power research project. In the years to follow, Bren and his wife, Brigitte Bren, also a Caltech trustee, agreed to make the donation to fund the project. The first of the donations to Caltech (which will eventually exceed $100 million in support for the project and endowed professorships) was made through the Donald Bren Foundation.

In addition to the support received from the Brens, Northrop Grumman Corporation also provided Caltech $12.5 million over three years through a sponsored research agreement between 2014 and 2017 that supported for the development of technology and advancement of science for the project. Individual SSPP units will fold up into packages about 1 cubic meter in volume and then unfurl into flat squares about 50 meters per side, with solar cells on one side facing toward the sun and wireless power transmitters on the other side facing toward Earth.

A Momentus Vigoride spacecraft launched aboard a SpaceX rocket on the Transporter-6 mission carried 50-kilogram SSPD to space. Momentus is providing ongoing hosted payload support to Caltech, including providing data, communication, commanding and telemetry, and resources for optimal picture taking and solar cell lighting. The entire set of three prototypes within the SSPD was envisioned, designed, built, and tested by a team of about 35 individuals—faculty, postdocs, graduate students, and undergrads—in labs at Caltech.

Caltech
http://www.caltech.edu/

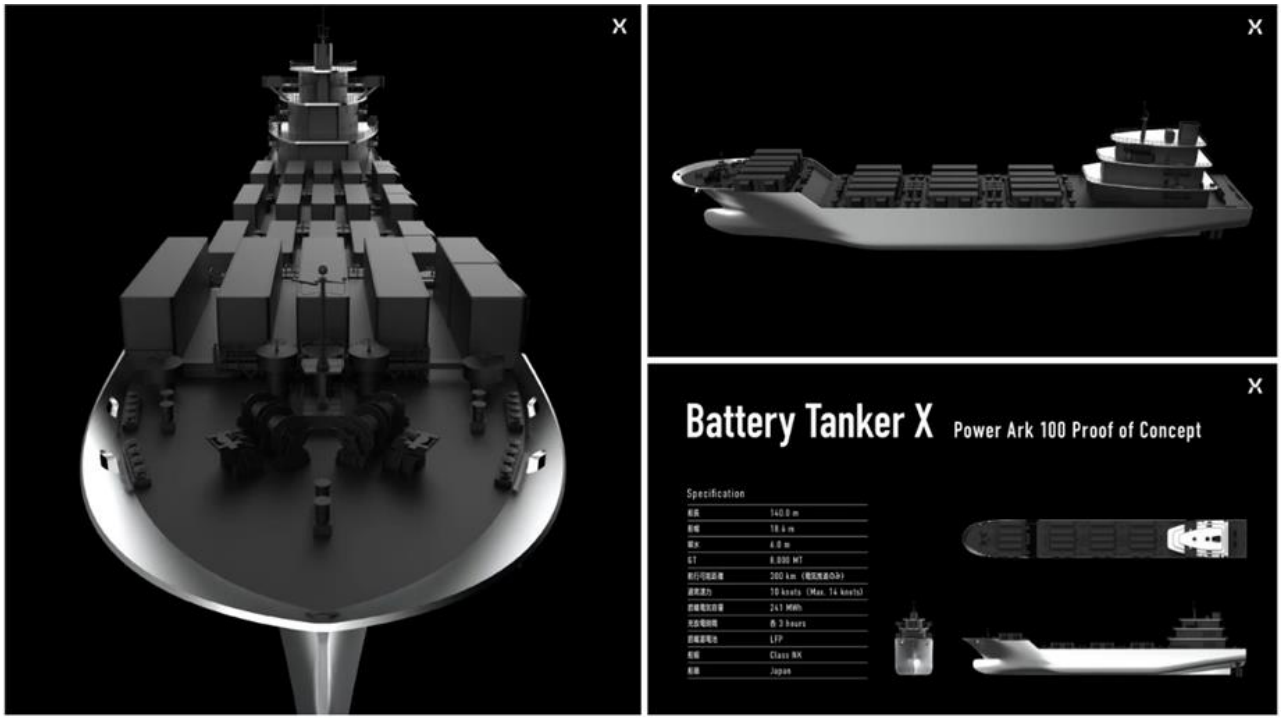
1 June 2023

PowerX: World's first battery tanker breaks cover

Japanese battery startup PowerX Inc. has unveiled a detailed design of the first-ever battery tanker at the Bariship International Maritime Exhibition held in Imabari City in Japan. As informed, this electric propulsion vessel will feature a length of 140 meters and will be equipped with 96 containerized marine batteries, providing a total capacity of 241MWh.

According to the company, the onboard battery system is based on our proprietary module design, and encompass lithium iron phosphate (LFP) battery cells that can manage a lifespan of over 6,000 cycles. Additionally, the battery system is highly scalable, allowing for the installation of additional batteries to create larger electric transport vessels such as Power Ark 1000 or even larger sizes to meet specific mission requirements.

Furthermore, the system includes dedicated gas emission control and fire suppression mechanisms to ensure safety. All batteries will be manufactured in-house in Okayama Prefecture and are scheduled to obtain international ship classification certifications and applicable standards such as DNV and Class NK.



Delivery of the batteries is scheduled to commence by mid-2024. The inaugural ship "X" will be completed by 2025, with domestic and international field testing planned to commence in 2026, PowerX said. The Japanese company also revealed that a new company called Ocean Power Grid Inc. will be established in the third quarter of 2023 to advance the maritime power transmission business using battery tankers. This company will own, sell, and operate the battery tankers in Japan and abroad.

PowerX has already signed a memorandum of understanding (MoU) and a partnership agreement with Kyushu Electric Power Co., Ltd. and the City of Yokohama to pursue this new maritime power transmission concept and achieve carbon-neutral ports.

Offshore Energy
http://www.offshore-energy.biz/

2 June 2023

New Delhi agrees to power transmission from Nepal to Bangladesh through India

Nepal and India on Thursday, June 1, renewed the treaty on transit and agreed in principle to export Nepali electricity to Bangladesh after talks between the two prime ministers were held in New Delhi.

During the talks, the boundary issue was also discussed. Nepali Prime Minister Pushpa Kamal Dahal was on his first foreign visit to India after taking over the post in his third term as premier of the Himalayan Republic. Along with an 80-member delegation, he was accompanied by his youngest daughter, Ganga Dahal, who is projected as his political heir. Following the talks, the two leaders virtually inaugurated six connectivity projects, which included the development of integrated check posts, rail lines and power transmission projects.

Seven agreements were signed in the presence of the prime ministers, which included the key transit treaty that had expired in 2019. The amended treaty will allow Nepal to access India's inland waterways for cargo transportation to sea ports. "In this, along with new rail routes for the people of Nepal, a provision has also been made for the facility of India's inland waterways," said Prime Minister Narendra Modi in his press statement.

Prime Minister Dahal noted that the two leaders had also directed their commerce secretaries to direct the initiation of the process to review the trade treaty. He also revealed that India has been asked to give non-reciprocal market access with more "flexible and easy quarantine procedures" for Nepal's agricultural products, as well as, simplified Rules of Origin for other products. Besides, India was also asked to remove anti-dumping duty on Nepali jute products.

Describing hydropower projects as "one of the most important elements of our economic partnership", Dahal thanked Modi for agreeing to facilitate the export of hydropower from Nepal to Bangladesh through India. "We have agreed that export of up to 50 megawatt (MW) of power from Nepal to Bangladesh via India would commence soon and the three countries would work out an agreement to this effect soon," he said.

Currently, India exports around 452 MW of power from Nepal. Dahal added that India had agreed to import an additional 1,200 MW. "Looking ahead, an agreement on the long-term power trade has been completed. Under this agreement, India will import 10,000 MW of power from Nepal in the next 10 years. This is a major development in enhancing cooperation in this area based on the Joint Vision Statement that the two prime ministers issued in April 2022," he said.

A significant deadline of just three months for finishing the Detailed Project Report (DPR) of the Pancheshwar Multipurpose Project was announced by Dahal. The Pancheshwar project has been hanging fire for 27 years since the signing of the Mahakali treaty, but it remained mired in dispute at the DPR stage itself. On connectivity, Dahal said that India has given "positive indication" for additional air entry routes. "We request for the approval of a high-altitude additional air-entry route from Mahendranagar at an early date. We appreciate India's approval for near-border flight operation in the Gautam Buddha international Airport in Bhairahawa, Nepal through publishing ILS procedure in the AIP to enhance safety and efficiency of flight operation," he said. The Nepal premier added that Kathmandu would like to have regular flights from Nepal's newly built international airports of Bhairahawa and Pokhara to and from various cities of India.

India Times
http://indiatimes.com/

5 June 2023

Hitachi Energy to develop first phase of NEOM transmission system

Hitachi Energy has signed agreements with Saudi Electricity Company (SEC) and ENOWA to design and develop the first phase of the transmission system for the planned NEOM smart city in Saudi Arabia. In this connection, the Japanese company will provide three high voltage direct current (HVDC) links for a total power capacity of 9GW. ENOWA is the utility company for NEOM, which is being built in Northwest Saudi Arabia. SEC is the engineering, procurement, and construction management (EPCM) partner of ENOWA.

ENOWA grid technology and projects, energy executive director Thorsten Schwarz said: "By securing the first capacities for such an important part of our future grid in only one year since the decision to use this technology, we show ENOWA's commitment to supporting Saudi Vision 2030 in collaboration with Saudi Electricity Company and Hitachi Energy." The agreements include an order from SEC awarded to Hitachi Energy and its consortium partner Saudi Services for electro mechanical works (SSEM).

The order is for delivering a 3GW, 525kV HVDC Light transmission system that will link Oxagon, a regional development of NEOM, with the larger Yanbu area. Yanbu, which is in Western Saudi Arabia, is located more than 650km away from Oxagon.

Hitachi Energy will be responsible for the design, engineering, and procurement of HVDC technology in addition to placing the HVDC Light converter stations into service.

SSEM's role will be to design and supply the AC equipment portion and carry out the construction and installation. Hitachi Energy and ENOWA have also entered into an early works and capacity reservation agreement for two more HVDC projects, each with a capacity of up to 3GW. Hitachi Energy grid integration business managing director Niklas Persson said: "We are delighted to strengthen our collaboration with ENOWA and Saudi Electricity Company in order to power one of the most visionary development projects of all time. Recently, NEOM Green Hydrogen (NGHC) reached financial close on the green hydrogen production facility in NEOM with a total investment of $8.4bn. NGHC is a joint venture between ACWA Power, Air Products, and the NEOM sustainable living project.

NS ENERGY
http://www.nsenergybusiness.com/

5 June 2023

ENTSO-E: Implementation Monitoring Platform for Connection Network Codes

Pursuant to its legal mandates and monitoring needs, ENTSO-E initiated in 2021 a project to develop a customized solution to gather data from TSOs after the national implementation of the Connection Network Codes. Following the development of the tool by Uprise, ENTSO-E successfully deployed the Implementation Monitoring Platform (IMP) for the Connection Network Codes for handling internal monitoring activities.

The IMP has been used successfully in the monitoring processes of 2022 by TSOs' representatives for Connection Network Codes (NCLPs) and the dedicated working group (StG CNC) in ENTSO-E.

Following this achievement, ENTSO-E identified opportunities for upgrading the IMP and launched the development of its version 2 with Uprise, which has been made available online, https://imp.entsoe.eu . Some of the key functionalities of the platform below:

Creation of a public layer, in line with ENTSO-E's transparency policy, facilitating the outcome of the monitoring processes in a user-friendly manner, enabling stakeholders to consult reports and comparative data of the implementation of the Connection Network Codes across the EU Member States. By doing so, ENTSO-E follows a related stakeholder's suggestion voiced in the Grid Connection European Stakeholder Committee:

- Inclusion of national implementation of non-exhaustive parameters from the Connection Network Codes (CNCs) in a dynamic table and which allows NCLPs to update the needed piece of data without any further intervention, facilitating keeping this source of information up to date.
- Development of dynamic graphs for the diverse national implementations of non-exhaustive parameters, enhancing the visualization of correlations of the diverse system needs driving different regulatory approaches.
- Inclusion of Implementation Monitoring Reports from previous years.

ENTSO-E
http://www.entsoe.eu/

5 June 2023

El Salvador partnership to build $1 billion bitcoin mining farm

A public-private partnership in El Salvador will pump $1 billion into creating one of the world's largest bitcoin mining farms, the group called Volcano Energy announced on Monday.

The project will start with an initial $250 million, backed by "key Bitcoin industry leaders" in collaboration with renewable energy developers, Volcano Energy said in a statement. El Salvador's state "Bitcoin Office" retweeted the news on its Twitter. The presidential office did not immediately respond to a request for comment. Volcano Energy

said the funds would go toward an estimated 241 MW power generation park using solar and wind energy in the northwestern municipality of Metapan, which will eventually power the bitcoin mining farm.

Bitcoin mining uses high-power computers hooked up to a global network, sucking up massive amounts of electricity in the process. The energy-intensive practice has come under fire from environmentalists who are concerned that it would exacerbate forest loss and climate change. The announcement comes two years after Salvadoran President Nayib Bukele declared his intention to make bitcoin legal tender.

A Reuters report found adoption among residents has been shaky, while the International Monetary Fund has cautioned against the embrace due to legal risks, fiscal fragility and the speculative market. Bukele and his bitcoin backers have said the currency can bring jobs, financial inclusion and foreign investment to the country, one of the poorest in the Western Hemisphere.

The El Salvador government will have "a preferred participation equivalent to 23% of the revenues" in the project, Volcano Energy said, with private investors holding 27%. The remaining 50% will be reinvested back into infrastructure, the statement said, without clarifying the overall ownership structure. Tether, a startup operating a cryptocurrency pegged to the U.S. dollar, participated in the initial investment, it confirmed in a separate statement, without specifying the amount contributed. It listed Josue Lopez, who was involved with a $200 million solar energy plant announced last year, as the CEO of Volcano Energy, and Max Keiser, a bitcoin influencer, as its chairman.

Reuters
http://www.reuters.com/

5 June 2023

Chinese scientists produce green hydrogen directly from seawater at floating offshore pilot project

Chinese state-owned wind turbine maker Dongfang Electric has successfully produced green hydrogen directly from seawater during ten days of testing on a floating offshore platform. Electrolysers usually require purified water to ensure that the electrodes are not contaminated when splitting H2O into hydrogen and oxygen — and desalination equipment is usually factored into green H2 projects that need to source their water from the sea. The floating platform — which includes in-situ electrolysis, as well as “intelligent energy conversion management”, safety detection and control systems — was said to have produced hydrogen in a “stable” fashion for more than 240 hours at the Xinghua Bay offshore wind farm, off Fujian province, despite enduring gale-force winds, one-metre high waves and a rainstorm, according to China’s English-language news channel CGTN.

While the new technology could remove the need for desalination, the removal of salt and other substances and microorganisms from seawater by reverse osmosis is relatively inexpensive, costing about 0.035kWh of electricity per kilogram of hydrogen — a fraction of the 50-65kWh/kgH2 needed by electrolysers, according to Paul Martin of the Hydrogen Science Coalition. Nevertheless, the Chinese technology removes the need to build onshore desalination plants, and means that hydrogen could be produced directly offshore using power from nearby wind turbines, and then pumped to shore via pipeline, which could be a cheaper option than sending offshore wind power along subsea electricity cables and producing green H2 onshore.

Germany, for instance, has set aside North Sea acreage for 1GW of green hydrogen to be produced offshore and pumped onshore via pipeline, while the Netherlands has promised to hold a tender for a 500MW offshore green hydrogen project that will also see its H2 pumped to shore via pipeline. The Chinese technology, which was jointly developed

by Dongfang and the Chinese Academy of Engineering, was detailed in a study published in the journal Nature on 30 November last year. A demonstration system was stably operated for more than 3,200 hours without failure, the study explained.

Hydrogen Insight
http://www.hydrogeninsight.com/

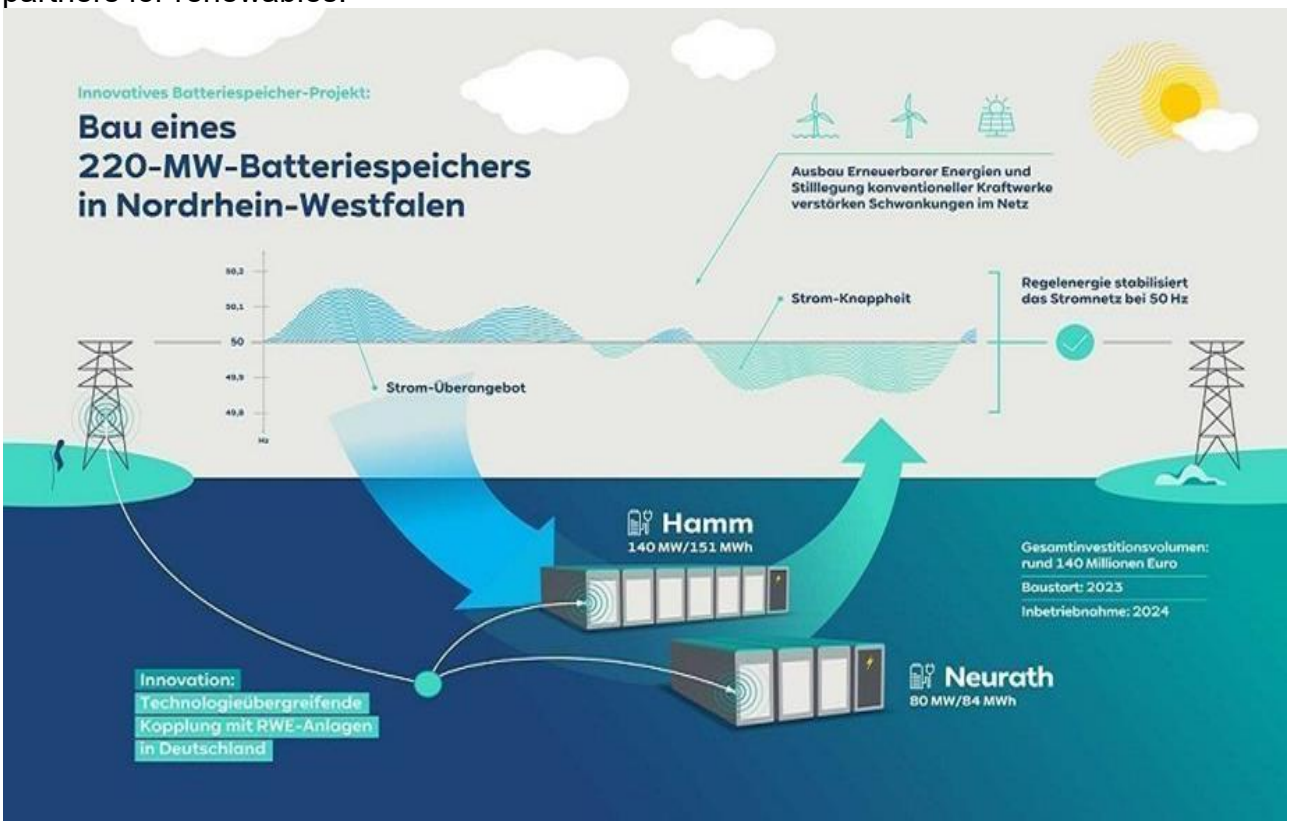
5 June 2023

RWE begins construction on 220MW frequency-stabilizing battery system

RWE has begun construction of one of Germany's largest battery storage projects at two power plant locations in Neurath and Hamm, intended to provide grid-stabilisation services once active mid-2024. The German multi-national energy company's two-prong project will have a capacity of 220MW and a storage capacity of 235MWh.

A total of 690 lithium-ion battery blocks will be installed, involving an investment of approximately €140 million ($150.7 million).

The Battery Energy Storage System (BESS) is scheduled to supply balancing energy to stabilise the electricity grid from the second half of 2024. This will entail the plant taking excess power from the electricity grid and feeding it back into the system when required, to maintain the required grid frequency. Lars Kulik, member of the board of RWE Power stated: "With this battery storage facility, RWE is providing a major boost to structural transformation in North Rhine-Westphalia. By making practical use of the existing locations and grid connections, we are making the traditional power plant sites of Hamm and Neurath important partners for renewables."



The storage facilities will also be deployed on the wholesale market – electricity will be taken into the storage system if electricity prices are low and conversely will be fed out when prices are high. In Neurath, batteries with a total capacity of 80MW (84MWh) will be installed on an area of around 7,500m², the equivalent of about one football pitch, utilising about €50 million ($53.9 million) of the planned total. The remaining €90 million ($97 million) will be directed towards the facility at Hamm-Uentrop, including batteries with a total capacity

of 140MW (151MWh), covering an area of 14,000 m². Marc Herter, mayor of Hamm, commented: “The construction of the large battery storage facility at the Westfalen power plant once again underlines the tradition and importance of Hamm as an energy location. “The large-scale battery storage facility secures the energy supply and forms an important foundation for the success of the energy transition. We are pleased that RWE is accompanying us on the way to a climate-neutral economy in Hamm.” The planned BESS can operate at its maximum capacity of 220MW for over an hour. According to RWE, this will be enough to charge the equivalent of about 4,000 EVs.

The facility will also be virtually networked with RWE power stations in Germany, which will make it possible to control whether the storage units work alone or in conjunction with other power stations to supply balancing energy. RWE will be individually coordinating planning, modelling, system integration and commissioning of the project directly.

Roger Miesen, CEO of RWE Generation commented on the rising need for such flexible systems as clean energy sources continue to increase in number:

“They [renewables] balance out fluctuations in the electricity grid in seconds, which means they are the key to a reliable electricity supply. In terms of size and technology, the new large-scale battery storage facility in Neurath and Hamm is setting standards throughout Europe.”

Smart Energy International
http://www.smart-energy.com/

6 June 2023

Cash-strapped Bangladesh shuts power plant as heatwave hits

Cash-strapped Bangladesh shut its biggest power plant Monday because it was unable to afford the coal to fuel it, as a sweltering heatwave creates surging electricity demand. The 1,320-megawatt government-run Payra Power Plant in southern Bangladesh had already slashed production last month due to fuel shortages, but it was forced to go a step further on Monday, manager Shah Abdul Mawla said. “Due to the coal shortage, the plant came to a complete shutdown at 12. 15pm today,” Mawla said. Bangladesh is struggling against a depreciating currency, with foreign exchange reserves slumping from $46 billion in January last year to $30 billion at the end of April this year.

The official inflation rate is around 9. 9%, but independent economists say the real figure is substantially higher. The country has faced nationwide blackouts of up to five hours a day in recent weeks as a heatwave sweeps across the country. Bangladesh recorded a temperature of 41.1 ° Con Monday, with the government closing primary schools until Thursday.

Power grid company of Bangladesh spokesman ABM Badruddoza Khan said the country had experienced “2,500 MW shortage of electricity in the national grid”, compared to 2,200 MW a day earlier, with daily demand16,000 MW. Minister for power Nasrul Hamid said he hoped tonormalise the situation within 10 to 15 days.

India Times
http://timesofindia.indiatimes.com/

8 June 2023

FERC to oversee settlement talks to resolve PJM Winter Storm Elliott complaints amid $1.8B in charges

A Federal Energy Regulatory Commission administrative law judge will oversee settlement discussions aimed at resolving 13 complaints seeking to overturn or reduce at least some of the $1.8 billion in charges imposed by the PJM Interconnection against generators that failed to perform during Winter Storm Elliott last year.

"Given PJM's interest in finding a resolution to the issues raised in these proceedings — along with parties' general collective willingness to engage in settlement procedures — we find that these procedures are a reasonable first step," FERC said in a decision released Monday. PJM, the largest U.S. grid operator, levied $1.8 billion in nonperformance charges after nearly a quarter of the capacity in its footprint didn't run during certain hours in late December. Generators that overperformed in those periods stand to receive a share of the fines.

In response, Calpine, Energy Harbor, Invenergy, LS Power and other companies filed complaints with FERC arguing the nonperformance charges are unjust because PJM made forecasting mistakes, exported power to other regions and imposed fines against generators that weren't dispatched or scheduled, among other things. Energy Harbor, for example, faces a $12.2 million charge related to its coal-fired Sammis power plant in Stratton, Ohio, according to the company's complaint. Companies such as Constellation Energy, Public Service Enterprise Group and Vistra asked FERC to reject the complaints and uphold the fines. Resolving the complaints through settlement discussions could avoid years of litigation and market uncertainty, Calpine and others said in support of the talks.

In approving PJM's request for settlement procedures, FERC declined Vista's request that it issue an interim order providing guidance and a legal framework for the discussions. Parties have 60 days to reach an agreement after a settlement judge is appointed to oversee the talks. The deadline can be extended by 30 days if the judge determines that progress is being made. FERC did not put the pending complaints on hold, saying that responses may help advance the settlement talks. The commission, however, won't address the complaints until the settlement discussions are over.

Utility Dive
http://www.utilitydive.com/

8 June 2023

UK grid operator's computer systems failure disrupts electricity matching

National Grid Plc, the operator of Britain's grid, encountered a failure in the computer systems responsible for matching electricity supply with demand.

The electricity control centre reported that the incident occurred at 11 a.m. London time on Wednesday and was resolved shortly before 3pm. Measures were implemented to ensure a secure and reliable power supply throughout the disruption. According to a notice from the electricity control centre, the Balancing Mechanism IT systems experienced a complete outage at 11am, causing the unavailability of BM data submissions via EDL and EDT.

Despite this, all Balancing Mechanism Units were instructed to operate based on their last notified Planned Notification, considering any bid-offer acceptances. They were also directed to continue delivering ancillary services as instructed to maintain stability. The outage was officially concluded at 14:51, as announced in a notification from National Grid. The Balancing Mechanism IT Systems were declared operational again, allowing electronic data submissions via EDL and EDT to resume.

Energy Live News
http://www.energylivenews.com/

8 June 2023

Russia's Rosatom to build its first small-sized NPP abroad in Kyrgyzstan

Russia's Rosatom state corporation will build its first small-sized nuclear power plant abroad in Kyrgyzstan. "Our first export delivery, which, in my opinion, will serve as the flagship deal in global exports, will be that to Kyrgyzstan," Rosatom head Alexei Likhachev

said at the Eurasian Congress. "Kyrgyzstan demonstrates the highest dynamics in the implementation of a small-sized nuclear power plant [project] based on Russian technology," he said.

Atomenergoprom said in its annual report that Rosatom was planning to finalize a preliminary feasibility study for small-sized nuclear power plants in Kyrgyzstan and Myanmar this year. It is also planned to present a preliminary feasibility study for a small-sized nuclear power plant to India in 2023.

Rusatom Energy Projects, a member of Rosatom Group, and the Kyrgyz Energy Ministry signed a technical assignment for drafting a preliminary feasibility study for a small-sized nuclear power plant in Kyrgyzstan on the sidelines of the Atomexpo 2022 exhibition last November.

Interfax
http://interfax.com/

9 June 2023

ENTSO-E: 13 years of resources on the future pan-European electricity transmission network just a click away

Our new website on ENTSO-E's Ten-Year Network Development Plan (TYNDP) is now available, with a wealth of resources on European grid planning, including the final TYNDP 2022 package. The main challenge tackled by the new site is to ensure that the vast amount of data and documents published as part of ENTSO-E's successive TYNDPs since 2010 is easily accessible to interested stakeholders.

ENTSO-E's TYNDP is the European electricity infrastructure development plan. It links, supports, and complements national grid development plans. It provides a wide European vision of the future power system up to 2050 and investigates how power links and storage can be used to make the energy transition happen in a cost-effective and secure way.

TYNDP 2022, now available in its final version after ACER opinion, investigated system needs in 2030 and 2040. It finds that opportunities to improve the power system exist all over Europe. In 2030, the study finds 64 additional GW of needs on over 50 borders, a 55% increase on the 2025 grid. In 2040, results find space for 88 GW of cross-border capacity increase after 2025 on over 65 borders.

By connecting more consumers with more producers, grid development allows a better use of the cheapest generation. As a result, European countries can exchange electricity to replace expensive generation (gas and coal) with cheaper one (mainly renewable). Addressing system needs would reduce gas-based generation by 9 TWh by 2030 and 75 TWh in 2040 in the ENTSO-E area.

TYNDP 2022 assessed how 141 transmission projects and 23 storage projects could contribute to reaching the EU's energy and climate goals, with a series of indicators on CO2 emission, security of supply, RES integration.

ENTSO-E
http://www.entsoe.eu/

9 June 2023

New oil and gas tax changes set to protect energy security and British jobs

The Energy Profits Levy, which puts a marginal tax rate of 75% on North Sea oil and gas production, will remain in place for the next five years while oil and gas prices remain higher than historic norms – but this will fall back to 40% when prices consistently return to normal levels for a sustained period.

- The Energy Profits Levy will remain in place until March 2028, and the Government will introduce a new Energy Security Investment Mechanism to protect domestic energy supply and help safeguard some of the tens of thousands of jobs reliant on the sector.
- This forms part of the Government's strategy to support households with energy bills whilst providing certainty to investors to secure the long-term future of domestic energy production.
- The Energy Profits Levy has raised around £2.8 billion to date, helping the Government pay just under half the typical household energy bill last winter.

Put in place to tax extraordinary profits made by industry following record high prices of oil and gas driven by Putin's invasion of Ukraine, the levy has raised around £2.8 billion to date and is expected to raise almost £26 billion by March 2028 – helping to fund the measures to help with the cost of living, such as the Energy Price Guarantee. While the levy included an investment allowance to encourage firms to continue to invest in oil and gas extraction in the UK, industry has warned that companies are cutting back on investment. This puts the long-term future of the UK's domestic supply at risk, meaning we would be forced to import more from abroad at a time when reliable and affordable energy is a focus for families and businesses.

In response to this, the Government has today announced an Energy Security Investment Mechanism to give the oil and gas sector certainty to raise capital and invest in new and existing projects, securing affordable and reliable domestic energy supply and protecting some of the 215,000 British jobs the sector supports. It will mean that if prices fall to historically normal levels for a sustained period the tax rate for oil and gas companies will return to 40%, the rate before the Energy Profits Levy was introduced. Based on the independent Office for Budget Responsibility's forecast the Energy Security Investment Mechanism won't be triggered until before the tax's planned end date in March 2028.

In light of Putin's weaponisation of energy, the UK government is taking concrete steps to accelerate home-grown sources of energy to reduce the UK's reliance on foreign imports. In October 2022, the industry regulator the North Sea Transition Authority (NSTA) opened applications for oil and gas licences to explore and potentially develop 898 blocks and part-blocks in the North Sea which may lead to over 100 licences being awarded from later this year.

Gareth Davies MP, Exchequer Secretary to the Treasury, said: "It is right that we recover excess profits resulting from Putin's war and use the money to help people with their energy bills. Thanks to the revenue raised from windfall taxes on energy profits, we will have helped save the typical household £1,500 on their energy bill by July. "While we stepped into help, never again can our energy supplies be at the whim of petrostate despots like Putin. That's why it's so important that we secure investment in our own domestic supply, protecting the tens of thousands of British jobs that come with it.

"It would be beyond irresponsible to turn off the North Sea taps overnight. Without oil and gas from British waters, we would be forced to import even more from overseas, putting our security of supply at risk." This 'windfall tax' takes the total revenues from taxes on oil and gas companies to £50 billion over the next five years. These taxes will have helped the Government save the typical household over £1,500 to July. It also helped cut the energy bills of businesses from pubs to leisure centres, with just under £40 billion paid out across businesses and households to date.

The tax rate for oil and gas companies will only return to 40% if both average oil and gas prices fall to, or below, $71.40 per barrel for oil and £0.54 per therm for gas, for two consecutive quarters. This level is based on 20-year historical averages. The Energy Security Investment Mechanism is not expected to impact receipts from the Energy Profits Levy, based on current market forecasts.

Today the Government has also published the terms of reference for the oil and gas fiscal regime review that was announced at the Autumn Statement. The review will focus on how the tax regime can support the country's energy security and our net-zero commitments, while ensuring the country retains a fair return in exchange for the use of its resources when responding to any future price shocks.

GOV.UK
http://www.gov.uk/

12 June 2023

FERC Order Delays Capacity Auction to Allow for Consideration of Resource Adequacy Reform

The Federal Energy Regulatory Commission issued an order June 9 accepting PJM's proposal to revise upcoming Base Residual and Incremental Auction schedules for the 2025/2026 through 2028/2029 Delivery Years.

This action reschedules the June 14, 2023, capacity auction until June 2024 and realigns subsequent auctions every six months after that through May 2026, in accordance with a revised schedule to be submitted to FERC by June 26.

FERC's order (PDF) postpones capacity auctions beginning with the 2025/2026 Delivery Year through the 2028/2029 Delivery Year, which will first allow for Commission consideration of anticipated capacity market enhancements that is expected to be filed by October 1, 2023. PJM and stakeholders are currently working toward crafting that package of proposals to improve resource adequacy through the accelerated Critical Issue Fast Path process.

The capacity market reforms being fast tracked in the stakeholder process are designed to proactively address potential reliability concerns identified in "Energy Transition in PJM: Resource Retirements, Replacements & Risks." Learn more about how PJM is working to ensure a reliable energy transition, and offer solutions to reliability challenges through research, analysis and collaboration across government and industry.

PJM
http://insidelines.pjm.com/

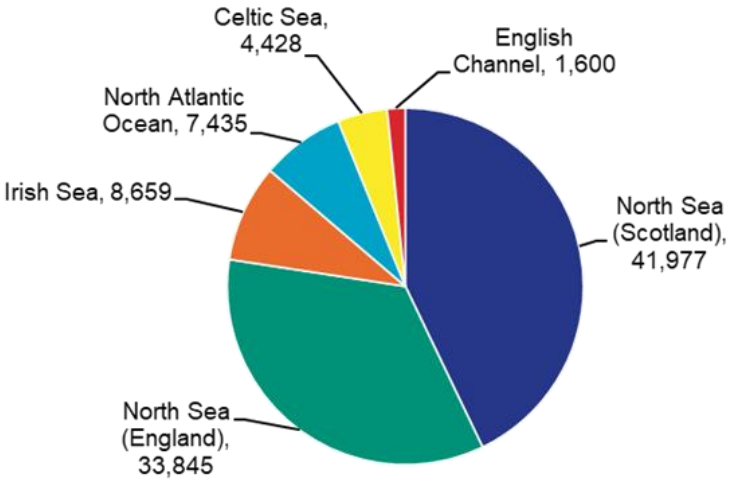
12 June 2023

UK Offshore Wind Pipeline Now at 98 GW, Second Only to China

The UK's pipeline of offshore wind projects has reached 97,944 MW, up from 91,287 MW a year ago, while the global pipeline topped 1.23 TW, an increase of nearly 400 GW in the last year, according to RenewableUK's latest EnergyPulse market intelligence data report. The pipeline includes projects at every stage of development, including operational, under construction, consented, or planned.

The UK total pipeline was second globally at 98 GW, second only to China with 157 GW, followed by the USA in third place with 82 GW, Sweden is fourth with 75 MW, and Brazil fifth with 63 GW. ''These latest Energy Pulse figures show that both the UK and global offshore wind pipeline is continuing to grow at pace, with new projects coming forward on a massive scale," said Dan McGrail, RenewableUK's CEO.

By the end of 2020, the UK was leading the world in operational offshore wind capacity, with 10.4 GW compared to the 7.7 GW of China. 2021 saw China not only surpassing the UK but reaching more than double its capacity, with 16.9 GW going operational in a single year, according to the press release. After installing 5 GW since the end of 2021, China currently accounts for 48 per cent of global operational capacity, the report outlines.



The UK raised its 2030 offshore wind target to 50 GW last year and the government has also decided to accelerate the permitting processes to achieve the new goal. At the beginning of this year, Ofgem approved the strategic electricity transmission reinforcements required to deliver the increased target.

OffshoreWind.biz
http://www.offshorewind.biz/

14 June 2023

Australia: Hazelwood becomes first coal plant to transition to big battery

The first big battery to be built in Australia at the site of a former coal generator – the Hazelwood big battery in Victoria – was officially commissioned on Wednesday in what is being hailed as an "historic" moment for the green energy transition in Australia.

The 150MW, one hour Hazelwood battery is located at the site of what was once the country's dirtiest coal generator, a 1600MW giant that was shut down in early 2017, controversially with little notice. It was a move that set in train a period of high power prices and political outrage. But it also accelerated efforts to build new wind, solar and storage.

The Hazelwood battery energy storate system – which began testing on the grid in April – is majority owned by French energy company Engie, the owner of the former Halzewood coal plant, and 30 per cent by the newly formed Macquarie Group battery spinoff, Eku Energy. Hazelwood might be the first big battery to be built on the site of a former or existing coal generator, but is by no means the last. Big batteries are and will be built at the sites of the Kogan Creek, Stanwell, Swanbank, and Tarong plants in Queensland, and at the sites of the Liddell, Eraring and Mt Piper coal plants in NSW, along with Loy Yang in Victoria and in Collie in Western Australia.

The reason is pretty clear. Coal fired generators are getting old and less reliable and less able to cope with the changing dynamics of a grid driven by a large uptake of wind and solar. But coal plants may be shutting down but they leave infrastructure – switchyards, substations and power lines – that make it easier and cheaper for big batteries to connect to the grid. And while the batteries themselves do not have the raw capacity of the coal plants they are replacing, they do have the flexibility to respond to variations in wind and solar, and they delight in the price volatility – charging at times of low or even negative prices, and discharging when demand in high.

Victoria has a 95 per cent renewable energy target by 2035, which will require significant amounts of new wind, solar and storage to replace the three big coal generators

in the Latrobe Valley that will retire by then – Yallourn in 2028, and Loy Yang A and Loy Yang B in the early 2030s. Hazelwood is the first of many batteries planned by Eku Energy, which is Macquarie Group's newly launched battery storage specialist, and is now also partly owned by Canada's British Columbia Investment Management. Eku is also building the 250MW/500MWh Big Canberra battery in the ACT, and is teaming up with Shell for the 200MW/400MWh Rangebank battery near Melbourne. It has other un-named projects around Australia.

Daniel Burrows, the chief investment officer and head of Asia Pacific for Eku Energy said it is the biggest battery to be built in Australia with private finance, meaning without any government support or contracts, and is a significant event in the transition to green energy. The Hazelwood battery is likely to focus on grid services such as frequency control and the newly created very fast frequency market, which is why it has only one hour storage in its first stage. It will likely add more hours of storage as the market develops for time shifting the output of wind and solar. The Hazelwood battery uses technology supplied by Fluence, and is the first in Australia to deploy its Gridstack energy storage product and its Fluence Mosaic bidding software.

Renew Economy
http://reneweconomy.com.au/