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1 November 2018

No legal barriers to cross-border electricity trading in no-deal Brexit scenario

National Grid has given assurances there will be no legal barriers to continued cross-border electricity trading in the case of a no-deal Brexit. However, the company warned recent changes to day-ahead trading arrangements will have to be rolled back if the UK leaves the EU without a withdrawal agreement. Planned reforms to intraday trading arrangements will also need to be scrapped.

Speaking at a media briefing at the UK converter station for the BritNed interconnector to the Netherlands, National Grid interconnectors regulation manager Mark Duffield, said: “We’ve done quite a lot of internal analysis. We’ve also commissioned external opinions from a couple of law firms.

“They’ve been, and we’ve been and actually the government has been quite clear that there isn’t any kind of legal right or obligation that exists for interconnectors to have to be switched off.”

He continued: “At the highest level, we’re linking two national markets and those national markets will still exist as they currently do in their own right. There’ll still be a Dutch power market. There’ll still be a UK power market post-Brexit. They will still operate in their own national ways.

“The interconnector will still have a connection agreement in the UK under a UK framework. It will still have a connection agreement in the Netherlands under a Dutch framework. We’ll still have the right to import or export under those physical connection agreements.”

“The key thing is how we monetise that link,” he added. “We’ve got the physical right to flow between two nations. It’s making sure that the commercial arrangements still work and still allow people who want to flow to buy power in one market, sell it into another market and then secure the interconnected capacity to balance off that position”.

Duffield said the main issue in this regard is the day-ahead trading of interconnector capacity.

Since the coupling of day-ahead power markets in north west Europe in 2014, interconnector capacity in the region has been traded “implicitly” through exchanges.

Exchanges use the available capacity to minimise the price differentials between national markets. Operators are then paid for flows on the basis of the remaining spreads.

Duffield said interconnectors to the UK will be unable to continue operating under these arrangements if there is a no-deal Brexit. Day-ahead capacity will instead need to be bought and sold “explicitly”, meaning market participants will once again be responsible for procuring enough capacity to cover their positions.

Forward and intraday capacity is still traded explicitly via the Damas platform. However, intraday power markets in Europe are currently in the process of being coupled as part of the Cross-Border Intraday (XBID) project. The markets of 14 European countries were joined up on 12 June 2018 to enable the implicit trading of interconnector capacity. The UK’s intraday power market is also due to be integrated into the bloc in 2019.

Duffield said the reforms will have to be discarded if the UK leaves the EU without an agreement on their future relationship. He said the system operator at National Grid has already delayed implementation to avoid any potentially unnecessary disruption.



The coupling of day-ahead and intraday power markets are both part of the ongoing development of the EU's internal energy market.

The 1GW BritNed interconnector is owned and operated by a joint venture between the Dutch transmission system operator TenneT and National Grid.

National Grid also owns and operates the 2GW IFA link through a joint venture with the French transmission system operator RTE. Alongside various European partners, the company is building or developing four further interconnectors to Belgium, Norway, France and Denmark with a combined capacity of 4.8GW.

Utility Week
<http://www.utilityweek.co.uk>

2 November 2018

Tanzania awards construction contract for 2.1 GW hydropower project

The Tanzanian government has awarded a design and construction contract to The Arab Contractors Company for the 2,100-MW Rufiji dam and the associated power plant in Stiegler's Gorge, Tanzania. The contract will be implemented by a joint venture (JV) of the Arab Contractors Company and the Egyptian state-run utility Elsewedy Electric Company. Neither the project cost nor the amount of the contract were disclosed.

Once completed, the plant is set to deliver at least 5,920 GWh/year. The project is controversial insofar as it would be located Rufiji River in the Selous Game Reserve, a World Heritage site renowned for its animal populations. In May 2018, the government federal budget proposal contained an allocation of US\$307m for the construction of the facility, a sum which accounts for 40% of the domestic 2018-2019 budget.

Enerdata
<http://www.enerdata.net>

2 November 2018

ACWA power signs PPA for 2.3GW gas-fired combined cycle plant in Egypt

A consortium led by ACWA Power has signed a power purchasing agreement (PPA) with the Egyptian Electricity Transmission Company (EETC) for a 2.3GW gas-fired combined cycle plant.

The PPA signed by the ACWA Power consortium is under a build-own-operate framework with a term of 25 years.

The gas-fired combined cycle plant, which will be built with an investment of about \$2.3bn, will be located in Luxor, Egypt.

It is expected to begin the first phase operation in summer 2022 and the full commercial operation in summer 2023.

The combined cycle power plant will play a key role in meeting Egypt's increasing demand for electricity over the next years, particularly in the upper Egypt region.

ACWA Power president & CEO Paddy Padmanathan said: "Signing the PPA today represents a significant step in the development of the project, more importantly it demonstrates the commitment of the Egyptian government to encourage the participation of the private investors in infrastructure projects."



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“We look forward to completing the financing arrangements and commence construction of the power plant to enable us to contribute to the development of the Egyptian power sector by delivering reliable, safe and cost effective electricity.”

The company has partnered with the Egyptian group Hassan Allam for the gas-fired combined cycle power plant project.

COMPELO

<http://www.compelo.com>

4 November 2018

Few Clear Lines in MISO Energy Storage as Transmission Plan

A recent MISO workshop on storage providing transmission services made clear how much the technology is blurring the once clear lines between generation and transmission.

In opening the Oct. 31 workshop, MISO Director of Planning Jeff Webb jokingly nodded to the industry’s choice of “SATA” as shorthand for “storage as a transmission asset,” saying: “Happy Halloween. Welcome to what we’re calling SATAN’s workshop.”

MISO last month detailed how SATA would be evaluated in its annual Transmission Expansion Plan reliability studies compared with traditional solutions. The RTO is proposing that costs for storage projects selected as a preferred transmission solution would be recovered in local transmission zonal rates while avoiding double recovery for the same service in the energy market.

“I don’t expect ... that we’re going to have a lot of energy storage resources that we’re going to consider to be the preferred option,” Webb said. For now, MISO is only proposing a model for storage to act as a transmission reliability solution, solving thermal, voltage or stability issues. Beyond that, Webb said the RTO will have to pick through more complex Tariff issues. He said it will hold off on discussions around evaluating storage as economic transmission, competitive storage projects and how regional cost sharing for high-voltage transmission projects applies to storage.

The Interconnection Question

MISO has laid out potential paths for interconnecting SATA, including only requiring the MTEP process — not the interconnection queue — for transmission-only assets. An interconnection queue requirement would kick in if a storage owner decides to begin offering market services.

Alternatively, MISO could require entering the interconnection queue for all SATA, even for assets that don’t plan on participating in the energy market, Webb said. Some stakeholders also contend that SATA providing some market services should not be subject to a queue requirement unless it plans to offer capacity.

For a storage asset that has completed the interconnection queue, MISO has proposed that the owner could decide to provide market services when the RTO doesn’t need transmission services. Webb said it’s “you’re a wire unless we say you’re not” philosophy, similar to CAISO’s approach. MISO must also determine how registration should differ between transmission and generation storage assets.

“There seems to be a fair amount of passion around these issues, particularly around interconnection issues,” Webb said. “There are those that say if you’re going to treat it as a wire, treat it as a wire. Don’t treat it the way it acts; treat it the way it’s



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categorized.” Webb said that if storage-as-wires is required to enter the interconnection queue, it may have to compete for scarce transmission capacity with other proposed generation, potentially disadvantaging other generators.

He also noted that the approximately three-year backlog in the queue might hinder the ability for storage resources to go in service more quickly than traditional transmission lines. He said MISO could also add steps to the MTEP process that consider the potential impact of SATA on queued generation. Webb said MTEP studies could capture even the benefits of energy withdrawals to potential generation.

“That unloading of the line will probably be beneficial for generations seeking to load up that line,” Webb said. “Part of the problem with getting your head around these devices ... is optimal location on the system.”

MISO has said that if storage would “negatively impact potentially interconnecting generation in the area, it is not a good MTEP solution.”

But Customized Energy Solutions’ David Sapper said that statement could use more clarity. “That sounds good on a bumper sticker, but we don’t know what ‘negatively’ means. We don’t know what ‘potentially’ means. We don’t know what ‘area’ means,” he said.

Webb said MISO will offer more detail and that it is more focused on finding the grid locations that would benefit most from SATA characteristics.

CleanGrid Alliance’s Rhonda Peters said the queue should be required even for transmission-only storage, unless MISO can “clearly demonstrate” that the storage projects would “never inject during times of congestion.”

Great River Energy’s Angela Maiko said MISO should evaluate both charging and discharging scenarios as part of MTEP’s no-harm evaluations, to find the “worst-case scenario.”

Webb said MISO should also compare the lifespan of storage devices against lines, evaluating a battery’s possible 10-year lifespan with the average 40-year lifespan of traditional transmission.

But stakeholders also said MISO might consider the evolving grid and the risk that traditional transmission may well become a stranded asset as the energy landscape changes.

Market Control?

Webb said MISO is still contemplating whether it should adopt control of SATA through market commitment and dispatch because storage injects and withdraws energy, unlike traditional wires. He said the extra control might be needed “primarily for energy balance and orderly control of the asset.”

Entergy’s Yarrow Etheredge, representing MISO’s Transmission Owners sector, said there’s no need for the RTO to create a new process to functionally control SATA, suggesting that current transmission operating procedures can be used.

Steve Swan, MISO senior real-time operations engineer, said transmission owners’ control of storage devices likely won’t affect the short-term energy balance, but an imbalance could develop once 500 MW of SATA interconnects because the RTO won’t have enough regulating reserves. Other stakeholders countered that transmission operators would not operate their assets in a way that would harm the MISO system. Still



others pointed out that today, transmission operators don't have a role that involves injection of energy and that such injections must be accounted for in the energy market.

MISO will continue to discuss the finer points of how storage will function as a reliability transmission asset through early next year. The RTO has not committed to a date for when it will release a draft proposal.

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

5 November 2018

PG&E defends planned outages as 'last resort' tool to prevent wildfires

Pacific Gas & Electric (PG&E) told the California Public Utilities Commission last week that while its October decision to cut power to 60,000 customers during a three-day windstorm that heightened the potential for wildfires was a "last resort" decision, such actions can also help keep customers and communities safe.

PG&E cut power to customers in the North Bay and in the Sierra Foothills from Oct. 14 to Oct. 17, citing "weather and wildfire-risk conditions." It was the first time the utility used the technique, known as a Public Safety Power Shutoff (PSPS).

Wildfires have become a significant issue for electric utilities, both in terms of safety and liability. State regulators are moving swiftly to review fire mitigation plans ahead of the 2019 wildfire season.

PG&E has incurred more than \$2 billion in costs, net of insurance recoveries, related to wildfires this year and faces billions more in potential liability, putting a premium on efforts to avert such disasters. While the company's October actions drew some complaints, its new report defends the power shutoff as the right decision, though one to be used cautiously.

"Although we were able to leverage and successfully execute the PSPS process with zero safety incidents and no ignitions ... we continue to view PSPS as a tool of last resort among PG&E's overall wildfire mitigation strategy," the utility said. "PG&E views this as an extreme measure that should be taken with great care."

It's impossible to know what would have happened had the lines remained energized. But PG&E's report found 18 instances of wind-related damage during the event, including damaged spans of conductor, insulators, fuses and a transformer. In addition, one pole was damaged.

All told, complaints were relatively low: 17 residential customers.

There were more claims filed with the utility, including more than two dozen for business interruptions and economic impacts, 17 for property damage and 102 for food loss. According to PG&E, however, "because of the safety-related nature of PSPS events, customers will not be reimbursed for associated losses."

PG&E "is in the process of making both short- and longer-term improvements for any future PSPS events," the utility said in an emailed statement. Among them are:

- ✓ Notifying customers between 8 a.m. and 9 p.m. of possible upcoming de-energization,
- ✓ Reducing multiple notifications (especially for multi-premise commercial customers),



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- ✓ Providing county offices of emergency services with more detailed information about affected customers, and
- ✓ Notifying communities of the estimated time of restoration more frequently.

PG&E, like all California utilities, wants to mitigate fire risks. The utility was hit particularly hard in the last season: The state's fire management agency has said electric equipment owned by PG&E caused 12 wildfires that killed 18 people and burned hundreds of square miles.

PG&E is not alone, however. Southern California Edison recently informed federal regulators that its equipment may have sparked a blaze last year that led to two deaths, and which may have ultimately created conditions for a subsequent mudslide that killed 21 people.

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

5 November 2018

ScottishPower launches UK's first end-to-end electric vehicle package that's 100% green

Following its announcement it would become the first large energy company in the UK to produce 100% green electricity, ScottishPower today revealed it would be prioritising the UK's switch to cleaner greener transport by unveiling the UK's first end-to-end package electric vehicle ownership.

Keith Anderson, ScottishPower CEO, said, "We have moved on from fossil fuels to concentrate on clean renewables and today we announce the UK's first end to end electric vehicle package that is 100% green. After removing carbon from how we generate electricity we believe the decarbonisation of the UK's transport system has to be next.

"This means industry and Government working together to build the infrastructure so we can charge electric vehicles as well as building clean and cheap renewables to bring down the cost of motoring.

"The UK needs to decarbonise transport faster and we have to make the switch to electric vehicles simpler."

In another UK-first, ScottishPower has agreed an unique link-up with the major car retailer Arnold Clark allowing buyers to purchase or lease an EV of their choice, book a home charging point installation and sign up to an exclusive 100% renewable electricity tariff as part of the same package.

As part of the same easy process, customers will receive the UK's smallest fast charging point as well as having access to the ScottishPower App to facilitate smart charging. This will ultimately allow vehicle charging to be remotely scheduled via a smart phone to start/stop charging at a time that suits day or night, allowing electric vehicle owners to take advantage of cheaper unit rates at off peak times. No other utility in the market currently offers users this comprehensive app experience.

This simple solution is launched as new research published today shows that the number of adults thinking about buying an electric vehicle will shoot up dramatically in the next three years. A YouGov poll predicts that 1 in 5 adults who don't currently own an electric vehicle, or aren't currently in the process of buying one, will be considering either



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the purchase or lease of an electric vehicle by October 2021 – a much faster rate of change than previously predicted, with only 2% of British adults owning an electric vehicle at present.

The survey of around 2,000 adults, commissioned by ScottishPower, found a third of those who don't currently own an electric vehicle, would be more likely to consider purchasing one if the manufacturers guaranteed that their power would come from 100% renewable sources.

ScottishPower
<http://www.scottishpower.com>

8 November 2018

UK nuclear power station plans scrapped as Toshiba pulls out

Plans for a new nuclear power station in Cumbria have been scrapped after the Japanese conglomerate Toshiba announced it was winding up the UK unit behind the project. Toshiba said it would take a 18.8bn Japanese yen (£125m) hit from closing its NuGeneration subsidiary, which had already been cut to a skeleton staff, after it failed to find a buyer for the scheme.

The decision represents a major blow to the government's ambitions for new nuclear and leaves a huge hole in energy policy. The plant would have provided about 7% of UK electricity.

"This is a huge disappointment and a crushing blow to hopes of a revival of the UK nuclear energy industry," said Tim Yeo, the chair of pro-nuclear lobby group New Nuclear Watch Institute and a former Tory MP.

Greenpeace UK's executive director, John Sauven, said: "The end of the Moorside plan represents a failure of the government's nuclear gamble."

After a board meeting of Toshiba on Thursday, the company said it was winding up NuGeneration because of its inability to find a buyer and the ongoing costs it was incurring. The firm has already spent more than £400m on the project.

"Toshiba recognises that the economically rational decision is to withdraw from the UK nuclear power plant construction project, and has resolved to take steps to wind-up NuGen," the firm said in a statement.

The plant first ran into trouble when Toshiba's US nuclear unit, Westinghouse, was declared bankrupt last year, leading it to search for a buyer to take the scheme. Toshiba also said it would no longer take forward new nuclear projects overseas.

South Korean energy firm Kepco initially appeared to ride to the rescue, but despite talks with the UK government it later rowed back due to a change of leadership at Kepco and new approach to financing nuclear power in the UK.

Some industry watchers said the collapse of the scheme should be seen as an opportunity rather than a risk, for the UK to prioritise renewables instead.

Jonathan Marshall, an analyst at the ECIU thinktank, said: "Shifting away from expensive, complicated technology towards cheaper and easier to build renewables gives the UK the opportunity to build an electricity system that will keep bills for homes and businesses down for years to come."



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The government's infrastructure advisers recently urged ministers to rethink their nuclear plans and focus on renewables instead.

But unions decried the axing of the plant and accused the government of not doing enough to help it succeed.

Justin Bowden, the GMB national secretary, said: "The British government has blood on its hands as the final sad but predictable nail is banged into the coffin of Toshiba's jinxed jaunt into nuclear power."

Labour said the pullout was a result of government indecision and a refusal to step in.

The only new nuclear power station to get the go-ahead so far is EDF Energy's Hinkley Point C in Somerset, which started construction in 2016 and is expected to be operational between 2025 and 2027. As well as EDF, Chinese and Japanese firms hope to build further nuclear plants in the UK.

Once NuGeneration is wound up at the end of January, the Moorside site in Cumbria will be handed back to government body the Nuclear Decommissioning Authority.

The Department for Business, Energy and Industrial Strategy said: "We understand that Toshiba have faced a difficult decision in ending their involvement in new nuclear projects outside of Japan in light of their well-known financial challenges.

"All proposed new nuclear projects in the UK are led by private sector developers and while the government has engaged regularly with the companies involved, this is entirely a commercial decision for Toshiba."

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

8 November 2018

The cost of energy storage has stalled adoption of renewable power, Energy Vault has a solution

Because solar and wind power are now cheaper to produce than energy from fossil fuels, the only obstacle that remains to the mass adoption of renewable power is the amount of money utilities need to spend to store the energy those systems produce.

Right now, storing 100 megawatts of renewable energy (enough to power roughly 600,000 homes) means spending roughly \$65.6 million on massive batteries like the kind made by Tesla, or relying on huge pumped hydro-electric storage projects that essentially create man-made dams where the release of water spins turbines to generate energy (those projects are typically far larger than 100 megawatts).

A new company called Energy Vault, launched from Bill Gross' Idealab incubator in Pasadena, Calif., has developed a technology, based on the principles of pumped hydro storage, that it claims can slash the cost of energy storage to a fraction of the current price and make renewable energy cost-effective all day, every day.

As climate change worries mount, finding a solution that can make renewables even more compelling and cost-effective isn't just a good business — it's a global priority.

Energy Vault's technology consists of a 33-story-high, six-armed crane with booms extending to nearly the length of a football field (about 87 yards). That crane is surrounded by 5,000 huge concrete blocks weighing roughly 35 metric tons altogether (or around



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172,000 pounds). "These would typically be built out near wind farms or solar plants," said Robert Piconi, the chief executive of Energy Vault. "This is not something that you'd drop in the middle of the city."

The cranes are controlled by a software system that manages the movement of the cement blocks to either store the energy generated by solar or wind farms, or discharge that energy onto the power grid.

According to Piconi, each of the company's systems will have 35 megawatt hours of nominal energy capacity and 4 megawatts of peak power capacity. Ramp times occur in as little as a millisecond with 100 percent power achieved in 2.9 seconds.

The systems have roundtrip efficiencies of roughly 90 percent and there's no energy loss, as the technology relies on mechanical energy from incredibly durable materials that have a roughly 30-year lifetime.

And all of this at a price tag of around \$7 million to \$8 million per system, according to Piconi. What makes the system even more sustainable, according to Piconi, is the use of recycled concrete that was only going to be landfilled — instead of new cement construction.

Energy Vault has already set up a demonstration system in Biasca, Switzerland, next to the company's Lugarno headquarters. That demonstration plant likely had a role in the company's ability to sign up a clutch of initial customers, including The Tata Power Company Limited, India's largest integrated power company, to deploy an initial 35 MWh Energy Vault system by 2019.

TechCrunch

<http://www.techcrunch.com>

9 November 2018

RWE freezes development of UK CCGT/storage project at Tilbury

RWE has frozen development of gas-fired generation and battery storage capacity at Tilbury Energy Centre, Essex, the German utility said in an update on its project website.

In August last year RWE took initial planning steps at Tilbury for a 2.5 GW combined cycle gas plant, 300 MW open cycle gas turbine plant and 100 MW of battery storage.

"This decision was made based on current market conditions and project costs. As with any development project, options are continuously evaluated and only progressed if they become economically viable," RWE said.

A formal planning application for the projects was expected in late 2018, with environmental studies taking place through 2017 and early 2018. The old coal/biomass plant site's location to the east of London made it viable, RWE said.

The company said it would "constantly explore options" for how best to develop the Tilbury site, "which remains a good location for future energy options." The site had previously hosted the coal-fired Tilbury B power station, which was converted to biomass before closure in 2013 after 44 years of operation.

S&P Global

<http://www.spglobal.com>



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Storage will replace 3 California gas plants as PG&E nabs approval for world's largest batteries

The California Public Utilities Commission on Thursday approved four energy storage projects for Pacific Gas & Electric (PG&E) to replace retiring gas generators, including two batteries that would be the largest in the world.

The CPUC granted approval for a total of 567.5 MW / 2,270 MWh of storage, including a 300 MW / 1,200 MWh project from Vistra Energy and a 182.5 MW / 730 MWh project from Tesla that the utility would own. Those batteries, once completed, would be the two largest in service.

The CPUC directed PG&E to purchase the storage in January instead of approving new ratepayer-funded contracts for three gas plants in PG&E's service area. Analysts told Utility Dive the cost of the batteries is likely cheaper than continuing to operate the plants.

Utility Dive

<http://www.utilitydive.com>

12 November 2018

Terna with the State Police for the protection of critical infrastructures on the electricity grid

The collaboration for territorial control has been strengthened thanks to a new ad hoc digital platform.

The State Police Director for the Inspection of the Territory Division, Maurizio Vallone, and the Head of Corporate Affairs at Terna, Bernardo Quaranta, today signed an agreement in the presence of the Head of the State Police – General Director of Public Security Franco Gabrielli, the Central Anti-Crime Director of the State Police Vittorio Rizzi, and the Chief Executive Officer and General Manager of Terna Luigi Ferraris, whereby the parties involved undertake to implement synergies to increase the security and protect critical Terna infrastructure. This agreement falls within the scope of the Memorandum of Understanding with the Ministry of the Interior and resulting Agreement between the State Police, Carabinieri Corps and Terna, with the aim of providing higher levels of physical protection for substations and electricity lines.

The project envisages developing and integrating a specifically conceived module within Terna's infrastructure called Energy (NRG) on the Mercurio technology platform for inspecting the territory, which is already being used by the State Police. This will make it possible to promptly send through any geo-localised report of intrusions at critical Terna sites, thus speeding up the Police's response time. The technical aspects of the procedures for realising connections between Terna's video alarm systems and the Police operating centres will be regulated in this manner. Based on dedicated procedures and innovative computer tools from its Security Operations Centre (SOC), Terna will also promote the exchange of data and images with the relevant Police headquarters that are responsible for a territory.

Today's agreement follows on from the cooperation plan already introduced, which aims to protect one of the country's major strategic infrastructures, comprising 72,000 km of high-voltage lines and 873 electrical substations, which every year carry approximately 320 billion kWh of the national electricity requirement.



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“We are highly satisfied with this agreement,” commented Luigi Ferraris, Chief Executive Officer and General Manager of Terna, “which represents an important step forward in the cooperation already initiated some time ago with the State Police. Guaranteeing the utmost level of security on the national transmission grid is our priority. Thanks to this strategic arrangement, activities relating to protecting sensitive infrastructure will improve and become quicker, including those managed by Terna to make them increasingly secure and reliable based on the innovation provided by the protection systems and invaluable technological know-how made available by the Police”.

“Today’s signing represents a contemporary interpretation of the State Police’s role and responsibilities,” Prefect Gabrielli added, “which currently also encompass protecting the strategic infrastructure in our country. Technology allows us to multiply the resources involved and public-private platforms make it possible to elevate quality standards in the services offered”.

Terna
<http://www.terna.it>

13 November 2018

Vietnam plans to open its domestic wholesale power market in 2019

The Vietnamese Ministry of Industry and Trade will launch the full opening of the domestic electricity wholesale market to competition in 2019, following the establishment of a successful year-long pilot period. The Electricity Regulatory Authority of Vietnam (ERAV) will use the remaining time of the trial period to complete training companies in market operations, to improve information technology infrastructure, and to prepare the integration of Electricity of Vietnam (EVN)’s hydropower plants into the market. Renewable energy producers will also be allowed to connect to the national grid.

This wholesale market opening decision fits in the country's long term plan for the electricity sector as mandated in the 2004 Electricity Law. The liberalisation of the Vietnamese power market is moving forward and is taking place in three stages. The power generation market was opened to competition in 2012 and 87 power plants totalling nearly 23 GW have entered the power generation market over the past five years. The second stage of the liberalisation process is the opening of the wholesale market, slated for opening in 2019. The opening of the retail market will be the final stage of the process and will take place later.

Enerdata
<http://www.enerdata.net>