

# THE ESI BULLETIN

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Quarter 4, 2022

## **GLOBAL**

# **The state of Europe's ENERGY CRISIS**

## **Regional**

**Indonesia Signs Deals  
to Accelerate Clean  
Energy Transition**

**India to export green  
energy to Singapore  
from 2025**

## **Local**

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Launches a Voluntary  
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**Singapore, Sarawak to  
cooperate in carbon  
capture storage,  
carbon credits**

# ABOUT

The ESI Bulletin is a **compilation** of news and articles related to electricity supply industry across the globe. It is an initiative by **Single Buyer** to improve our knowledge and awareness on the subject matter. All articles and news are taken from **publicly available resources** and the compilation is made every quarter of the year.



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# The state of Europe's energy crisis

Published 20 Oct 2022



Russia's invasion of Ukraine and the subsequent curtailment of gas flows to Europe has pushed international prices to new highs, with market turbulence expected to continue in 2023, according to the International Energy Agency's (IEA) latest quarterly Gas Market Report. In the US, prices reached their highest summer levels since 2008, the report adds.

The crisis has led to a decline in natural gas consumption across a majority of regions. In OECD Europe, gas demand declined by close to 10% year-on-year in the period from January to August, falling by an estimated 15% in industry due to production cutbacks, according to the report.

## Energy crisis causing 'significant harm to consumers'

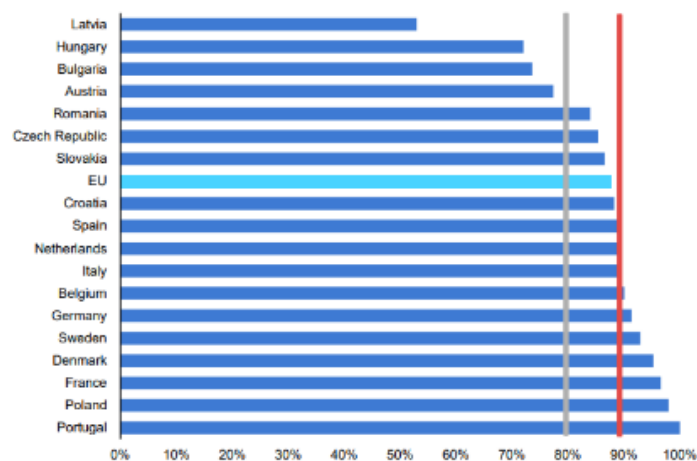
The discovery of leaks in the Nord Stream 1 gas pipe in September has limited the supply of gas to Europe further, and a complete shutdown of Russian pipeline flows to the European Union cannot be ruled out in future, the report adds.

"Russia's invasion of Ukraine and sharp reductions in natural gas supplies to Europe are causing significant harm to consumers, businesses and entire economies – not just in Europe but also in emerging and developing economies," said Keisuke Sadamori, the IEA's Director of Energy Markets and Security. "The outlook for gas markets remains clouded, not least because of Russia's reckless and unpredictable conduct, which has shattered its reputation as a reliable supplier."

Source : [shorturl.at/foEKL](https://shorturl.at/foEKL)

## EU gas inventory levels stood at 87% of their working storage capacity on 26 September 2022

Natural gas inventory levels as a percentage of working storage capacity in EU member states, 26 September 2022



Source: IEA analysis based on GIE (2022), [Aggregated Gas Storage Inventory](#).

IEA. CC BY 4.0.

The European Union has been working collectively to strengthen the security of its supply this year, including "further diversifying supply sources, setting minimum underground storage inventory obligations, and co-ordinating seasonal demand reductions in recent months". This has meant it has managed to fill its gas storage to 90%, the IEA adds.

## Demand for liquefied natural gas is rising fast

Europe's push to mitigate its reliance on Russian gas has increased demand for liquefied natural gas (LNG). The IEA forecasts that Europe's LNG imports will increase by over 60 billion cubic metres (bcm) this year. This has led to record high ship rates and a shortage of ships to transport the fuel, according to Bloomberg. Asia's LNG imports will remain lower than last year for the remainder of 2022, according to the report.

## Behaviour change needed to avoid exacerbating the gas crisis

The IEA says further major adjustments are needed to avoid exacerbating a gas crisis in Europe in the case of lower flows. A 13% demand reduction would be needed in order to keep storage levels above 33% into 2023 if lower flows continue, it says. The analysis indicates that behaviour change alone could reduce gas demand by 15 bcm during the 2022/23 heating season, which equates to over 40% of the required 13% demand reduction.

Looking ahead, the IEA says storage levels will be crucial at the end of the 2022/23 heating season and cold spell preparation should be put in place. The report explains cold spells are particularly challenging for the gas system due to "the deliverability of storage sites declining with the decreasing level of working gas in stock (due to the lower reservoir pressure)."

# Global energy storage market to grow 15-fold by 2030, says BNEF

Published 14 Oct 2022

Energy storage installations are expected to accelerate through the remainder of the decade, reaching 411GW/1194GWh by 2030, 15 times the 27GW/56GWh of storage that had been brought online by the end of 2021.

These are the headlines from the most recent Energy Storage Market Outlook report from analysts BloombergNEF (BNEF), which increases its outlook for storage deployment by 13% by 2030.

The good news for the energy storage sector stems from recent policy changes in the United States and Europe which BNEF has calculated equates to an extra 46GW/145GWh by the end of the decade.

Prime amongst the recent policy shifts was the passage of the Inflation Reduction Act (IRA) in the United States which, despite its name, is primarily a climate and clean energy bill that provides in excess of \$US369 billion in funding for clean technologies.

## The IRA and the REPowerEU

Specifically, BNEF expects the IRA to drive approximately 30GW/111GWh of energy storage through the remainder of the decade. Unfortunately, while the long-term growth is almost guaranteed, ongoing supply chain constraints leave the short-term confused.

Bolstering the long-term growth for the global storage sector was passage of the European Union's REPowerEU plan, part of the EU's efforts to squeeze out from continued reliance on gas from Russia.

All told, between 2022 and 2030, an estimated 387GW/1,143GWh will be

added around the globe, with the United States and China set to remain the two largest markets. Together, the US and China will represent over half of global storage installations by decade's end, though Europe will significantly ramp up its own capacity, spurred as it has been by Russia's invasion of Ukraine. Just as in the US, though, short-term supply chain constraints – stemming from long-tail effects of the global COVID-19 pandemic and the more recent invasion of Ukraine – have pushed storage prices sky-high.

"The energy storage industry is facing growing pains," said Helen Kou, an energy storage associate at BNEF and lead author of the report.

"Yet, despite higher battery system prices, demand is clear. There will be over 1 terawatt-hour of energy capacity by 2030. The largest power markets in the world, like China, the US, India and the EU, have all passed legislation that

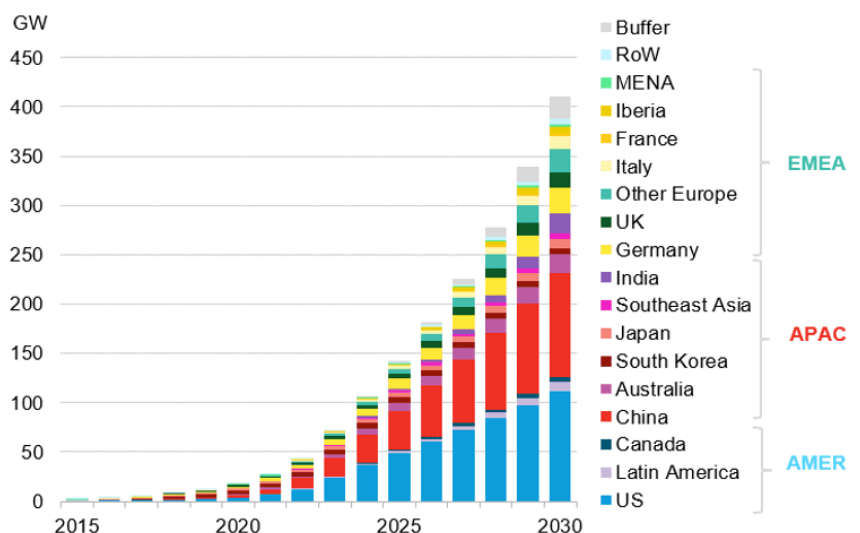
incentivizes energy storage deployments."

## Storage focus on energy shifting

One of the key components of energy storage growth over the remainder of the decade will be so-called energy shifting projects. BNEF expects that around 61% of storage megawatts will be dedicated to energy shifting – advancing or delaying the time of electricity dispatch. Unsurprisingly, then, co-located storage projects with renewable energy projects will become more commonplace, according to BNEF, particularly solar + storage projects.

However, customer-sited batteries will continue to grow through the decade, led by Germany and Australia, who are currently the leaders in this space. BNEF expects that, by 2030, energy storage located in homes and businesses will account for around a quarter of global installations.

Figure 1: Global cumulative energy storage installations, 2015-2030



Source: BloombergNEF. Note: "MENA" refers to the Middle East and North Africa; "RoW" refers to the rest of the world. "Buffer" represents markets and use cases that BNEF is unable to forecast due to lack of visibility.





# Nuclear Power Is Finally Poised to Ramp Up Again in Japan



Published 1 Dec 2022

The Japanese have been hesitant to re-embrace nuclear power following the triple reactor meltdowns at the Fukushima Daiichi plant in 2011, but there are indications that nuclear power could ramp up again in Japan sooner rather than later. Prime Minister Fumio Kishida, who has held his position for a little more than a year, has been a strong advocate for restarting many of the reactors in the island nation's existing fleet, and in August, he also suggested Japan should look at developing next-generation reactors, as soaring energy costs have forced both a policy rethink toward nuclear power and a change in public opinion.

Japan relied heavily on nuclear power before the Fukushima units experienced partial meltdowns. Prior to 2011, about 30% of Japan's electricity was supplied by nuclear power, and the percentage was expected to increase to at least 40% by 2017. That all changed after the disaster. All of Japan's nuclear reactors were taken offline in the months that followed, and units have been slow to return to service.

The first reactor to come back online was Sendai Unit 1 (Figure 1) in August 2015. Unit 2 at the site followed in October that year. Since then, eight additional units have restarted, and another 15 reactors are at various stages in the process of gaining approval to restart, according to the World Nuclear Association (WNA). Two under-construction reactors (Ohma and Shimane 3) have also applied. "In light of the war between Ukraine and Russia, Japan's prime minister announced that the country would accelerate the restart of nine units by winter 2022, and a further seven units by summer 2023," the WNA has reported.

The restart process is not simple, however. Japan's Nuclear Regulation Authority (NRA), which calls itself a "highly independent regulatory body," requires both a safety assessment by its inspectors and a briefing of affected local governments by the operators. The assessment is based on new regulatory requirements formulated by the NRA in July 2013 after public consultation. In its rulemaking, NRA commissioners referenced safety guidelines of the International Atomic Energy Agency, Finland, France, and the U.S., as well as stress test rules and provisional 30-point measures issued in April 2012 by one of the NRA's predecessor agencies.

Apart from local government consent, the NRA review process is split into three parts, but these can be carried out in parallel. Among the items required by the NRA procedures are review of tsunami protection, seismic approval, review of plant facilities, approval of the plant's detailed design, and approval of the plant's operational safety program. Pre-service inspections may be carried out upon receipt of the detailed design, which is reviewed in stage two, but typically take place after all three stages of review have been completed.

The WNA reports that pre-operational inspections—with reference to the engineering work program—took an average of 137 days for the five reactors that had restarted by the end 2016. For the five reactors that have returned to service since then, the inspections have taken more than 200 days on average.

Meanwhile, there's also a movement underway in Japan to extend the operating life of reactors. In December, Yamanaka outlined proposed changes that would allow units to operate

beyond 60 years through additional safety inspections. Under current rules, which were adopted following the Fukushima accident, the operating life of nuclear reactors is capped at 40 years in Japan. However, reactor vessels that pass the NRA's degradation inspections before reaching the 40-year mark can operate for an additional 20 years. The extension is allowed only once, so reactors must be decommissioned when they reach 60 years of age.

Under the new proposal, reactors in operation for 30 years would be required to undergo inspections for signs of degradation. If they pass the tests, the units would be allowed to operate for an additional 10 years. Every decade, the reactors would be required to undergo and pass additional degradation safety tests in order to continue operating. Under this arrangement, they could remain in operation beyond the 60-year limit, as long as they continue passing the tests.

Examples of aging degradation include reactor pressure vessel embrittlement through neutron exposure, corrosion of the outer containment vessel, and concrete strength deterioration. The safety risks associated with aging degradation increase over time.

Four Japanese reactors—Mihama 3, Takahama 1 and 2, and Tokai 2—have been in operation for more than 40 years. All of them have reportedly received approval for the 20-year extensions, but only one of them, Kansai Electric Power Co.'s Mihama 3 in Fukui Prefecture, has resumed operations. Seven additional operable reactors in Japan will reach the 40-year threshold within the next five years.



# Indonesia Signs Deals to Accelerate Clean Energy Transition

Published 16 Nov 2022

**The agreements were an important step for the country, a major exporter of coal that has abundant green energy potential.**

Indonesia signed deals with international lenders and major nations on Tuesday that will bring billions of dollars in funding to help the country increase its use of renewable energy and reduce its reliance on coal.

The \$20 billion agreement was announced on the sidelines of the Group of 20 summit in Bali, Indonesia. Called a Just Energy Transition Partnership, or JETP, it is meant to help developing countries reduce their reliance on fossil fuels such as coal and gas that cause carbon emissions that contribute to climate change.

It's an important step for Indonesia, a major exporter of coal that has abundant potential for developing cleaner energy.

"In today's world, climate change is a global emergency," said Luhut Binsar Pandjaitan, Indonesia's coordinating minister of maritime and investment affairs. "Indonesia has an important role to play in avoiding the worst impacts of climate change on our countries, our people, and the environment."

Participating governments – the United States, Japan, Canada, Denmark, the European Union, France, Germany, Italy, Norway, and the United Kingdom – are to provide a total of about \$10 billion in concessional lending, grants and equity. Major private global financial institutions that earlier pledged to support climate investment will arrange the rest, U.S. officials said.

As part of the agreement, Indonesia has pledged to ensure emissions from the country's power sector start falling by 2030. The country has stepped up its goal of making the entire power generation sector emissions-free by 2050.

"Indonesia's energy transition plans will send a very strong signal not just in the Asia-Pacific but also the world that Indonesia is a global leader in the just and affordable transition from fossil fuels to clean energy," said Indonesian finance minister Sri Mulyani Indrawati.

U.S. climate envoy John Kerry said the United States and Indonesia have been laying the groundwork for the deal from the first days of President Joe Biden's administration.

"We've wrestled with countless issues to arrive at today's groundbreaking announcement," Kerry said. The agreement "can truly transform Indonesia's power sector from coal to renewables and support significant economic growth," he said.

South Africa was the first country to sign a JETP deal, during last year's climate conference, COP26, in Glasgow. It calls for major countries in the Group of Seven to provide \$8.5 billion in concessional loans and grants to help the coal-rich country scale back its use of fossil fuels.

Citing lessons learned from the South Africa accord, U.S. officials said the package with Indonesia has firm, short timelines, will start soon and keep stakeholders looped in.

The Indonesian deal is the biggest so far, reflecting the nation's heavy reliance on

coal. Indonesia is the world's third-largest producer of coal and the average age of its coal power plants is only 12 or 13 years old. Such plants can remain operational for up to 45 years.

The effort to form JETPs reflects a recognition that developing countries are disproportionately suffering the consequences of climate change, said Swati D'Souza, a New Delhi-based energy analyst with the Institute for Energy, Economics and Financial Analysis.

"Therefore, we need finance and money from the Global North to help with Global South's transition to clean energy," D'Souza said. "JETPs are a method to provide the money required."

Other coal-rich developing economies are watching how the deals with South Africa and Indonesia progress. India, the world's third-biggest emitter of planet-warming gases, Vietnam, Senegal, and the Philippines all are considering signing similar deals.

Putra Adhiguna, an IEEFA energy analyst in Indonesia's capital, Jakarta, noted that a transition to alternative energy sources could be "low hanging fruit" for many places in the archipelago of more than 17,000 islands.

However, since Indonesia already has excess power generating capacity, there's less incentive to switch to cleaner sources. "This is another issue energy transition deals need to address," Putra said.

The bigger worry is that such arrangements may be too little, too late.





# Thailand to rely on coal for power longer amid record gas prices

Published 26 Oct 2022

Thailand expects to burn coal for power for longer after it extended the lifespans of some plants to cope with record-high natural gas prices, the assistant secretary general of its Energy Regulatory Commission (ERC) said on Wednesday (Oct 26).

The country has intensified its search for alternative energy sources, ranging from coal to renewables, to cut liquefied natural gas (LNG) imports amid a surge in prices of the super-chilled fuel, Prasit Siritiprussamee told Reuters on the sidelines of the Singapore International Energy Week.

"The price of LNG is increasing rapidly and we are trying to cope with this by finding (other) options," he said.

Global gas prices rose to records this year as a result of Russia's gas supply cuts to Europe amid the Ukraine conflict. The region has imported record volumes of LNG which has eased some of their supply concerns but Asian buyers come under enormous strain as regional spot prices surged to a record while shipments were pulled to Europe, where prices were even higher.

The price volatility coincided with a rebound in Thailand's electricity demand which hit a new peak in April as industries ramped up post-COVID, hitting consumers hard. Thailand, a net oil and gas importer and Southeast Asia's No. 2 economy, last year relied on imports for nearly 75 per cent of its electricity, crude oil, coal and natural gas needs. Natural gas generates 55 per cent of Thailand's electricity and of the gas consumed, about 30 per cent is LNG, Prasit said.

Among the measures to reduce its gas usage, Thailand is extending the lifespan of some of its coal-fired power plants for one or two years, shelving earlier plans to retire the units, Prasit said. The government is also purchasing excess electricity for the grid from local renewable power plants, he added.

Thailand, which already imports hydropower from neighbouring Laos, could seek more supplies, he added.

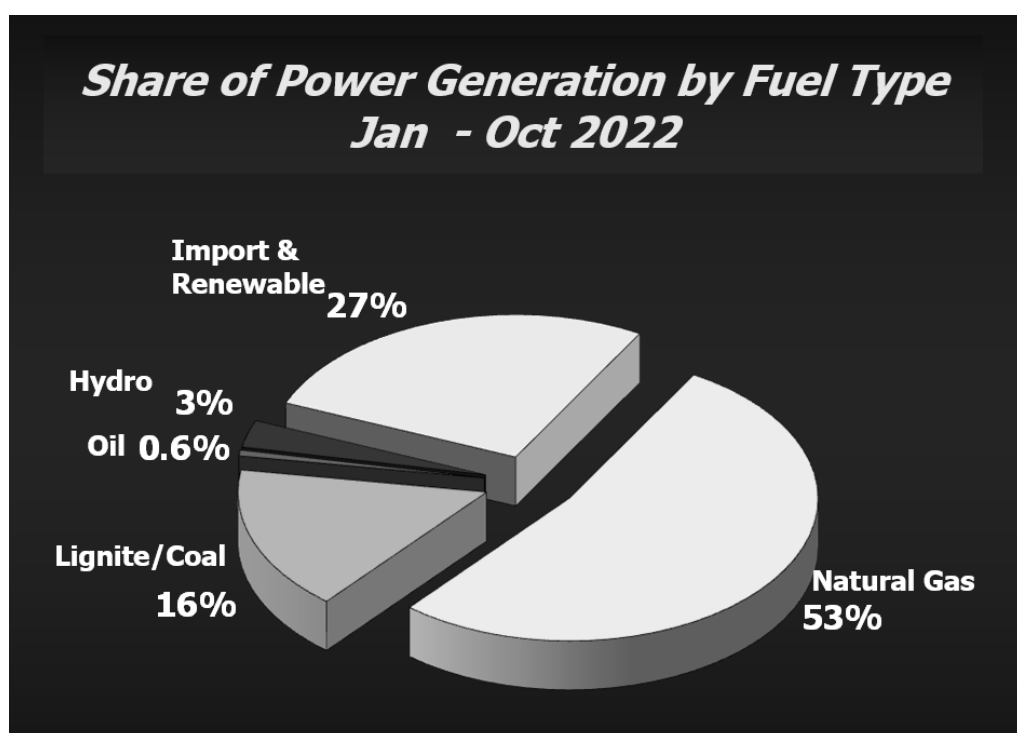
The country's ERC Secretary-General Komkrit Tantravanich told Reuters in March that some of Thailand's power plants will switch to using oil to generate electricity to lower gas demand, while the government was extending the closure of a coal power plant and biomass contracts.

Energy security and keeping electricity prices at affordable levels are Thailand's priorities, Prasit said.

"We try to optimise prices to be as low as possible. Even if we have to use fuel oil or diesel oil, if it's cheaper than the LNG, then we must do it," he said.

To reduce spot LNG purchases, Thailand has been looking to secure supplies in medium- to long-term contracts, but they were "quite difficult" to find and negotiate, Prasit said.

"At this moment, people can't forecast what will happen and how long the high-price situation (will last)," he added. "The priority is to find alternative options and reduce the use of gas."



Thailand electricity generation mix

# India to export green energy to Singapore from 2025

**Keppel Corporation**



Published 26 October 2022

India will for the first-time export green energy from 2025, with the first shipments going to a Singapore power plant under an MoU signed by an India based dispatchable renewables company and Singapore's energy business here on Tuesday.

The MoU to explore opportunities in green hydrogen potential in India will see Greenko group and Singapore's Keppel Infrastructure working towards a 250,000 tonne per annum contract to be supplied to Keppel's new 600MW power plant in Singapore.

Further, the contract for the export of green ammonia would also expand to cover bunker fuel through the Keppel network in Singapore's network of bunker fuel supplies to ships, said Mahesh Kolli, President and Joint Managing Director of Greenko Group.

Likewise, Greenko's wide range of investments includes USD 5 billion in the storage of carbon-free green hydrogen energy across India, said Kolli.

"India will be exporting energy for the first time from 2025," said Kolli, after Greenko and Keppel Infrastructure signed the MoU on the sidelines of the Singapore International Energy Week 2022.

Kolli said Greenko would participate in green hydrogen exports from 2025-26 onwards, estimating global demand of 50 million tonnes a year globally, including 15 million tonnes replacing bunkers fuels in ships. The green ammonia will fuel newly built ships, including a fleet ordered by the international shipping group Maersk.

"This is the first time we are making lowest cost carbon-free energy which means this energy is of high quality," he stressed.

Last month, Greenko signed a deal to supply one million tonnes a year of green ammonia supply to South Korean steel and power producer, Posco. The delivery is also expected from 2025-26 onwards.

In total, Greenko is planning to produce close to three million tonnes of green ammonia, which will also cover domestic demand, he said.

Greenko's green ammonia will help reduce India's imports of about six million tonnes of ammonia and urea, he added.

The Greenko-Keppel MoU was virtually witnessed by Petroleum and Natural Gas Minister Hardeep Singh Puri and Singapore's Trade and Industry Minister Gan Kim Yong.

Welcoming the MoU, Puri said, "Over the last few years, India has developed unparalleled strength in renewable paths, which acts as a catalyst in producing green hydrogen at competitive prices.

"I think the manner in which we have brought down the cost of solar power and I think is something that as appreciation and being applauded, applied throughout the world equally."

Sources : <https://indiashippingnews.com/india-to-export-green-energy-to-singapore-from-2025/>

<https://www.theedgemarkets.com/article/singapore-sarawak-cooperate-carbon-capture-storage-carbon-credits>

## Singapore, Sarawak to cooperate in carbon capture storage, carbon credits



Published 25 October 2022

Singapore and Sarawak announced that they will cooperate on mutual interests in carbon capture and storage as well as carbon credits.

A joint workgroup will be set up for policy exchanges, and to identify potential projects for implementation, according to Singapore's Ministry of Trade and Industry.

"Singapore and Sarawak enjoy long-standing relations," said Tan in a statement issued here.

"The workgroup reaffirms our commitment to collaborating with like-minded partners in areas of mutual interest, such as carbon capture and storage and carbon credits. International cooperation is critical to promote regional and global climate action to achieve the Paris Agreement goals," he said.

"We need to rethink our approach to development in the context of a rapidly warming and increasingly interconnected planet. This international collaboration is a ground-breaking step going forward, and I look forward to successful cooperation," he added.

In the same statement, the ministry said Singapore and Sarawak share a long-standing relationship, and "our trade and investment have grown over the years in areas such as agriculture".

"Climate change and sustainability are a new area of cooperation, and the workgroup on carbon capture and storage and carbon credits is a reflection of that," said the ministry.



# Bursa Malaysia Launches a Voluntary Carbon Market Exchange

## First Shariah Compliant Carbon Exchange

Bursa Malaysia Berhad announced the launch of Malaysia's pioneer voluntary carbon market with the introduction of the Bursa Carbon Exchange ("BCX" or "Carbon Exchange") at an event officiated by the Minister of Natural Resources, Environment & Climate Change, YB Tuan Nik Nazmi Nik Ahmad. The BCX is the first Shariah-compliant carbon exchange in the world, diversifying the product universe for ESG and Shariah compliant products.

The objective of the Bursa Carbon Exchange is to enable companies to trade voluntary carbon credits from climate-friendly projects and solutions, with the aim to offset their emission footprint and meet climate goals. The BCX will support Malaysia's ambition to achieve its target of net zero greenhouse gas ("GHG") emissions by 2050, while accelerating Corporate Malaysia's pivot towards a green economy and meeting global demands for a sustainable supply chain.

The BCX Rules, auction terms and conditions, online module and operational processes have been finalised. Projects permitted to be traded include Nature-based solutions or Technology-based solutions, which result in avoidance, reduction or removal of GHG emissions. The first trades will be conducted via an auction

which will facilitate price discovery for the new standardised carbon credit products listed on BCX. The first trade via auction is expected to commence in March 2023.

Interested project developers and project proponents are invited to submit their interest to supply carbon credits for the auction, as well as for the Bursa Carbon Exchange. Similarly, corporate buyers who would like to participate in the auction and purchase carbon credits, are encouraged to register their interest by downloading the onboarding forms at <https://bcx.bursamalaysia.com> or email [bcx@bursamalaysia.com](mailto:bcx@bursamalaysia.com).

**Another incentive for companies to go for green power – Corporate Green Power Programme (CGPP)**

1 November 2022

The Government has introduced the Corporate Green Power Programme (CGPP) to encourage more companies in the country to use green electricity by installing solar photovoltaic (PV) systems through the Virtual Power Purchase Agreement (VPPA) mechanism with a total quota of 600MW.

Under the CGPP programme, eligible companies could enter into a Corporate Green Energy Agreement (*Perjanjian Tenaga Hijau Korporat*, PTHK) with solar energy generators for the sale and purchase of Renewable Energy (RBE) virtually through mutually agreed terms and conditions.

PTHK is a two-way financial hedge agreement detailing a pricing structure agreed between a corporate entity and a solar power generator based on the value or financial benefits available through the reduction of greenhouse gas emissions derived from solar power generation.

The signing of a financial hedge contract between a corporate company and a solar power generator will enable the generator to participate in the electricity market operated by a Single Buyer through the New Enhanced Dispatch Arrangement mechanism.

The agreement would reduce the risk borne by solar energy generators due to fluctuations in electricity market prices; and enable corporate companies to get a virtual supply of green electricity at a fixed price for a long period.

Companies would also obtain a Renewable Energy Certificate (REC) from solar power generators to increase its ESG commitments.



*"The launch of Bursa Carbon Exchange is momentous as it will play a significant role in supporting the nation's, and indeed the world's, voluntary carbon market ecosystem. In addition, leveraging on Malaysia's position as the global Islamic financial marketplace as well as being the world's leading exchange for Islamic fund raising and investment, Bursa Malaysia is the first exchange in the world to receive a Shariah Pronouncement for its Carbon Exchange and the standardised carbon products that the Exchange will offer,"*

**- Tan Sri Abdul Wahid Omar, Chairman of Bursa Malaysia**

*"The launch of the Bursa Carbon Exchange is timely given the growing impact of global warming, and the important role voluntary carbon markets will play to support financing for climate-friendly projects and solutions. Both buyers and suppliers will now be able to transact high-quality carbon credits and use them to offset their existing climate impact alongside their other internal carbon reduction initiatives",*

**- Datuk Muhamad Umar Swift, CEO of Bursa Malaysia**



# Decarbonisation of Malaysia's power sector cheaper than 'business as usual': industry watchers

Published 30 November 2022



***The country's energy transition makes economic sense but will require effective coordination and huge upfront investments, especially from the private sector.***

Malaysia could save as much as US\$250 billion on its cumulative energy system if it aligned its decarbonisation efforts with a 1.5 degrees Celsius scenario, making for a “compelling cost argument”, according to International Renewable Energy Agency (IRENA).

“Malaysia’s switch to renewable energy is actually less costly than business as usual, and that is largely a result of the competitiveness of renewable energy technology,” said IRENA’s programme officer Nicholas Wagner at a panel session at Malaysia’s COP27 pavilion in Sharm El-Sheikh, Egypt recently.

However, achieving these cost savings will require higher upfront investments than the energy sector had previously allocated towards an expansion in renewable energy technologies, he said, citing examples of costly initial infrastructure needed, such as energy storage, electric vehicle charging stations and hydrogen electrolyzers.

Malaysia’s power sector is currently the largest source of greenhouse gas emissions in the country, accounting for about 80% of national carbon emissions. Its economy is also heavily reliant on oil and gas, which accounts for one-fifth of the country’s gross domestic product.

Although more than 90% of electricity in Malaysia continues to be generated from fossil fuels, the government has reiterated its commitment to increase its renewable energy share to 31% by 2025.

“You most certainly need coordination

among all the different government, non-governmental and private sector actors to realise these renewable energy goals,” said Wagner.

IRENA is currently working with Malaysia’s Ministry of Energy and Natural Resources to produce a long-term energy transition outlook and roadmap for Malaysia, which is expected to be released in late January or February 2023.

Malaysia does not need to go it alone in its energy transition efforts, however. “The energy transition that is needed is so substantial that the Asean region also has to coordinate and work together on it,” Wagner said.

**According to IRENA’s estimates, the region will require US\$6-7 trillion of investment in the energy transition, of which Malaysia requires US\$450 billion.**

Among financial actors, multilateral development banks are crucial for financing the energy transition, but they are not able to provide capital that is catalytic enough, said Jay Collins, vice chairman of banking, capital markets and advisory at Citigroup and fellow panelist at COP27. Calls were made at the climate change conference for these banks to be reformed in order to better support climate action in developing countries.

“It is absolutely critical that at the end of that reform, not only do we come out of it with more development bank money, but that that capital takes more risks. If it doesn’t mobilise the private sector, we can’t get to these trillions of

dollars,” said Collins.

Instead of focusing on the “bankability” of projects, Collins urged private financiers to focus on financing project development instead. “We don’t even have enough projects to see if they are bankable or not,” he said.

This view was echoed by Malaysia’s Khazanah Nasional. The sovereign wealth fund’s senior vice president of investment Elaine Ong called on investors and lenders to be more “courageous” in funding more catalytic projects.

“While we can invest through renewables, we also need to create a good enough ecosystem to catalyse newer technology,” said Ong.

Khazanah itself has taken a blended finance approach with multilateral development banks, among other financing models, to fund projects that have the potential to move the needle within Malaysia’s energy sector, she said. One such investment is the fund’s investment in an early-stage Canadian company focused on general fusion technology, which is not yet commercialised.

According to Collins, if the Malaysian government wants to achieve its Nationally Determined Contribution (NDC) and achieve a just energy transition, it must hold talks with the private sector, which he says makes up 60% of the Malaysian economy.

“The private sector doesn’t invest in NDCs, the private sector invests in projects. We need to move to projects,” he said.