JAPAN NRG WEEKLY

MAY 29, 2023

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ANALYSIS

JAPAN HEADS ASIA ZERO EMISSION COMMUNITY TO LEAD ENERGY TRANSITION

To accelerate the energy transition, Japan and others in Asia-Pacific have joined forces to form the Asia Zero Emission Community (AZEC). Taking the lead, Japan has pledged financial support and technological assistance. During recent G7 meetings, Japan emphasized the need to invest in natural gas, hydrogen, and ammonia. But AZEC offers a broad approach to decarbonization.

JAPAN PLAYS CATCH-UP ON CLIMATE TECH AS KISHIDA PUSHES STARTUP INNOVATION

Japan isn't known for its own Silicon Valley or high-profile investors in climate tech. But there are signs the government and big business will support a new startup-focused ecosystem to accelerate R&D in clean energy. For example, a new Mitsubishi fund to support climate tech startups should unlock more interest and money for Japanese ventures and spark innovation.

GLOBAL VIEW

A wrap of top energy news from around the world.

EVENTS SCHEDULE

A selection of events to keep an eye on in 2023

JAPAN NRG WEEKLY

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OFTEN USED ACRONYMS

METI	The Ministry of Energy, Trade and Industry		mmbtu	Million British Thermal Units
MoE	Ministry of Environment		mb/d	Million barrels per day
ANRE	Agency for Natural Resources and Energy		mtoe	Million Tons of Oil Equivalent
NEDO	New Energy and Industrial Technology Development Organization		kWh	Kilowatt hours (electricity generation volume)
TEPCO	Tokyo Electric Power Company		FIT	Feed-in Tariff
KEPCO	Kansai Electric Power Company		FIP	Feed-in Premium
EPCO	Electric Power Company		SAF	Sustainable Aviation Fuel
JCC	Japan Crude Cocktail		NPP	Nuclear power plant
JKM	Japan Korea Market, the Platt's LNG benchmark		JOGMEC	Japan Organization for Metals and Energy Security
CCUS	Carbon Capture, Utilization and Storage			
OCCTO	Organization for Cross-regional Coordination of Transmission Operators			
NRA	Nuclear Regulation Authority			
GX	Green Transformation			

NEWS: ENERGY TRANSITION & POLICY

Top energy expert backs GX Power Bill, calls for more focus on security

(Japan NRG, May 26)

- The Economy, Trade and Industry Committee of the House of Councillors (the Diet's Upper House), summoned three experts to give opinions on the GX Decarbonization Power Supply Bill.
- RITE President Dr. Yamaji Kenji and two others were giving testimonials: Dr. Iwafune Yumiko of Tokyo University who sits in multiple ANRE panels, and Mr. Matsukubo Hajime, secretary-general of anti-nuclear group Citizens Nuclear Information Center and also sits in ANRE panels.
- Dr. Yamaji said:
- 1) He supports the bill as it will enable Japan to realign its strategy to the S+3E (safety, energy security, economic efficiency, environmentally friendly) principles. Japan was too focused on the climate aspect of energy issues and got side tracked. Energy security is more important than ever.
- 2) The FIT system created problems, such as expanding costs on the back of boost in variable renewables that required new investments into transmission networks and placing renewable power stations in far and remote areas. So, a more disciplined approach on the back of community conflicts and used panel disposal problems is a good move.
- 3) The bill recognizes nuclear as a power source that needs to be maximized, clearly states support for next gen nuclear tech, and leaves room for extension of existing nuclear plant life. However, the basic lifetime of a nuclear plant remains 40 years and that extensions are given. He cannot support this as the 40-year lifetime of a power plant is not based on scientific evidence.
- 4) Many countries are falling back to nuclear after the Ukraine invasion. Japan should not be following in their footsteps. Japan recognizes the importance of nuclear energy because it supports the S+3E principles, not because other countries are doing it.
- CONTEXT: *There are two GX bills: the GX Promotion Act that just passed the parliament; and the GX Decarbonization Power Supply Bill, which fosters disciplined growth of renewables, and seeks to find a role for nuclear power in energy supply and security; it has passed the Lower House.*

- TAKEAWAY: Dr. Yamaji is one of the most influential policy voices in the METI expert committee ecosystem, as profiled in our two-part series "Who is Driving Decarbonization Policy in Japan?" in the Dec 7 and Dec 14, 2020 reports. It's no surprise that he supports the GX bills, but his comments on other issues are worth noting. The renewed focus on energy security in particular could steer state policy more in that direction over the coming years.

Japanese companies invest ¥10 billion in British floating NPP company

(Japan NRG, May 23)

- About a dozen companies, including Imabari Shipbuilding and Onomichi Shipbuilding, invested about ¥10 billion in the UK's CORE POWER, a maritime and technology innovation company. This takes the startup's total funding to $100 million.

- CORE POWER works with Bill Gates' TerraPower and two others companies to develop a floating nuclear power plant that uses molten salt fast reactors (MCFRs), a type of small modular reactor (SMR) each with an output of 300 MW.
- The company's plan to launch a demo vessel in 2026; commercialization in 2030-2032. To fund development, an estimated ¥50 billion will be shared among the four companies that also include Southern Company (U.S.) and France's Orano.
- CORE POWER's CEO Mikal Boe told Japan NRG that floating nuclear energy can power green fuel production and power large ships, providing faster speeds and zero emissions. "New Nuclear for maritime is being funded by the industry, for the industry, and not by Silicon Valley or Wall Street, and I think that matters," Boe said.
- CONTEXT: *Compared to land-based plants, floating NPPs are less vulnerable to earthquakes and are cheaper to build. Global demand for floating NPPs is expected to rise; CORE will implement this project in Japan after gaining experience abroad.*

- TAKEAWAY: The Cabinet approved the Basic Policy for GX in February, which calls for development and construction of next-gen nuclear reactors such as SMRs. While the restart of NPPs requires consent from local governments, proponents say that SMR projects can be less controversial and therefore could more readily get approval. Hence, the potential for their widespread adoption is more likely.

Mitsubishi Power to build hydrogen-ready power plant for Singapore

(Company statement, May 24)

- Mitsubishi Power and Jurong Engineering secured an EPC contract for a new 600 MW hydrogen-ready combined cycle power plant (CCPP) in Singapore.
- The project will be led by a Sembcorp Industries subsidiary. The power plant will be operational by 2026, located at Sembcorp's multi-utilities center on Jurong Island.
- Mitsubishi Power will supply the M701JAC gas turbine, an air-cooled version of their J Series gas turbine and other essential equipment. It will also maintain the major equipment of the plant. JEL will handle the construction and Balance of Plant aspects.

- TAKEAWAY Singapore has an ambitious target to generate 50% of its power from hydrogen by 2050, while moving away from natural gas dependency. It partners with local companies Keppel and Sembcorp, along with MHI to develop the necessary infrastructure. Hydrogen is a clean energy source that produces no CO2 when burned, but it presents several challenges related to safety, turbine development, and transportation networks. Singapore is working on regulations and providing support to companies involved in power plant construction and the establishment of hydrogen supply chains. Sembcorp is also exploring an ammonia supply chain using green hydrogen and planning a major hydrogen transport project.

MHI to build medium sized 100% hydrogen-fired gas turbine starting 2025

(Denki Shimbun, May 25)

- By 2025, MHI plans to commercialize 100% hydrogen-fired gas turbines with 30 MW to 50 MW capacity. Production is planned to start in 2025.
- Also, with JERA, MHI plans to develop and produce a 100% ammonia-fired 60 MW gas turbine in Singapore.
- Larger 100% hydrogen fueled gas turbines won't be developed until 2030 due to issues with ensuring hydrogen supply volumes.

- CONTEXT: *The GX Basic Policy calls to develop 100% hydrogen/ ammonia-fired gas turbines in 2026 to 2030, and to invest ¥7 trillion into the technology. In 2030, 3 million tons of hydrogen and ammonia will be used for power generation in Japan, about 1% of the country's power mix.*

Japan Gas Association plans overseas e-methane production hub to export to Japan

(Denki Shimbun, May 26)

- The Japan Gas Association plans to build an e-methane (synthetic methane) production hub overseas and then export the fuel to Japan.
- To reach an e-methane target production cost of ¥120 per normal cubic meter in 2030, and ¥50 per normal cubic meter in 2050, cheap sources of hydrogen are needed. Almost 70% of e-methane's cost is hydrogen. Moreover, if the hydrogen cost is lowered to ¥20 per normal cubic meter (nm3), which is METI's price target, then e-methane's cost will be close to the LNG price before the Ukrainian war.
- However, it's expensive to transport liquefied hydrogen to Japan. So, the Association's plan is to source a large amount of green hydrogen overseas, then produce e-methane at a production hub close to the hydrogen manufacturing site, and finally import e-methane to Japan.

- TAKEAWAY: By 2030, METI plans to replace 1% of total natural gas consumed in Japan with e-methane or biomethane (the purified form of raw biogas that can be used as a natural gas substitute). By 2050, the goal is a 90% reduction. If achieved, then Japan can reduce its natural gas imports by 90%.

Meiji invests ¥940 mln in methanation to reduce CO2 and industrial waste

(Company statement, May 17)

- Meiji will use methanation at its Tokachi Factory in Hokkaido to reduce industrial waste and the CO2 emitted from cheese production. Total investment is ¥940 million.
- The equipment is provided by Kurita Water Industries; it ferments methane using permeate that comes from producing whey protein powder.
- By using a hybrid of methanation and aerobic treatment, Meiji can use methane biogas as energy and reduce electricity consumption for water treatment equipment.

FEED begins at Australian green hydrogen project that includes Marubeni and Iwatani

(Japan NRG and Company statement, May 26)

- Japanese companies, including Marubeni, Iwatani, and Kansai Electric are founding members of a consortium developing Central Queensland hydrogen (CQ-H2), potentially one of Australia's and the world's largest green hydrogen projects; when completed it'll be a big source of energy for Japan.
- On May 25, the consortium announced the Front-End Engineering Design (FEED) study for the project.
- Operations could begin in 2028, with an initial production of 70,000 tons annually, to be scaled up to 260,000 tons by 2031.
- CONTEXT: *Australia's Stanwell Corp leads the consortium. The company said that the FEED study for CQ-H2 is the largest investment in an Australian renewable hydrogen project of its kind to date.*

Successful completion of FEED will bring the project one step closer to a Final Investment Decision (FID) planned for late 2024.

Mitsubishi Shipbuilding delivers ammonia fuel supply system for large marine engines

(Company statement, May 24)

- Mitsubishi Shipbuilding delivered an ammonia fuel supply system to Japan Engine (J-ENG), a marine engine manufacturer.
- This system is designed for large, low-speed two-stroke marine engines and is a major advancement in utilizing ammonia as a clean fuel in the maritime industry.
- At the MHI Research & Innovation Center, J-ENG is doing tests on a large-scale, low-speed two-stroke marine engine using ammonia fuel under various conditions.

Mitsubishi Shipbuilding and Nihon Shipyard to develop vessel to transport LCO2

(Company statement, May 22)

- Mitsubishi Shipbuilding (MS) and Nihon Shipyard (NS) plan to develop a vessel to transport liquefied CO2 (LCO2) across oceans. Completion is expected in 2027.
- MS designs and builds liquefied gas carriers (such as liquefied petroleum gas and LNG carriers). NS has experience in shipbuilding and advanced technology.
- CONTEXT: *NS is also involved in the commercialization of ships fueled by LNG and ammonia. The companies aim to provide the necessary LCO2 carriers to establish a comprehensive CCS value chain.*

Marubeni signs MoU for forest and carbon credit project in Angola

(Company statement, May 22)

- Marubeni ALCAAL ANGOLA IEP inked a MoU for a study on an afforestation and reforestation project in Angola. The goal is to address deforestation in Africa by revitalizing 31,000 hectares of neglected land.
- Marubeni and IEP will set up a carbon credit program that leverages timber utilization to rejuvenate the forest industry and utilizes the forests for carbon absorption.
- CONTEXT: *Marubeni has expertise in plantation projects that span about 130,000 hectares in Indonesia and Australia (with a total project area of 290,000 hectares as of May 2023). Also, the company is active in a reforestation project in the Philippines.*

Osaka Gas, e-mobility platform provider Terra Motors ink alliance

(Japan NRG, May 23)

- Osaka Gas and Terra Motors, a Tokyo-based e-mobility service provider, will build EV charging stations, supply power and offer services using demand response systems. Osaka Gas will also take a minority stake in Terra Motors.
- Osaka Gas, which has about 2 GW generation capacity, will supply the power.

  - CONTEXT: *The govt aims for 150,000 EV charging stations by 2030, up from 20,000 today. The central and some local govts provide subsidies for charging stations.*
- TAKEAWAY: Despite state support, charging station operators struggle to secure long-term loans. Many lenders are unsure of EV's potential since vehicle sales remain slow in Japan despite subsidies. The partnership will boost Terra Motors' business. Osaka Gas, which supplies power to companies through PPAs, will be able to diversify its customer base.

Exeo supplies EV chargers in Singapore

(Company statement, May 22)

- Exeo won an order from Leng Aik Engineering in Singapore to install and make EV chargers in public housing areas that cover places where 80% of locals live. Exeo will provide 987 EV chargers at 314 sites to achieve "EV-Ready Town.".
- Singapore plans to install 60,000 EV chargers by 2030.
- CONTEXT: *Exeo Group was founded in 1951 to connect Japan with electricity wires and telephone lines. Exeo connects urban systems from plants to subways and railways, and deploys 5G and the cloud. Exeo has 37 business offices in Japan with over 16,000 employees. Its total sales in FY2022 were ¥627 billion.*

UCC applied for a patent to roast coffee with hydrogen

(Company statement, May 22)

- Ueshima Coffee (UCC) and its partner Heat Energy Tech applied for a patent for a coffee bean roasting technology that uses hydrogen, claiming to be Japan's first.
- Currently, UCC mixes hydrogen with natural gas; but eventually the company wishes to use 100% hydrogen. NEDO financed the hydrogen R&D.

Fuji Oil plans to produce SAF in Chiba

(Company statement, May 17)

- Fuji Oil plans to produce sustainable aviation fuel (SAF) at its Sodegaura Refinery in Chiba. Total capacity will be 180 million liters; production will launch in 2027.
- Fuji Oil partners with Itochu for SAF production, because it has much knowledge in producing and handling the liquid fuel.

Euglena to supply next-gen biodiesel for buses

(Company statement, May 24)

- Starting June 1, Euglena will supply the next gen biomass-based biodiesel, "SUSTEO", to Star Flyer and Nishitetsu to operate their bus services.
- SUSTEO mixes 20% of biofuel with 80% of fossil-fuel based kerosene.
- The three companies will test how their biodiesel impacts the conventional diesel engines and verifies efficiency of fuel consumption and CO2 reduction.

Japan wants overseas flights at its airports to use 10% sustainable fuel by 2030

(Asia Nikkei, May 25)

- Japan will ask international flights that use Japanese airports to use sustainable aviation fuel for at least 10% of their total fuel load by 2030.
- The country plans to pass a mandate on this matter and will also hold oil wholesalers accountable to hitting the target.
- CONTEXT: *Sustainable aviation fuel (SAF) can be made from plants and waste oil, among other sources, and helps to reduce the overall CO2 footprint of kerosene-type fuels used by today's aircraft by about 70%.*
- METI plans to present its idea on this matter to a public-private council soon and then consider which regulations need to be updated. The ministry will issue penalties for non-compliance with its SAF 2030 target.

- TAKEAWAY: This is a bold initiative given the tiny volumes of SAF currently available in Japan. However, it is clearly not only an idea being pushed by bureaucrats. Oil wholesalers like Cosmo and ENEOS have plans to install SAF production lines in Japan over the next 2-3 years. SAF-blended fuel is expected to be more expensive than regular jet fuel, and so a national mandate that applies not only to Japanese airlines but all international flights in the country should actually help oil wholesalers secure their new business line. Boeing chief executive Dave Calhoun recently told the FT that he doesn't believe that SAF will ever achieve price parity with petroleum-based jet fuels.

South Korean delegation visits Fukushima to survey waste water release; IAEA to follow

(Government statement, May 25)

- On May 23-24, a South Korean delegation of 20 nuclear safety experts visited Fukushima to survey the ALPS and facilities to transport waste water into sea.
- From May 29 to June 2, the IAEA task force of experts from 11 countries will visit Fukushima for the second review of the waste water discharge.

NEWS: POWER MARKETS

Power stations' generation record to be disclosed starting March 2024

(Denki Shimbun, May 23)

- At an EGC meeting, the Transmission & Distribution Grid Council (TDGC) announced that starting March 2024 it will disclose the power generation record of power stations.
- Disclosure will affect the data of generators with capacity of over 100 MW that are registered in the JEPX system. The power generation record will be released within five days by the transmission companies (power grid sector of EPCOs) and OCCTO.
- This will greatly improve power trading market predictability and transparency.

- TAKEAWAY: The JEPX has been transforming its website and disclosure to offer more data points and more variety in pricing of electricity. The improved transparency element should be a big boon for the market. That said, the fact that it will affect generators with a capacity of 100 MW means that nearly all biomass, hydro, wind and most solar power plants will not be included.

METI plans to keep as much as 4 GW of retired thermal power plants as reserve source

(Denki Shimbun, May 26)

- At the working group for power and gas policy systems ANRE discussed a plan to keep retired thermal power plants for restart in case the need arises.
- While the capacity market lines up power generation sources four years into the future, a reserve market secures power sources that aren't usually operational (and thus not applicable for listing on the capacity market.
- The reserve power sources are classified as either long term (thermal generators that can restart within one year) and short term (thermal generators which can restart within three months). METI is to secure a total of 3-4 GW of reserve power sources.
- CONTEXT*: At a Subcommittee for Electricity and Gas Basic Policy meeting on April 26, METI said it will prioritize retired oil-fired power plants as reserve power capacity.*

- TAKEAWAY: About 6 GW of thermal power generation has ceased operation since 2020, because the cost of operating old thermal power plants is very high, and not competitive in a deregulated power market. Therefore, METI needs funds to maintain reserve power sources to cover the costs borne by operators. If a power source is certified as "reserve power capacity", the operator is paid the cost of maintenance.

Chugoku Electric to issue ¥80 billion in transition bonds, company's first

(Nikkei, May 26)

- Chugoku Electric will issue ¥80 billion in transition bonds, a first for the company. Funds will go to develop renewable energy sources such as solar and hydro power.

- There'll be two types of bonds: one with a 5-year maturity period, and "transition-linked bonds" with a 10-year maturity period whose terms will be adjusted based on Chugoku Electric's progress toward decarbonization.
- The 10-year bonds, totaling ¥60 billion, will carry an interest rate of 0.920% and will be managed by five lead managers including Mizuho Securities and Daiwa Securities. The payment date for these bonds is scheduled for June 1.

Octopus Energy to invest £600 million in Japan's renewable market

(New Energy Business, May 22)

- Octopus Energy will invest £1.5 billion (about ¥257 billion) in energy markets in Asia Pacific, including Japan. Of those, the company will spend £1.2 billion for solar and wind power generation: half that will go to Japan's renewable energy sector.
- Also, Octopus will increase its employees in Asia ten-fold by 2027, spending £300 million to make the Tokyo office its focal point of technology for electricity retail. The office has been developing the latest functions of Octopus' technology platform, "Kraken," and it will play a bigger role in developing more solutions.
- CONTEXT: *Octopus Energy only started selling electricity in Japan in 2021 when it began a partnership with Tokyo Gas.*

- TAKEAWAY: The company's advertising has taken over one of the business train hubs in Tokyo and hence Japan – Shibuya Station. Octopus seems keen to revive consumer interest in switching their power provider. Such interest was evidence soon after the 2016 full liberalization of the electricity market, but waned after a couple of years and almost entirely disappeared with the onset of Covid and the turmoil in domestic power markets of the last two years.

METI backs MoE's conclusion that GPI's 164 MW wind project is unacceptable

(Japan NRG, May19)

- METI affirmed the MoE's conclusion that Green Power Investment's 164 MW Yogo Minami Echizen onshore wind power project doesn't meet environmental standards. The ministry asked GPI to revise its plan.
- The wind farm is in Shiga and Fukui Pref. The Shiga governor asked GPI to scrap the plan entirely to protect rare bird species, while the Fukui governor called for a scaling down of the project. The area also has high risks of natural hazards.
- GPI wants to install 39 wind turbines (each 4.2 MW) in Minami Echizen. Currently, the company has seven wind farms – 281 MW total capacity.
- CONTEXT: *On May 18, JERA and NTT Anode said they agreed to acquired GPI from Pattern Energy Group (U.S.).*

- TAKEAWAY: This situation shows how the govt is inclined to ask for changes in wind project plans based on environmental, land safety and noise concerns. Earlier this month, the MoE and Aomori governor asked Cosmo Eco Power to scale down the 56 MW wind farm planned in Yokohama Township. Once again, this demonstrates the complexity of developing larger onshore wind projects in Japan on local community and environmental concerns.

Hokkaido Electric joins Orix in 189 MW wind power project

(Company statement, May 19)

- Hokkaido Electric and Orix will collaborate on the onshore Seiryo Wind Power Project in Date City, Hokkaido Pref. Hokkaido Electric aims to generate 300 MW of electricity from renewable sources by 2030.
- The companies plan to build 45 units of 4.2 MW turbines for a total capacity of 189 MW of wind power. The project is making its environmental assessment.

Denso started testing a new energy management system

(Company statement, May 18)

- Denso started a pilot for a new energy management system at its Nishio Plant in Aichi Pref using a solid oxide fuel cell (SOFC) to generate electricity from hydrogen, and a vehicle-to-grid (V2G) system.
- Denso developed the SOFC using thermal management tech and fuel recycling tech, aiming for the world's highest level power generation efficiency of 65%.
- The demo of the pilot program will use city gas, then explore the mixed or exclusive use of carbon-neutral gas. NEDO supports the project.
- CONTEXT: *Denso is a global automobile parts manufacturer established in 1949, today with 190 affiliated companies worldwide. About 45,000 employees work in Japan, and 165,000 globally. Total sales in FY2022 were about ¥640 billion.*

Hitachi to stop domestic production of T&D equipment, but retain overseas factories

(Denki Shimbun, May 24)

- Hitachi will stop domestic production of high voltage transformers and gas insulated switchgears (GIS), and instead integrate production with its Swiss subsidiary Hitachi Energy.
- While Hitachi mostly supplies T&D equipment manufactured overseas to clients out of Japan, the company still produces equipment in Japan for Japanese customers.
- Hitachi produces transformers and GIS in factories in Hitachi City (Ibaraki Pref), but will switch production of transformers to factories in Chongqing and Zhongshan (both China), and switch the production of GIS to the factory in Xiamen (China) from 2025.

- TAKEAWAY: Japanese power companies have very different designs and equipment to overseas peers. This was a profitable business for Japanese suppliers when many products were sold at high prices, but since sales of transmission companies started to be regulated by the Revenue Cap System, the potential of Japan's T&D market is viewed as more limited.

Joyo sodium-cooled experimental fast reactor allowed to restart by NRA

(Ibaraki Shimbun, May 24)

- The NRA gave approval to restart Joyo, which is a sodium-cooled experimental fast reactor fueled by uranium-plutonium mixed oxide (MOX).
- Joyo's operation began in 1977, but it hasn't operated since 2007 due to trouble with equipment. In 2017, JAEA applied to restart Joyo, but the request stalled because the NRA pointed to certain thermal heat issues. Joyo's restart is now planned for March 2025.

- Since the Monju Fast Breeder Reactor (FBR) was slated for decommissioning in 2016, Joyo is Japan's only operational experimental reactor. Japan wants to develop next-gen reactor tech and will continue to develop Joyo.

France's Orano to work with Japanese nuclear operators on MOX fuel reprocessing

(FEPC statement, May 19)

- Nine power utilities, Japan Atomic Power Company, J-Power and France's Orano will research mixed oxide (MOX) nuclear fuel to establish reprocessing technologies.
- Orano is active in MOX reprocessing, and can analyze MOX fuel and its impacts on reprocessing facilities; and identify how to realize fuel reprocessing in Japan.
- Japan Nuclear Fuel Ltd, Japan Atomic Energy Agency, Nuclear Reprocessing Organization of Japan and Orano will conduct the research.
- CONTEXT: *This research agreement follows the May 3 statement by METI minister Nishimura and France's Minister of Energy Transition to strengthen nuclear cooperation.*

Shikoku Electric restarted Ikata NPP Unit 3

(Denki Shimbun, May 25)

- Shikoku Electric restarted Ikata NPP Unit 3, a reactor that has been offline since Feb 23 for regular maintenance. Power transmission started on May 26; commercial operation starts June 20.
- Ikata Unit 1 stopped operation in May 2016, and Unit 2 in May 2018; Ikata NPP Unit 3 is the only operational nuclear reactor owned by Shikoku Electric.
- While the operation rate of Ikata Unit 3 was 92.4% in FY2022, Shikoku Electric still posted its second highest loss ever due to rising fuel prices.
- SIDE DEVELOPMENT:
  Sendai district court rejects resident group calls to oppose restart of Onagawa NPP
  (Japan Times, May 25)
    - Court ruled that the group's objections to the restart of Tohoku Electric's Onagawa NPP Unit 2 were not valid. The group claimed that the operator's emergency evacuation plans were not adequate.

Japan to donate transformers and power equipment to Ukraine

(Jiji, May 26)

- PM Kishida said Japan will donate 10 large transformers and 140 units of power equipment to Ukraine.
- Japan has already provided power generators to Ukraine through Japan International Cooperation Agency (JICA) and UNHCR.

- TAKEAWAY: Traditionally, Japanese power equipment suppliers were not allowed to export to Ukraine due to regulations of the Coordinating Committee Control for Export to Communist Areas (COCOM). Also, most of Ukraine's power equipment was supplied by Russia and China. Therefore, this emergency donation will be the first time Japanese power products are sent to Ukraine.

NEWS: OIL, GAS & MINING

Cosmo proposes defense to prevent Murakami activists from increasing stake

(Company statement, May 23)

- Cosmo Energy proposed to shareholders to block activist investors associated with the Murakami group from increasing their stake up from 20.01%. The company plans to issue stock options to shareholders (excluding the activist investors) if the Murakami faction tries to raise their stake.
- The shareholders will vote on Cosmo's and the activists' proposals at the June 22 AGM. The activists proposed a spinoff of the renewable energy unit.
- CONTEXT: *Cosmo's key shareholders include Master Trust Bank of Japan (12.73%), Custody Bank of Japan (5.3%), UBS (4.15%) and Kansai Electric (2.24%). City Index Eleventh, Reno and other Murakami Group companies are prepared to raise their stake to 30%, the activists had previously warned management.*

- TAKEAWAY: The Murakami group has a unique strategy. Other shareholder activists have attacked companies for low price-to-book ratio (PBR). The Murakami Group says it is focused on the energy transition. Cosmo's price-to-book ratio (PBR) stands at 0.71. To attract shareholder support, its low PBR must be addressed eventually by management.

JERA unit outlines strategy for power generation assets and LNG trading

(Japan Maritime Daily, May 27)

- Kasai Kazunori, CEO of JERA Global Markets (JERAGM), a trading subsidiary of JERA, said his goal is to leverage JERA's power generation assets to pursue profitable opportunities with relatively low risks.
- JERAGM's fleet consists of 20 LNG vessels that are chartered on a long-term basis for JERA's LNG purchases under FOB (Free on Board) contracts.
- JERAGM's annual trading volume for LNG exceeds 10 million tons, while they handle around 45 million tons of coal in total.

Japan, Australia energy ministers discuss LNG supply and investments

(Government statement, May 22)

- METI Minister Nishimura and Australia's Minister for Climate Change and Energy Chris Bowen spoke online to discuss climate change and energy trends.
- Minister Nishimura stressed that Australian LNG supply is crucial for Japan. They exchanged views on the investment environment for Japanese upstream companies.

- TAKEAWAY: Japan has been very alarmed at recent moves by Australia to curtail natural gas exports from some parts of the country so as to leave enough resource to meet growing local needs, as well as plans to diminish the role of Australia's gas sector on environmental grounds. Japan's Ambassador to Australia and CEO of top Japanese investor in Australian gas industry, INPEX, both voiced concerns about the issue in recent months.

LNG stocks fall to 2.5 million tons

(Government data, May 24)

- LNG stocks of 10 power grids stood at 2.5 million tons as of May 21, down 4.2% from 2.61 million tons a week earlier. The May 14 stocks were first reported at 2.67 million tons but the figure was revised.
- The end-May stocks last year were 2.11 million tons. The five-year average for this time of year was 2.01 million tons.

ANALYSIS

BY FILIPPO PEDRETTI

Japan Heads Asia Zero Emission Community to Lead Energy Transition in the Region

In a collective effort to accelerate the transition to clean energy and meet the targets outlined in the Paris climate accord, Japan and ten other countries in the Asia-Pacific region joined together earlier this year to form the Asia Zero Emission Community (AZEC).
Renewable energy potential in Asia is often perceived as limited due to weak wind resources, a shortage of underutilized flat land near populated areas, and extended rainy seasons that hinder solar power generation. The region's complex geography, including numerous islands, coupled with underdeveloped transmission lines, also complicates building new energy infrastructure.

Moreover, the region's relatively young fleet of coal-fired power plants is expected to continue playing a significant role in energy generation for the foreseeable future. AZEC intends to find a solution to such problems.

Taking the lead in this alliance, Japan has not only pledged financial support but also promised technological assistance to the Association of Southeast Asian Nations (ASEAN) countries. During the Sapporo meeting on climate, energy, and environment and the G7 summit, Japan emphasized the importance of investing in natural gas / LNG, hydrogen, and ammonia. While this approach finds supporters within Asian countries, other G7 members hold a more cautious stance.

AZEC's inaugural ministerial meeting on March 4 saw participating countries make pledges to collaborate on reducing CO2 emissions and promote decarbonization by developing renewable energy, hydrogen, ammonia, carbon capture, and battery storage. Several industry groups and state-owned energy firms inked about 30 agreements for decarbonization projects.

Faith in hydrogen and ammonia

During the March 4 meeting, hydrogen and ammonia emerged as key points, as evidenced by the numerous agreements signed. The meeting came along with Minister Nishimura's announcement that Japanese companies, including Kawasaki Heavy Industries, Iwatani, Electric Power Development (better known as J-Power), and Sumitomo Corp, will collaborate with the government to establish Japan's first hydrogen supply chain, connecting Australia and Tokyo Bay.

Furthermore, Indonesian companies were at the forefront of closing agreements, reflecting its ambitious targets for decarbonization. While Japanese banks pledged a $200 million loan to Indonesian utility PLN for renewable energy projects, PT. PLN Nusantara Power and Mitsubishi Heavy Industries signed an MoU to explore co-firing cleaner fuels at power plants using MHI's decarbonization technology. PT Pupuk Indonesia and IHI also partnered to study the construction of a green ammonia production plant and co-firing of ammonia in a coal-fired power plant.

Other MoUs included collaboration between TEPCO HD and Pertamina New and Renewable Energy that will focus on developing green hydrogen and green ammonia in Indonesia, primarily utilizing renewable energy sources such as geothermal power. Additionally, PETRONAS and JOGMEC announced collaboration on research in energy sources in Malaysia, specifically hydrogen, ammonia, and carbon capture and storage projects.

Country	Japanese company	Type
Indonesia	*NEXI*	Financing
Indonesia	*Kyudenko*	Energy management system
Indonesia	*Mitsubishi*	Hydrogen, Ammonia, Biomass co-firing
Indonesia	*IHI*	Hydrogen, Ammonia, Biomass
Indonesia	*IHI*	Ammonia
Indonesia	*Chiyoda*	CCU/Co2 recycling
Indonesia	*Mizuho*	ESG advisor
Indonesia	*Osaka Gas, INPEX, JGC*	Biomethane
Indonesia	*TEPCO*	Green Hydrogen, Green Ammonia
Indonesia	*Toyo*	Green Ammonia
Indonesia	*JOGMEC*	Geothermal power
Indonesia	*ITOCHU, Kyushu Electric, INPEX*	Geothermal power
Thailand	*INPEX, Kyushu Electric*	LNG
Thailand	*Kyushu Electric*	LNG
Thailand	*Sojitz*	SAF
Thailand	*IHI*	Decarbonization strategy discussions
Thailand	*METI*	Biofuel
Thailand	*Chiyoda, Mitsubishi*	Clean Hydrogen/Ammonia
Vietnam	*Kumagaigumi, INPEX, Kansai Electric*	Wind power
Vietnam	*erex*	Biomass
Vietnam	*JOGMEC*	CCS/CCUS
Malaysia	*JGC*	Biofuels, Biochemicals
Malaysia	*JOGMEC*	Green and Blue Hydrogen/Ammonia, CCUS
Australia	*Toyo, Sojitz*	e-fuel/SAF
Cambodia	*NEXI*	Financing
Philippines	*Shizen Energy*	Wind power
Singapore	*Zeroboard*	ESG management service

Other players: CCUS, Biomass, Wind and Geothermal power

The AZEC agreements were not limited to hydrogen and ammonia. For instance, Chiyoda and PT Pertamina signed an agreement to develop carbon recycling technology in Indonesia, utilizing CO2 from the Indonesian company's stranded gas fields. The companies claim that they'll be able to use methane reforming with carbon capture to extract the CO2 that will then go into value-added chemical products.
Agreements related to biomass were also inked. PGN, JGC HD, Osaka Gas, INPEX, and PTPN partnered to explore the use of biomass resources for biomethane fuel in Indonesia, as well as an MoU between erex Co., Tuyen Quang Province, and Yen Bai Province in Vietnam for the development of biomass fuels and biomass power plants.

Noteworthy agreements in wind power were also established. Shizen Energy and Ganubis Renewable Energy signed an MoU to develop an onshore wind power plant in the Philippines, with a target capacity of up to 96 MW. In Vietnam's Tra Vinh Province, TTVN and a consortium of Japanese companies (Kumagaigumi, INPEX, Kansai Electric, etc) signed an MoU to develop a large-scale offshore wind power farm. The project aims to generate 2 GW of offshore wind power, supporting Vietnam's economic growth and Japan's energy infrastructure exports.

Incidentally, Vietnam has just announced a new 2030 energy plan that contains offshore wind power and LNG as key components for reducing its dependence on coal-fired generation.

With assistance from METI, Japan also pledged to promote overseas geothermal power projects. This initiative, supported by JOGMEC with funding of ¥630 million, aims to gain knowledge and expertise in geothermal power development, with a particular focus on Indonesia. As part of this effort, JOGMEC and Geo Dipa Energi have entered an MoU for geothermal resource development. Various other collaborations were announced to expand existing geothermal projects in Sumatra.

LNG and the G7's wary approach

Japanese representatives at the Sapporo G7 meeting in mid April emphasized the importance of increased investment in natural gas development in Asia to ensure Japan's energy security and support other countries to transition away from coal. While Japan plans to reduce reliance on natural gas, the country seeks new contracts as existing ones expire.
LNG plays a significant role in Japan's power generation, 10% of which is sourced from Russia. In contrast to other G7 countries, Japan did not commit to a specific date for phasing out coal, citing differences in electricity infrastructure and energy security needs. At the G7 summit, the group emphasized that investing in natural gas and LNG can be a suitable response to the ongoing crisis and potential gas market shortages. However, they also stated that such investments needed to align with climate goals and avoid long-term dependencies.

So, it's no surprise to see that within the AZEC forum there were a number of agreements related to LNG, especially between Japanese and Thai companies. For example, Kyushu Electric Power, PTT International Trading, and INPEX signed an MoU to cooperate in LNG, aiming to address inventory challenges and ensure reliable supply. Another agreement was signed by Kyushu Electric Power, PTT Global LNG Company, and PTT International Trading to expand LNG assets and optimize LNG cargo.

One goal, various pathways

AZEC has set three primary objectives: balancing decarbonization with energy security, promoting decarbonization while ensuring economic growth, and recognizing the need for a diverse and realistic approach to carbon neutrality that accounts for each country's unique circumstances. The alliance's slogan, "one goal, various pathways," encapsulates its commitment to achieving carbon neutrality while acknowledging the distinct challenges faced by Asian countries.
Critics of AZEC highlight the relatively minor role assigned to renewables within the platform as compared to the attention paid to innovative fuel technologies such as co-firing of ammonia and hydrogen. Japan strongly supports the development of co-firing, but environmental activists and pro-renewables analytical houses like Bloomberg NEF say that this approach is

not compatible with climate goals.

For now, Japan's co-firing narrative is gaining traction. Even at the G7, Japan's stance won tacit approval and co-firing hydrogen and ammonia was described in the final communique as a viable option for decarbonization.

As stated in its GX policy, Japan's collaboration with other Asian countries aligns with its goal of becoming a leader in the region, financing projects, and exporting advanced technologies and expertise. This comes as AZEC members and others such as India become more assertive in outlining alternative paths toward the energy transition that accord with their national peculiarities.

As an island nation with inherent resource limitations, Japan seems to be both willing to set an example on how to deal with common energy challenges and be an authoritative interlocutor between AZEC countries and G7 members.

ANALYSIS

BY CHISAKI WATANABE

Japan Plays Catch-up on Climate Tech as Kishida Pushes Startup Innovation

(This is Part 1 of a two-part series about Japan's climate-tech/ clean-tech sector)

Japan isn't known for its own Silicon Valley or high-profile private backers of technologies to tackle climate change such as Elon Musk. But there are signs from the government and big business in Japan that it's willing to support a new startup-focused ecosystem to accelerate R&D in clean energy and emission-cutting tech.

Pursuing engineering and technological breakthroughs with new ventures has come to be known as 'climate tech.' In Japan, research in this and other fields has traditionally taken place within the walls of top universities or major companies. The approach has served the country well to date, but with rapid change in technologies across the energy and climate sector, that big institutional approach is no longer enough. And Prime Minister Kishida's vocal support for more startups is starting to translate into interest in "climate tech" within the country, both from those keen to create new ventures around the theme and those keen to invest in them.

The mobilization of a new Japanese ecosystem in climate tech augurs more than just progress in engineering. It should stimulate greater investment by funds and corporations into the energy transition. That's vital if the issue of climate change is to be addressed, according to the International Energy Agency, which estimates that an average annual investment of $2 or more trillion is required globally.

One major beacon for Japan's burgeoning climate tech sector is the arrival of top trading house Mitsubishi Corp, which counts Warren Buffett among shareholders. A new Mitsubishi fund to support climate tech startups may be late compared to the scene in the U.S., but it should unlock a greater interest and money for Japanese ventures and may spark a new wave of innovation.

Global movement

A lot has changed since Joe Biden became president in January 2021, and with the passage of his Inflation Reduction Act in August 2022, the U.S. is a leader in climate-tech. As climate change's impact is increasingly felt across the globe, governments are setting more ambitious emission reduction targets to align them with the Paris Agreement, and investors are looking to bet on decarbonization technologies.

In recent years, Japanese companies have been eager to ink partnerships with U.S. entities and they've found allies in powerful forces such as Bill Gates and his TerraPower nuclear energy startup. Also, earlier this month, Mitsubish announced a $1 billion fund that will invest in startups with promising technologies. The U.S. and EU countries will be prime targets for the fund, according to Japanese media reports.

With the U.S. and EU member states scaling back partnerships with China and totally ending cooperation with Russia, Japan is well positioned to benefit from the new geopolitical realities thanks to its close relationship with its G7 partner countries.

Is 'climate-tech' just a marketing gimmick?

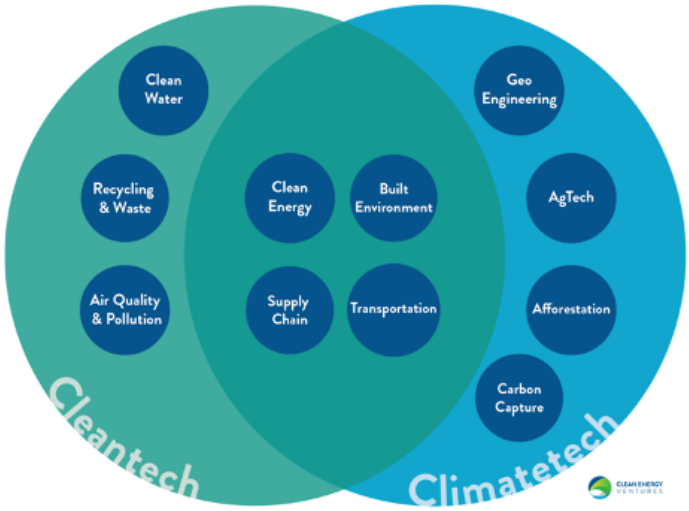
In the 1980s the very mention of "Japan" was a buzz word for high tech innovation. Sony's Walkman conquered and amazed the world. Fuel-efficient Japanese cars provided enormous relief to millions of middle-class Americans and Europeans living on tight budgets in the wake of the 1970s energy crisis.

Back then people didn't think of Japanese cars as 'climate-tech' or 'clean-tech,' but in essence that's what they were as the dominance of gas-guzzling U.S. auto producers was broken. In some ways, the notions of 'climate-tech' and 'clean-tech' may be just a rebranding of decades-long technological advancements in fuel and energy efficiency, and a way to market new innovations for the clearly defined goals of the energy transition.

Cynicism aside, the fact is that those marketing and branding efforts are crucial elements of the sales and dissemination process.

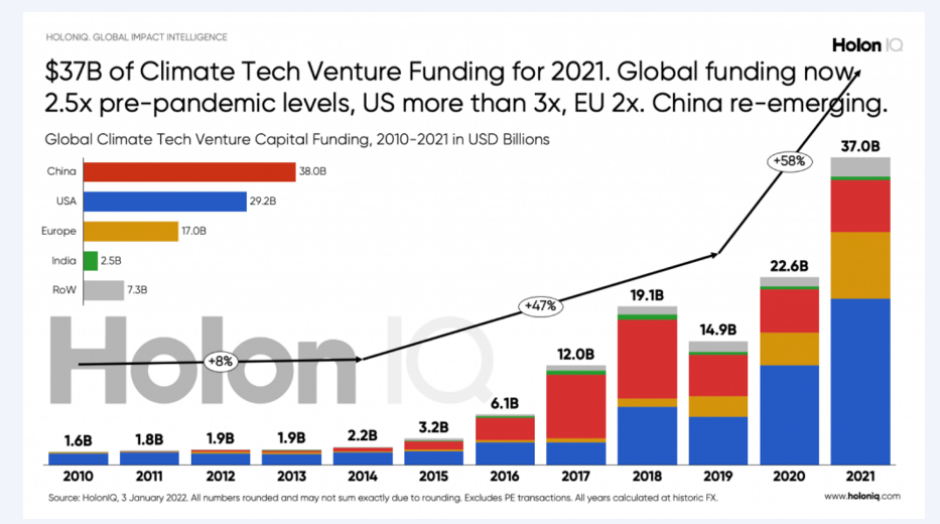
Japan today hopes that it can once again jumpstart its technological innovation sector, especially in regard to technologies that can accelerate the energy transition. Climate-tech offers tremendous opportunities, and could build on Japanese efforts to date in new areas such as hydrogen-fired power generation.

While the two terms - climate-tech and clean-tech - are used interchangeably, they're not synonymous, according to Boston-based Clean Energy Ventures. They are more like siblings with slightly different missions, says the U.S. investment fund. Climate-tech specifically addresses climate change and thus, is defined as any new business model and technology that mitigates the impacts and drivers of global GHG emissions. Meanwhile, clean-tech addresses humanity's impact on the environment, and includes clean energy, clean air, water treatment, transportation, recycling and waste reduction, etc.



Source: Clean Energy Ventures

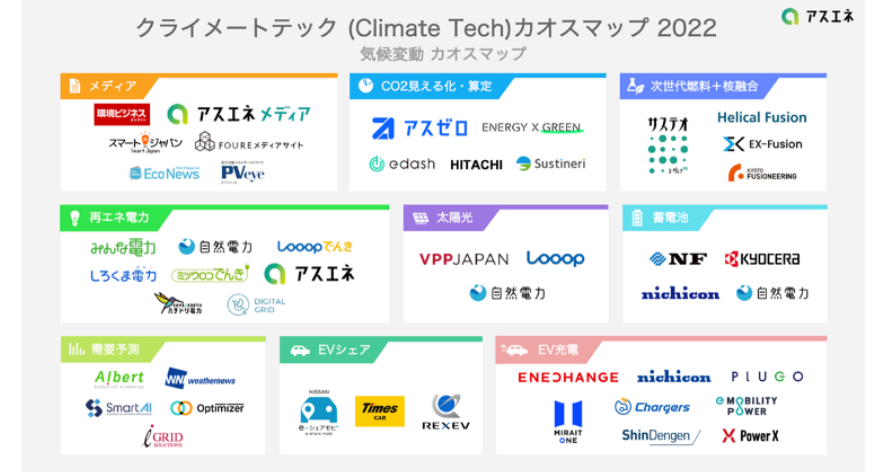
Compared to its G7 partners, Japan is not recognized as having a strong presence in either climate-tech or clean-tech. The U.S. tops the Global Clean-tech 100 list of private companies that are most likely to make a significant market impact in five to 10 years with a total of 53 companies; Canada has 12 on the list, while there's not a single one from Japan. Between 2010 and 2021, China was the top destination for climate tech funding, receiving $38 billion. The U.S. trailed close behind with $29.2 billion, according to HolonIQ.



Source: HolonIQ

Buds of climate tech sprout in Japan

Climate-tech is also now recognized as a viable sector in Japan. While the country's climate-tech landscape is still in its early stages, an industry map published by Asuene last year featured public companies such as Hitachi, Kyocera and Euglena, and already-established private companies such as Shizen Energy and Updater.



Source: Asuene

Mitsubishi is setting up the Marunouchi Climate Tech Growth Fund with MUFG bank and South Korea's Pavilion Private Equity. Mitsubishi will invest several hundred million dollars in the fund, and individual investments are expected to range between $20 million and $100 million, according to the *Nikkei*.

Such large amounts are not typical when it comes to tech startups as a whole. But given the high up-front costs of getting an innovative energy project off the ground, especially in areas like nuclear fusion, such funding figures are required.

Current leaders among Japanese startups include nuclear fusion tech firm Kyoto Fusioneering, which earlier this month raised $79 million from a group of investors that included Mitsubishi and Mitsui. Still, there are energy startups that exist within the realm of traditional IT solutions. For example, founded in 2021, Sustineri provides carbon offset cloud computing services.

Japan's effort for the energy transition is detailed in the government's Green Transformation (GX) initiative. The GX aims to promote decarbonization, while maintaining a stable supply of energy and economic growth. There are also other awards and platforms set up by various parts of the government that seek to identify and promote progress in climate solutions.

In October 2022, the Japan Green Investment Corp for Carbon Neutrality (JICN) was set up by the MoE to unite public and private investors. While much of its investment targets later stage projects, the fund says it can also invest in startups.

For its part, the Tokyo Metropolitan Government plans to open the "Tokyo Innovation Base" next year, which will serve as a physical venue bringing together accelerators, businesses, universities, and government to support startups that focus on the environment and infrastructure, as well as other sectors such as mobility.

The recent wave of announcements and reports about climate-tech suggests the sector will take off in Japan. On May 12, a committee for startup policy of the ruling Liberal Democratic Party presented a set of proposals to the PM to ensure the government's five-year development plan for startups actually takes off.

Committee members called on the government to clarify on how it will promote climate-tech, and also to mention climate-tech in the updated version of its "Action Plan for a New Form of Capitalism," to be released soon. This would cement climate-tech's place in state planning for the energy transition and act as a catalyst for the emerging sector.

(Part 2, to be published in June, will go into greater detail about Japan's climate-tech/ clean-tech sector.)

GLOBAL VIEW

BY JOHN VAROLI

Below are some of last week's most important international energy developments monitored by the Japan NRG *team because of their potential to impact energy supply and demand, as well as prices. We see the following as relevant to Japanese and international energy investors.*

China and Turkmenistan/ Gas pipeline
China is accelerating work on a long-delayed fourth natural gas pipeline from Turkmenistan that will carry 30 bcm a year. In 2022, China imported 35 bcm of gas worth $10.3 billion via three Turkmen pipelines, compared with 16 bcm via a single Russian pipeline worth about $4 billion.

EU/ Hydrogen aviation fuel
The roll out of hydrogen planes will need €300 billion of investment and a tax on conventional jet fuels. Airbus, the world's largest plane maker, aims to fly a zero-emissions hydrogen-powered aircraft by 2035

Germany/ Solar and wind power
Norway's Statkraft plans to spend €1 billion to develop and build between 300 MW and 500 MW of wind and solar power capacity annually in Germany starting in 2027. It will also develop hydrogen power projects.

Italy/ Solar power
France's Engie and Amazon opened Italy's biggest agrivoltaic farm. They signed a corporate PPA and most of the energy produced by the 66 MW solar plant in Sicily will go to the e-commerce giant.

Namibia/ Green hydrogen
Hyphen Hydrogen Energy inked a deal with Namibia for the next phase of a $10 billion green hydrogen project to export to Europe. Hyphen's shareholders include Germany's Enertrag. The plant will produce 2 million tons of green ammonia by 2030.

Netherlands/ LNG infrastructure
PetroChina International and BP won a tender to handle 2 bcm of gas annually for 20 years at Rotterdam's Gate terminal. The commercial operations are expected to start in the third quarter of 2026. PetroChina is expanding its global LNG portfolio.

Norway/ ESG
The country's sovereign wealth fund, which is the world's largest with $1.4 trillion in assets, will support climate activists against ExxonMobil and Chevron. The goal is to force changes on emissions policy next week at annual shareholders meetings and introduce targets for cutting GHGs.

Philippines/ LNG imports
With just four years before the country's only gas field runs dry, LNG is seen as the solution. Utility First Gen uses domestic gas at four power plants with 2 GW total capacity, but will start LNG imports in September. Without LNG the company would have to buy expensive diesel.

Spain/ Solar and wind power
Repsol plans to sell a 49% stake in wind farms and solar power plants. The deal is estimated to be worth between €700-€800 million. The renewable plants have a combined total capacity of 600 MW.

UK/ Energy transition
Power group SSE will increase investment in clean energy by 50%, rising to £18 billion by 2027 and £40 billion by 2033. The vast majority will go to the UK and Ireland. About half will go to develop electricity networks, such as offshore wind farms.

Ukraine/ Wind power
Phase I of the Tyligulska wind farm that's 100 km from the frontline started generating power. The plant's 19 turbines have 114 MW total capacity. DTEK invested $200 million in this first phase. The project is among the first to deploy 6 MW Enventus turbines by Vestas.

2023 EVENTS CALENDAR

A selection of domestic and international events we believe will have an impact on Japanese energy

January	○ METI Minister Yasutoshi Nishimura met with US DOE Secretary Jennifer M. Granholm in Washington D.C ○ PM Kishida met with IEA Executive Director Fatih Birol in Paris ○ Kishida-Biden summit meeting (January 13) ○ Last day to solicit public comments about GX (January 22) ○ Indonesia takes over as chair of the ASEAN for 2023 ○ JCCP (Japan Cooperation Center for Petroleum and Sustainable Energy) Symposium (January 26) ○ Japan's parliament convenes (January 23) ○ Lunar New Year (January 21-27) ○ Ammonia as Fuel World Summit (January 30-February 2) ○ Toyota group launches trial runs of FC truck transport system ○ IMO carbon regulation enters into force for all ships ○ China expected to announce the volume of rare earth production permitted by the government for the first months of 2023
February	○ Japan Energy Summit (February 28-March 2) ○ FIT solar auction (February 20-March 3) ○ IEA Global Methane Tracker 2023 release (TBD) ○ GX roadmap to be approved in a Cabinet meeting (February)
March	○ REvision 2023 Symposium by Renewable Energy Institute (March 8) ○ Japan Atomic Industrial Forum Seminar (March 13) ○ World Smart Energy Week (March 15-17) ○ Small solar, wind operators subject to tighter technical rules due to Electricity Business Act amendments (March 20) ○ FIT on-shore wind auction (March 6-17) ○ IPCC to release sixth assessment report ○ End of 2022/2023 Japanese fiscal year ○ WTO conference on steel decarbonization standards (March 9) ○ China hosts National People's Congress to appoint top government officials
April	○ Enforcement of Acts to Promote Non-Fossil Energy and Sophisticated Supply Structure enters Phase II (April 1) ○ Amendments to Energy Conservation Act take effect (April 1) ○ Process for non-firm renewable connection to local transmission lines starts (April 1) ○ Rare earth mining will require state licensing (April 1) ○ Canadian Sigma Lithium to start commercial production at its Brazilian mine, one of the five largest lithium projects in the world ○ GX League becomes fully operational ○ Eurus, Cosmo and Looop to bring online Japan's largest onshore wind farm ○ Japan holds local elections for governors, mayors and legislatures ○ G7 ministers meeting on climate, energy and environment in Sapporo (April 15-16)

May	○ May Golden Week holidays (May 3-5) ○ General election in Thailand (May 7) ○ World Hydrogen Summit (May 9-11) ○ G7 Hiroshima Summit (May 19-21)
June	○ 35th OPEC and non-OPEC ministerial meeting (June 4) ○ IEA annual global conference on energy efficiency (June 6-8) ○ General and presidential election in Turkey (June 18) ○ Lithium Supply and Battery Raw Materials 2023 (June 20-22) ○ Happo Noshiro, Murakami-Tainai, Oga-Katagami-Akita and Saikai-Eshima wind project auctions close (June 30) ○ JERA, Shikoku Electric start running new coal power plants
July	○ LNG 2023 World Conference (July 10-14)
August	○ China expected to announce the volume quota allowances of rare earth production for the balance of 2023
September	○ G20 New Delhi Summit (September 9-10) ○ 2023 UN SDG Summit (September 19-20)
October	○ IEA World Energy Outlook 2023 Release ○ BP Energy Outlook 2023 Release ○ Connecting Green Hydrogen Japan 2023 ○ Japan Wind Energy 2023 summit ○ FIT on-shore/offshore wind, biomass auctions (October 16-27)
November	○ COP 28 (November 30-December 12) ○ U.S. hosts the APEC summit in San Francisco ○ FIT/FIP solar auction (November 6-17)
December	○ ASEAN-Japan summit to mark 50 years of cooperation ○ Last market trading day (December 30)

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