JAPAN NRG WEEKLY

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Feb. 27, 2023

NEWS

TOP

- PM Kishida steps in to demand tough review of utility price hike applications, signaling hard stance of big increases in power bills
- TEPCO starts safety checks at operational nuclear power plant, positioning itself as ready to restart Kashiwazaki Kariwa NPP
- Nippon Steel buys 10% of Canadian coal miner for ¥110 bln; says it can supply coal suitable for hydrogen-reduction ironmaking

ENERGY TRANSITION & POLICY

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- TEPCO to hire most new staff since the 2011 Fukushima disaster

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- Hokkaido Electric delays start of LNG-fired units by several years
- LNG stockpiles held by Japanese utilities rise; stay above 5yr avg.

ANALYSIS

JAPAN'S MAKERS OF THERMAL POWER PLANTS TRY TO ADJUST TO THE ENERGY TRANSITION

Alongside a national pledge to cut emissions and use more green energy, there's one more indicator that shows Japan's reliance on fossil fuels is on the wane. At the end of last year, two major Japanese suppliers of equipment for coal and gas-fired plants announced plans to merge their thermal generation business. While both companies have "Mitsubishi" in their name this is by no means a happy marriage. The fact it's going ahead anyway shows just how much the makers of thermal power equipment in Japan are adjusting to the new net-zero era.

COLUMN: ENERGY JOBS IN JAPAN LETTING EMPLOYEES GO, DO's AND DON'Ts

Regardless of effort and careful planning, it's still possible to make the wrong hire. And, sometimes those who have the hard skills and track record simply don't adjust into the speed, style or culture of your business. Letting people go in Japan is no easy feat with the Labour Law firmly on the side of the employee in almost all situations. We review the key points to keep in mind before and after things come to such a conclusion.

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.

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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

Kishida asks METI minister to directly engage with power rate hike reviews

(Government statement, Feb. 24)

- Prime Minister Kishida has asked METI minister Nishimura to directly engage with power rate hike reviews during the ministers' taskforce meeting on inflation, wage and livelihood issues.
- Kishida urged minister Nishimura to consider management efficiency of the companies, the recent exchange rate moves and fuel market prices in the reviews, and come up with measures to better control power rates. Nishimura is to complete these tasks in March.
- CONTEXT: *In January, regional power companies applied to METI for rate hikes. Presently METI is soliciting the general public to submit opinions. The public consultation period ends in mid-April.*

- TAKEAWAY: PM Kishida knows that utility prices is a sensitive issue and faces local elections in April. No matter how much industry protests, he wants to show the government is being tough to protect the population. But the economics of power generation in an age of elevated fuel prices cannot be ignored for long. Even with the recent easing in global gas and coal prices, power utilities will hope that they get at least a partial approval of their sought price increases.

METI to set up working group to drive EVs' integration into power network

(Japan NRG, Feb. 21)

- METI plans to set up a working group to drive EVs' integration into grid networks, to identify data types needed to control power transmission traffic, as well as data specifications and standards for sharing data among varied players, and etc.
- The working group will be set up by the end of March 2024, and members will include automakers, charging systems makers, charging service providers, regional electric power operators, power retailers, aggregators, data platform operators and scholars.
- CONTEXT: *Japan's EV sales in 2022 were 26,465 vehicles, or 0.9% of total passenger car sales. In this sector, Japan has fallen behind the EU and the U.S., which are developing data and communication standards to connect EVs with power networks. The METI working group aims to catch up with international competitors.*

- TAKEAWAY: Potential network issues include a sudden surge in the EV charging demand affecting power transmission elsewhere, and a lack of consistent standards among electrical systems at homes, offices and power facilities, making power charging and discharging inefficient. The biggest challenge is that on the back of slow EV spread Japan has little data to make base assumptions.

Transition finance panel publishes briefing paper on financed emissions

(Government statement, Feb. 20)

- A government-private sector panel on transition finance published a briefing paper identifying issues for financial institutions working on climate initiatives.

- The panel, called the sub-working group of government and the private sector on financed emissions to promote transition finance, has proposed a disclosure system designed to encourage emission cut engagements.
- Going forward, it will propose calculations, disclosure and other rules to G7, G20 and other international frameworks.
- CONTEXT: *The new sub-working group, includes METI, the MoE, the Financial Services Agency, and representatives from MUFJ, SMBC, Mizuho FG, Nomura group, BofA, Dai-ichi Life, Nippon Life, Tokio Marine Holdings, and Asset Management One.*

ANRE to establish new divisions for ammonia, hydrogen and carbon resources in summer

(Japan NRG, Feb. 22)

- ANRE will establish a Hydrogen and Ammonia Division in the Energy Efficiency and Renewable Department.
- The Carbon Resources Division will be created in the Natural Resources and Fuel Department.
- The Petroleum and Natural Gas Division will be renamed as the Fuel Resource Development Division.
- The Petroleum Refining and Reserve Division, and the Petroleum Distribution and Retail Division, will merge. Biofuel and bioethanol will also fall under the new unit.
- The Coal Division, and the Mineral and Natural Resources Division, will merge.

NRA met to discuss new rules for NPPs operating more than 60 years

(Denki Shimbun, Feb. 22)

- The NRA hosted its first meeting to discuss the new regulation that allows nuclear reactors to operate for more than 60 years.
- CONTEXT: *The present rules allow operation for 40 years, and one 20 year extension. However, the NRA changed the rules so that it will have powers to review operational safety every decade after 30 years. This effectively changes the potential license period.*
- CONTEXT: *To make the matter more complicated, recent METI rule changes allow operators to discount the years spent idle post Fukushima from the licensing term. That could see some reactors operate more than 70 years after they first entered service. Again, the NRA would need to sign off on the safety standards every 10 years in operation starting from the 30-year mark.*
- The NRA said that it doesn't expect major changes in the general outline of regulation since it has introduced its new rules. For facilities that are over 60 years in service, it will refer to U.S. experience in the field.

- TAKEAWAY: If the new regulation adheres fundamentally to the current one, then the essence won't change substantially. Therefore, it seems METI is trying to bolster the perception that nuclear safety is being increased by requiring inspection every 10 years, and yet, also easing concerns about NPPs being in service for more than 60 years.

JBIC, three banks to finance construction of power lines between Saudi Arabia, Egypt

(Government statement, Feb. 21)

- The government-run Japan Bank for International Cooperation and three private banks will provide a total of $207 million loans to Saudi Electricity Company for construction of power transmission lines connecting Saudi Arabia and Egypt.
- JBIC, the MUFJ Bank, the Bank of Yokohama, and the Nishi-Nippon City Bank will finance a 3,000 MW high voltage direct current system with 1,350 km of overhead power lines and 22 km of submarine cables.
- The system will allow Saudi Arabia and Egypt to share surplus power from renewables.

Narita International Airport and Tokyo Gas to invest in airport decarbonization

(Nikkan Kogyo Shimbun, Feb. 21)

- Narita International Airport (NAA) and Tokyo Gas established a company with the aim of decarbonizing energy supplied to the airport. The new company is a 50/50 JV, with a total investment of about ¥100 billion.
- Energy supplies to the airport will start in April, and by FY2045 solar panels with a total output of 180 MW will be installed; 40% of the electricity used at the airport will be supplied by solar power.
- By 2050, the new company will locally produce and consume e-methane (synthetic methane). Hydrogen will be produced from PVs at the airport, and e-methane will be produced by methanation and supplied as fuel to the main electricity distribution station.

TEPCO PG launches Japan's first SF6 gas-free GIS

(Denki Shimbun, Feb. 21)

- Tokyo Electric Power Grid (PG) started Japan's first gas insulated switchgear (GIS) that does not use the greenhouse gas sulfur hexafluoride (SF6).
- Two GIS lines by Toshiba Energy Systems (Toshiba EES) were installed in Fuchu City, Tokyo. By using a mixture of nitrogen and oxygen (dry air) as insulating gas, there'll be a 470-ton reduction (of CO2 equivalent) of SF6 gas over 50 years.
- SF6 has 25,000 times more GHG concentration than CO2.
- CONTEXT: *In Japan, SF6 is used in GIS because of its insulation performance, odourlessness, non-flammability, colourlessness, and ease of handling. However, at the COP3 in Kyoto in 1997 it was designated as a GHG subject to emission reductions. TEPCO PG has been studying alternatives to SF6 since 2016 and intends to further promote them in the next few years.*

Three major chemical companies join forces on carbon neutrality in Keiyo Rinkai Complex

(Company statement, Feb. 13)

- Sumitomo Chemical, Maruzen Petrochemical, and Mitsui Chemical signed an MoU to accelerate carbon neutrality in the Keiyo Rinkai Industrial Complex in Chiba by reducing GHG emissions and transitioning to greener sources of power.
- In 2020, the chemical industry was responsible for 15% of Japan's total CO2 emissions.

  - The plan calls for using biomass instead of oil, to develop and implement new chemical and material recycling, as well as to secure and collect biomass and its wastes.
- TAKEAWAY: Each company has a decarbonization target. In December 2021, Sumitomo Chemical called for decarbonization by 2050. Maruzen Petrochemical follows its parent company, Cosmo Energy Group, to develop decarbonization tech, chemical recycling, and negative emission technologies. Mitsui Chemical also declared carbon neutrality by 2050.

Toshiba completes the last of four TF coils for ITER

(Nikkan Kogyo Shimbun, Feb. 23)

- Toshiba Energy Systems & Solutions (Toshiba ESS) said it manufactured the fourth of four toroidal field (TF) coils for the International Thermonuclear Experimental Reactor (ITER) that's now under construction in France.
- Toshiba ESS makes the world's largest superconducting coils at 16.5 m in height, 9 m in width, and weighing about 300 tons.
- Japan was designated by ITER to supply 8 coils — Toshiba took four, and MHI the remaining four. ITER is scheduled to start operation in 2025.

Kajima won its first JCM for the Senayan Square tender in Jakarta

Company Statement, Feb. 14)

- Kajima Corp was selected by the Joint Crediting Mechanism (JCM) for its commercial buildings in Jakarta, Indonesia – "Senayan Square" where shopping malls, offices, residential areas, and hotels are built.
- This is the first JCM granted for the development of large-scale buildings; the main office buildings are powered by the solar PV power generating system.

Panasonic to sell pure hydrogen fuel cell generators in China from April

(Asia Nikkei, Feb 26)

- Panasonic will start to offer pure hydrogen fuel cell generators in China from April. The tech is an alternative to solar panels for factories and offices.
- The Japanese firm will manufacture the fuel cells at a factory locally. It already sells the fuel cells in Europe together with German partner Viessmann, and in Japan.

DENSO to produce plant decarbonization equipment

(Nikkei, Feb. 22)

- Starting in 2024, Denso will start the production and sale of equipment that can be used in the decarbonization of factories. The company will produce a hydrogen generator that uses electricity to decompose water to produce hydrogen, as well as fuel cells that can generate electricity using multiple fuels, such as ammonia, and CO2 capture equipment.

NEWS: POWER MARKETS

TEPCO pushes forward with safety checks at unit 7 of Kashiwazaki – Kariwa NPP

(Niigata Sogo Television, Feb. 22)

- TEPCO started to verify the safety of the main equipment at Kashiwazaki Kariwa NPP unit 7; for example, checking whether the process to add nuclear fuel into the reactor is functioning properly, and also checking the functioning of the control rods.
- However, since the NRA has prohibited using nuclear fuel at Kashiwazaki Kariwa NPP simulant fuel is deployed during the test. When real nuclear fuel will be allowed onsite is still unclear.

- TAKEAWAY: Faced with rising energy costs and tight electricity supply, the restart of this NPP is a top priority for TEPCO, as well as the for government. The company is doing everything possible to ensure an early restart, and wants to demonstrate its readiness to move forward. The company says it expects to restart Unit 7 in October, but that has yet to be confirmed by regulators.

Mitsubishi Electric acquires Swedish DC circuit breaker developer Scibreak

(Company statement, Feb. 20)

- Mitsubishi Electric concluded a share transfer agreement to wholly acquire Scibreak AB, a Swedish-based company that develops direct current circuit breakers (DCCBs).
- The two firms aim to strengthen the competitiveness of their unified business by working closely on developing DCCB technologies for high-voltage direct current (HVDC) systems to support the increasing global deployment of renewable energy, especially offshore wind power generation.
- HVDC is used for long-distance transmission between offshore and onshore load centers because it offers lower power losses and cost when compared to AC transmission.

- TAKEAWAY: For many years, European companies, especially ABB and Siemens, had a technological advantage in HVDC tech over Japanese companies. This is why Hitachi purchased ABB in 2020. Dr. Tomas Modeer, the founder of Scibreak, worked at ABB before establishing his company in 2014.

- SIDE DEVELOPMENT:
  Mitsubishi Electric to develop insulation tech that can reduce thermal power generation loss
  (Denki Shimbun, Feb. 24)
  - Mitsubishi Electric said it successfully developed a new insulation technology used for turbine generators that can reduce loss of power generation by more than 5%.
  - New resinous material has been developed for insulating the coil of the generator, which can reduce the total amount while keeping insulation capacity. The new material improves generation efficiency and allows the same power generation with less fuel. A typical power generator will be able to reduce more than 1,000 tons of CO2 emission per 1 GWh of generation.
  - Mitsubishi Electric has more than 50% of the domestic market for power generators.

- TAKEAWAY: In 2015, Mitsubishi Electric developed the world's most efficient large-scale thermal power generator. It can use 99% of energy for generation. The new thermal power generation company formed from

MHI, Hitachi and Mitsubishi Electric assets, which is scheduled to be fully consolidated from April 2024, is expected to have a competitive position in international markets.

- TAKEAWAY: Please see this week's Analysis section for a detailed look at the history of the power equipment making sector in Japan.

Hokkaido Electric delays Ishikari LNG-fired units' start and Tomari NPP inspections

(Nikkei, Feb. 24)

- Hokkaido Electric will postpone the start of operations of new LNG-fired units at the Ishikari power plant. The startup of Unit 2 (570 MW) will be delayed four years to 2034; Unit 3 (570 MW) will be delayed two years to 2037.
- The company will also postpone by three months an explanation on issues related to its Tomari NPP. The explanation to the nuclear regulator will now be given in December 2023. Unit 3 of the NPP is under review for a restart.

Pacifico Energy plans a 120 MW solar plant in Yamaguchi Pref.

(New Energy Business News, Feb. 21)

- Pacifico Energy plans a 120 MW solar plant in Shunan City, Yamaguchi Prefecture on about 191 hectares.
- The company will install 221,000 panels with 24 power conditioners that have 3.2 MW output and storage batteries. Commercial operation begins in December 2027.
- The power plant will be built on a former golf course where herbicides were often used. Pacifico Energy pledged to operate the plant without using harmful chemicals.

KEPCO announced a new offshore wind project in Hokkaido

(Company statement, Denki Shimbun, Feb. 22)

- KEPCO plans a 1.8 GW wind power plant off the coast of Ishikari city, Hokkaido. The plan will be reviewed by the METI Minister and the governor of Hokkaido.
- The project would see the installation of up to 130 turbines, with output of 12 to 15 MW; total maximum capacity would be 1.785 GW.
- In the same area, Marubeni and JERA also plan offshore wind farms.
- CONTEXT: *KEPCO plans an additional 5 GW of renewables capacity in Japan by 2040, which would boost its total in the domestic green power sector to 9 GW.*
- SIDE DEVELOPMENT:
  Kansai Energy Solutions to supply renewable energy to Sumitomo Rubber in Thailand
  (New Energy Business, Feb. 24)
  - KEPCO's wholly-owned subsidiary, Kansai Energy Solutions, agreed with Sumitomo Rubber in Thailand to supply rooftop solar power and gas co-generation systems using the Joint Crediting Mechanism (JCM) of the MoE.
  - The project includes 22 MW of solar PV and two units of 6.6 MW gas co-generation systems that will start operation in January 2025. The solar power system is one of the largest built at a single factory.

- Sumitomo Rubber plans to accelerate its energy transition with this project, reducing 38,000 tons of CO2 each year. The factory has already adopted zero carbon electricity using the I-REC (international renewable energy certification) from KEPCO.

J-POWER's Shimamaki Wind Farm begins commercial operation

(Company statement, Feb. 16)

- The Shimamaki Wind Farm in Hokkaido, a J-POWER subsidiary, began commercial operation after revamping the plant with Siemens Gamesa's wind turbines.
- J-POWER owns 28 wind power sites (22 in operation, 3 to be updated, and 3 under construction) with a total output of 662 MW. These wind farms are part of J-POWER's "Blue Mission 2050" plan to achieve carbon neutrality.

Itochu and Shizen Energy to work on grid-scale storage batteries

(Company statement, Feb. 16)

- Shizen Energy (SE) and trading house Itochu signed a MoU to collaborate in the grid-scale storage battery business. SE plans a full-scale entry into the grid-scale storage battery business.
- A demo project in Fukuoka uses a storage battery named "BlueStorage" with a 4.8 MWh capacity (output: 2 MW) that's provided by IBeeT Corp, a JV between Itochu and Tokyo Century Corp. SE will provide the energy management system, "Shizen Connect."
- IBeeT will procure and operate the equipment; SE and Itochu will optimize the storage battery; and SE will use the wholesale and supply and demand adjustment electricity markets to balance the operations of batteries.

Kansai Electric puts marketing on hold until compliance improves

(MBS News, Feb. 24)

- The Representative Executive Officer of Kansai Electric Nozomu Mori said the company will refrain voluntarily from marketing until the end of April, including broadcasting commercials. This move follows direction from METI to improve legal compliance.
- Hosaka Shin, the Commissioner of the ANRE sent a notice to the utility demanding it comply with laws and regulations after it was discovered that staff in its retail department accessed customer information of other market players.
- METI has required Kansai Electric to establish a compliance system.

- TAKEAWAY: Over the past three years, more than 1,600 staff at Kansai Electric repeatedly gained unauthorized access to customer data of new power market players. Since this is the first time for Kansai Electric to voluntarily cease marketing, meeting compliance obligations has been strongly requested.

GE Hitachi Nuclear Energy's SMR will be deployed in Estonia

(Denki Shimbun, Feb. 21)

- GE Hitachi Nuclear Energy's BWRX-300 small modular reactor (SMR) will be deployed by Estonian nuclear startup Fermi Energia.
- The company plans to start operation in late 2031, however they need to get parliament's approval, selection of site, and the development of the proper legal framework before construction starts.
- In September 2022, Fermi Energia said it would accept tenders from three SMR developers: GE Hitachi, NuScale and Rolls-Royce.

- TAKEAWAY: Prior to this order, GE Hitachi Nuclear Energy's BWRX-300 SMR was deployed in the U.S. (TVA / Clinch River site); in Canada (OPG / Darlington site) and (SaskPower / Estevan and Elbow sites); and in Poland (ORLEN Synthos Green Energy / sites to be disclosed in April). Hitachi is currently the most active of the Japanese nuclear vendors on a global stage.

TEPCO to hire 850 people in 2024, the most since 2011 Tohoku earthquake

(Nikkei, Feb. 20)

- TEPCO will hire 850 new graduates and mid-career workers in FY2024, an increase of 100 workers compared to FY2023. This is the largest number since FY2012, when recruitment was temporarily suspended following the Great East Japan Earthquake.
- The employee total at the five TEPCO Group companies at the end of March 2023 will be about 28,000, or nearly 30% fewer than at the end of March 2012. This primarily owes to efforts to streamline management.

- TAKEAWAY Due to a reduction in employees, the transfer of technical know-how among staff is an issue. TEPCO is compensating for a shortage of young employees. It is also trying to thicken its workforce while facing issues such as high fuel costs and electricity prices.

- SIDE DEVELOPMENT:
  Chubu Electric introduces a job-based recruitment system for specialists
  (Company statement, Feb. 21)
  - Starting in April, Chubu Electric Group companies will recruit specialists. They'll be treated according to the concept of a job-based personnel system in career recruitment.
  - A Specialist Employee System for career hires will be introduced, targeting those with advanced skills. Job grades will be set based on descriptions of the work and expected results. Evaluations and compensation amounts will be determined accordingly.

Green Power Investment plans a 37 MW wind farm in Mie Pref

(Kankyo Business, Feb. 21)

- Green Power Investment plans to build the Hiraki Awa #2 wind farm in the Iga and Tsu cities in Mie Prefecture.
- Most of the 157 hectares allocated for the project is classified as water conservation forest and erosion control forest. Neighboring areas are sanctuaries for wildlife.
- The company will conduct environmental studies before starting on the project.

- TAKEAWAY: While the government has called for building more renewable energy capacity, concerns over environmental protection continue to be important. This dilemma might slow construction of new renewables projects as companies are more cautious on what they seek to develop.

TEPCO will use surplus renewable energy to produce chemicals

(Nikkei, Feb. 21)

- TEPCO launched Japan's first project to manage the use of surplus renewable energy power for chemical production.
- The company will collaborate with chemical manufacturer Tokuyama and others. When output from solar and wind power generation increases and power supply exceeds demand, the company's Tokuyama Plant will use the surplus power. Conversely, if supply falls below demand, the company will reduce production and use less electricity.
- CONTEXT: *TEPCO is looking for ways to integrate more renewables into its portfolio while also balancing the power demand and supply in the Tokyo area.*

Hitachi Energy launches next-gen TXpert solution to digitalize transformers

(Company statement, Feb. 22)

- Hitachi Energy launched the next-gen "TXpert Hub", a part of its ecosystem for transformers digitalization. The hub enables monitoring by aggregating, storing, and analyzing information received from the digital sensors of a transformer. This pools data from across many devices, improving efficiency.
- The TXpert system is applicable to all types of transformers – old, new, dry, and liquid-filled, as well as transmission or distribution.

- TAKEAWAY: Up to now, all transformer data such as voltage, current, frequency or impedance have been measured by analogue equipment. Hitachi's new technology can be applied to any kind of transformer and should drastically improve the reliability of power systems.

NEWS: OIL, GAS & MINING

Nippon Steel takes 10% of Canadian coal miner EVR

(Company statement, Feb. 22)

- Nippon Steel acquired 10% of Canadian coal miner Elk Valley Resources for ¥110 billion (C$1.15 billion).
- EVR runs three coal mines with a total output of 25-35 million tons/ year.
- EVR supplies will account for around 10% of Nippon Steel's coal consumption. The mines produce heavy coking coal, which, according to Nippon Steel, is suitable for hydrogen-reduction of iron ore.
- CONTEXT: *Hydrogen-iron reduction is a zero-emission transition technology that is still in the developmental phase and is expected to cut emissions by around 10%. The final goal is hydrogen-iron reduction without any use of coal.*

- TAKEAWAY: High-coking coal prices and the need to replace Russian coal are driving steelmakers to secure new supplies. Nippon Steel spent over ¥100 billion in the last five years for facility upgrades to cut carbon. These costs will eventually be figured into the prices of steel used for vehicles and wind power equipment.

Sumitomo Corp signs sales agreement with U.S. MP Materials for rare earths

(Japan NRG, Feb. 21)

- Sumitomo Corp signed an agreement with U.S.-based MP Materials to sell its neodymium-praseodymium (NdPr) oxide products exclusively to Japanese manufacturers of magnets for cars and wind turbines. NdPr products will be produced at the Mountain Pass facility in California.
- MP is building a facility that separates rare earth elements from concentrate ores, to be completed by April. The U.S. Department of Defense granted $35 million to the project, to process the ore concentrate on-site instead of shipping the raw materials to China.
- Sumitomo's exclusive sales license will not cover lanthanum, cerium, yttrium, samarium and europium, also produced at Mount Pass and used for batteries.
- MP Materials' customers include General Motors which buys Neodymium-iron -boron (NdFeB) supplies on a long-term contract.
- CONTEXT: *The Mountain Pass facility is the largest rare earth production site in the Western Hemisphere, with an annual output of over 40,000 tons/ year. The new processing facility aligns with U.S. government policies to reduce rare earth dependency on China.*

- TAKEAWAY: Sumitomo will also help MP Materials identify outsourcing partners in Thailand, Malaysia and Vietnam to build a global rare earth supply chain from ore extraction to magnet production. As the Mountain Pass output is very large, intermediate processing needs to be split among multiple plants in diverse locations.

LNG stocks rise to 2.63 million tons

(Government data, Feb. 24)

- LNG stocks of 10 power grids stood at 2.63 million tons as of Feb 19, up from 2.57 million tons a week earlier. METI initially reported the Feb 12 stocks were 2.56 million tons but corrected the figure.
- The end-February stocks last year were 1.69 million tons. The five-year average for this time of year is 1.98 million tons.

ANALYSIS

BY YOSHIHISA OHNO

Japan's Makers of Thermal Power Equipment Seek to Confront and Adjust to the Energy Transition

Alongside a national pledge to cut emissions and use more green energy, there's one more indicator that shows Japan's reliance on fossil fuels is on the wane.

At the end of last year, two major Japanese suppliers of equipment for coal and gas-fired plants announced plans to merge their thermal generation business. While both companies have "Mitsubishi" in their name, referring to their roots as once being part of Japan's biggest industrial *zaibatsu* grouping, this is by no means a happy marriage, especially for the employees.

The fact that Mitsubishi Electric and Mitsubishi Heavy Industries (MHI) still went ahead and announced plans to integrate their thermal power business is significant. In a historical sense, it brings the multiple restructurings of the Mitsubishi electrical equipment empire back full circle – almost 100 years on from its first asset split. It also marks a turning point for Japan's power equipment industry, reflecting the global trend of moving away from the burning of fossil fuels for electricity.

In the late 20th century, Japan had enough big players producing equipment for oil, coal and gas-fired power plants to field a sports team. The transition to cleaner energy has put tremendous pressure on the sector, which is now rapidly, if reluctantly, consolidating to survive. But will the merged entities find a place in the energy transition's brave new world?

Background

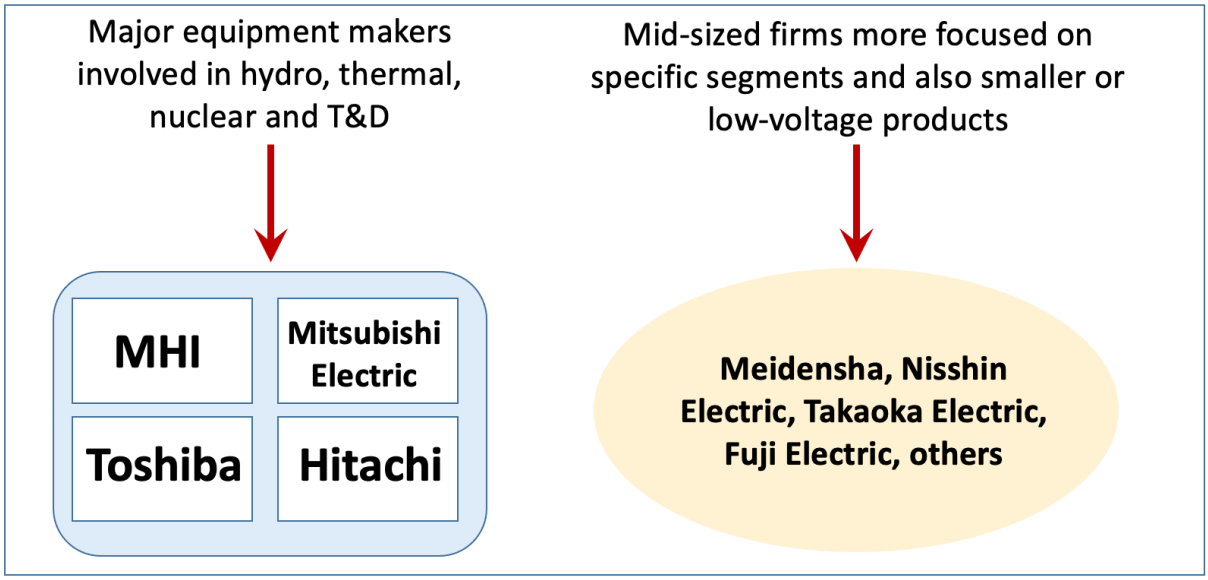
In late December 2022, Mitsubishi Electric and MHI said they'll form a JV to integrate their respective thermal power technologies and assets. Mitsubishi Electric is expected to be the majority shareholder of the new company, the name of which is still not known, and the merger is expected to be completed by April 2024.

The companies seek to improve competitiveness in a world focused on carbon-neutrality by pooling resources, which would help them offer cleaner thermal power products; for example, by helping to convert thermal plants to burn hydrogen and ammonia.

Mitsubishi Electric was created in 1921 when the electrical equipment business of MHI (then known as Mitsubishi Zosen) was spun off. Post-war Japan saw the power industry dominated by four major companies and several second-tier suppliers. As the economy grew rapidly after the war, demand for power also increased, continuing to the very end of the 20th century.

Many companies supplied equipment to produce electricity and also transport it (known as Transmission & Distribution, or T&D). First, there were the big players, including Toshiba, Hitachi, MHI and Mitsubishi Electric, that supplied equipment for large power plants and substations. Then, there was a group of smaller players that

were also specialists in certain areas. This group included Meidensha, Nisshin Electric, Takaoka Electric and Fuji Electric.



Source: Japan NRG

However, the domestic market started to shrink as it became saturated and Japan's population started to decline. Today, the volume of orders inside Japan can't support this many firms, while competition for projects abroad has grown fierce. In the past two decades, highly competitive players in this sector have emerged in other countries in Asia and elsewhere, causing the global market share held by Japanese companies to decline.

After a big bang-like explosion a century ago, Japan's power equipment space is shrinking.

The collapse

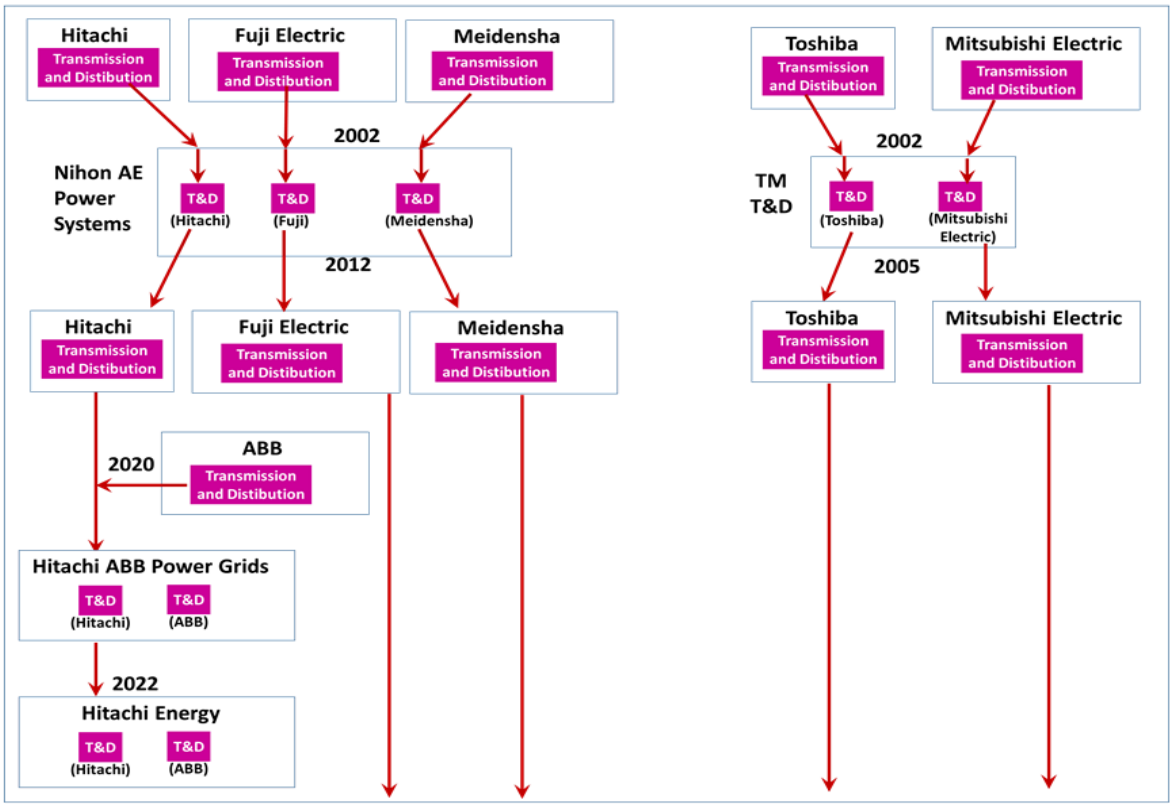
In July 2001, Hitachi, Fuji Electric and Meidensha merged their power T&D businesses to form Nihon AE Power Systems, with the following share structure: Hitachi 50%, Fuji 30%, and Meidensha 20%. This merger was an attempt to manage decreasing domestic demand. A decade later, however, even this entity was dissolved.

In April 2002, just one year after the creation of Nihon AE Power, Toshiba and Mitsubishi Electric also merged their assets in the same space to form TM T&D, an equal partnership. That company, however, had an even shorter life, folding in March 2005.

Why were those power T&D mergers unsuccessful? In part, it was likely due to an overt focus on the domestic market, which at the time still looked healthy if subdued. Also, the combinations did little to bolster Japanese competitiveness overseas.

In the case of TM T&D, for example, the product lineup of the two parent companies had a lot of overlap: both made transformers, switchgears, distribution equipment and power systems. In such cases, engineers and sales teams from each side try to protect their own tech and get embroiled in internal struggles. At the same time, what the

merger failed to do was offer a new leap in technology or improved business efficiency.

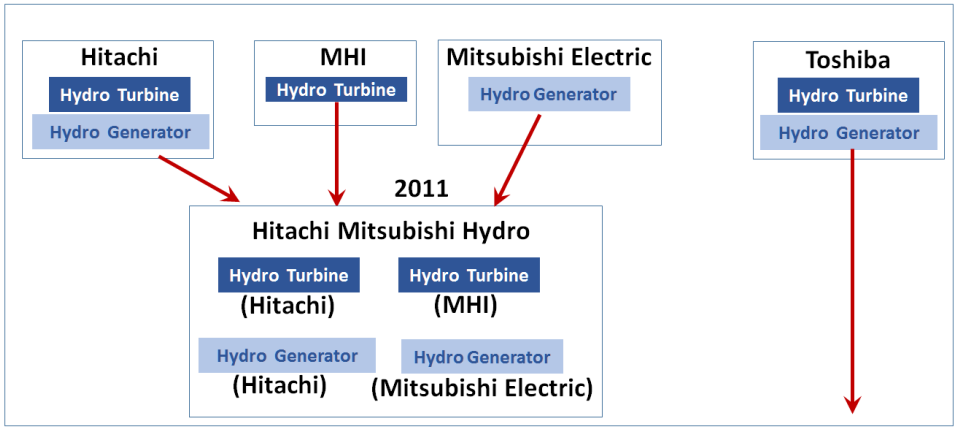


Source: Japan NRG

Hitachi began to suspect that it needed to look for inspiration elsewhere and broke away from Fuji and Meidensha.

Meanwhile, Japanese equipment makers looked to make gains through restructuring in the power generation side of the business.

In October 2011, the hydro assets of Mitsubishi Electric, MHI and Hitachi merged to form Hitachi Mitsubishi Hydro Corporation. (Hitachi with a 50% stake, Mitsubishi Electric 30%, and MHI 20%). Hitachi supplies both water turbines and generators, MHI supplies only water turbines and Mitsubishi Electric supplies generators.



Source: Japan NRG

Most suitable sites in Japan for large hydro power stations were already developed, but this segment continued to bring in decent revenue from maintenance work. It was a neat solution for a small segment, but all parties knew that the overall impact would be small. So, industry players turned to big-ticket overseas M&A as their next solution.

This precipitated the nadir for power equipment makers in Japan.

Nuclear fallout from investment

When nuclear energy came back in vogue around the mid-2000s thanks to a rethink over new plant construction in the U.S. and elsewhere, as well as the emergence of China as a major new investor in atomic stations, Toshiba decided to make a big bet on the sector. After all, a nuclear power plant also contains a lot of equipment that's utilized in a thermal power plant. It seemed a logical next step.

Toshiba was already a major supplier of BWR reactors, one of the two dominant technologies globally. But China and other new entrants to the nuclear arena seemed more inclined to base their nuclear programs around PWR, the other mainstream tech. And so, in 2006 Toshiba struck a $5.4 billion deal to buy Westinghouse.

Westinghouse, then owned by British Nuclear Fuels, had struggled for decades but was on an upward trajectory having become one of the new foreign firms allowed to win orders to build reactors in China. The prospect of entry to such a potentially large market, and holding the keys to both PWR and BWR technologies, pushed Toshiba to outbid GE and MHI and pay triple what Westinghouse was initially expected to cost.

Unfortunately for Toshiba, the deal spectacularly unraveled. The flood of Chinese reactor orders never materialized as Beijing simply took over Westinghouse IP. Construction projects in the U.S. stalled. Culture clashes between Toshiba and Westinghouse foiled progress. Then came the news of accounting irregularities that turned into billions of dollars in losses for Toshiba. Westinghouse finally filed for bankruptcy in March 2017.

On a less grand scale, MHI saw its own nuclear ambitions sour. The company secured an order for four reactors in Turkey and planned to partner with France's Areva in the project. Construction costs doubled, however, and MHI and Areva both pulled out in 2018. Since then, MHI has not secured any major nuclear orders for their traditional PWR reactors.

The less "glamorous" path

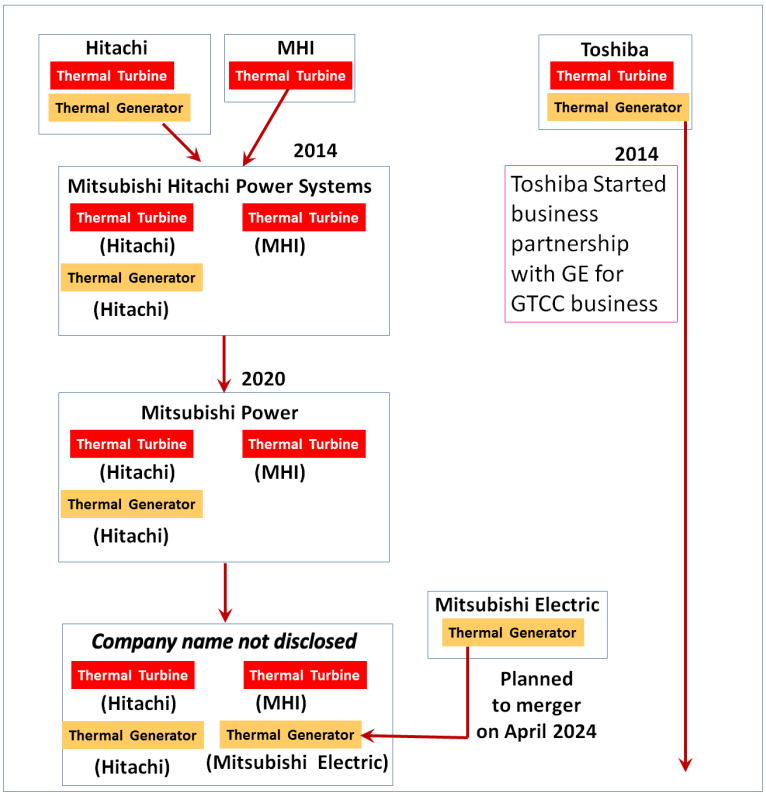
At first, Hitachi fared just as poorly as its domestic industry peers. A post-Lehman global slowdown hit the engineering group hard. In 2009, it posted a ¥787 billion loss, the biggest by a Japanese manufacturer and the second biggest by a Japanese company.

This led to hard choices. In nuclear, Hitachi decided to pool its business with GE, becoming very much the junior partner in the global market (while retaining a stronger presence in the domestic nuclear sector).

More significantly, Hitachi decided to refocus resources from generation to T&D, but

this time through international alliances. After years of searching for the right fit, Hitachi made a record acquisition for a Swiss firm that makes high voltage DC (HVDC) transmission infrastructure, transformers, and control systems. In 2018, Hitachi agreed to pay $6.85 billion for about 80% of engineering conglomerate ABB's power grid business. In 2022, Hitachi exercised a $1.68 billion call option to buy out ABB's 19.9% stake in the joint venture, claiming full ownership of the entity, which has since been renamed Hitachi Energy.

In the last five years, profit attributable to Hitachi's shareholders is up 60%.



Source: Japan NRG

Reinventing themselves

Today, Japan's power equipment makers are looking to reinvent themselves for the net-zero era. Rounds of restructuring, resource consolidation and M&A have made the companies more focused, although the ongoing troubles at Toshiba indicate that this process is likely not over.

So, where are these companies heading? MHI has clearly aligned itself with the latest nuclear renaissance and is the most likely vendor to build new reactors in Japan over the coming two decades. After all, it has performed the lion's share of maintenance work on existing units nationwide in the last decade.

Meanwhile, MHI has poured more resources into development of hydrogen-fired generation, promising commercial-scale turbines and other equipment ready to run on ammonia or hydrogen fuel by 2025. It is also involved in several CCS test projects in Japan and has orders for the technology from power plants around the world. Perhaps even more telling is the fact that MHI has spun off its conventional thermal power business.

Hitachi poured its thermal power assets into a JV with MHI and then sold out; today, it is more of a software-led engineering firm with interest in T&D, energy systems, optimization, renewables and EV integration and carbon solutions. Hitachi is also developing ammonia co-firing technologies.

The merger of assets by Mitsubishi Electric and MHI shrinks the product and service options in pure thermal power even further. The two say they are interested in transforming thermal plants to burn carbon-neutral fuels including hydrogen and ammonia. That makes sense since Japan plans to decommission almost 27 GW of oil, gas and coal-fired capacity this decade. While some new thermal stations will be added, the net capacity loss should be around 17 GW, based on METI data.

In recent history, Japanese manufacturers have struggled to put aside former rivalries and learn to survive together. Almost no one buys a Japanese branded smartphone anymore. The makers of power equipment have taken hard decisions, scrapped once untouchable assets and boldly selected new paths. Now they need their people to do the same.

ENERGY JOBS IN JAPAN

BY ANDREW STATTER

Column: Hiring the Wrong Person - Letting Employees Go in Japan

Regardless of the stringency of the interview process, the effectiveness of aptitude tests and the quality of references from a candidate, it's still possible to make the wrong hire. There's only so much that can be discerned through the interview, and sometimes those who have the hard skills and track record simply don't adjust into the speed, style or culture of your business.

To make matters more complicated, Japan's energy workforce is now facing a major transition. This was traditionally a sector run by large corporations and utilities. But over the last decade it has fragmented into a number of smaller domestic and international players. Many highly-qualified professionals have spent their entire career in one company, which makes gathering reference checks troublesome and poses challenges for people to adjust to a new corporate culture and way of working mid-career.

What's more, letting people go in Japan is no easy feat. So here are the key points to keep in mind before and after things come to such a conclusion.

Letting go of an employee in Japan

Japanese labor law is highly protective of employees, making it more difficult to fire them in comparison to the U.S. and other markets. All employment contracts are superseded by Japanese Labour Law, which can effectively mute clauses in the contract. A key example of this is probation periods. Typically, we see a three- or six-month probation period in a full-time contract; however, under law, once an employee has been employed for a period of two weeks, they are protected by labor law, and the contract cannot be instantly terminated as is often stipulated.

In order to let an employee go over poor performance or discipline violations, the matter must be clearly proven. While cases of severe misconduct can warrant instant dismissal, when it comes to minor infractions or underperformance, employers must move slowly and carefully. This includes meetings, warnings, and support from the company to help the employee improve over a period of months.

In both cases, the employer is required to give 30 days' notice and pay the employee during that time. Like many things in Japan, details on how long, and what level of warnings must be given are vague. For a more comprehensive overview, we suggest speaking to a labor lawyer before taking decisive action, since the majority of unfair dismissal lawsuits go the way of the employee.

A negotiated voluntary resignation is the most common and effective method to release an employee in Japan. In this case, the employer will need to privately speak with the employee, explain the reasons for which they wish to end the employment, and compensate the employee for their voluntary resignation. This will come with costs: months of salary, accrued bonuses, buyout of annual leave, and etc.

Contract labor force

For construction and engineering, Japan has a relatively mature contract labor market that can readily move around the country for work on project sites. However, the contract employment market for highly skilled workers in finance, law, project management, and etc., is very narrow. This is in large part due to a cultural adversity to perceived risk and instability. In addition to cultural or social pressure, it can be more difficult for contract employees to get access to financing for home loans, approvals for rental properties, entrance for children to schools of choice, and etc.

There's some opportunity to hire talent in more white collar, headquarter functions. However, this tends to be for either top level professionals who come with a high price tag, or well-connected experts who are close to or beyond standard retirement age.

Severance payments

Again, Japanese labor law tends to be quite vague when it comes to how much should be paid to workers during layoffs in cases of downsizing, market exit or strategic shifts in the business.

While we've seen cases of companies paying out severance as low as the legally required 30 days, this is on the low side and tends to anger and disappoint employees. Though a company is unlikely to face legal action for this, be careful, because the industry is small. People talk to each other. So, in order to protect your brand and corporate reputation, we advise against paying such a low amount, especially if you plan to remain in Japan's market.

On average, the market standard is a package of between three to six months, depending on the employee's position, length of service and contribution. Also, just like with letting an employee go over poor performance, resolving this matter via a negotiated voluntary resignation is the most painless option.

If the employer is downsizing for economic reasons, a key point to bear in mind is that you'll need to prove that other cost reduction measures have already been implemented. These may be reducing working hours, cutting executive pay, business trips, and etc.

Risk mitigation strategy

As mentioned earlier, probation periods are rendered mute as labor laws protect employees two weeks after starting. An option available to employers is to offer a three- or six-month fixed contract, with the option to move to full-time employment upon successful performance during the contract period. In this case, there's no obligation to renew, or offer full-time employment, effectively giving an option to cease employment after expiry of the initial contract.

Point to bear in mind, though: Japanese are typically risk-averse, and this strategy is still not widely used, meaning that if a company is making an offer to a candidate with multiple offers, this may reduce the chances of a successful close. Also, we advise to clearly state, in written form at the time of offering the initial contract, the full-time employment conditions, including salary, bonuses, annual leave, benefits, etc.

Case study A:

Private equity backed infrastructure developer | All positions

One of our early clients has been employing this strategy with all hires. Initially, people are employed on a six-month contract, with full insurance and medical benefits. The offer letter clearly states the conditions for full-time employment so that the employee knows what to expect. This company is not concerned about the risk of losing some candidates who are not keen on an initial contract without guarantee of full-time employment. Their position is that they're fostering a performance-based, results-focused culture, and a lean, high-performing team. Therefore, they wish to attract only those with confidence in their ability to deliver.

Case study B:

Private equity solar and storage project developer | Country Manager & Head of Development

Some years ago, we supported a new firm to enter the Japanese renewable energy market when it needed to hire an initial senior leadership team. The company wished to hire professionals who were well connected and could add value very quickly. The hires were initially given a three-month contract with a reasonable monthly salary and performance targets to hit before being considered for full-time employment.

This narrowed the candidate pool, as only those who could deliver quickly and had a high-risk appetite, were eligible. An interesting twist was the power placed in the candidate's hands. By performing well and bringing projects forward to acquire and develop within that three-month period, candidates were able to make a case for themselves and greatly increase their bargaining power for package negotiations when it came time to raise the issue of full-time employment.

We see this strategy most often implemented with project developers and private equity investors. This can be an excellent risk mitigation tool for professionals who are in highly 'pay for performance' positions, such as development and acquisition. However, in more stable functions it can be harder to attract talent.

Ultimately, Japan is a market that best rewards a long-term view. The same is true in the hiring and firing part of it. However, starting a new office or building from a small team gives you the ability to set the tone and mold a culture in line with your business targets.

GLOBAL VIEW

BY JOHN VAROLI AND FILIPPO PEDRETTI

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.*

Australia/ Energy transition
Resolving congestion on the main electricity grid was top of the agenda at the first meeting of federal, state and territory energy ministers in 2023. The gathering approved changes to reduce lost electricity and lower the risks for clean energy investors. The government also plans to push for a separate national green hydrogen strategy.

China/ Commodities trading
A subsidiary of CNIC Corp bought an approximate 5% stake, worth about $220 million, in Swiss-based global energy trader Mercuria. China seeks to hedge its global interests against possible Western sanctions due to its support for Russia in its conflict with NATO.

EU/Gas supplies
While Europe had a mild winter with gas storage close to record levels, it faces another costly race to replenish reserves. While prices have eased to around €50/ MWh from last August's peak of more than €340, they still remain above historic averages.

France/ Climate lawsuit
Three climate activist groups took legal action in a Paris court against BNP Paribas, alleging that the bank's loans to big oil and gas companies breach laws that protect the environment.

Indonesia/ Carbon trading
Indonesia launched the first phase of mandatory carbon trading for coal power plants. The first stage of a carbon trading mechanism will cover 99 power plants with a total installed capacity of 33.6 GW. Coal makes up more than half of Indonesia's power generation.

Methane emissions
The fossil fuel industry is failing to tackle methane emissions despite pledges to fix leaking infrastructure, said the International Energy Agency (IEA). In 2022, the global energy industry released into the atmosphere some 135 million tons of methane.

Sri Lanka/ Wind power
The Board of Investment approved two wind power plants by India's Adani Green Energy with a total investment of $442 million. The two wind farms will have a total capacity of 350 MW and will be operational by 2025.

Vietnam/ Wind power
EU manufacturers might make major investments to build wind turbine plants. The Southeast Asian country is seen as a potential major player because it has strong winds in shallow waters near densely populated coastal areas, reported the World Bank.

UK/ Energy subsidies

The UK government announced measures to help more than 300 energy-intensive companies which are dealing with high power costs. The targeted manufacturing sectors include steel, metal, paper, and chemicals.

Pakistan/ Coal power

Pakistan intends to quadruple its coal-fired power from 2.31 GW to 10 GW after deciding not to build new gas-fired plants. The country experienced severe blackouts after not being able to procure required volumes of gas or LNG last year. Pakistan needs to cut electricity costs and is facing a severe foreign exchange crisis.

EU/ Carbon market

Europe's carbon price hit an all time high of €100 ($106.59) as its economy starts to recover. Demand for carbon contracts is increasing as many anticipate that industrial companies will restart production. At the same time, the prospect of tighter climate regulations means that pollution rights may be less available in the future.

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 (late January) ○ 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 ○ 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

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
November	○ COP 28 (November 30-December 12) ○ U.S. hosts the APEC summit in San Francisco
December	○ ASEAN-Japan summit to mark 50 years of cooperation ○ Last market trading day (December 30)

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