JAPAN NRG WEEKLY

JANUARY 14, 2025

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ANALYSIS

NUCLEAR CRISIS IN JAPAN: OLD IDEAS HOLD BACK SECTOR FROM AIDING NET-ZERO

This is an opinion column from former head of the International Energy Agency, Nobuo Tanaka. He asks if Japan is losing its nuclear capability for peaceful purposes, noting that the country's post-war strength in this sector has eroded since 2011. For now, the interim solutions are extending the lifespan of existing reactors, but this does little to build the future of nuclear power generation in Japan. What's worse, while the Japanese nuclear sector is fixated on past business and technological models, other countries are moving on.

HEADWINDS IN OFFSHORE WIND SHOW VALUE OF RISK MANAGEMENT AND GOOD PLANNING

No sooner had Japan announced the results of Round 3 offshore wind auctions, than attention shifted from the big wins for JERA and Marubeni to the fact that many of the major industry players abstained from bidding. Media reports of potential losses for winners of Round 1 followed. Pundits questioned Japan's ability to meet its wind capacity goals for 2030, while developers bemoaned the weak yen and supply chain headaches. So, is Japan losing its allure as a lucrative destination for offshore wind power? Au contraire.

ASIA PACIFIC REVIEW

This column gives a brief overview of last week's top energy stories from across the region

JAPAN NRG WEEKLY

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OFTEN-USED ACRONYMS

METI	The Ministry of Economy, 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

MLIT, MoE tap 16 projects to promote zero-emission ship building

(Government statement, Jan 9)

- MLIT and MoE announced 16 projects under the Zero-Emission Ship Construction Promotion Project. These include:
- 1) Hydrogen engine / FC system / hydrogen supply equipment: Yanmar Power Technology; 2) Ammonia engine: Japan Engine Corp, Daihatsu Diesel; 3) Ammonia/hydrogen engine parts: Volcano, Nippon Nozzle Seiki
- The goal is to reduce CO2 emissions while also strengthening the international competitiveness of Japan's shipbuilding industry by building a supply base for zero-emission ships that use ammonia, hydrogen fuel, etc.
- The government will cover part of the costs to develop production for engines, fuel tanks, fuel supply systems, etc to build zero-emission ships, and to develop facilities for installing this marine equipment on ships.
- CONTEXT: *MLIT sees conversion of ship fuel as a chance for Japan's shipbuilding industry to make a breakthrough and "secure a top share of orders for next-gen ships for the maritime industry by 2030". Japan's shipbuilding and marine equipment industries will invest over ¥120 billion in production and will significantly increase capacity to build ships that run on ammonia fuel and other clean fuels, as well as to produce zero-emission engines and other products.*
- SIDE DEVELOPMENT:

  J-ENG's ammonia-fuel engine approved for zero-emission ship

  (Company statement, Jan 9)
  - Japan Engine Corp (J-ENG) was chosen as part of the "Zero-Emission Ship Construction Promotion Project" to expand production capacity for ammonia fuel engines.
  - J-ENG plans to complete its first full-scale ammonia fuel engine in 2025, with operational trials in 2026. Investment could total ¥20 billion by 2028, including ¥6.64 billion in state subsidies.
  - The company plans to increase the share of new fuel engines from 10% to 40% by 2033, and to 100% by 2040. By 2050, the company seeks to produce 100 ammonia fuel engines annually, capturing a 20-30% global market share.
- SIDE DEVELOPMENT:

  Yanmar Power advances hydrogen fuel systems for zero-emission ships

  (Company statement, Jan 9)
  - Yanmar Power Technology's new production plan for hydrogen fuel engines and fuel cell systems was approved on Jan 9, as part of the Zero-Emission Ship Construction Promotion Project.
  - Yanmar aims to accelerate its 2050 production target for hydrogen fuel engines to 2040. By 2045, it plans to achieve 100% carbon-neutral marine power products, in line with the International Maritime Organization's GHG reduction strategy.

The Sustainable Open Innovation Initiative selects 27 grid-scale BESS projects

(Company statement, Dec 23)

- The Sustainable Open Innovation Initiative (SII) selected 27 grid-scale energy storage projects, providing grants totaling ¥34.6 billion in the FY2024 round of the "Energy-Saving Investment Promotion & Demand Structure Transformation Support Project".
- This program is for advanced equipment and other solutions offering clean tech and energy-saving performance, selected by ANRE under METI.

	Project owner	Location	Subsidy amount (¥)
1	JAPEX	Hokkaido Pref	1,862,934,438
2	Terras Energy	Hokkaido Pref	820,233,710
3	Tokyo Century; JFE Engineering	Hokkaido Pref	1,558,110,000
4	Yonden Engineering; Asunaro Aoki Construction; East Japan Railway; Japan Green Investment Corp for Carbon Neutrality; JR-East Energy Development; WWB; Chubu Plant Service; Mitsubishi Research Institute; GS Yuasa	Hokkaido Pref	1,046,732,850
5	Tokyo Gas, Okaya	Hokkaido Pref	2,257,148,025
6	Mitsuuroko Green Energy	Hokkaido Pref	162,322,823
7	Mitsuuroko Green Energy	Hokkaido Pref	162,330,738
8	Eurus Energy	Hokkaido Pref	3,346,205,000
9	NTT Anode Energy	Hokkaido Pref	1,947,501,895
10	Banpu Japan	Fukushima Pref	1,952,952,144
11	Kurihalant	Ibaraki Pref	132,305,066
12	Q.ENEST	Tochigi Pref	113,612,197
13	Q.ENEST Ready	Chiba Pref	115,343,964
14	Enewill	Kanagawa Pref	2,762,814,750
15	Shizuoka Gas & Power	Shizuoka Pref	1,224,469,000
16	Diamond Energy Storage 1	Aichi Pref	2,808,885,577

17	au Renewable Energy	Mie Pref	2,834,005,607
18	Itami Sangyo	Hyogo Pref	1,127,565,350
19	Kurihalant	Hyogo Pref	280,918,601
20	ML Power (Mizuho Group)	Hiroshima Pref	1,189,500,000
21	Chugoku Electric	Yamagichi Pref	1,959,900,000
22	Renewable Energy Development	Fukuoka Pref	168,326,182
23	Daiwa House Industry	Fukuoka Pref	140,093,905
24	J-Power	Fukuoka Pref	736,620,938
25	Tokyu Land; IBeeT; Akaysha Energy Japan	Fukuoka Pref	1,544,006,935
26	Shin-Idemitsu	Kumamoto Pref	322,209,999
27	Banpu Japan; Fuyo General Lease; Global Engineering	Miyazaki Pref	2,072,676,500

ANRE, JOGMEC update application rules for low-carbon fuel price difference support

(Government statement, Dec 26)

- ANRE and JOGMEC updated application information for the Price Difference Support Program of the Low-Carbon Hydrogen etc Supply Chain Development Support Project.
- CONTEXT: *This is popularly known as the Contract for Difference (CfD) program.*
- ANRE added new questions and answers to the FAQ sheet, and also added examples to the application form instructions. The main additions are the timing and frequency of grant payments, eligible expenses, calculation of standard prices, and conditions related to SPCs.
- JOGMEC announced the subsidy grant regulations and prepared the format of the application form. The companies that have applied to METI and have been certified through the screening process will submit this grant application to JOGMEC.
- The application form includes the amount of subsidy requested for each year based on the business plan submitted to METI.
- CONTEXT: *On Oct 23, 2024, the day the Hydrogen Society Promotion Act came into force, ANRE unveiled a website to provide information on support projects, and on Nov 22, applications for the Price Difference Support Program (CfD) began.*

- TAKEAWAY: The fact that JOGMEC announced the subsidy regulations more than a month after METI began accepting applications means that some companies will soon be certified by METI. Applications to METI will be accepted until late March 2025, but the contents of the business plans are reviewed in the order of application. Certified companies will have to prepare a new application form and undergo a review by JOGMEC; it's unclear how long it will take to decide on the grant.

METI to provide subsidies to five firms engaged in battery production

(Nikkei, Dec 20)

- METI will provide up to ¥25.5 billion in subsidies to five firms engaged in battery production and tech development.
- This is the fourth round of battery-related support under the Economic Security Promotion Act, and the first for production facilities related to solid-state batteries.
- Idemitsu Kosan will receive funding to set up facilities for producing lithium sulfide for solid-state batteries in Ichihara City, Chiba Pref. Operations are scheduled to begin in October 2027.
- Mitsui Mining & Smelting and Toyo Kohan were approved for projects focused on developing materials for solid-state batteries aimed at mass production.
- Mitsubishi Chemical will establish production facilities for natural graphite-based anode active materials. Production is set to begin in October 2026.
- Chizu Electric will receive support for its battery manufacturing equipment.
- CONTEXT: *Solid-state batteries are seen as a key component in the future of energy storage and electric vehicles. This also underscores Japan's efforts to strengthen its economic security and reduce reliance on overseas supply chains in key industries.*

J-Power among developers of environmental value platform for renewables

(Company statement, Jan 6)

- J-Power has partnered with three firms to develop an environmental value platform for renewables and reducing fossil fuel usage. The project assigns time value.
- The other firms are: Industry One, which is the core company in the digital solutions business of Mitsubishi; NSW, an IT solutions provider; and Scalar, a startup that develops database middleware.
- The platform claims it can process high-volume transactions and safeguard power generation data. The goal is to accurately record the time that non-fossil power sources generate power and link that data with demand data to assign the environmental value of each time period. It will reflect the different energy mixes in each time period to accurately calculate the non-fossil fuel ratio.
- CONTEXT: *Current practice of using non-fossil certificates without time-based verification makes it hard to ensure in real-time that the electricity comes from renewable sources. For instance, relying solely on solar power increases the use of CO2-heavy thermal power at night. To encourage renewable energy use around the clock, it's crucial to align environmental value with supply and demand by time.*

MOL inks MoU to develop green shipping corridor linking Portugal to North Europe

(Company statement, Jan 9)

- Mitsui O.S.K. Lines (MOL) inked an MoU with Madoqua Renewables and others to establish a green corridor connecting Portugal to Northern Europe. The initiative aims to use low-emission shipping solutions and transport low-carbon fuels.
- Madoqua is a Dutch-Portuguese renewable energy developer. It will coordinate the project, which involves several stakeholders — financial partners, terminal operators, green fuel producers, and alternative fuel users.
- MOL will provide strategic insights into green fuel logistics and operational needs.

EV sales drop 33% in 2024, marking first decline in four years

(Asia Nikkei, Jan 9)

- Japan's EV sales fell 33% YoY to 59,736 units in 2024, reducing EVs' share of total vehicle sales to under 2%, the lowest among advanced economies.
- Nissan Motor, with about half the EV market, saw sales drop 44% to 30,749 cars, posting significant declines for both the Sakura (-38%) and Leaf (-48%).
- Toyota's total EV sales fell 30% to 2,038 units; Mitsubishi Motors saw a sharper 64% decline, selling 2,504 cars.
- Chinese and South Korean brands gained market share, with BYD posting a 54% increase to 2,223 cars, which is almost 40% of Tesla's sales in Japan.

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Marubeni invests in UK's Altilium that's active in Li-ion battery recycling tech

(Company statement, Jan 7)

- Marubeni joined a $5 million third-party capital increase for UK-based Altirium Metals, a company specializing in Li-ion battery recycling tech.
- Marubeni did not disclose the percentage of shares acquired but highlighted its anticipation of growing demand for battery recycling with the expansion of EVs.
- CONTEXT: *Founded in 2020, Altirium Metals has developed tech to extract raw materials like sulfates from used Li-ion batteries. Unlike conventional recycling methods that use gas to remove impurities, Altirium uses a chemical treatment process, which reduces the CO2 emissions of recycling. It plans to open a facility in the UK by the late 2020s, processing batteries from around 150,000 EVs per year.*

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Report on an interlaboratory comparison with the IAEA

(Government statement, Jan 6)

- The International Atomic Energy Agency (IAEA) has been conducting interlaboratory comparisons (ILC) to help Japan ensure transparency in monitoring coastal waters. Recently, the IAEA published results of the ILC held in 2023.
- The IAEA said that Japanese laboratories conducting marine monitoring continue to exhibit high levels of accuracy and technical capability.
- A separate report on ILC results related to the monitoring of ALPS-treated water will be released by the IAEA at a later date.
- CONTEXT: *Since 2014, the IAEA has organized ILCs to ensure transparency in monitoring. In 2023, experts from the IAEA, Canada, South Korea, and China participated in an ILC, with a joint sample collection in October.*

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Air Water to launch 'green' industrial gases

(Nikkei, Jan 7)

- Air Water plans to launch 'green industrial gases' that achieve net-zero CO2 emissions during the production of nitrogen and oxygen supplied to factories.

- CONTEXT: *Nitrogen is essential for preventing semiconductor wafer oxidation. Oxygen is crucial for processes like melting iron. Transitioning all electricity used in industrial gas production to renewable energy is cost-prohibitive. This is Japan's first practical example of green industrial gases.*
- The firm will produce the gases at its Hirakata Plant (Osaka Pref). The separation of nitrogen and oxygen from air requires significant electricity.

Kanadevia Inova acquires Iona Capital and UK biogas portfolio

(Company statement, Jan 7)

- Kanadevia Inova acquired London-based Iona Capital (ICL) and its portfolio of renewable gas plants in the UK. The acquisition adds 11 operational biogas plants to Kanadevia Inova's portfolio, now totaling 18 plants.
- A pipeline of projects across Europe (Netherlands, Italy) and the U.S. enhances the company's market presence. ICL's team and expertise will integrate into Kanadevia Inova's Asset Management unit.
- CONTEXT: *In October, Hitachi Zosen Inova was rebranded as Kanadevia Inova.*

Breakthrough in green hydrogen catalyst evaluation

(Nikkei, Jan 8)

- NIMS researchers developed a technique to measure local pH changes at electrode interfaces, improving the evaluation of oxygen evolution reaction (OER) catalysts for green hydrogen production.
- Current electrolyzer catalysts rely on scarce, expensive platinum-group metals. The research focuses on developing cost-effective alternatives using abundant elements like iron and zinc.

Panasonic to launch hydrogen-powered energy solution for office building

(Company statement, Jan 8)

- Starting spring 2025, Panasonic will install a renewable energy system at one of its office buildings in Ottobrunn, Germany, combining solar panels, new pure hydrogen fuel cells, and storage batteries.
- Panasonic has deployed similar hydrogen-based solutions in its Japanese and UK factories. The German project introduces a new 0.01 MW fuel cell model.
- This is Panasonic's first hydrogen-powered energy project targeting an office building.

Hitachi Energy to improve energy efficiency of Munich's S-Bahn

(Company statement, Jan 8)

- Hitachi Energy won an order from Siemens Mobility to deliver 360 RESIBLOC Rail dry-type onboard traction transformers for upgrading the S-Bahn München rolling stock in Bavaria, Germany.

- These transformers will improve energy efficiency and reduce environmental impact.
- Siemens Mobility will deliver 90 new S-Bahn trains as part of an extensive project to upgrade Munich's S-Bahn.

NEWS: ELECTRICITY MARKETS

LTDA clean power capacity auction to start later this month, 5 GW to be offered

(Japan NRG, Jan 10)

- Round 2 of the bidding in the LTDA (Long-term decarbonization power source auction) is due to start on Jan 20, with strong interest expected from the battery/ BESS and nuclear sectors especially.
- Total capacity on offer will be 5 GW, up from 4 GW in Round 1 (excluding LNG-fired capacity).
- For batteries and pumped storage, the minimum capacity for bidding has been changed from 10 MW to 30 MW, and the application quota and upper limit are set according to operation duration (750 MW for storage durations of 3 to 6 hours, and the same for storage of 6 hours or more; total – 1.5 GW).
- The auction has updated criteria for other generation types. These include:
    - Boosting nuclear's cap to 2 GW and allowing the money to cover investment in the safety upgrades of existing facilities;
    - Allowing ammonia / hydrogen co-firing to include fuel costs as part of the fixed cost calculations (up to a maximum value);
    - Adding 4 GW as a separate cap to the 5 GW specifically for LNG-fired thermal power plants; the previously allocated 6 GW for the sector was almost entirely used up in Round 1.

- TAKEAWAY: Several developments in power markets this year will be encouraging for BESS operators on top of existing opportunities. In the Balancing/ Ancillary products market, there'll be a change starting April to the bidding unit and response time for the Replacement Reserve for FIT, the category known as Balancing Capacity III (2) or ３次調整力（２）in Japanese. Currently, generation units that qualify need to startup within 45 mins and offer 3 hours of service. That will change to activation within 60 minutes and bidding via 30-minute segments. There is also expected to be progress towards the creation of a so-called simultaneous market that would combine the bidding of volume (kWh) with adjustment capacity (delta kW). Finally, more T&D firms are expected to offer contracts to pumped hydro facilities to secure last-minute reserves.

Hamaoka NPP faces a key year 2025 to put itself on path to restart

(Nikkei, Dec 10)

- 2025 is a crucial year for plans to restart Hamaoka NPP in Omaezaki, Shizuoka Pref. The NRA began plant inspections; plans to raise the height of the tsunami breakwater are under review. The timeline and costs for these upgrades must be finalized.
- Chubu Electric proposed raising the breakwater to 28 meters; NRA feedback is set for the end of 2025. If no objections arise, Chubu Electric could finish construction on schedule and budget.
- Plant inspections will conclude by 2026. Completion of the breakwater would pave the way for a potential restart.
- Funding for the breakwater upgrades could cost ¥180 billion. Chubu Electric, despite its strong financial position, may need to issue bonds to pay for the project.

- CONTEXT: *Chubu Electric is expanding its renewable energy portfolio, focusing on offshore wind power. The company is developing floating wind turbine projects off the coast of Goto City in Nagasaki Pref.*
- SIDE DEVELOPMENT:
  Chugoku Electric resumes commercial operation at Shimane NPP
  (Company statement, Jan 10)
  - Chugoku Electric said Shimane NPP Unit 2 (BWR, rated output: 820 MW) resumed commercial operation on Jan 10.
  - This follows the completion of a comprehensive load performance test held the same day. The NRA issued the pre-use inspection certificate, enabling the transition to commercial operation.
  - CONTEXT: *The load performance test is the final stage of inspections. It confirms the functionality of the plant under operating conditions.*

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Hokuriku Electric tender to enhance grid stability with land leasing for storage batteries

(Company statement, Dec 20)

- Hokuriku Electric Power Transmission & Distribution began its first public tender for leasing substation land to install grid-use storage batteries.
- The initiative addresses growing renewable energy integration by enhancing the grid's ability to balance supply and demand fluctuations.
- The project targets specific substations with relatively easy grid access — two sites at Funahashi Substation in Toyama Pref, and one each at Fuminami Substation (Toyama City) and Togo Substation (Fukui City).
- The tender, which runs until March 27, outlines key criteria such as battery capacity, grid connection timelines, and evaluation metrics. Selected operators will be announced by late April.
- This marks Hokuriku Electric's first venture into leasing substation land for battery installations, following similar projects by Hokkaido Electric Network, Chubu Electric Power Grid, and Shikoku Electric Power Transmission and Distribution.
- SIDE DEVELOPMENT:
  NCS RE Capital to launch grid-scale battery storage in Fukuoka
  (Company statement, Jan 7)
  - NCS RE Capital plans to establish its first grid-connected battery storage system in Omuta City, Fukuoka Pref, to begin commercial operation in the fall.
  - The system will have an 1.2 MW output capacity and storage of 8.2 MWh.
  - Kyuden Mirai Energy will manage the project. Electricity will be sold through wholesale, demand-supply adjustment (balancing), and capacity markets.
  - CONTEXT: *This is Kyuden Mirai Energy's first foray into operating grid-connected battery storage systems.*

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Chugoku Electric to install grid-scale BESS on site of thermal power plant

(Company statement, Dec 27)

- Chugoku Electric will install a grid-scale battery storage system on the site of a former thermal power plant in Kudamatsu City, Yamaguchi Pref that was decommissioned in January 2023.
- The facility will use li-on batteries with a total capacity of 10 MW and a storage capacity of 30 MWh. Operations are scheduled to begin in the second half of FY2028.
- CONTEXT: *This marks the first time Chugoku Electric has installed grid-scale BESS on a former power plant site.*
- SIDE DEVELOPMENT:
  Shizuoka Gas enters grid-scale BESS
  (Company statement, Dec 25)
  - Shizuoka Gas will enter the grid-scale energy storage battery market with a 13 MW/ 46.9 MWh project in Shizuoka City, Shizuoka Pref.
  - The project, which will use li-on batteries, will benefit from a ¥1.2 billion METI subsidy to promote grid-scale BESS.
  - Construction will start this year, set to be operational in FY2027.

Vestas secures first major order under offshore wind tender

(Company statement, Dec 27)

- Vestas received an order for 21 offshore wind turbines – V236-15.0 MW – from Oga-Katagami-Akita Offshore Green Energy, which is a JV funded by JERA, J-Power, Tohoku Electric, and Itochu.
- The turbines will power the 315 MW wind project off the coast of Akita, Oga, and Katagami cities (Akita Pref). Deliveries to begin in 2026.
- Vestas will also provide O&M services for the turbines.
- CONTEXT: *This is Vestas' first order for a project awarded under the Act on Promoting Utilization of Sea Areas for Renewable Energy. Also, it is the first order for the V236-15 MW turbine in Asia-Pacific.*
- SIDE DEVELOPMENT:
  GE Vernova to provide onshore wind turbines for Eurus Energy
  (Company statement, Jan 9)
  - GE Vernova won an order to provide 4.2 MW turbines with a 117-meter rotor for two onshore wind farms under development by Eurus Energy in Aomori Pref.
  - The projects – Iwaya (32.5 MW) and Shitsukari (19.25 MW) wind farms in/ around Higashidori Village – are expected to begin commercial operations in June 2028.
  - The Iwaya project will use nine units, whereas the Shitsukari wind farm will use five.
  - This is the fourth time that GE Vernova has won an order in Japan since the beginning of 2024. It will bring the total amount of energy supplied in Japan by GE Vernova turbines to 1.8 GW.

Hitachi Energy tech to help ensure grid stability for UK offshore wind

(Company statement, Dec 23)

- Hitachi Energy won an order from Ørsted to supply an advanced grid-forming system that uses grid stabilization tech STATCOM. It manages grid frequency variations and system voltage at all times.
- The system will be used at the UK's Hornsea 4 offshore wind farm to integrate 2.4 GW of renewables into the grid, the first use of the tech in Europe.
- The project aims to begin operations in 2030.
- CONTEXT: *The SVC Light Enhanced system consists of the STATCOM "SVC Light" that provides reactive power, and a supercapacitor to store and release active power in milliseconds. With grid-forming control and other features, it can instantly suppress voltage and frequency fluctuations caused by renewables output variability.*
- SIDE DEVELOPMENT:
  Chubu Electric signs first Virtual PPA for non-fossil certificates from wind farm
  (Company statement, Jan 7)
  - Chubu Electric Miraiz inked a virtual PPA with four companies: audio equipment producer Yamaha, Nippon Thompson, a manufacturer of needle roller bearings, MUFG Bank, and Merck Electronics.
  - Under this agreement, environmental value derived from wind-generated energy will be supplied for 20 years starting March 2027.
  - Funds from the certificate purchases will be allocated for updating the 15 MW Aoyama Plateau Wind Farm in Iga City (Mie Pref), operated by the Chubu Electric Group. It is set to resume operations in March 2027.
  - CONTEXT: *This marks Chubu Electric Group's first virtual PPA.*

Kyushu Electric president discusses corporate strategies

(Nikkei, Jan 10)

- Kyushu Electric President Ikebe Kazuhiro praised the govt's upcoming basic energy plan and called for diversifying Japan's power generation sources.
- In Kyushu, electricity demand will grow due to semiconductor industry investments, such as TSMC's new production facility in Kumamoto, and the expansion of data centers. Existing power plants ensure stable supply for the next decade. Still, the company plans to focus on LNG-fired power plants in the short term and nuclear energy in the long term.
- The utility also needs to gain local support for projects like the proposed third unit at Sendai NPP. Kyushu Electric will unveil a new development plan in spring 2025.

JERA ordered by watchdog to submit additional report on power market malpractices

(Denki Shimbun, Jan 7)

- The Electricity and Gas Market Surveillance Commission (EGC) requested JERA to submit a revised report by March 31, after having deemed insufficient the utility's December submission on withheld spot market power.

- From April 2019 to October 2023, JERA failed to supply all surplus power to the spot market, leading to a misconduct advisory for potential market manipulation.
- The commission criticized the report for unclear links between causes and solutions, demanding detailed timelines, comprehensive auction reviews, and actionable short- and long-term countermeasures.
- JERA now faces intensified oversight to ensure compliance and market fairness.

Spot electricity trading volume rises 14.5% in Dec, prices remain stable

(Denki Shimbun, Jan 10)

- JEPX spot market's December daily average transaction volume increased 14.5% MoM to 788 GWh, marking two consecutive months of growth.
- Total monthly volume rose 18.3% over November to 24.43 TWh, accounting for 31.6% of national demand, down 0.9 percentage points from the prior month.
- System prices dropped across the board: the 24-hour average fell by ¥0.16 to ¥12.25/ kWh, with peak prices down ¥1.20 to ¥10.1.
- Regional disparities persisted, with Tokyo's 24-hour average area price highest at ¥13.92; Shikoku recorded the lowest at ¥9.44, benefiting from strong solar output.
- SIDE DEVELOPMENT:
  Day-ahead market trading volume drops 10%
  (Denki Shimbun, Jan 9)
  - The JEPX day-ahead market saw a 10.1% MoM decline in daily average trading volume, falling to 16.4 GWh, with limited demand growth due to mild temperatures and fewer power plant disruptions.
  - Monthly trading volume fell 13% to 492.7 GWh, while average daily trades decreased 2.2% to 7,113 transactions.
  - The average settlement price dropped ¥0.22 to ¥13.24/ kWh, ¥0.83 higher than the spot market's system price.
  - The highest price, ¥36.10, was recorded on Nov 15, coinciding with peak spot market prices due to power grid issues and unexpected supply interruptions.
  - CONTEXT: *November spot market data on the JEPX had average daily volume up 5.9% on the month to 1.1 TWh, while the average daily volume of electricity bought was little changed at 894 GWh. Trading was moderate due to balmy temperatures across the country.*

ICE posts first trades in Japanese electricity futures

(Nikkei, Jan 9)

- Jan 8 saw the first-ever trade in Japanese electricity futures on the Intercontinental Exchange (ICE), with Feb 5 contracts for Tokyo electricity prices sold at ¥14.75/ kWh, representing 3.36 GWh in total.
- CONTEXT: *On Dec 9, ICE launched four electricity futures products for Japan, covering Tokyo and Kansai base and peak loads.*

- ICE attributes the transaction to market participants and brokers gradually preparing for trading after the products' introduction. The U.S. exchange wants to tap into growth in demand for spark spread trading in Japan.

Foreign firm enters bid for Japan's power transmission network expansion

(Nikkei, Dec 25)

- Frontier Power, based in the UK, is part of a consortium bidding for the "Japan Sea Route" transmission link between Hokkaido and Honshu.
- This is the first time in which a foreign company has shown interest in Japan's power transmission network expansion. OCCTO's announcement on Dec 25, revealed two competing consortiums: 1) Japanese utilities like Hokkaido Electric, Tohoku Electric, and TEPCO-affiliated power distribution firm; 2) the other includes Frontier Power.
- OCCTO will review the bids and select the operator.

TEPCO PG curtailment uses innovative method to tackle grid congestion

(Company statement, Jan 7)

- TEPCO PG curtailed thermal power plants using a specific order method, aiming to reduce congestion in its transmission system.
- On Jan 6, this system was used for the first time to control output at a thermal power plant connected to the main grid in Chiba Pref.
- Curtailment targeted only thermal power plants, excluding pumped-storage power generation and renewable energy sources.

INPEX eyes doubling capacity of geothermal power plant in Indonesia

(Nikkei, Dec 27)

- INPEX is considering increasing the capacity of an existing geothermal power plant in Indonesia's West Sumatra to 170 MW by around 2030.
- The project has a 30-year PPA with state-run utility PLN as the off-taker, and a 20-year support from Indonesia's finance ministry.
- CONTEXT: *INPEX already operates three geothermal plants in Indonesia and also has a 33% stake in Indonesian power generation developer Supreme Energy Sumatra. Indonesia has an estimated 27.8 GW in potential geothermal reserves, the world's second largest, but uses less than 10% of that. Fossil fuel-based power generation remains the country's main source of power.*

- TAKEAWAY: Japan is seeking a more active role in Indonesia's energy transition, with more companies moving forward with investments particularly in geothermal power. PM Ishiba has over the weekend completed a visit to Malaysia and Indonesia, showcasing the importance of the Southeast region to Tokyo. Indonesia seeks Japan's financing and technology, which can benefit from Presidential Regulation 112, (2022) that sets the procurement and electricity purchase price for renewable power projects, aiming to encourage renewables investments, especially for geothermal; also, firms can use funding partly sourced from the state budget.

- SIDE DEVELOPMENT:
  Toyo Engineering wins contract for Indonesian geothermal power plant
  (Company statement, Dec 25)
  - Inti Karya Persada Tehnik (IKPT), a local subsidiary of Toyo Engineering, inked a contract for a geothermal power project with state-owned Geo Dipa Energi (Persero).
  - IKPT will do the EPC work for the Patuha-2 Geothermal Power Plant in Bandung Regency, West Java.
  - The project is set to deliver a max capacity of 60 MW; completion slated for 2027.

NEWS: OIL, GAS & MINING

Hokugas considers carbon-neutral hub and LNG import terminal in Hokkaido

(Company statement, Jan 7)

- Hokkaido Gas (Hokugas) is considering the development of a carbon-neutral hub at Tomakomai East Port, hoping to leverage the region's renewable energy potential and build infrastructure for hydrogen, e-methane, etc.
- The company is also increasing use of LNG, planning a new facility in Tomakomai that will include equipment for LNG import and distribution.
- E-methane will be the focus of this initiative. Since its production utilizes CO2 captured from emissions, it ensures no net increase in atmospheric CO2.

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Kaneka develops zero-waste solar panels with easy rare metal recycling

(Nikkei, Jan 9)

- Chemical manufacturer Kaneka has developed a solar panel that enables easy recycling of rare metals used in its production.
- These panels significantly reduce adhesive use and enable the extraction of key components within minutes using an electromagnetic technique.
- The tech lowers energy consumption across the product lifecycle by two-thirds and facilitates the recycling of metals such as silver and copper.

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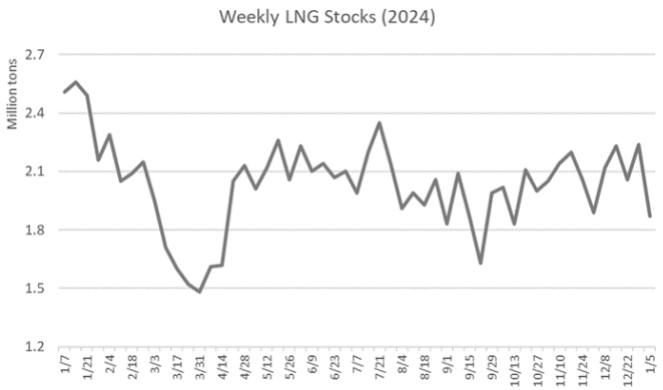
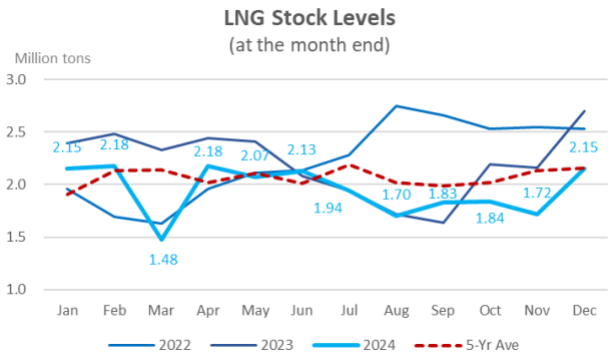
LNG stocks up over last week, but down from early Jan

(Government data, Jan 8)

- As of Dec 29, the LNG stocks of 10 power utilities were 2.24 Mt, up 8.7% from the previous week (2.06 Mt); but down 17% from end Dec 2023 (2.16 Mt), and 3.7% down from the 5-year average of 2.16 Mt.
- As of Jan 5, the LNG stocks were 1.87 Mt, down 16.5% from the previous week (2.24 Mt); down 13% from end Jan 2024 (2.15 Mt), and 4.6% down from the 5-year average of 1.96 Mt.
- Weekly averages (in the course of the year) were 1.95 Mt in 2024; 2.21 Mt in 2023; and 2.23 Mt in 2022.



- CONTEXT: *Many places, except shopping malls and big supermarkets, closed for the New Year holidays, from Dec 30 to Jan 5. Power utilities ramped up stocks at the end of December ahead of the high consumption period.*



ANALYSIS

BY NOBUO TANAKA

Nuclear Crisis in Japan: Old Ideas Hold Back Sector from Aiding Net-Zero

In October, "Nippon Hidankyo" – the organization that represents survivors of the U.S. nuclear bombing of Hiroshima and Nagasaki in August 1945 – received the 2024 Nobel Peace Prize. This decision reflects a sense of urgency among the global community about the rising risk of nuclear war as international tensions accelerate.

Yuval Noah Harari, author of *The Sapiens,* has said that nuclear war is the first of the three key challenges that humans face in the 21st century. The other two being a climate crisis and disruptions from Artificial Intelligence. And so, as nuclear war is once again discussed as a potential outcome, can humanity step away from the abyss? Japanese people, more than anyone, understand the consequences.

But this essay isn't about nuclear war. What I worry about is that Japan is losing its nuclear capability for peaceful purposes.

In the post-war era, Japan harnessed the atom to power industries, ranking among the top five nuclear energy producers globally before 2011. At that time, the nation had 54 reactors that could supply about 30% of its electricity. Today, just 14 reactors are online and they cover only 8% of the total. Even that is a small grace compared to a period of zero nuclear power generation, which Japan experienced in the aftermath of the March 2011 Fukushima disaster.

This nuclear energy 'winter' shut down more than plants. The number of Japanese students enrolling in advanced nuclear studies at universities dropped from a high of over 500 in the mid 1990s to 185 in 2022.

With no new reactors slated for construction, the industry's supply chain has atrophied. METI promotes a so-called Advanced Light Water Reactor (LWR), a safer model of the current reactor type to replace older units. But unless it is rolled out at scale and completed on time, costs will invariably balloon, as has been the case in Finland, France and the U.S.

Unlike the Soviet Union's post-Chernobyl program to sell its nuclear power plants abroad, Japan has had no overseas contracts to sustain its nuclear supply chains. We offered our LWR reactors to Vietnam, Turkey, UAE and the UK, but lost out to competitors each time. Though very safe, large Japanese LWRs are not price competitive in the global market and would lead to higher electricity prices.

In this context, it's not surprising that the Japanese government decided to extend the operation period for existing domestic reactors from 40 years to more than 60, and focus its nuclear energy policy on restarting the existing units. But while Japan has focused on reviving the past, the global nuclear sector has moved on.

Innovation in reactor technology

Overseas, there is now increased focus on Small Modular Reactors (SMRs) to power the proliferating data centers, generative AI and industrial heat. There are many

venture companies in the U.S., UK, and Canada at work designing diverse types of SMRs. Even South Korea, which had been successful in winning large reactor contracts overseas, is now determined to develop SMRs.

China has already deployed an SMR, as has Russia. But not one company in Japan is interested in this technology. My concern is, Japan's nuclear capability could disappear when conventional LWRs plants shut down.

The Fukushima disaster killed the notion of nuclear power as a cheap, clean and safe source of electricity. While almost 14 years have passed, the trauma of Fukushima remains. Many think that *kejime* (the final responsibility) of the accident has not been proven. But if there isn't an acknowledgement of responsibility and mistakes, it will be difficult to do things differently in the future.

Here's an interesting observation made by an all-female investment consulting firm. Half a year before the Fukushima accident, they stopped recommending TEPCO stock to their clients. This wasn't due to a superhuman premonition. The consultants were simply good at keeping records of company actions and errors, and their monitoring of TEPCO showed a company that repeated mistakes time after time, with no effort to reform.

My concern is that post-Fukushima, the men who monopolize Japan's nuclear sector are making the same errors because they do not acknowledge their responsibilities. They wish to pursue the same nuclear reactor model as before – a large LWR, built in a remote town, operating as a base load source. What energy systems need today, however, is flexibility and speed, as well as CO2-free power. SMRs seem more fitting both to complement the fluctuations of solar and wind power, and support data centers and carbon intensive industries.

Whether it is SMRs or another innovation, we need a change in mindset. That's the reason I created a working group for advanced nuclear systems at the Canon Institute of Global Studies, but ensured that only women are members of the group. If this group can agree that a new system for nuclear power is "sustainable," then there's a higher chance that it will be accepted by the Japanese public.

Innovation in waste storage

Figuring out the safety systems of new reactors is only one of the issues we need to solve, however, to retain the use of nuclear energy. The other key point is the disposal of waste.

Anti-nuclear activists often say that a nuclear system is a condominium without toilets. The sector focuses on safety but leaves the issue of radioactive waste for future generations to resolve.

This is a tricky topic and not only for Japan. Only Finland and Sweden, and maybe France, have decided on disposal sites. Meanwhile, Japan's program to find a site stumbles on without result for decades. The latest is that three localities have agreed to preliminary reviews of their areas as a potential location. But regional authorities have already vowed to stop any future site construction.

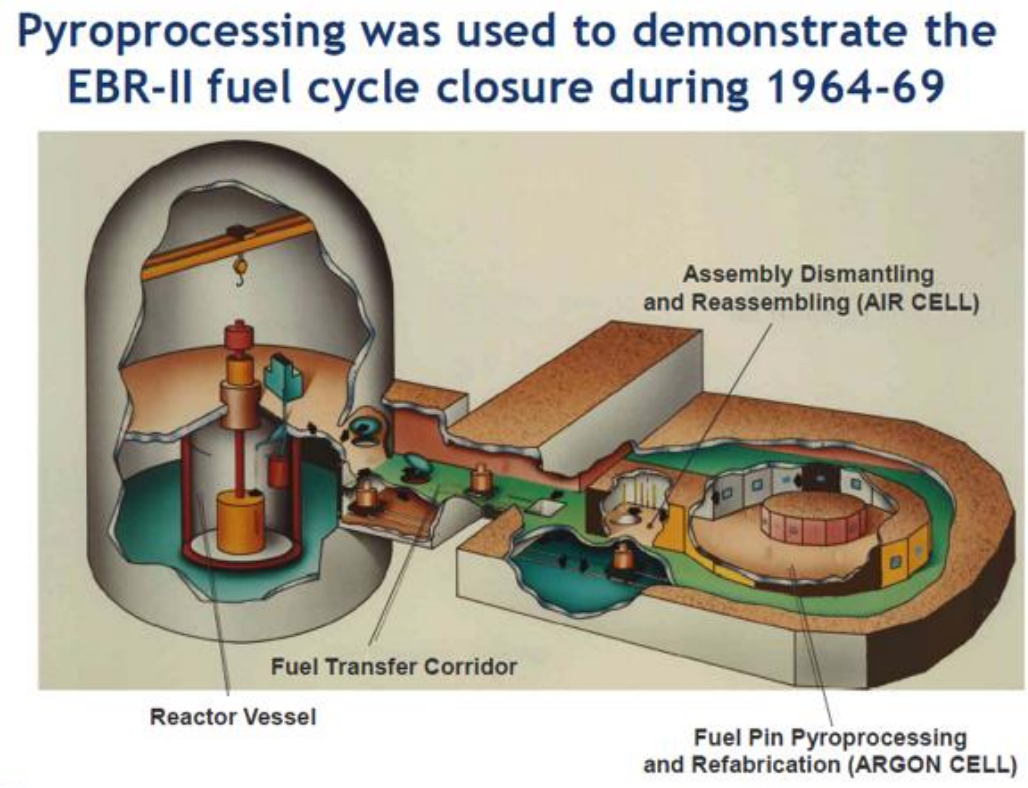
Meanwhile, there's a lot of waste to manage, including at the Fukushima site, and no prefecture is keen to accept it. Radiation takes over 300,000 years to abate naturally.

The Rokkasho reprocessing plant – if it is ever launched – could shorten at least the spent-fuel disposal problem to 9,000 years. Another new technology promises to shorten this to 300 years, which is manageable. But this tech, called Integral Fast Reactor (IFR) with Pyroprocessing, was developed by the Argonne National Laboratory in the U.S. It differs from the PUREX technology being built at Rokkasho.

IFR is much simpler and cheaper than PUREX. It consists of a metal fuel, sodium coolant, fast neutron reactor and pyroprocessing unit connected in one facility. It also lowers the risk of proliferation.

At the Sasakawa Peace Foundation I asked experts to estimate the cost of building a facility to apply this technology to the Fukushima debris solution*. The estimate was ¥300 billion ($2 billion).

So, why won't Japan introduce it? Speaking with people in Fukushima, their reaction was favorable. But once again, the mindset of never changing is holding Japan's nuclear sector back. Friends at METI and TEPCO tell me that while they understand the potential of U.S. technology, they can't change their plans. "It would be different from what we've already told the people in Fukushima," they say.



Fortunately, not everyone is wedded to the ideas of the past. A female expert from Fukushima**, Nagayama Chieko, is an observer with the CIGS working group. She says that we cannot hold onto the old saying that Fukushima is *utsukushima* ("beautiful land"), we need to update the mindset to treating it as *tsukusushima* ("land

that contributes to science"). If only METI and TEPCO officials felt as willing to innovate.

Nagayama's organization, CIGS, published a report advocating for trialing IFR with the idea that it could be piloted in Fukushima and then deployed nationwide. Luckily, Fukui prefecture has shown an interest and established a consortium to build IFR.

Technology should be used to unite us. With IFR, I see the potential for its introduction in South Korea also. In fact, I propose trilateral collaboration between Japan, Korea and the U.S. to develop IFR and Pyroprocessing as well as nuclear propulsion submarines.

Geopolitics in Northeast Asia legitimizes this collaboration. When three countries can find the solution to Fukushima debris as the ultimate peaceful use of nuclear power, I dare say that Japan can finally overcome the trauma of Fukushima, Hiroshima and Nagasaki.

Nobuo Tanaka is the former executive director of the International Energy Agency and former chair of the Sasakawa Peace Foundation. He is CEO of Tanaka Global, Inc.

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*Technical Feasibility of an Integral Fast Reactor (IFR) as a Future Option for Fast Reactor Cycles -Integrate a Small Metal-Fueled Fast Reactor and Pyroprocessing Facilities-Research Project on "Sustainability of Nuclear" November 30, 2016 The Sasakawa Peace Foundation

**Ms. Chieko Nagayama's comment is available at CIGS site (Japanese only): https://cigs.canon/videos/20220310_6639.html

ANALYSIS

BY MAGDALENA OSUMI

Headwinds in Japan's Offshore Sector Show Value of Good Planning

No sooner had Japan announced the results of Round 3 offshore wind auctions, than attention shifted from the big wins for JERA and Marubeni to the fact that many of the major industry players abstained from bidding.

Media reports of potential losses for winners of Round 1 followed. Pundits questioned Japan's ability to meet its wind capacity goals for 2030, while developers bemoaned the weak yen and supply chain headaches.

So, is Japan losing its allure as a lucrative destination for offshore wind power?

Au contraire.

The challenges in Japan's offshore wind sector were always on the cards as the teething pains of setting up a new national infrastructure segment. Inflation, community and even currency issues echo those elsewhere. At least Japan's leaders support wind power rather than calling it "garbage," as per the opinion of the incoming U.S. president.

The potential size of the Japanese market; the legislative push to expand the available sea areas; the political backing; and (slowly) stabilizing domestic supply chains indicate to many industry players that projects in Japan are worth it. Some equipment suppliers say they see strong order growth in the second half of this decade. But in the short term, expect choppy waters.

Japan NRG looks at the state of play in the sector in the aftermath of Round 3 results.

The Departed of Japanese wind

The enactment in 2018 of the Act on Promotion of Use of Marine Areas for Development of Marine Renewable Energy Generation Facilities was a milestone for Japan in expanding the use of renewables. It attracted the attention not only of energy companies but plenty of other businesses that saw in wind power what they did not in solar – scale.

According to one of Japan's major think tanks, the Mitsubishi Research Institute, the country's seas can accommodate 70 GW of fixed and as much as 2,396 GW of floating wind power capacity.

The size of the potential story attracted several dozen companies to bid in the first two rounds for offshore wind auctions hosted by Japan. Winning consortiums even included two overseas energy firms: Germany's RWE and Spain's Iberdrola.

Round 3 covered two areas off the coasts of Aomori and Yamagata prefectures. The Aomori site was awarded to a consortium of JERA, renewables developer Green Power Investment and Tohoku Electric. The second went to a group comprising

Marubeni, Kansai Electric, BP Iota Holdings (a unit of the UK's bp), Tokyo Gas, and local construction firm Marutaka.

While Round 3 featured yet another European winner and several fresh domestic faces, media coverage focused instead on those who had abstained from the latest auction, noting that most winners from Round 1 and 2 did not participate in Round 3.

To further the claim that Japan's offshore wind tenders were losing their luster, media pointed to Cosmo, which owns Cosmo Eco Power, the third-largest wind power firm in Japan, and its decision not to bid for Round 3 after completing an environmental impact survey off the coast of Yamagata Pref. and concluding that a project there would simply not be profitable.

Similarly, before placing the bid for the Aomori block, JERA surveyed both sites but chose only one.

This is where, however, it's worth considering that the scale of the offshore wind business opportunities are starting to catch up with even the biggest companies in the sectors. Firms like Mitsubishi Corp, JERA, Chubu Electric and Tohoku Electric, for example, have already secured two or three major projects of at least 300 MW of capacity that will require a years-long process of procuring the turbines, foundations, and electrical systems before the start of construction, let alone commissioning.

If the floating offshore wind project in Nagasaki Pref from Round 1 is taken into consideration, the number of firms financially committed to multiple projects rises to include Kansai Electric, ENEOS, and Osaka Gas.

Investments in the larger projects will hover around $3–5 million per installed MW, eventually amounting to several hundred million dollars for fixed-bottom technology. Taking a break to assess the existing commitments and focus on making progress on them are good reasons for sidestepping the latest round.

Expansion through trial and error

To be sure, the zeal to be among the first wind auction winners has come back to bite certain players, none more so that top trading house Mitsubishi, which swept all three bottom-fixed projects from Round 1 in 2021. Three years later, the company is believed to be facing severe challenges with these projects.

While winners of the Round 3 rejoiced in celebrations over the Christmas period, business magazine *Diamond* ran an investigative report claiming industry rumors say Mitsubishi may even withdraw from its Round 1 projects. The report exposed Mitsubishi's missteps in project planning and worsening external economic pressures.

According to *Diamond*, the trading house rushed a seabed analysis, which led to unforeseen issues with the project area's soft ground. This required additional costly studies and design adjustments. Other misjudgments were related to onshore transmission infrastructure, which incurred significant costs and delays.

The magazine raises questions whether delays in the 391 MW Choshi project in Chiba Pref, the first among three originally scheduled to start operations in 2028, could

cause a domino effect on subsequent projects. This is the first bottom-fixed offshore wind power project in the general-sea-area in Japan.

The project's cost estimates, based on overly optimistic fixed price purchase agreements under the FIT system, were apparently misaligned with actual construction expenses. Industry insiders told *Diamond* they expect Mitsubishi's losses on the three projects to exceed ¥100 billion ($630 million).

Financial challenges

Mitsubishi's big win in 2021 was largely due to the trading house correctly reading the mood of the government at the time. Back then, METI was determined for offshore wind costs to be driven down as quickly as possible to avoid a repeat of what happened in the solar sector as it first took off. Overly generous state tariffs turbo-charged the solar boom but also saddled the country's consumers with high bills.

Mitsubishi focused on price over speed of execution. Critics warned that this could lead to delays in delivery of the capacity, and the company's current troubles seem to be confirming such concerns. As a result, METI and MLIT have altered their project evaluations to focus more on feasibility of operators' plans, risk assessments, backup plans – both for the construction phase and while in operation.

The changing dynamics were clearly picked up on by the bidders in the latest round. In Round 3, all bidders seemed to offer electricity prices at the minimum, so-called zero-premium level of ¥3/ kWh, to secure top scores in the pricing category.

The sacrifices from the bidders are being recognized by the government. After all, wind projects in other countries, and energy infrastructure projects in general, are facing many of the same challenges: rising materials costs, contractor scarcity due to inflation and labor shortages, currency fluctuations, and rising borrowing costs.

Over the past couple years, the offshore wind industry has experienced several project cancellations and delays globally. For instance, in April 2024, New York State canceled power contracts for three offshore wind projects due to concerns over financial viability and turbine supply.

To ensure that Japan's offshore wind sector can stay on course not just now but into the 2030s, when it is expected to play an outsized role in the nation's energy mix, METI and other state agencies are looking at new ways to support the sector. Details are likely to emerge later in the year, based on progress of projects already auctioned off, but the intent is clear. Last month, METI's draft of the new Basic Energy Policy called for wind power to deliver as much as 8% of the nation's total by 2040.

Mitsubishi's further moves to mitigate their emerging challenges, particularly regarding the Choshi project, will also influence government response toward other operators.

Conclusion

With most of the projects currently under development in Japan scheduled to launch by 2030, the offshore wind power industry is – contrary to claims of dwindling interest – approaching a period of significant growth.

Costs remain a major challenge, but this benefits those developers that can channel both scale and expertise into project management, while keeping a close eye on technological evolution. Further tweaks to Japan's auction system to cover cost uncertainties are also likely.

Mitsubishi was envied for sweeping Round 1 and immediately gaining scale. Time has shown that scale alone won't lead to profits; identifying and acknowledging the risks is key. In this sector, being first is not the same as being a winner.

ASIA ENERGY REVIEW

BY JOHN VAROLI

This column provides a brief overview of the region's main energy events from the past week

Australia / Clean energy

ZEN Energy, in partnership with Taiwan's HD Renewable Energy (HDRE), plans a JV in Australia that will build 1 GW of power storage capacity. The two companies will launch a green energy investment and management platform called ZEBRE, with a total target investment capacity of 1.4 GW. HDRE will have a 70% stake; Zen the remaining 30%.

Asia / Oil

Asia's crude oil imports dropped in 2024, the first annual decline in three years, led by weak demand from China, with only India managing meager growth. The world's top importing region saw imports of 26.51 mbpd in 2024, down 1.4% from the 26.88 mbpd in 2023, according to LSEG Oil Research.

China / EVs

China will exceed both international forecasts and its own official targets for domestic EV sales, growing about 20% YoY to more than 12 million cars in 2025, according to the FT. This will more than double the 5.9 million sold in 2022.

China / Hydropower

China approved construction of what will be the world's largest hydropower dam, to be located in the lower Yarlung Tsangpo River; it could generate three times more energy than Three Gorges Dam, the world's largest hydropower plant.

China / Solar and hydrogen

CHN Energy said its 400 MW Rudong integrated PV-hydrogen-storage project was connected to the grid on Dec 31. The project, which is located on the coastal flats in Rudong County, is China's first integrated offshore facility combining PV power generation, hydrogen production and refueling, and energy storage.

India / Power generation

Over the past decade, the country's total installed power generation capacity grew to 457 GW today, up 83.8% from 249 GW as of March 2014.

Philippines

Citicore Renewables Energy sold a 20% stake to Pertamina Power Indonesia. The Philippines is one of the fastest growing markets for renewable energy investment, and the $115 million of proceeds from the deal will be used towards hydro, wind and solar projects in the country.

South Korea / Offshore wind

Korea South-East Power (KOEN) will exit the 390 MW Shinan-Ui offshore wind farm that it was developing with Hanwha Ocean and SK D&D. KOEN owns a 37% share in the project, to be built off the Korean peninsula's southwest.

South Korea / Renewables

Hithium and Samsung C&T Engineering group inked a deal to jointly develop energy storage projects globally, with a pipeline estimated at 10 GW/h.

Taiwan / Gas turbines

Natural gas turbine maker GE Vernova sees opportunities in Taiwan, which is set to phase out nuclear power this year and needs more gas-fired generation to power its chip-making industry. In mid 2025, Taiwan will shut its last active commercial NPP, Maanshan.

2025 EVENTS CALENDAR

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

Month	Date	Event
January	6	First market trading
	6-24	FIT/FIP solar auction #23
	21-22	World Forum Offshore Wind (WFO) Global Summit 2025, Barcelona, Spain
	29-31	ENEX 2025 / DER Microgrid Japan 2025 / Renewable Energy 2025 / Offshore Tech Japan 2025 / InterAqua 2025 / Green Infrastructure Industry @ Tokyo Big Sight
February	19-21	Smart Energy Week 2025 / H2 & FC Expo / PV Expo / Battery Japan / Smart Grid Expo / Wind Expo / Biomass Expo / Zero-E Thermal Expo / GX Management Week / Decarbonization Expo / Circular Economy Expo @ Tokyo Big Sight

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