JAPAN NRG WEEKLY

JULY 22, 2024

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BUILDING HYDROGEN / AMMONIA SUPPLY CHAINS -- HOW FAR HAVE THEY COME?

The Hydrogen Society Promotion Act that passed the Diet in May promises subsidies for 15 years. Many studies and projects in Japan are about building supply chains, rather than a large production base. Green hydrogen production sites will go onstream in 2025, and the next wave of hydrogen market hype will be about 2027, when ammonia-coal co-firing begins. This analysis is Part 1 of a two-article series, and it looks into the hydrogen supply chain projects in an advanced phase.

AOMORI PROPOSES NEW REGIONAL RULES FOR 'COHABITATION' WITH RENEWABLES PROJECTS

Last year, Aomori Prefecture's incoming governor announced an audacious plan for a regional tax on renewable energy projects, calling for a levy that would apply even to existing solar and wind farms. A year on, the prefecture's strategy for the renewables sector looks quite different. This month, the prefecture's expert panel published a skeleton draft of an ordinance that would see local authorities assume greater control over solar and onshore wind projects.

ASIA ENERGY VIEW

A wrap of top energy news that impacts other Asian countries.

EVENTS SCHEDULE

A selection of events to keep an eye on in 2024.

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

Govt drafts plans to solve jet fuel shortages, a lack of transport and storage cited

(Government statement, July 18)

- METI and the Ministry of Land, Infrastructure, Transport and Tourism have drafted plans to cope with looming jet fuel shortages at airports.
- Near-term actions are to:
    - Understand the amount of jet fuel demand at each airport;
    - Secure supplies by increasing domestic output and imports;
    - Strengthen logistics and human resource development, by securing trolly trucks and inland vessels and utilizing them at full capacities, and conducting more training.
- Mid and long-term actions are to:
    - Secure supplies by increasing tank sizes at refineries and airports;
    - Strengthen logistics by increasing the size of trolly trucks, expanding sizes of transport vessels, and upgrading old loading facilities.
- CONTEXT: *Japan has 20 refineries with a total capacity to process 0.5 million kl (3.1 mln barrels) per day of crude oil. In May, the country's refinery run rate was around 75%.*
- SIDE DEVELOPMENT:

  Import of aviation fuel would be a last resort: Petroleum Association

  (Association statement, July 18)
    - The aviation fuel shortage is mainly due to a lack of transport to airports and their storage capacities.
    - Oil refineries can produce the required amount domestically and will import when needed, said the Petroleum Association of Japan chairman.
- SIDE DEVELOPMENT:

  ENEOS steps up as first SAF importer after supply contract win

  (Company Statement, July 12)
    - ENEOS said it will be the first domestic oil company to import and supply Sustainable Aviation Fuel after inking a supply contract with Japan Airlines.
    - JAL aims to replace 1% of its total petroleum-based fuel with cleaner SAF by 2025, reaching 10% by 2030; the SAF will be sourced domestically and internationally.
    - CONTEXT: *ENEOS is developing a SAF supply chain from raw material procurement to production and sales, with a manufacturing plant in Wakayama set to make 400,000 kiloliters annually.*

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Renewables associations discuss clean power, urge spread of storage battery systems

(Government statement, July 17)

- The Renewable Power Association for Sustainable Power Supply (REASP) proposed changes to the CO2 coefficient of power utilities that's used to calculate emissions.

- It suggests coefficients that vary according to the time of day, to encourage changes in end-user consumption behavior.
- Japan Photovoltaic Energy Association (JPEA) and REASP urged:
    - The faster spread of storage battery systems to optimize renewable resources;
    - Changes to the battery-derived power fee schemes;
    - Incentives to drive a more speedy shift to the FIP from the FIT scheme among renewable operators.
- The Federation of Electric Power Companies (FEPC) said new stable supply sources and stronger demand-response (DR) measures are required to complement variable renewables, adding that rising grid maintenance costs and varied community stakeholder interests need to be addressed as well.
- CONTEXT: *The ANRE panel on renewables conducted interviews with renewables associations and FEPC to seek ways to meet the 2030 govt target to double renewable power sources. The panel will further interview wind, biomass and hydro power associations, consumers and energy aggregators.*
- SIDE DEVELOPMENT:

  JGA head weighs in on Japan's energy future

  (Company statement, July 17)
    - Japan Gas Association (JGA) chairman Uchida Takashi gave his opinion on three issues. First, he discussed the govt's Basic Policy on Economic and Fiscal Management and Reform that was approved in June.
    - He expects specific institutional designs in support of the transition to natural gas and the promotion of hydrogen. He emphasized the importance of natural gas and e-methane in Japan's energy policy.
    - Also, he said the MoE's decision to treat e-methane as having zero CO2 emissions under certain conditions is a significant step forward.
    - Finally, he discussed the MoU that was signed by the city gas associations of Japan, Korea, and Taiwan. Uchida said it's a step in achieving carbon neutrality.
    - CONTEXT: *Uchida is also chairman of Tokyo Gas.*

INPEX, Toyota's Woven among investors in PSC startup Enecoat

(Company Statement, July 18)

- INPEX, Toyota's fund Woven Capital, and Mitsubishi HC Capital became investors in Enecoat Technologies, a startup from Kyoto University that specializes in developing perovskite solar cells (PSC).
- This was a Series C funding round, raising ¥5.5 billion. Existing investors like Sparx Asset Management's Future Creation No. 3 Fund and Kyoto University Innovation Capital also participated.
- Enercoat's total funding is now over ¥8 billion, which will go to build production and sales systems, diversify the solar supply chain, support IoT devices, etc.
- CONTEXT: *The technologies, known for their thin, flexible structure, utilize iodine compounds that INPEX produces at its Narutou gas field in Chiba Pref. The gas is extracted from underground brine water that can also be used to make iodine.*

SIDE DEVELOPMENT:

Tokyo govt accepting applications for PSC project subsidies

(Government statement, July 11)

- Tokyo is accepting subsidy applications for demo projects that utilize perovskite solar cells. The govt offers to cover up to two-thirds of costs, with a max of ¥40 million.
- Applications are open until March 31, 2025.
- Eligible projects must address issues and verify the effectiveness of the next-gen solar cells within Tokyo, and have plans for early social implementation.
- CONTEXT: *The city govt promotes PSC as Japanese technology and one that is based on a domestic resource base of iodine.*

Consortium to make investment plans for liquefied hydrogen supply chains

(Japan NRG, July 18)

- A consortium consisting of Japan Suiso Energy, Iwatani Corp and ENEOS will soon begin planning investments for a liquefied hydrogen import project, as they expect to complete facility outlines and data collection by Sept.
- Since 2021, the companies have been exploring importing liquefied hydrogen. They chose the Australian port of Hastings as the loading point, and the port of Kawasaki as the offloading point. Storage tanks, boil off gas compressors, pumps, liquefaction equipment, loading arms and other facilities will be built at these ports, as well as ships capable of cargo storage at -253 C.
- The consortium plans to commercialize liquefied hydrogen imports in 2030, said Japan Suiso Energy, which delivered a presentation at a NEDO event.
- SIDE DEVELOPMENT:

  ANRE may open applications for hydrogen subsidies

  (Denki Shimbun, July 17)
  - In August, ANRE might open applications for hydrogen and ammonia subsidies to businesses building supply chains.
  - The subsidies fill the gap between clean fuel prices and those of fossil fuels being replaced for a period of 15 years, as stated in the Hydrogen Society Promotion Act.

KHI to test run hydrogen generator in Germany in early 2026

(Japan NRG, July 18)

- Kawasaki Heavy Industries plans to conduct a trial run of its hydrogen-gas co-fired power generator in Germany in the first quarter of 2026. RWE Generation, a German power utility, will provide the test site.
- KHI reported its FY2023 research results at a NEDO event. Its 30 MW generator accommodates hydrogen blending in the fuel, handling a mix range that spans just several percent of H2 to fully hydrogen-fueled power generation.

- The generator consumes 2.6 tons of hydrogen/ hour, KHI said, without elaborating on the co-firing ratio. During the trial run, hydrogen will be supplied by RWE Generation that has a 300 MW electrolyzer.
- CONTEXT: *KHI's largest hydrogen co-firing output capacity test has been 8 MW with a hydrogen blending ratio of 30%. In 2022, Mitsubishi Power succeeded in 20% hydrogen blending at a 265 MW plant in the U.S. state of Georgia.*
- SIDE DEVELOPMENT:
  Toyo Kanetsu to build a pilot liquefied hydrogen plant in FY2025
  (Japan NRG, July 18)
  - Toyo Kanetsu, which reported its research results at the NEDO event, plans to build a test tank for storing liquefied hydrogen in FY2025. It will be 5,000 cubic meters.
  - The company aims to make tanks ten times bigger for commercial use. It has identified several potential sites for the test tank and will begin the regulatory process after October.
- SIDE DEVELOPMENT:
  Chiyoda starts hydrogen extraction pilot in Singapore
  (Company statement, July 12)
  - Chiyoda Corp began a pilot project in Singapore to extract hydrogen using a small dehydrogenation unit and fuel cell vehicles. It's a joint project with PSA Singapore and Nanyang Technological University (NTU), and runs to Sept 2025.
  - The process involves transporting Methylcyclohexane (MCH) from abroad, storing it locally, extracting hydrogen using the dehydrogenation unit, refining it to high purity, and then compressing and dispensing it to fuel cell vehicles.
  - Chiyoda is in charge of the dehydrogenation unit and technical support based on its SPERA technology, while PSA supplies the site and equipment. NTU will contribute to catalyst development and quality control.

NIMS to begin analysis of liquefied hydrogen's impact on metals

(Japan NRG, July 18)

- This year, the National Institute for Materials Science will begin analysis of metals likely to be used for liquefied hydrogen tanks, pipes and liquefaction equipment.
- The analysis will include corrosion, strength and other properties when exposed to high pressure and low temperatures of -253 C.
- It will first test SUS316L steel (chrome, molybdenum and nickel-containing steel) and A5083 alloy (aluminum and magnesium).

Yanmar to unveil a 35 kW hydrogen FC system

(Company statement, July 16)

- In September, Yanmar Energy System will commercialize a compact polymer electrolyte hydrogen fuel cell (about 2.3 x 2.3 x 0.9 meters), weighing 1.65 tons.

- One fuel cell has 35 kW output. Up to 16 can be interconnected for higher output.
- CONTEXT: *In the past year, hydrogen FC systems (with 0.1 kW to 1 MW output capacity) have been commercialized. This product is 10% smaller than its peers. Separately, Yanmar and Osaka Gas groups have tested a 30% hydrogen-blended co-firing system which was installed in Daigas Energy site in Osaka*

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NGK Insulators battery wins U.S. award

(Company statement, July 16)

- NGK Insulators's lithium ion battery, EnerCera, was awarded the Best of Sensors Awards hosted by Questex in the U.S.
- EnerCera performs in a wide temperature range, from -40 C to 70 C, and has strong resistance to pressure changes.
- SIDE DEVELOPMENT:
  ENECHANGE reports Jan-March earnings after two months delay
  (Company statement, July 16)
    - ENECHANGE reported a net loss of ¥371 million on total sales of ¥1.36 billion in Q1 2024 (ending March). The company said there was a governance issue that forced it to postpone the results release by two months.

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Resonac supplies low-carbon ammonia to fuel tug boat

(Company statement, July 17)

- Resonac will supply low-carbon ammonia produced at its Kawasaki waste processing plant to an ammonia-fueled tug boat.
- The Kawasaki plant uses plastic wastes and natural gas as feedstock to produce hydrogen that's converted into ammonia.
- The boat will be operational in late August.
- CONTEXT: *A NYK Line group company will sail the boat, which will be the world's first ammonia-fueled vessel.*

NEWS: ELECTRICITY MARKETS

Power X begins production of battery systems, targeting annual production of 4 GWh

(Nikkei, July 19)

- PowerX, a renewable energy startup, took the first step toward mass production of storage batteries for factories and EV trucks. It started trial operations of the first production line at what is due to become one of Japan's largest assembly plants.
- PowerX is using robots to assemble water-cooled battery modules (85 cm long, 45 cm wide, 25 cm high) from core components, such as cells. The factory, in Tamano, Okayama Pref., is currently staffed by only about 30 people.
- The batteries will initially be supplied to electric cargo ships, but in the mid to long term, Power X expects to make products for EV buses and trucks, EV chargers, and other stationary storage systems.
- Initial product shipments are due around July 2025, with mass production capacity planned at just under 4 GWh a year.
- PowerX President Ito said the advantages of Tamano City are the area's low frequency of natural disasters such as earthquakes, and good transport links.
- CONTEXT: *PowerX has raised a total of about ¥23 billion from more than 33 corporate investors, including JAPEX and Yaskawa Electric Corp. The startup expects to ship over 100 large storage batteries this year, and expects sales to exceed ¥10 billion.*
- SIDE DEVELOPMENT:
  KDDI, TEPCO, Eneres to launch large-scale battery storage business by late 2025
  (Company Statement, July 10)
  - Mobile phone operator KDDI, together with TEPCO and power retailer Eneres, will launch a large-scale battery storage business under the 'au Renewable Energy' brand by next year.
  - The partners plan to develop a battery project at the KDDI Oyama Network Center in Tochigi Pref, with a 2 MW output and a 5.6 MWh capacity. It will act as a grid balancing tool.
  - Construction of the battery facility will start in December.

Ten power companies apply for state rate discounts to deal with extreme heat

(Japan NRG, July 19)

- Ten retail electricity companies said they will implement special price measures, based on the govt's electricity and gas rate support, for August to October usage.
- They seek METI approval to implement the measures even for regulated rates.
- The govt says these are measures to deal with the extreme heat; discounts for low voltage are ¥4/kWh in August and September; and ¥2.5 in October.

- High-voltage charges will be discounted by ¥2 in August and Sept, and ¥1.3 in October. City gas will be reduced by ¥17.5/ m3 in August and Sept, and ¥10 in October.
- Customers do not need to apply for these discounts, they are automatic, as the govt seeks to offer immediate support in light of rising prices. The discount amount will be deducted from the monthly fuel cost adjustment and raw material cost adjustment bill items.
- SIDE DEVELOPMENT:
  Hokkaido Electric to offer subsidized power, gas this fall
  (Company Statement, July 18)
    - The main utility for the north island of Hokkaido said it will cooperate with the govt's electricity and gas price support measures, and offer discounts on September to November electricity and city gas bills.
    - The discount is available to all customers with a low-voltage contract (¥4/ kWh in Sept-Oct, then ¥2.5 in Nov); high-voltage electricity contract (¥2/ kWh in Sept-Oct, then ¥1.3 in Nov); and buyers of city gas (¥17.5/ m3 in Sept-Oct, then ¥10 in Nov).

- TAKEAWAY: As global prices for fuels cooled after the 2022 energy crisis, the govt stopped subsidies for power and gas in May of this year. However, the weak yen raises the cost of importing fuels; meanwhile, PM Kishida is facing his lowest popularity since taking on the job. The ruling Liberal Democratic Party will hold its next leadership contest in September. Kishida, however, has presented the latest energy subsidies in a different light, claiming they are related to severe weather (as opposed to global fuel prices). In June, he said that this would be "emergency support to survive the extreme heat."

Amazon makes first investment in onshore wind, says it's Japan's top clean power buyer

(Company Statement, July 11)

- Amazon has invested in two new renewable energy projects in Japan: a 33 MW onshore wind farm in Rokkasho, Aomori Pref, and a 9.5 MW solar plant in Kudamatsu, Yamaguchi Pref.
- This marks Amazon's first investment in an onshore wind farm. To date, the company has invested in 20 renewables projects in Japan; and when operational, these will generate over 200 GWh of renewables electricity, the equivalent demand of 48,000 Japanese households.
- Amazon also claimed that it now buys more electricity from renewable energy sources than any other company in Japan, citing Bloomberg NEF analysis.
- CONTEXT: *Amazon has a global goal by 2030 to procure as much green electricity as it requires to run its data centers and other businesses.*
- SIDE DEVELOPMENT:
  Kazuno Green Energy plans onshore wind farm in Akita
  (New Energy Business News, July 19)
    - Able Inc.'s subsidiary, Kazuno Green Energy, plans to develop a wind farm in Kazuno City, Akita Pref, with a maximum output of 106 MW.
    - Kazuno Eastern Civic Wind Farm will be located in the mountainous region of Kazuno City, covering about 2,700 hectares and featuring 20-25 wind turbines, (each 4.2 MW to 6.1 MW output capacity).
    - Construction is expected to take 61 months.

METI, ANRE reports fifth consecutive monthly decline for electricity demand

(Denki Shimbun, July 17)

- METI and ANRE reported a 2.8% YoY decrease in national electricity demand for February, totaling 755,467 GWh. This is the fifth consecutive month of decline. The volume of electricity sold, which excludes special use supply and self-consumption, fell by 2.6% to 726,632 GWh.
- Within electricity retail, the market share of *shin denryoku* (new power companies, i.e. those other than the major utilities) dropped by 1.07% to 17.40%, marking 23 consecutive months of decline.
- Major utilities (i.e. EPCOs) saw a 1.3% YoY drop in sales. The breakdown by voltage revealed increases in special high voltage (3.5%) and high voltage (0.9%); while low voltage saw a decrease of 4.6%.
- New power companies experienced declines in market share across all voltage categories. Special high voltage dropped by 1.50 points, high voltage by 1.49 points, and low voltage by 0.75 points.

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Tohoku Electric delays Onagawa NPP Unit 2's restart

(Company statement, July 18)

- Tohoku Electric revised the schedule for the fuel loading of Onagawa NPP Unit 2 from the planned July to around Sept 2024. The plant might restart around November.
- On May 27, the utility completed safety measures for Onagawa NPP Unit 2. The NRA conducted an on-site inspection in June.
- The NRA pointed out that Tohoku Electric did not assess impact on the temporary buildings near the storage area, and did not assess transport routes for reactor cooling water supply equipment in the event of an earthquake.

- TAKEAWAY: To avoid further financial losses, Tohoku Electric must restart the plant before winter. This marks the third delay for restarting Onagawa NPP Unit 2. Tohoku Electric will register a loss of about ¥8 billion.

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KEPCO gets NRA permit for spent fuel dry storage at Mihama and Oi NPPs

(Company statement, July 12)

- KEPCO applied to the NRA for a permit to install spent fuel dry storage facilities at the Mihama and Oi (also written as Ohi) NPPs. This follows approvals from Fukui Pref and the towns of Mihama, Takahama, and Ohi on March 15.
- The facilities will be built at Mihama from 2026 to 2030; at Oi, from 2025 to 2030.
- The Mihama NPP facility will have up to 10 casks, storing 100 tons of spent fuel. The Oi NPP facility will have up to 23 casks, and store 250 tons of spent fuel.
- CONTEXT: *The facilities will be used to temporarily* store spent fuel until it's sent to an interim storage facility in a different location.
- SIDE DEVELOPMENT:
  KEPCO submitted a long-term facility management plan for Takahama Unit 2
  (Company statement, July 19)

- KEPCO submitted a long-term facility management plan for Takahama NPP Unit 2 to the NRA. The plan includes high-aging technology assessments and new measures to manage obsolete technology.
- CONTEXT: *Takahama NPP Unit 2 had its operational lifespan extended from 40 to 60 years. The amended regulatory act requires approval of a management plan. Also, it requires safety assessments every 10 years starting from the 30th year of operation.*

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Hokkaido Electric delays explanation of review process for Tomari NPP Unit 3 restart

(Nikkei, July 19)

- Hokkaido Electric said at a NRA meeting that the expected end date for the review of the restart of Tomari NPP Unit 3 had been pushed back to late December. Previously, the company had expected the review to be completed in early October.
- One reason for the delay is that the utility has to consider its disaster countermeasures in case several geological faults are triggered together, due to them being interlinked. The utility will revise the timing of its explanations to the NRA on tsunami response and other matters.
- CONTEXT: *Hokkaido Electric has already pushed back its explanation briefing to the regulator once. In March, it said it will delay the briefing from June to Oct.*

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Real estate firm Ichigo invests in German renewables firm

(Company statement, July 11)

- Ichigo Corp, a real estate firm listed in Tokyo, invested €25 million (¥4.37 billion) to acquire 24.39% of GIGA.GREEN GmbH, which develops and operates solar farms and storage battery systems, as well as charging infrastructure.
- The German firm also specializes in rooftop solar projects.

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MoE raises concerns over bird ecosystems around Agrihills' Kumamoto solar project

(New Energy Business News, July 18)

- The MoE submitted comments on the environmental impact assessment (EIA) for the "Agrihills Solar Yama-to Power Project," planned by an investment unit of Agrihills Solar near Kumamoto City, Kumamoto Pref.
- The 107 MW solar farm will lay 173,000 panels and take up about 119 hectares of land, most of which is unused and designated for agriculture. Construction starts in April 2025; commercial operations are scheduled for May 2029.
- The ministry's concerns include impact on local endangered species such as the Crested Serpent Eagle (Kumataka) and the Northern Goshawk (Sashiba), which are on the MoE's endangered species list. To mitigate any impact on the birds' ecosystems, the MoE asks developers to conduct conditioning measures, and install noise barriers and sheets.

JERA reports minor incident at Shinagawa Thermal Power Station

(Company statement, July 15)

- JERA found a lubricating oil leak at the bottom of a steam turbine at the Shinagawa Thermal Power Station.
- The company said the leak had been stopped.

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NRA and TEPCO discuss risk related to Fukushima decommissioning

(Denki Shimbun, July 16)

- The NRA's nuclear facility monitoring and assessment group met with TEPCO.
- They discussed problems such as contamination during the cleaning of the pipes of Fukushima Daiichi NPP's ALPS. Both cited inadequate risk assessments.
- The NRA asked TEPCO to improve personnel training.
- The NRA also reported on safety inspections related to issues from February, and it was determined that they are minor violations.
- SIDE DEVELOPMENT:
  Equipment for debris retrieval arrives at Fukushima Unit 2
  (Denki Shimbun, July 11)
  - Equipment for the test retrieval of fuel debris from Fukushima Daiichi NPP Unit 2 has arrived at the site.
  - The equipment will undergo NRA pre-use inspections by Aug 5, and the debris retrieval might begin later in August.

NEWS: OIL, GAS & MINING

Tokyo Gas announces possible data leak of customer information

(Company statement, July 17)

- Tokyo Gas announced a possible data leak of customer and other party information due to unauthorized access to servers in Tokyo Gas Engineering Solutions Corp.
- The possibly leaked information includes personal and business contact details. Also, it may include financial institution account numbers and MyNumber (national ID) information of people associated with corporate customers and TGES employees.
- There are possibly 4.16 million affected consumer records provided by contractors. An investigation is underway with the Tokyo Metropolitan Police.

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Shizuoka Gas invests in Indian biogas company Farmgas

(Company Statement, July 11)

- Shizuoka Gas will invest in Farmgas, a biogas production and sales company based in Gujarat, India; and aims to acquire over 10% by fall. This marks Shizuoka Gas's first venture into the biogas industry.
- Farmgas has been operating a biogas plant since December 2022, producing and compressing biogas from cow dung and rice straw collected from surrounding areas. The biogas, in the form of bio-CNG, is primarily sold as fuel for vehicles.
- Currently, Farmgas produces 5.3 tons of biogas daily at its Punjab plant, enough to fill 600-700 CNG vehicles. It plans to boost production to 18 tons over the next five years, aligning with India's mandate to blend bio-CNG into city gas starting 2025.
- CONTEXT: *Farmgas is a JV of natural gas supplier IRM Energy and consultancy Eximius Resources Private.*

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AESC faces financial difficulties as lithium prices slump

(Facta, July 17)

- AESC Japan appears to be facing financial difficulties; on May 30, the company's director asked some of its suppliers to reschedule payment.
- CONTEXT: *In April this year, it brought on-stream the country's largest lithium ion battery manufacturing plant in Ibaraki Pref. AESC has aggressive production plans including the Ibaraki plant expansion, as well as building a lithium ion battery plant in South Carolina and a lithium iron phosphate battery plant in Spain.*

- TAKEAWAY: Lithium prices have slumped to less than one third compared to a year ago due to slowing Chinese demand. When market sentiment is bearish, buyers of lithium and lithium-containing products

typically step back from purchases. Battery makers, not only AESC, are in a challenging environment as they have expensive raw materials but buyers seek lower prices.

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LNG stocks up 10.6% amid a hot summer

(Government data, July 17)

- LNG stocks of 10 power utilities were 2.2 million tons as of July 14, up 10.6% from the previous week (adjusted to 1.99 million tons).
- This is a 13.4% rise from a year ago (1.94 million tons); and 0.5% up from the 5-year average of 2.19 million tons at the end of July.
- CONTEXT: *LNG stocks increased to reflect preparations for the summer heat. Schools in Japan start summer holidays around this time, which may increase power demand from the households.*

ANALYSIS

BY MAYUMI WATANABE

PART ONE: Building Hydrogen/ Ammonia Supply Chains – How Far Have They Come?

After Japan's government published the Basic Hydrogen Strategy in 2017, over 50 supply chain plans sprang up from business consortiums and municipalities. Now, new feasibility study launches are continuing into this year.

The Hydrogen Society Promotion Act that passed the Diet in May promises subsidies for 15 years for qualified projects. Many studies and projects in Japan are about building supply chains, rather than a large production base.

The new sources of clean energy need to satisfy the "S+3E" criteria to get state funding. It stands for "safety, economic efficiency, energy security and environment-focused". This means that supply plans need to address consumer demand, which is about delivering hydrogen in an economically efficient manner. Hydrogen user hubs need to identify their sources of stable supplies.

Green hydrogen production sites will go onstream in 2025, and the next wave of hydrogen market hype will be about 2027, when ammonia-coal co-firing begins. In the 2030's, hydrogen-fired power generation and other technologies under development are expected to fully enter the market.

This analysis is Part 1 of two articles, and it looks into the projects in an advanced phase. Naturally, the smaller ones are commercializing first.

Repurposing oil infrastructure

METI has clearly stated that supply chain building makes the national economy stronger. Companies with a total supply chain system will be more likely to compete in international markets compared to those with solutions that address only part of the supply network.

Japan NRG categorized these supply chain projects into three types:

- Those that capitalize on legacy fossil fuel infrastructure, driven by facility owners such as the oil and chemical refineries;
- Those that address specific requirements of power utilities and other heavy emitters with deadlines to cut their carbon footprint; and
- Those that are building new local supply sources, led by municipalities with renewables resources.

The re-use of legacy infrastructure has both cost and lead time advantages. It's cheaper to upgrade naphtha pipelines to accommodate high-pressure gas, rather than building a whole new transportation network. Commercial hydrogen supply services are already operational in Kawasaki City using decades-old plastic waste treatment facilities and pipelines.

Since 2003, chemical manufacturer Resonac has been producing hydrogen from plastic waste. Its Kawasaki plant produces about 20,000 tons/ year of hydrogen. "In the early days, plastic recycling was unpopular because people thought the process was polluting, but after Coca Cola called it a climate solution, the momentum picked up," said a Resonac official.

Today, the use of plastic waste-derived hydrogen can boost corporate image. The Kawasaki King Skyfront Tokyu Rei Hotel, located several kilometers away from the Resonac plant, switched to hydrogen-fueled heating and power systems two years ago. After almost a year of trial runs at the hotel, Resonac decided to commercialize its hydrogen supply service. Since last September, it has been delivering the gas via underground pipelines built for naphtha. In addition to hydrogen, Resonac produces ammonia.

ENEOS is another upcycler, developing a value chain centered on the methylcyclohexane (MCH) chemical compound. After reacting with toluene, hydrogen converts into MCH, making it possible to store and transport it at normal temperatures and pressures.

This is unusual for the hydrogen family, which requires temperatures below zero and high pressure for storage. Thanks to MCH, conventional tankers, trolley trucks, onshore and offshore oil tanks, and oil refineries can be used. Refineries have dehydrogenation equipment that converts MCH back to hydrogen.

ENEOS plans to import thousands of tons of MCH through the Kawasaki port, supplying it to Haneda Airport and others along Tokyo Bay. Last year, it held the first MCH value chain trial run: Hydrogen produced and converted to MCH in Australia, using its proprietary technology called DirectMCH, was shipped to Japan, where it was converted back to hydrogen at a refinery and finally used to fuel a fuel-cell-vehicle. The ship carried only a few tons, but a second trial run is planned for 2025. This time, the volume should be larger as ENEOS is scaling up its 150 kW Australian electrolyzer to a 1-MW size or larger.

The MCH chain will commercialize in about 2030 when there are more hydrogen supplies overseas. ENEOS also has issues to clear before the service launch. In order to carry more MCH, it seeks to change a regulation on the tanker cargo volume limit, which stands at 3,000 cubic meters for Class 2 tankers.

The consumer side of the supply chain also needs to be strengthened. ENEOS wants to find more users like Haneda Airport that plans to introduce a hydrogen-fueled system to supply power and heat to the terminal building.

Repurposing could take longer if the old and new functional requirements are too different. A consortium in west Japan plans to install gas pipelines in the ducts along the railway tracks and underground telecom cabling systems, to deliver to industrial users hydrogen imported into the port of Himeji.

Fusion of flammable gas and telecom cable pipelines is unprecedented, and it may take years to reset safety and other requirements as these are essential infrastructure. The consortium in charge, which consists of Kansai Electric, the NTT Group, the JR

Group and Panasonic, has a vague target for commercialization. They say the project will be operational in the 2030's.

Repurposing projects

Legacy facilities (Location)	Key Players	Description	Status
Naphtha pipelines (Kawasaki, Kanagawa Pref)	Resonac (supplier), Tokyu Hotels (consumer)	Transporting waste plastic-derived hydrogen to end users	Commercial services running since 2023
Oil refineries, chemical tankers, tanks, pipelines (Tokyo Bay Kanagawa Pref, Tokyo)	ENEOS (supplier), Haneda Airport (consumer)	Importing hydrogen converted into MCH, transport it on tankers, convert MCH back to hydrogen at refineries	5 MW electrolyser in Australia to be completed in 2025; Trial runs of the entire supply to start in 2025 at the earliest, commercialize about 2030
Railway and communication cable network (Hyogo Pref)	Kansai Electric, JR Group, NTT Group, Panasonic	Using telecom and railway network to transport hydrogen to industrial users	Field studies in 2024-2025; Commercial rollout in 2030's

Ammonia supply chains to serve big users

Coal-ammonia co-firing, or mixing ammonia with coal, to generate power is a typical demand-driven project. It involves a handful of users with a significant demand, and the supply chains are custom-tailored for them. Co-firing is also a repurposing of existing infrastructure. The power plants are not overhauled entirely, but burners and related equipment are replaced.

Therefore, the lead time for building co-firing supply chains is relatively short: from planning to full-scale operation would take six years. Domestic supply chains are possibly the shortest in terms of distance: only a few kilometers from certain ammonia port terminals to the power plants.

The major ammonia supply chain projects are: the Central Japan Hydrogen and Ammonia project in Aichi, Mie and Gifu prefectures; and the Shunan Industrial Complex project in Yamaguchi Prefecture. The consortium running these projects have strong support from the municipal and national governments, which also helped shorten the lead time.

The government has an ammonia first policy. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is writing ammonia bunkering guidelines although there's no ammonia oceangoing vessel sailing anywhere. Thanks to this push, the ammonia supply chains are likely to launch in 2027-2028, before ENEOS brings onstream its MCH chain.

JERA, the key player in the Central Japan consortium, will start running the Hekinan No. 4 coal power unit with 20% ammonia co-firing in FY2027. It recently completed a three-month co-firing trial at Hekinan and will start plant reconstruction later this year.

During the trial, co-firing was not conducted continuously at 20%, with time spent on testing and measuring emissions as well as power generating performance. Preparing for the FY2027 start of commercial-scale, continuous co-firing will involve not only building the new infrastructure, such as bigger ammonia storage tanks, but also thorough equipment checks.

Tokuyama, Tosoh and Zeon Corp, which operate coal power plants in Shunan, plan to start ammonia co-firing in 2028 and later. But they have not conducted any trials yet. Meanwhile, JERA has already held international tenders to purchase ammonia, and selected the initial suppliers, which will deliver the fuel to the Kinuura port, now a coal offloading terminal. For the Shunan users, Idemitsu Kosan will be the supplier of imported ammonia.

In terms of volumes, JERA will require at least 0.5 million tons/ year, while the three Shunan companies will need about 1 million tons/ year combined.

Ammonia is also used to replace methane and other gases used at chemical plants; the gases fuel naphtha crackers. Idemitsu Kosan has succeeded in running a naphtha cracker with ammonia replacing 20% of the fuel. Mitsui Chemicals, which is building an ammonia supply chain based in Osaka Bay, aims for an even higher ammonia ratio. In fact, it seeks ammonia to take over entirely and expects to implement such technology in 2030.

Ammonia projects

Project name (Location)	Key consumer, supplier	Description	Status
Central Japan Hydrogen Ammonia Association (Aichi, Mie, Gifu pref)	JERA (ammonia consumer), Toyota Motor (hydrogen consumer); Overseas producers (supplier)	Using imported ammonia for co-firing at JERA and other users in the area	JERA finished ammonia co-firing trial in June; full launch in FY2027
Shunan Industrial Complex Ammonia Supply Base Council (Yamaguchi Pref)	Tokuhama, Tosoh, Zeon Corp (consumers); Idemitsu Kosan (supplier)	Using legacy pipelines to supply ammonia to users	Users to start co-firing studies in 2025, Tokuyama plans to start co-firing in 2028
Osaka Waterfront Industrial Complex Consortium (Osaka)	Mitsui Chemicals, Kansai Electric (consumers) Mitsui & Co (supplier)	Using ammonia to fuel naphtha crackers, replacing methane and other gasses.	Ammonia-fueled cracker to start running in 2030

This report continues next week.

ANALYSIS

BY MAYUMI WATANABE

Aomori Proposes New Regional Rules for 'Cohabitation' with Renewables Projects

Last year, Aomori Prefecture's incoming governor announced one of the most audacious plans for a regional tax on renewable energy projects in Japan, vowing to bring in a levy that would apply even to existing solar and wind farms. A year on, the prefecture's strategy for the renewables sector looks quite different.

This month, a panel of experts employed by the prefecture published a skeleton draft of an ordinance that would see the local authorities assume greater control over solar and onshore wind projects. Specifically, the proposal targets operators with solar projects of over 2 MW in capacity (and 3 ha in size) and wind farms sized 500 kW and above.

The panel recommended that the prefecture use zoning rules, and placed an emphasis on installing an official community consultation procedure. The panel provided no details of a possible future tax.

After the rapid introduction of, in particular, solar power capacity in the last ten years or so, Japan has seen a slowdown in the rollout of new renewables facilities. Rising costs and dropping state tariffs for new projects were among the major factors, but a public backlash against new solar and wind farms in some communities has also been a serious issue in recent years. That has emboldened some municipalities, and even regional governments, to introduce new taxes or regulations to more closely control new developments.

In April, Miyagi became the first prefecture in Japan to introduce an ordinance that effectively taxes owners of new solar, wind or biomass generation facilities that cut down a certain level of forest cover to build the project. And so it was feared that Aomori would follow with an even more expansive tax plan.

New zoning concept

Aomori's expert panel on renewables development was created earlier this year by Governor Miyashita Soichiro, who took office in June 2023. Soon after, Miyashita announced that he aimed at slowing down the proliferation of onshore wind projects, because, in his words, they were not meeting community interests. Aomori is the country's top wind power producer, accounting for 20% of wind generation.

What the experts came back to the governor with is a little different from his 2023 pronouncements. Firstly, the draft of the proposed ordinance excludes offshore wind, residential rooftop solar, biomass, and hydro power sources.

It also states that the purpose of the new regulation in Aomori is not to discourage the local development of renewable energy, but to ensure that it expands in a smooth manner, avoiding environmental damage. The panel noted that most community conflicts in Aomori were related to solar and onshore wind farms.

Going forward, the panel proposes creating a zoning concept. This will restrict the areas where new solar and onshore wind projects can be sited. But even in the least restricted zone (a "cohabitation district"), a community council may need to be set up before an operator can even hold its first town hall meeting. This is the case if the community members and the operator seek to become "a renewables promotion district" as defined in the Act to Prevent Global Warming. The latter is important to help receive backing from the MoE, which has an important voice in decisions on large renewables projects.

The panel suggests introducing:

1) Zoning concept native to Aomori to clarify in which areas renewable projects are banned outright;
2) Closely monitored communication between developers and community stakeholders.

The prefecture will then make a judgment on whether proper communication took place or not before giving them a green light.

The proposal sees the need for two major zones: the "protected zones," where renewable projects will be banned; and "cohabitation zones," where projects are possible should they meet set requirements. There are two sub-categories in the latter zone: "preserved districts"; and "cohabitation districts". Projects in the "preserved districts" will require approval from the municipalities in order to begin the local communication process.

In theory, renewable project development will be encouraged in the "cohabitation districts", provided that there is no strong opposition.

Zone	Applicable Laws	Can renewables develop?
Protected zone	Natural Park Act (high priority Type I and specially protected areas), Natural Environment Preservation Act (wildlife protection), Cultural Asset Protection Act, equivalent prefectural ordinances	Totally banned
Cohabitation zone 1: Preserved district	Natural Park Act (lower priority Type II and III areas), Forestry Act	May be possible if projects have municipality support
Cohabitation zone 2: Cohabitation district	Global Warming Act, Act on Renewables in Rural Areas	May be possible but a community council needs to be established; talks required over the zoning status if community members seek a "promotion status" as defined by the Global Warming Act, Act on Renewables in Rural Areas, etc.

The panel also said it will write guidelines on the factors that project operators need to take into consideration when choosing sites. Their guidelines will include protection of livelihood and assets, consideration around disaster prevention and national

defense issues, as well as requirements related to nature, landscape, history and culture.

The new communication procedure will involve:

1) municipal and prefectural governments sending their views to project operators in writing; and
2) The prefecture making a final judgment on whether a consensus was successfully formed with community stakeholders.

The panel argues that under the present Environmental Impact Assessment process, which requires the operators to disclose scoping documents and survey results, there is no mechanism to reflect the interest of the municipalities directly affected by projects. The present system allows only the governor to submit opinions to the Environment Ministry and METI.

New tax

The panel was inconclusive about the new tax on renewable operators, an idea put forward by the governor last year. His initial plan was to levy a tax on all solar and wind operators, new and already operating. The panel did not discuss tax rates, to whom a potential tax will apply, or when. It said the scope of a renewable project's tax will reflect its zoning category, environmental impact and project size.

The panel also clarified that tax rates should not be designed so as to chase away renewables operators. Further, any proceeds from a tax should be limited to promoting cohabitation, conservation, renewables development and similar, according to the panel's findings.

The governor said last year he intended the revenue from a new renewables tax to be used freely, which would allow funds to be directed to causes unrelated to the environment.

Conclusion

The panel will need to work out details of the ordinance, including any new tax proposal, and these ideas would then need to get approval from the prefectural assembly.

The success of any new system that Aomori introduces will also depend on the clarity of its guidelines for defining zones. The MoE has already tried to spur the creation of various "renewables promotion zones" under the umbrella of the Global Warming Act, but this program has seen little takeup. Municipalities have been loath to strictly define such zones, and efforts to do so were complicated by competing stakeholders' interests.

Still, Aomori may succeed in setting a precedent for introducing zoning-based ordinances and provide a template for local communication procedures, ideas that other prefectures could borrow. Introducing a new tax requires national government approval, but changing administrative rules is within the remit of prefectural authorities. Other regions may see this as a viable approach to control new developments.

ASIA ENERGY REVIEW

BY JOHN VAROLI

This weekly column focuses on energy events in Asia and the Pacific

Australia / Nuclear power
The clean energy industry's opposition to nuclear power is on two fronts: technological complexity and viability, and high costs. This was one of the main takeaways from last week's Australian Clean Energy Summit 2024.

Canada / Oil exports
Asia's crude oil imports from the expanded Trans Mountain pipeline will rise as major refiners in China, Japan and South Korea seek more supply. The flow of crude from Alberta to Canada's Pacific coast will triple to 890,000 bpd. The pipeline gives Canadian producers more access to the U.S. West Coast and Asian markets.

China / Carbon emissions
China plans to cut carbon emissions in its coal power industry by piloting co-firing using coal mixed with either green ammonia or biomass, as well as with carbon capture, utilization and storage.

India / Russia
PM Modi and President Putin agreed to cooperate in energy, including nuclear power, oil refining and petrochemicals. Both are also looking into increasing the supply of coking coal, and exporting anthracite coal from Russia to India.

South Korea / Nuclear power
The Czech govt picked Korea Hydro & Nuclear Power (KHNP) as preferred bidder to build two nuclear reactors, marking South Korea's first overseas order for a large-scale nuclear power project since 2009.

Sri Lanka / Energy transition
The Asian Development Bank granted Sri Lanka a $100 million policy-based loan to support reforms in the power sector introduced under the Electricity Act; this includes institutional and regulatory reforms that aim to improve operational sustainability of the electricity sector.

Thailand / Energy scandal
Share prices of Thai renewable energy company, Energy Absolute, plunged 30% in trading on July 16 after the lifting of a trade suspension following a leadership shake-up. Shares had been suspended on July 15 when the company announced changes to its board and senior management; the previous CEO was accused of fraud.

UAE / Green finance
State-backed green energy group Masdar raised $1 billion with its second green bond issuance on the London Stock Exchange. It was five times oversubscribed and is part of a larger effort to raise up to $3 billion to deploy 100 GW of renewable energy capacity by 2030. Masdar has a portfolio worth more than $30 billion.

U.S. / LNG exports

A U.S. court ordered the Federal Energy Regulatory Commission to reassess the impact of GHGs from Commonwealth LNG's project in Louisiana. By 2027, the government aims to cut average carbon emissions by 50% from 2023 levels.

Vietnam / Renewable energy

Vietnam's renewable energy developers are set to benefit from a newly approved mechanism for direct power purchase agreements, said Saigon Securities, adding that the DPPA can encourage more investment in domestic renewable energy, thus improving efficiency of the country's power market.

2024 EVENTS CALENDAR

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

January	○ First market trading day (Jan 4) ○ IEA "Renewables 2023: Analysis and Market Forecast to 2028" released (Jan 11) ○ Renewable Energy Exhibition (Jan 31 – Feb 2) ○ Taiwan presidential election (Jan 13) ○ Japan's Diet convenes ○ IEA "Electricity 2024 / Analysis and Forecast to 2026" released (Jan 24)
February	○ CFAA International Symposium (Feb 2) ○ India Energy Week 2024 (Feb 6-9) ○ Lunar New Year (Feb 10-17) ○ Indonesia presidential election (Feb 14) ○ Japan-Ukraine Conference for Promotion of Economic Reconstruction (Feb 19) ○ FIT/FIP solar auction (Feb 19 – March 1) ○ Smart Energy Week (Feb 28-Mar 1)
March	○ Announcement of auction result for Offshore Wind Round 2 (for Akita Happo-Noshiro Project) ○ Onshore wind auctions (March 4-15; results on March 22) ○ International LNG Congress (LNGCON) 2024, Milan, Italy (March 11-12) ○ Russian president election (March 15-17) ○ World Petrochemical Conference, Houston, TX, USA (March 18-22) ○ IAEA Nuclear Energy Summit @ Belgium (March 21) ○ Ukraine presidential election (due before March 31) ○ End of Japan's fiscal year 2023 (Mar 31)
April	○ Maritime Decarbonisation Conference Asia, Singapore (Apr 3-4) ○ Details of 2024 capacity auction results released ○ Japan Atomic Industrial Forum (JAIF) Annual Conference ○ Global LNG Forum (Apr 15-16), Madrid, Spain ○ Global Hydrogen & CCS Forum (Apr 17-18), Madrid, Spain ○ World Energy Congress (WEC), Rotterdam, Netherlands (Apr 22-25)
May	○ May Golden Week holidays (May 3-6) ○ World Hydrogen Summit (May 13-15)
June	○ Japan Energy Summit & Exhibition (June 3-5) ○ G7 Summit in Italy ○ International Conference on Oilfield Chemistry and Chemical Engineering (IOCCE), Tokyo (June 10-11) ○ American Nuclear Society (ANS) Annual Conference, Las Vegas (June 9-12) ○ Renewable Materials Conference 2024, Siegburg/Cologne, Germany (June 11-13) ○ Happo Noshiro, Murakami-Tainai, Oga-Katagami-Akita and Saikai-Eshima wind project auctions close (June 30)
July	○ Tokyo governor election (July 7) ○ 7th Basic (Strategic) Energy Plan draft published (expected)
August	○ 7th Basic (Strategic) Energy Plan draft presented to Cabinet (expected)

September	○ Global Offshore Wind Summit Japan 2024, Sapporo, Hokkaido (Sept 3-4)
	○ The United Nations Summit of the Future (Sept 22-23)
	○ Gastech 2024, Houston, TX (Sept 17-20)
	○ IAEA General Conference
	○ GX Week in Tokyo (expected late Sept to October)
	  ○ Asia Green Growth Partnership Ministerial Meeting
	  ○ Asia CCUS Network Forum
	  ○ International Conference on Carbon Recycling
	  ○ International Conference on Fuel Ammonia
	  ○ GGX x TCFD Summit

October	○ IEA World Energy Outlook 2024 Release ○ BP Energy Outlook 2024 Release ○ Innovation for Cool Earth Forum (expected) ○ Connecting Green Hydrogen Japan 2024 (Oct 16-17) ○ Japan Wind Energy 2024 Summit (Oct 16-17) ○ Solar Energy Future Japan 2024 (Oct 16-17) ○ Japan Mobility Show (Oct 25-Nov 5)
November	○ US presidential election (Nov 5) ○ COP 29 in Azerbaijan (Nov 11-22) ○ Abu Dhabi International Petroleum Exhibition Conference (ADIPEC) 2024, Abu Dhabi, UAE (Nov 11-14) ○ APEC 2024 @ Lima, Peru ○ International Conference on Nuclear Decommissioning (TBD) ○ G20 Rio de Janeiro Summit (Nov 18-19) ○ Offshore Energy Exhibition & Conference (OEEC) 2024, Amsterdam, the Netherlands (Nov 26-27) ○ Biomass & BioEnergy Asia Conference (TBD) ○ European Biomethane Week 2024
December	○ Last market trading day (December 30)

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