JAPAN NRG WEEKLY

JAN. 17, 2022

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NEWS

TOP

- Mitsubishi Heavy keen to show progress in nuclear technologies; engineering firm works on reactors that can adjust loads quickly
- Chemicals and several other sectors miss CO2 reduction targets; reports to government fudge status of high emission industries
- Japan to test zero-loss power transmission lines; technology aims to deliver electricity across distances without leakage

ENERGY TRANSITION & POLICY

- Commission plans to scrutinize fuel costs of baseload power
- MoE selects town to test streamlined offshore wind assessments
- Four ammonia R&D projects selected for government funding
- METI minister announces new Japan energy initiative for ASEAN
- Toshiba talks up potential for profit from CCUS and offshore wind; And improves charging speed of lithium-ion batteries
- Retailer Aeon to use 100% renewables at 160 malls around Japan
- Euglena says research confirms biofuel works well for coastal ships
- Mitsui OSK and Itochu win approval for ammonia fuel ships in U.S.

ELECTRICITY MARKETS

- U.S. and Japan seek to cooperate on fast-breeder reactors
- Fukui governor talks with Kansai Electric, Japan Atomic on restarts
- Cosmo submits plans to build 400 MW offshore wind farm in Akita
- Renova cuts profit forecast after failure to win offshore wind bid
- Vena Energy gets green loan from Shinsei Bank for wind farm
- Huawei to enter Japans battery storage market, chasing Tesla
- J-Power shares jump after UK wind farm project completes tests
- TEPCO suspends Fukushima submarine robot survey of Unit 1

OIL, GAS & MINING

- Chiba, Osaka areas use record daily gas volumes after a snowfall
- METI minister expresses relief after Indonesia lifts coal export ban
- Tokyo Gas and Mitsubishi build strategy to decarbonize city gas
- Marubeni, ENEOS to move to cleaner ethylene transporting ships

ANALYSIS

TOP INTERVIEW: DIRECTOR AT METI'S POLICY PLANNING DIVISION

Japan NRG sat down with KUME Takashi, Director at METI's Policy Planning and Coordination Division, to discuss the latest energy issues and outlook. Mr. Kume explained Japan's Asia strategy goals, stance on LNG, willingness to protect coal-fired generation, how Japan will meet its renewables goals, the policy stance on nuclear and carbon pricing, outlook for batteries and green steel, and how the power market liberalization has changed the ministry's relationship with industry.

UPSET OVER OFFSHORE WIND TENDERS MAKES METI RECONSIDER PROCESS, MAY DELAY NEW PROJECTS

Japan's first-ever, fixed-bottom offshore wind tenders were swept by groups led by Mitsubishi Corporation and backed by record low prices. The results caused surprise and even shock in the industry. The winning price may now become a catalyst for the beginning of competitive pricing of offshore wind power generation in Japan, but it could also cause challenges for diverse participation in future auctions in what is still a nascent market. In response, METI Minister Hagiuda signaled that the framework to select auction winners may be reconsidered, or at least adjusted, to accommodate some of the industry's concerns.

GLOBAL VIEW

An offshore energy storage system is touted as a game changer for wind farms. Czechs vow to phase out coal. The UK will speed up closure of an aging nuclear plant. The U.S. says its oil and natural gas production could set new records. The IEA accuses Russia of slow gas supplies to Europe. Details on these and more in our global wrap.

EVENT CALENDAR FOR 2022

Key political and business events in Japan and abroad.

JAPAN NRG WEEKLY

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Events

Rystad Energy Japan Virtual Information Session | Energy outlook in 2022: Finding the balance in the energy transition

Date:
Tuesday, January 25, 2022
Time:
2:00pm - 3:30pm JST

Register

OFTEN USED ACRONYMS

METI	The Ministry of Energy, Trade and Industry
MOE	Ministry of Environment
ANRE	Agency for Natural Resources and Energy
NEDO	New Energy and Industrial Technology Development Organization
TEPCO	Tokyo Electric Power Company
KEPCO	Kansai Electric Power Company
EPCO	Electric Power Company
JCC	Japan Crude Cocktail
JKM	Japan Korea Market, the Platt's LNG benchmark
CCUS	Carbon Capture, Utilization and Storage
mmbtu	Million British Thermal Units
mb/d	Million barrels per day
mtoe	Million Tons of Oil Equivalent
kWh	Kilowatt hours (electricity generation volume)

NEWS: ENERGY TRANSITION & POLICY

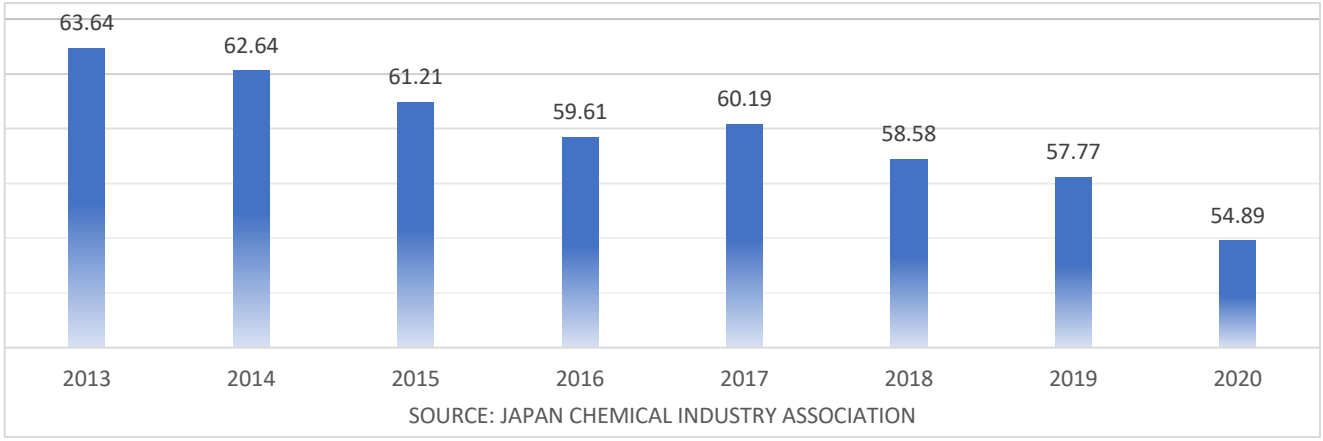
Japan Chemical Industry Association fails 2020 carbon target

(Japan NRG, Jan. 11)

- The Japan Chemical Industry Association (JCIA) reported to METI that the sector failed to reach the 2020 target to cut 1.5 million tons of carbon emissions from 2005 levels on a business as usual (BAU) basis. The 2020 reduction was 0.9 million tons, BAU basis.
- The actual carbon emissions were 55 million tons, down from 58 million tons a year ago. The emissions dropped thanks to lower plant run rates on the back of Covid, but energy efficiency deteriorated and the reduction was 0.6 million ton short of the target.
- The association's 2030 reduction goal is 6.5 million tons on a BAU basis compared to 2013 levels. It plans to revise up the 2030 target to a more ambitious level, once it achieves the 1.5 million tons/ year reduction on a BAU basis.
- Similarly, rubber and lime industryl bodies reported failing their 2020 reduction targets.
- CONTEXT: *The chemical sector is the second largest GHG emitter outside the energy sector, after steel. The sector runs 38 coal-fired plants with a total capacity of 4.1 GW.*

- TAKEAWAY: The industrial bodies set carbon reduction goals that aren't legally binding. They also can decide measurement metrics that range from BAU-basis carbon to energy efficiencies. The means there is little recourse to verify the reported figures.
- JCIA has refused to disclose run rate details used in the BAU carbon calculations, claiming collecting operational data of member companies may be seen as non-compliance with the anti-monopoly act.

Chemical industry carbon emissions, million CO2 tons



Superconductors hold promise to reduce transmission losses

(Nikkei, Jan. 12)

- The Railway Technical Research Institute, a research body of Japan Rail, began trialing a 1.5 km stretch of superconducting transmission line in Kyushu.

- The line carries several hundred amps at 1500 V, the amount railways use.
- Superconductors use cryogenic temperatures to eliminate electrical resistance and thus, transmission losses.
- While previous technologies required conductors to be cooled to -269°C, necessitating the use of expensive liquid helium as a coolant, the Institute developed a way to make transmission lines superconducting at -196°; so, cheap and abundant liquid nitrogen can be used instead.
- In part, the transmission lines are made by MESCO, a Mitsui company.
- The technology holds promise for reducing carbon emissions: in Japan, 4.3% of electricity generated is currently wasted due to transmission losses. In the UK the figure is 8.0%, and in India the figure is 17.1%.

EGC to scrutinize fuel cost management of baseload power

(Japan NRG, Jan. 13)

- The Electricity and Gas Market Surveillance Commission (EGC) will monitor how baseload power operators calculate fuel costs after bid levels rose in the recent auction.
- The 2022 baseload capacity auction, held in November last year, settled at ¥15.69/ kWh for 4 MW Hokkaido; ¥13.42/ kWh for 146.7 MW in east Japan; and ¥10.63/ kWh for 409.3 MW in west Japan. No non-compliance was established, but the EGC will continue to monitor if the fuel cost calculations were reasonable.
- It will ask the operators with dominant market positions for more details of power generation costs, as well as their cost and supply forecast. Seller bids rose ¥0.44/ kWh and buyer offers were also up ¥1.74/ kWh from the previous auction, the EGC said.

MoE selects Yusa Town to test streamlined offshore wind assessment system

(Kankyo Business, Jan. 12)

- The area off the coast of Yusa Town, Yamagata Prefecture will be used to trial the new environmental impact assessment system for offshore wind projects.
- The MoE will conduct documentary research, interviews, and nature field surveys in the area where offshore wind power is expected to be introduced around Yusa. The trial will start from FY2022.
- CONTEXT: *The government vowed last year to speed up the offshore wind project development process by taking on the environmental impact assessment and other preparatory work. This would lessen the burden on the local area as currently each potential bidder needs to conduct its own assessment.*

Four ammonia R&D projects selected for government funding

(Kankyo Business, Jan. 12)

- NEDO announced winners for Green Innovation Fund financing for ammonia fuel and supply chain. R&D will get a maximum of ¥68.8 billion over 10 years.
- The winning projects are:
    - Development and demonstration of a new catalyst for ammonia production: Chiyoda Corporation, JERA, and TEPCO;

  - R&D of green ammonia electrosynthesis under normal temperature and pressure: Idemitsu Kosan, The University of Tokyo, Tokyo Institute of Technology, Osaka University, and Kyushu University;
  - Co-firing with ammonia at a high percentage in the mix and pure ammonia-fired generation and boiler systems: (Group 1) IHI Corp, JERA; (Group 2) Mitsubishi Heavy Industries, and JERA;
  - Development and demonstration of ammonia firing in gas turbines: IHI, Tohoku University, National Institute of Advanced Industrial Science and Technology
- CONTEXT: *JERA's projects in co-firing aim for at least 50% ammonia in the fuel mix at a thermal power plant. The R&D period is set to run for about eight years to FY2028. JERA plans to attract transition finance to cover its own costs outside of the government funding.*

Japan announces new energy initiative for ASEAN

(Kankyo Business, Jan. 13)

- At an online event on economic cooperation between Japan and the Association of Southeast Asian Nations (ASEAN), METI Minister Hagiuda announced the "Asia Future Investment Initiative," that will set the direction for economic cooperation in Asia in the post-Covid era.
- Together with the Asia Energy Transition Initiative (AETI), announced in 2021 to support energy transitions in Asia, the new program will invest in supply chains, connectivity, digital innovation, and human resources.
- This means funding to develop the market for next-gen vehicles, including EVs and hydrogen vehicles, and utilization of biofuels, as well as continued contribution to auto supply chains in ASEAN countries.
- Minister Hagiuda wants to promote cooperation between public and private sectors in areas of distributed power sources using renewable energy, geothermal power generation, ammonia co-firing at coal power plants and CO2 capture and storage.

Toshiba Energy Systems CEO talks up firm's decarbonization business vector

(Denki Shimbun, Jan. 14)

- CONTEXT: *This is an interview with Konishi Takao, president of Toshiba Energy Systems. The unit owns Toshiba's nuclear assets and Fukushima decommissioning work. The company last May partnered with GE to become one of the first major Japanese firms involved in the sector.*
- Toshiba ES will focus even more on decarbonization products and services. One big growth area is CCUS (carbon dioxide capture, utilization, and storage). Toshiba ES has already started to supply carbon capture equipment to smaller power plants, but needs to work more on standardizing CCUS tech costs.
- With GE, Toshiba is discussing how to set up a Japanese production base for offshore wind parts. It may be set up in Akita Prefecture, close to many of the offshore wind power projects.
- Toshiba ES also acquired a U.S. plant-monitoring software business. It is used in about 40% of thermal power plants in North America. Toshiba now hopes to expand its sales globally, especially to clients that already run its gas turbines.

- Getting into monitoring and data analysis of power plant operations and maintenance is another growth vector for Toshiba.
- SIDE DEVELOPMENT:
  Toshiba improves charging speed of lithium-ion batteries
  (Nikkei; Jan. 12)
  - Toshiba announced a new lithium-ion battery with additional safety features that can also charge 1.6-1.7 times faster than its predecessor while maintaining the same 20 amp/hour capacity. It is suitable for cars that require fast charging.
  - This lithium-ion battery uses lithium titanate as the anode to achieve high safety, long life and quick recharge. The new battery improves the internal structure of the electrodes and electrolyte, and is good for buses, trucks and passenger cars.

Retailer Aeon to use 100% renewable energy at 160-plus Japan malls

(Asia Nikkei, Jan. 11)

- Aeon operates more than 160 malls around Japan, which account for about 0.2% of the country's electricity demand. All the facilities will switch to 100% renewable energy by 2040.
- Aeon Mall plans to buy green electricity and produce its own with plans to buy land for this. The shift to solar will begin in 2022.
- CONTEXT: *Parent company Aeon, Japan's top retail group by sales, accounts for nearly 1% of the country's total electricity demand*
- Along with setting up solar panels at its sites, Aeon Mall will sign corporate power purchase agreements (PPAs) and install batteries.

Euglena says research confirms its biofuel works well for coastal vessels

(New Energy Business News, Jan. 11)

- Euglena released a report on biofuel-based navigation research for coastal vessels that showed no major issues with using the clean-fuel technology.
  The biotech firm worked with Japan Railway Construction, Transport and Technology Agency to test a tourist-type high-speed cruiser that ran on Euglena's next-generation biodiesel fuel Susteo.
- The partners measured data on speed, fuel consumption, engine exhaust temperature, and other factors during test cruises. Based on the successful trial, the two parties started a technical study on the co-firing of Susteo in marine diesel engines using heavy oil A from December 2021.

One-Dot Wrap

- Osaka Gas will supply 100% renewable energy to 10 stations in Saga Prefecture on the Chikuhi Line of the Kyushu Railway Company. (*Kankyo Business, Jan. 13*)
- Shipper Mitsui O.S.K. Lines and trading house Itochu announced getting the American Bureau of Shipping's basic approval for an Ammonia Fuel Supply Vessel Design (AIP), a first for Japanese companies. This is part of a joint development of the marine ammonia fuel supply chain in Singapore. (*Kankyo Business, Jan. 14*)

NEWS: POWER MARKETS

New nuclear reactor model to adjust output in just 17 mins, Mitsubishi Heavy says

(Nikkei, Jan. 14)

- Mitsubishi Heavy Industries (MHI) plans to develop a new nuclear reactor in the mid-2030s that will be able to fine-tune its output in minutes, enabling it to respond to fluctuations in power generation from renewable energy sources.
- The engineering firms hopes that the technology will make nuclear as nimble as thermal power, allowing it to take on the role of balancing the grid in a system with a high renewables component.
- CONTEXT: *Advanced gas-fired plants can adjust their output in as little as 10 minutes. Current nuclear technology requires about an hour.*
- The reactor size is expected to range from 600 MW to 1 GW. It will be able to cut output by half in 17 minutes, a quarter of the time current reactors take. This model could be used to replace existing reactors, according to MHI.
- The cost of power for the new fast-responding reactor will be ¥10.02 (8.8 U.S. cents) per kWh. That includes the cost of installing safety systems and getting fuel reprocessed.

- TAKEAWAY: This is just one of several new nuclear reactor designs that MHI is currently working on. An update on some of them will feature in next week's Analysis section. Judging by the timelines, work on the reactor design mentioned in the article has started fairly recently. And, while it offers a very important feature, quick and flexible load adjustment, the downside is: it won't be ready until mid-2030s. In practice, this means the reactor won't be an option for most domestic utilities until early 2040s. As a solution for replacing the aging fleet of reactors today, that already feels "last minute". Given the fact that just half a year ago, discussing new nuclear reactors in Japan was almost taboo, MHI has moved quickly to reinstate its nuclear credential. It will need to move even faster for the plans to turn into reality.

    - SIDE DEVELOPMENT:
      U.S. and Japan to collaborate on fast-breeder reactors
      (Yomiuri, Jan. 9)
        - Details have emerged of a MoA to be signed this month by TerraPower in the U.S., the Japan Atomic Energy Agency, and Mitsubishi Heavy Industries regarding fast-breeder reactor technology.
        - U.S. entities will share confidential technical information regarding fast-breeder reactor technology with their Japanese counterparts.
        - The agreement includes development of systems for inserting and removing fuel rods and identifying the location of broken fuel rods, improving heat exchangers and pumps for use with molten sodium coolant, and shielding technologies.

Fukui governor speaks with tops of Kansai Electric, J-Atomic on reactor plans

(Denki Shimbun, Jan. 12)

- Governor Sugimoto of Fukui Prefecture met with President Morimoto of Kansai Electric and President Muramatsu of Japan Atomic Power.

- CONTEXT: *All of Kansai Electric's nuclear plants are located in Fukui Prefecture. One of Japan Atomic's two plans is also in the prefecture.*
- Kansai Electric CEO Morimoto reiterated plans to find a site outside of the prefecture for interim storage of spent fuel by the end of 2023, while J-Atomic's Muramatsu expressed his determination to make progress in the examination of the Tsuruga NPP Unit 2.
- Morimoto expressed gratitude for the consent to restart the Mihama NPP Unit 3 last year. Regarding the interim storage facility, he said: "We are considering all possibilities in cooperation with the government and the Federation of Electric Power Companies of Japan."
- Governor Sugimoto praised the work to restart the older Mihama station without any major problems, and hopes the same would be true for the restart of the Takahama NPP Units 1 and 2, which, like the Mihama Unit 3 reactor, are over 40 years old. In the case of interim storage, the governor asked for "a relationship of trust and a sense of speed."

- TAKEAWAY: This is a reminder of the precarious operating status of Kansai Electric's nuclear reactors. The utility has until 2023 to fix a plan to move spent fuel rods out of storage pools inside reactor buildings to a facility outside of Fukui Prefecture. That was the deal on which it won approval to restart its nuclear fleet. With less than two years left, Kansai must do a lot of lobbying, mostly likely in northern Japan, to secure that safe storage site. It won't be easy.
- Meanwhile, the cordial comments by the governor towards Japan Atomic may signal that the company is making progress towards the restart of its Tsuruga reactor. Last year, the Nuclear Regulation Authority suspended the reactor's safety screening after discovering data tampering in documents submitted by the company. The scandal threatened to stall the restart of the Tsuruga station.

Cosmo submits plans to build 400 MW offshore wind farm in Akita area

(New Energy Business News, Jan. 14)

- A unit of Cosmo Energy Holdings, published the environmental assessment method statement for a 400 MW offshore wind power project off the coast of Oga City, Lagoon City, and Akita City in Akita Prefecture.
- The area is listed as "promising" under the Renewable Energy Use of Sea Act.
- The project area is approximately 5,569 hectares, and the maximum number of wind turbines to be installed is 42, ranging from 9,525 kW to 15,000 kW. Foundation work should start in spring 2028.
- At the letter of intent stage, Cosmo Eco-power partnered in the project with Venti Japan and Mitsubishi Corporation. But, the method statement was submitted by a venture between Cosmo, Venti Japan, Shimizu Corporation, and Japan Petroleum Exploration Co (JAPEX).

Offshore wind tender: losers unhappy about Mitsubishi's clean sweep

(Diamond Online, Jan. 7)

- Unsuccessful bidders were shocked at being undercut despite competitive offers.
- A similar project in Akita was recently awarded to a Marubeni consortium for ¥36/ kWh.
- The secret to Mitsubishi's rock bottom offer is backing from Amazon, NTT, and beer giant Kirin Holdings, with which Mitsubishi will have a PPA after its 20-year FIT agreement ends.

- Some worry that the emergence of cutthroat price competition so early in the game will actually discourage further investment in renewables.
- SIDE DEVELOPMENT:
  Renova reverses profit announcement after failed bid
  (Nikkei, Jan. 7)
  - Renewables giant Renova revised earnings projection for the year to March after its bid to develop offshore wind farms in Akita was unsuccessful.
  - Renova formerly projected a consolidated profit of ¥5.1 billion for the year.
  - The corporation is now projecting a ¥6.2 billion loss.

- TAKEAWAY: See the Analysis section for our take on the tenders.

Vena Energy gets green loan from Shinsei Bank for wind farm project

(New Energy Business News, Jan. 13)

- Vena Energy financed the 46.8 MW Nakazato wind farm in Aomori Prefecture through a green loan from Shinsei Bank. The amount is ¥14.48 billion.
- The plant will also have an interconnected capacity of 36 mW, and is scheduled to start commercial operation in the first quarter of 2022.

J-Power stock jumps on UK offshore wind farm news

(DZH Financial Research, Jan. 14)

- J-Power's share price rose on news that the Triton Knoll (UK) offshore wind farm built by J-Power, RWE and KEPCO has completed operational testing.
- The wind farm will generate enough electricity to supply 800,000 households, and will start to feed the grid in the first quarter of this year.

Huawei to enter Japan's battery storage market

(Asia Nikkei, Jan. 14)

- Huawei Technologies will begin selling large-scale battery systems for renewable energy storage in Japan in March. The units are the size of a shipping container and
- The Chinese firm plans to w buy small battery packs from manufacturers including Contemporary Amperex Technology (CATL) and then bundle them into shipping-container-sized units that can each store 2,000 kilowatt-hours of energy.
- Huawei Japan said it expects a rapid deployment of solar and cost reduction in the country to support demand.

TEPCO suspends Fukushima robot survey plans

(Jiji, Jan. 11)

- TEPCO suspended plans to use a robotic submarine to survey the interior of Unit 1 at the Fukushima nuclear site after the robot's radiation readings were found to be unreliable.

NEWS: OIL, GAS & MINING

Chiba, Osaka areas use record gas volumes in a day after snowfall

(Gas Energy News, Jan. 10)

- After heavy snow on Jan. 6, Keiyo Gas, which serves Tokyo-adjacent Chiba Prefecture, and Daito Gas, which serves Osaka area, had record gas deliveries.
- Keiyo Gas supplied 3,221,000 m3 of gas, its largest ever daily amount, beating the previous record set on Jan. 25, 2018. The average local temperature on Jan. 6 was 0.9 Celsius, cooler than the previous day. Demand for heating and hot water from households, which account for about 48% of total sales, increased.
- Daito Gas sent out 476,454 m3, beating its previous largest ever daily volume on Jan. 26, 2016, by 2.1%. The average temperature locally was minus 0.5 Celsius. Like Keiyo Gas, a big jump in household demand accounted for record volumes.

METI relieved that Indonesia lifted coal export ban

(NHK, Jan. 14)

- METI Minister Hagiuda expressed relief at an Indonesian decision to lift a temporary ban on coal exports. Indonesia had imposed the ban to ensure sufficient domestic supply.
- Hagiuda said the govt. will keep working on procuring enough energy to get through the winter.

Tokyo Gas and Mitsubishi build strategy to decarbonize city gas in Japan

(Sekiyu Tsushin, Jan. 11)

- Tokyo Gas and Mitsubishi Corporation recently agreed on a feasibility study for establishing a supply chain for methane (synthetic methane) made from green hydrogen derived from renewable energy sources and CO2 in LNG exporting countries such as North America, Australia, the Middle East, and Asia.
- The two aim to build up supply of carbon neutral (CN) methane that contributes to the decarbonization of city gas.
- CONTEXT: *Japan's 6th Basic Energy Plan includes substitution of natural gas with synthetic methane as a means to achieve carbon neutrality.*

Marubeni and ENEOS introduce environmentally friendly ethylene transporters

(LNews, Jan. 14)

- Marubeni and ENEOS agreed to introduce a fleet of more environmentally friendly vessels to transport ethylene. Switching to the new ships will enable to reduce CO2 emissions associated with ethylene transport by around 40%.
- Under an arrangement between the companies, Marubeni markets and ships ethylene manufactured by ENEOS.

ANALYSIS

BY TAKEHIRO MASUTOMO

TOP INTERVIEW: Director at METI's Policy Planning Division

Japan NRG sat down with KUME Takashi, Director at METI's Policy Planning and Coordination Division, to discuss the latest energy issues and outlook.

ASIA STRATEGY

At COP26, Prime Minister Kishida announced $10 billion in additional aid to developing countries over the next five years. What kind of assistance is envisioned?

Japan will contribute to the decarbonization of Asia by providing support via the Asia Energy Transition Initiative (ATI). While it's too early to speak of specific projects, we're talking about support for renewable energy, energy efficiency, and LNG, too. We will keep in mind all projects that could lead to decarbonization.

In terms of renewables, solar will be the main focus initially as it is quite difficult to set up wind power in Asia. However, if we install a lot of solar, as is also the case in Japan, we will need a certain amount of thermal power to manage the variable nature of solar power. This means it's also important to pursue zero-emission strategies for thermal power generation.

Asia has a lot of coal-fired power plants, so efforts that promote their decarbonization will be of great importance in the region. Japan is working on ammonia and hydrogen strategies through the building out of the infrastructure. This is a lot of work. But we believe it will be vital technology both for Japan and the broader Asia region, so we will promote its development.

There are strong voices calling for Japan to abandon the promotion of LNG in ASEAN and to focus on renewables. How do see this?

People in developed countries, including European countries and the U.S., need to understand that Asian nations still want economic growth and need stable energy at low cost. We can't just ask them to use renewable energy regardless of the high price, or to use nuclear power when they don't have the technology.

Even during the transition to carbon neutrality, the issue of securing a stable supply of fossil fuels remains, especially in LNG [which allows for an] uptake of more renewable energy while filling in for the intermittent nature of renewable. It's possible that other Asian countries, in addition to China, Japan, and South Korea, will want to move from coal to gas. And, I'm sure that people in Europe already understand the importance of stable gas supply, no matter how difficult it is for them to say so politically. Asian countries have the same understanding. Looking at things in a realistic light, Asian people need stable and inexpensive fossil fuel supply during this transition.

Within the G7, Japan is the only Asian nation, but in the G20 there are other Asian countries. Japan can play a crucial role in in these meetings to convey the message that the energy transition has to be done with a sense of reality.

COAL

At COP26 Japan did not signal any interest in ending coal-fired power generation. Why is coal still considered a necessity for Japan?

First of all, we are firmly committed to the goals of carbon neutrality by 2050 and a 46% reduction in emissions by 2030. These goals have received strong approval worldwide. But which route one takes to reach such goals is specific to each country. The energy picture greatly varies from country to country.

For a nation like Japan, which is not blessed with its own energy raw materials, we abide by the principle we call S + 3E, which calls for a balance between safety, energy security, economic efficiency, and concern for the environment. The latest Strategic Energy Plan[1], approved in October, includes the principle that renewable energy will be treated as a priority. In fact, the only CO2-free power generation sources available right now are renewables and also nuclear. But even if we use those two sources to the maximum, potential blackouts are a concern.

Unfortunately, we are not in a position where we can stop using thermal power or even announce when we'll phase it out completely. However, we have decided to phase out inefficient coal-fired generation, and we can also gradually reduce emissions by introducing ammonia as a fuel in coal-fired power plants. Our initial aim is for ammonia to account for 20% of co-firing, but eventually we will achieve single fuel firing of ammonia. We are now moving in this direction in a realistic manner.

RENEWABLES

The latest Strategic Energy Plan sets a goal of doubling the share of renewable energy to 36-38%. Yet, available land for solar, the main renewable source, is limited. So, how can Japan achieve this goal?

The share of renewables currently stands at around 18%, so within 10 years it must double. As you say, most of that growth will come from solar. Offshore wind power will be very important for the 2050 target, and we're counting on its contribution, but this decade it will be on solar to make up the numbers. Japan has about 56 GW of solar power capacity today. This suggests we need to add about the same amount again by 2030.

Still, it's true that local residents are becoming more and more critical of solar power, and the number of ordinances in place restricting further buildout of renewables has increased fivefold in the past five years. About one in 10 municipalities now have such ordinances. So, it's clear that solar capacity should not expand in a way that will cause friction with local communities.

We've been asking solar operators to conduct proper explanations of their projects to local communities for a long time. Nowadays, even if a project has been certified under the FIT system, if it violates an ordinance, the certification can be revoked. If there is a violation, the FIT will no longer be granted and power won't be purchased at the higher price. This is how discipline is maintained. Still, it is based on the premise that local people know the local situation best. The national government

[1] Please note, *Japan NRG* translates the government's long-term energy plan into English as the "Basic Energy Plan". METI refers to it as "Strategic Energy Plan".

can't impose a uniform request to do this or that. We simply ask municipalities to discuss the matter carefully.

The Ministry of Environment (MoE) is aware of the need to grow solar power, so they have set up promotion areas. The message is: "If you are going to [*create a solar project*], please do it here, and if you do, then we can conduct all the procedures in one place."

Meanwhile, some municipalities want to declare themselves as zero-carbon cities. For them, it's better if they can oversee a disciplined development [of solar] that is not overdone and is concentrated in a certain area. I think that approach works well for all parties.

We are aware that we need a considerable amount of solar capacity, so we, METI, and other ministries, are doing our best to find a spot for it in every possible place: at airports, public facilities, and schools. Roughly 60% of new houses will have solar panels in the future.

NUCLEAR

The latest Strategic Energy Plan has kept the nuclear target unchanged, yet this looks challenging in practice. What policies do you have in mind to achieve it?

Nuclear, together with renewables, is the only CO2-free power source that can provide stable electricity supply at scale, at the moment. That's why the new Strategic Energy Plan adopted the policy that nuclear energy should be utilized at the necessary scale as we aim for the 2050 target. I think this implies it will be difficult to achieve the right energy mix without nuclear power unless other energy sources, including renewable energy sources, get technologically advanced and become much more affordable.

For the foreseeable future, the first thing we need to do is restart the reactors that passed the Nuclear Regulation Authority safety review. Through this, people will gradually realize that with nuclear power in operation, the electricity prices of utilities that operate nuclear power plants remains relatively stable even when the price of LNG fluctuates.

We are working to restore public trust in nuclear power in an environment in which accidents are not tolerated. We need to obtain public understanding of the significance of nuclear power. I think it would be good if we can deepen the debate surrounding nuclear power, step by step.

CARBON PRICE

METI and MoE have examined the issue of carbon pricing and carbon tax for several years. When do you expect to form a final decision?

Both our and MoE's study groups have considered carbon pricing based on the same source materials. There are two types of carbon pricing: Implicit and explicit. The FIT system belongs to the former. Oil and coal taxes are partly an explicit price. Both MoE and METI have a common understanding within our respective study groups that we already have a system of economic tools linked to carbon and that if we are to

implement carbon pricing further, we need to do so in a way that contributes to economic growth.

In the tax system debate [*within government*] at the end of the year, the discussion tends to focus on whether or not to include a carbon tax. Tax is certainly one option among many. There is also the trading of emission credits. And there is the private sector's voluntary initiative that METI's Industrial Science and Technology Policy and Environment Bureau is considering, in which private entities pledge emission cuts and then conduct a review of their progress. In that initiative, if one misses its target, they have to procure carbon credits, which include credits from others who overachieve their goal. We are still in the process of discussing how to implement various mechanisms in a way that contributes to economic growth. I don't think we have yet decided on the best direction.

Is there any deadline for the discussion about carbon pricing?

None. But we are aware of the timing of the EU's move on CBAM and its content, and how that may change the environment. I don't mean that Japan should do something just because the EU is doing it. If Japan is going to do something, we need to make sure we can explain it to industry and the Japanese people, to show that it's a necessary course of action for decarbonization and that it will contribute to growth, rather than being yet another burden.

Still, we can't remain apart from moves overseas. What will Europe do? Or what will China do? What will the United States do? I think this is something we always need to monitor and think about as our domestic discussions proceed.

BATTERIES

When do you expect storage batteries to play a significant role in the power sector of Japan?

The more renewable energy is connected to the grid, the more important batteries become. The only and major drawback is that batteries are expensive. At the moment, pumped-storage hydro is the common way to balance supply and demand. Unless batteries become cheaper than pumped-storage, they will not become widespread. We are developing various technologies to make batteries as cheaply as possible so that their cost is equivalent to pumped-storage systems, which means around ¥23,000 per kilowatt.

As for when this will happen, that's a very hard question. This is a field that everyone around the world thinks is important and is researching. We will continue to provide industry with our strong support.

GREEN STEEL

The government is providing financing for R&D into steelmaking that moves away from use of coal. Why is this an important program; what are your expectations for it?

This is one of the initiatives covered in the Green Growth Strategy that was published in December 2020 and updated in June 2021. The financing is coming from a ¥2 trillion fund that METI set up, called the Green Innovation Fund. This fund's assistance

will cover a range of projects from R&D through to demonstrations to social implementation of the outcomes. We're organizing projects within the priority fields for which implementation plans have been formulated as part of the Green Growth Strategy, where policy effects are significant, and where long-term continuous support is required to realize social implementation. We're calling for applicants for each project.

Certainly, 'green steel' is one of the key areas covered by the Fund. If you count the amount of money that has been invested in this technology to date, it's quite large. But, as you know, we are pursuing this research without knowing whether it really can be done or not, especially in terms of iron production. Still, we can't stop ourselves from trying. We can't see the goal line yet, but we are working hard on this field.

POWER MARKET LIBERALIZATION

In the past, the power market in Japan was controlled by 10 or 11 companies. Thanks to the market liberalization, today there are hundreds of players. How has the government adapted to communicating with such a large number of stakeholders?

That's a very important question. The people who reformed the system didn't think at the time that 500 or 600 companies would enter the electricity business.

Since the electricity retail and generation markets where liberalized companies can enter and leave the market freely. This has created some issues. In the case of power generation, for example, the notification system used to be "after the fact". But, [*with a more diverse and complex generation system*] we should make it a "before the event" system, otherwise trouble could occur and there could be a shortage of capacity all over Japan.

As for the retail business, the registration system for new players is still open, so any interested company can apply. If they decide to quit, however, they should do so in a way that causes as little trouble as possible to their customers. We've seen some companies exit the retail sector. Given what's happened in the UK [*over recent months, when several power retail firms went bankrupt due to price volatility*], it's possible that more companies will quit this sector.

Last winter, [*when electricity prices in Japan spiked to a record and were volatile for several weeks*] we felt that we needed to communicate with each individual power retailer to find out what issues they were facing, their electricity procurement status, and whether or not there was any room for the government to support them. We did this, but it was very difficult to communicate with hundreds of companies all at once. Officials worked hard even on their days off.

Since then, we've become more organized. The department in charge of retail has informed retail companies how to hedge against the possibility of the same issues recurring. We have been providing information and answering questions on this topic for about a year now. We try to provide the right information as proactively as possible, and we hope that companies will make use of it.

ANALYSIS

BY MARIE TANAO

Upset Over Offshore Wind Tenders Makes Japan Govt. Reconsider Process, May Delay New Projects

Japan's first-ever, fixed-bottom offshore wind tenders were swept by a Mitsubishi Corporation led consortium that offered record low prices. The results caused surprise and even shock in the industry. Whilst the winning price may become the catalyst for the beginning of competitive pricing of offshore wind power generation in Japan, it may cause challenges for diverse participation in future auctions in a still nascent market. Now, METI Minister Hagiuda has signaled that the framework to select auction winners may be reconsidered or at least adjusted to accommodate some of the concerns.

The minister's comments, if taken at face value, would require time-consuming changes to regulation; thus, future tenders for offshore wind projects could be affected and even delayed.

Energy experts close to the government have given a mixed reaction to the results announced at the close of 2021, when tenders for all three sites were won by consortiums led by Mitsubishi Corporation and a unit of Chubu Electric.

The other auction from the first round of offshore wind tenders, for a floating turbine project off the coast of Nagasaki, was awarded in June 2021 to an all-Japan consortium led by Toda Corporation that made the only bid.

"Goto Floating Offshore Wind Turbine (Sakiyama)" by mmatsuura; licensed under CC0 1.0

Experts clash on results

Japanese academics who serve on relevant METI and MLIT[2] committees that are vital to offshore wind policy seem to be split on the clean sweep by Mitsubishi and C-Tech Corp. The latter is a unit of Chubu Electric Group that's mainly involved in power

[2] the Ministry of Land, Infrastructure, Transport and Tourism

facilities construction, maintenance, and data analytics. C-Tech independently operates just 57 MW of wind capacity, all onshore, across three Japan projects, the two biggest ones of which were built over a decade ago.

Yamaka Kimio, a distinguished professor at Kyoto University, and an analyst of domestic offshore wind development, went as far as to suggest[3] that the tender results should be reconsidered. Calling the choice of tender winners as especially sensitive, Yamaka voiced concern about the profile of the Mitsubishi consortium and called their low bids a "gamble", pointing to the feasibility of such a project in a still developing market. The outcome will "go down in history as one of the first energy projects to introduce international mentality" to tenders in Japan that give no "consideration of the existing systems or the consensus of the parties involved," Yamaka said.

A more favorable view came from Professor Matsumura Toshihiro of Tokyo University, who periodically appeared before government committees. Matsumura highlighted the unexpectedly low bids submitted by Mitsubishi as proof that offshore wind can be competitive with existing generation types and a chance to sway skeptics of the emerging energy source.

The sentiment was echoed by fellow University of Tokyo professor, Takamura Yukari, a big proponent of the energy transition, who called the cost-competitive nature of the winning bid an encouraging sign for Japan hitting its 2030 GHG reduction goals.

Indeed, Mitsubishi's ability to offer as little as ¥11.99/ kWh in one of the tenders is said to have been the big draw for the government's decision. METI is particularly sensitive to the issue of the "renewables surcharge", the markup on the Japanese power bill that covers the cost of the Feed-In Tariff (FIT) system introduced in 2012 to stimulate the development of renewables.

METI emphasized the issue of cost numerous times during committee discussions that led to the current offshore wind auction framework.

Can METI reconfigure the auction process?

Since the publication of the government's *Vision for Offshore Power Industry* and the *Green Growth Strategy* in December 2020, Japan's goal has been to bring the cost of offshore wind electricity generation to ¥8-9/ kWh by 2030-2035 and to award winners 10 GW worth of projects by FY2030.

The first four auctions awarded last year would bring online just over 1.7 GW of capacity. This year's auction in the Happo and Noshiro area in Akita Prefecture would add close to 0.36 GW. This would leave METI with eight years in which to stage 8 GW of tenders and award them.

To hit the cost targets, however, the government needs to act faster since projects awarded now would not come online for another eight years or so. That suggests within the next five years winning project bids need to drop to the ¥8-9 level.

The Mitsubishi consortium's ¥11.99-16.49/ kWh bids, which is rumored to be as much

[3] https://www.econ.kyoto-u.ac.jp/renewable_energy/stage2/contents/column0284.html

as ¥5 less than the nearest rival in some of the tenders, helps the government set the right marker to achieve its roadmap goals. Nevertheless, METI wants to keep most of the industry onside and cannot be seen playing favorites.

As such, METI Minister Hagiuda was cited in the media as saying that the government will consider "an alternative framework for selecting auctions winners" to counter the likely backlash from many in the industry.

The current rules are enshrined in law, specifically the "Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities," which lays out the flow from designation of development zone to auction winner selection. Still, details around how to implement the process are in the hands of METI, MLIT and other ministries via two sets of guidelines.

Although the government would not need to change the law, ministries would have to alter the two sets of guidelines – a process that typically requires additional committee sessions. Expert deliberation takes months. Finally, the changes would need to be incorporated in the guidelines, likely published for public review and feedback, and only then become active.

The process is possible, but if enacted, likely to take time. Meanwhile, all new tenders would have to be put on hold.

Of course, METI could take the cost issue out of the hands of the bidders and simply set a price, as with the floating turbine auction in Nagasaki Prefecture. Then, bidders would be evaluated purely on their ability to carry out the project. Such an approach would not be applicable to the next auction, for the Happo and Noshiro area in Akita Prefecture, the terms of which have already been announced.

Another option is for the bid prices to carry a smaller weighting in the overall assessment.

The result of the Happo and Noshiro area auction is expected in December 2022. If the METI minister follows through on his comments, however, the timeline could shift and the rollout of additional sites will be affected.

This may prove a delicate balance for the government: adjusting the auction framework so a diverse set of players can participate whilst trying to keep offshore wind generation costs competitive. Close monitoring of relevant METI and MLIT committee discussions going forward will be vital to those interested in future auction participation as they will likely shape the changes in the framework. This also sends a signal that the auction framework is not set in stone, and there are opportunities for potential players to advocate for change.

GLOBAL VIEW

BY JOHN VAROLI

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

Italy/ Solar power

NextEnergy Capital divested its solar portfolio in Italy that was part of its NextPower II fund established in 2016. The deal's value wasn't revealed. The fund's portfolio had 105 individual solar facilities with a total capacity of 149 MW. The company recently set up NextPower III, a solar infrastructure fund that exceeded the $750 million fundraising target.

Offshore wind battery storage

A sea-bottom, offshore energy storage system was unveiled at CES 2022 in Las Vegas, potentially a game changer, says the developer, Dutch startup Ocean Grazer. In a statement, it said: the "battery allows utilities to transform offshore wind farms into dispatchable power generators using hydro dam technology" that can be deployed at the source of power generation.

Czechia/ Coal and nuclear power

The new government pledged to phase out coal by 2033, and will compensate for the loss by increasing capacity for nuclear power and renewables. Coal-fired power plants currently generate about 50% of Czech electricity output.

UK/ Nuclear power

EDF Energy will speed up closure of Heysham 2, a nuclear power station operational since 1988. Instead of a planned closure in 2030, Heysham 2 will now close in 2028. Meanwhile, Heysham 1 will cease operations in 2024, as planned. The UK has 11 nuclear reactors at five locations; they produce 20% of the country's electricity.

Italy/ Fossil fuels

Italian energy services group Saipem won offshore contracts worth a total of $1.1 billion. The first contract is for connecting Scarborough gas field with an onshore plant in the Carnarvon Basin, off Western Australia; its first cargo is expected in 2026. Saipem's second contract is with a subsidiary of ExxonMobil for a project off Guyana's coast.

U.S./ Wind power

A 1 GW wind farm in the state of New Mexico began operation. Developed by Pattern Energy Group, "Western Spirit" is called the largest renewable energy project in the U.S. The four wind power facilities rely on 377 GE wind turbines that range from 2.3 to 2.8 MW.

U.S./ Oil

Oil production could break pre-pandemic records in 2023, thwarting President Biden's goal to transition away from fossil fuels. Output is likely to rise to 12.4 mbd in 2023, said the Energy Information Administration. U.S. natural gas production will also set records over the next two years. The EIA added that OPEC is expected to increase crude oil production to 28.9 mbd in 2023, up from an average of 26.3 mbd in 2021.

Russia/ Gas

The head of the International Energy Agency accused Russia of slowing gas supplies to Europe to create an energy crisis as part of a geopolitical ploy. The context is that Gazprom, Russia's state-owned gas company, wants approval for the start-up of the Nord Stream 2 pipeline to Germany, which is an alternative to pipeline transit routes via Ukraine.

U.S./ energy storage

Tesla unveiled its Megapack battery project in Texas that has a capacity of 100 MW/ 200 MWh. It's one of Tesla's biggest energy storage projects. Last winter, unexpected harsh weather resulted in many parts of Texas having blackouts.

Philippines/ Offshore wind

Spain's Iberdrola and Triconti ECC Renewables, the Philippines 'largest wind developer, plan to build five offshore wind projects with a combined capacity of up to 3.5 GW. The Philippines has a target of 35% renewable energy in its power mix by 2030, and 50% share by 2040.

UK/ Offshore Wind

EDF Renewables will work with DP Energy to build offshore wind capacity from floating turbines of up to 1 GW. The project, Gwynt Glas, is planned to be off the coast of Wales. It's expected to be operational starting in 2030.

Canada/Renewables

Blackstone Inc. will invest $3 billion in Canada's clean energy company, Invenergy, which has 190 clean energy projects across the globe with a total installed capacity of 29 GW.

2022 EVENTS CALENDAR

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

January	OPEC quarterly meeting; JCCP Petroleum Conference - Tokyo; EU Taxonomy Climate Delegated Act activates; Regional Comprehensive Economic Partnership (RCEP) Trade Agreement that includes ASEAN countries, China and Japan activates; Indonesia to temporarily ban coal exports for one month; Regional bloc developments: Cambodia assumes presidency of ASEAN; Thailand assumes presidency of APEC; Germany assumes presidency of G7; France assumes presidency of EU; Indonesia assumes presidency of G20; and Senegal assumes presidency of African Union; Japan-U.S. two-plus-two meeting; Japan's parliament convenes on Jan. 17 for 150 days; Prime Minister Kishida visits Australia (tentative)
February	Chinese New Year (Jan. 31 to Feb. 6); Beijing Winter Olympics; South Korea joins RCEP trade agreement
March	Renewable Energy Institute annual conference; Smart Energy Week - Tokyo; Japan Atomic Industrial Forum annual conference - Tokyo; World Hydrogen Summit - Netherlands; EU New strategy on international energy engagement published; End of 2021/22 Japanese Fiscal Year; South Korean presidential election
April	Japan Energy Summit - Tokyo; MARPOL Convention on Emissions reductions for containerships and LNG carriers activates; Japan Feed-in-Premium system commences as Energy Resilience Act takes effect; Launch of Prime Section of Japan Stock Exchange with TFCD climate reporting requirement; Convention on Biological Diversity Conference for post-2020 biodiversity framework - China; Elections: French presidential election; Hungarian general election
May	World Natural Gas Conference WCG2022 - South Korea; Elections: Australian general election; Philippines general and presidential elections
June	Happo-Noshiro offshore wind project auction closes; Annual IEA Global Conference on Energy Efficiency - Denmark; UNEP Environment Day, Environment Ministers Meeting - Sweden; G7 meeting - Germany

July	Japan to finalize economic security policies as part of natl. security strategy review; China connects to grid 2nd 200 MW SMR at Shidao Bay Nuclear Plant, Shandong; Czech Republic assumes presidency of EU; Elections: Japan's Upper House Elections; Indian presidential election
August	Japan: Africa (TICAD 8) Summit - Tunisia; Kenyan general election
September	IPCC to release Assessment and Synthesis Report; Clean Energy Ministerial and the Mission Innovation Summit - Pittsburg, U.S.; Japan LNG Producer/Consumer Conference - Tokyo; IMF/World Bank annual meetings - Washington; Annual UN General Assembly meetings; METI to set safety standards for ammonia and hydrogen-fired power plants; End of 1H FY2022 Fiscal Year in Japan; Swedish general election
October	EU Review of CO2 emission standards for heavy-duty vehicles published; Chinese Communist Party 20th quinquennial National Party Congress; G20 Meeting - Bali, Indonesia; Innovation for Cool Earth TCFD & Annual Forums - Tokyo; Elections: Okinawa gubernational election; Brazilian presidential election;
November	COP27 - Egypt; U.S. mid-term elections; Soccer World Cup - Qatar;
December	Germany to eliminate nuclear power from energy mix; Happo-Noshiro offshore wind project auction result released; Japan submits revised 2030 CO2 reduction goal following Glasgow's COP26; Japan-Canada Annual Energy Forum (tentative); Tesla expected to achieve 1.3 million EV deliveries for full year 2022

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