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JAPANESE INDUSTRY AND POLICY NEWS
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Legislation and Policy News

Cooperation of Japan and Russia in the field of hydrogen / CCUS carbon recycling, etc.

The Ministry of Economy, Trade and Industry announced that the Eastern Economic Forum (September 2-4) was held in Vladivostok, Russia and on September 3 in a TV meeting between Mr. Hiroshi Kajiyama, Minister of Economy, Trade and Industry and Mr. Shriginov, Minister of Energy of Russia, and both parties signed the "Japan-Russia Joint Statement on Cooperation in the Sustainable Energy Sector".

At the meeting held on September 2, they confirmed not only about the existing cooperation fields of such as hydrocarbons, energy saving, new energy and nuclear power, but also about the cooperation to promote hydrogen, ammonia and CCUS (carbon capture effective utilization storage) carbon recycling.

Furthermore, with the aim of promoting concrete cooperation between Japanese and Russian companies, the Cooperation Agreement (MOC) on "Hydrogen, Ammonia, and CCS/CCU carbon recycling" was signed between the Ministry of Economy, Trade and Industry and Novatek, Russia's largest private independent natural gas production and sales company.

Through these cooperation agreements, it is expected that Japan-Russia energy cooperation will be further accelerated.

The main contents of the joint statement are as follows.

- Exploring the possibilities of future activities, including joint research, joint projects and the creation of joint ventures in the areas of sustainable energy, especially renewable energy, hydrogen, ammonia as fuel (fuel ammonia) and CCS / CCU carbon recycling.
- For the future introduction and expansion of hydrogen and fuel ammonia, fostering cooperation in multilateral forums to raise awareness of the importance of blue, green and other types of hydrogen and fuel ammonia.
- Fostering cooperation in the production, transportation and sales of LNG within the scope of the implementation of the LNG project.
- Developing cooperation in the implementation of projects for the

construction and operation of polymer (polyolefin) production plants.

- Exchanging experience in regulations and the development of sustainable energy in Japan and the Russian Federation, and promoting the development of innovative technologies and scientific research.
- Developing and implementing the best available technologies and methods to reduce adverse environmental impacts, including the use of waste from thermal power generation.
- Analyzing the resource infrastructure, the potential of domestic and international markets for renewable energy sources, the demand for sustainable energy, future supply chains and economic efficiencies.
- Researching the technology for producing, storing, using and transporting hydrogen including liquefied hydrogen, methylcyclohexane and fuel ammonia.
- Accelerating cooperation for the development of hydrogen, fuel ammonia, and CCS /CCU carbon recycling projects in Japan and the Russian Federation.

METI webside:
https://www.meti.go.jp/press/2021/09/20210903002/20210903002-1.pdf

The Eastern Economic Forum from METI website

Japanese side

Russian side

Ministry of Economy, Trade and Industry announces the revised End User List

On September 17, the Ministry of Economy, Trade and Industry announced a revised version of the End User List. The List is provided for exporters with information on foreign organizations that do not eliminate concerns about the development of weapons of mass destruction (WMDs), in order to improve the effectiveness of the catch-all control * for cargo related to WMDs.

* A system that requires an export license application if there is a risk that the item will be used for the development of WMDs, etc., even if the item is not subject to export restrictions under an international agreement.

The number of organizations listed after this amendment will be 600 (54 increase) in total in 14 countries / regions. Exporters are required to apply for an export license when the user of the cargo to be exported is listed, unless it is clear that the cargo will not be used for the development of WMDs, etc. The list has been published by METI since the introduction of the catch-all control in April 2002.

METI website:
https://www.meti.go.jp/english/press/2021/0917_001.html

Experiment launch of short-range ballistic missiles from railroad on September 15 in North Korea, photo from Yahoo! news

Survey and Business Data

South Korea, a high employment rate for middle-aged and older people, more than 40% are employed even between the ages of 65 and 79

On August 4, Japan External Trade Organization (JETRO) reported on the "Economic Activity Population Survey" of the Korea Statistical Agency, and found that more than 40% of people aged 65 to 79 are working in Korea. It turned out that it was an economic reason.

The average retirement age of the workplace that worked the longest to date was 49.3 years (male 51.2 years, female 47.7 years), and the average length of service was 15 years 2.1 months (male 18 years 9.1 months, female 11 years 6.1 months). South Korea's Yonhap News Agency (August 1) titled "Lifetime employment is an old word", and reported that "10 years ago, in a 2011 survey, the average length of service was 19 years and 9 months, almost 20 years. The average retirement age was 53 years old." "From 2016 to 2017, the 60-year-old fixed-term system became mandatory in stages, but the average retirement time in major workplaces was rather earlier."

The employment rate (the ratio of the number of employees to the population) was 67.1% for 55-64 years old and 42.4% for 65-79 years old. The high employment rate of middle-aged and older people is influenced by the amount of pension payments that are not enough to live. According to the survey results, the percentage of pensioners (public pension, individual pension insurance) aged 60 to 79 is 64.9%, and the average monthly pension (55 to 79 years) when receiving a pension is 640,000 won. (Approximately JP¥ 61,000), gender is 830,000 won for men and 430,000 won for women. It is not easy to maintain a living with only a pension in Korea, where prices are not so different from Japan.

In fact, 93.1% of those who are currently working want to continue working. Because 58.7% is "to supplement their living expenses", 33.2% is "it is fun to work", and " 3.8% is "it's boring without working". The respondents answered that they wanted to secure living expenses. In addition, when asked how old they would like to work in the future, 55-59 years old is "70 years old", 60-64 years old is "72 years old", 65-69 years old is "75 years old", 70-74 years old is

"79 years old" and 75-79 years old is "82 years old". There was a strong intention to work until old age.

JETRO website (in Japanese):
https://www.jetro.go.jp/biznews/2021/08/c1ac647cf922f3c7.html

The ratio of female managers in companies is less than 9%, far from the government target

According to a 2021 survey toward female appointments released by Teikoku Data Bank announced on August 16, the average percentage of female managers in companies was 8.9%, the highest since 2014, when they can be compared. With the spread of ESG (environment, society, and corporate governance), the number of companies working to promote women is on the rise, but the result is far from achieving the government's 30%. The survey was conducted from July 15 to 31, targeting companies nationwide, and valid responses were obtained from 10,992 companies. Managers are at least equivalent to section managers.

According to the survey, the percentage of female managers was 8.9%, an increase of 1.1 points from the previous year, the highest increase ever. Teikoku data bank shows that "with COVID-19 work styles have become more widespread and companies are refocusing on promoting women, compared to the same period of 20 years.

Looking at the average percentage of female managers by size, "small businesses" had the highest ratio at 11.9%, followed by "medium-sized businesses" at 9.5%. “Large companies” accounted for 5.8%. By industry, "retail" was the most common at 15.5%, followed by "real estate" (15.3%) and "finance" (12.7%). On the other hand, the lowest was "transportation / warehouse" (5.7%).

The percentage of female managers who answered that they would “increase” in the future compared to the present was 22.6%, an increase of 0.9 points from the previous year. “No change” was 58.9%, down 1.4 points. When asked if they were promoting women, 46.9% of the companies answered that they were

"promoting", an increase of 4.3 points.
The government set a goal for the utilization of women in 2003. By 2020, women would account for at least 30% of leadership positions. According to Cabinet Office data, as of 2019, the ratio exceeded 40% in the United States and Sweden, while it remained in the 10% range in Japan. The lowness of Japan stands out because the UK and France are also around 35%. The percentage of women in the House of Representatives is in the 20-30% range in Western countries, but less than 10% in Japan.

Japan was ranked 120th out of 156 countries surveyed in the "Gender Gap Index" released by the World Economic Forum (WEF) at the end of March 2021, which quantifies how much gender equality is achieved in each country. It ranks lowest in the G7 countries and is lower than China and South Korea in Asia. In particular, the evaluation of women's political and economic participation was low.

Teikoku databank website:
https://www.tdb-en.jp/news_reports/w2107.html

Percentage of female managers

	2020	2021
Retail	12.8	15.5
Real estate	12.2	15.3
Finance	11.5	12.7
Service	11.2	12.0
Agriculture, forestry and fisheries	8.2	9.7
Wholesale	8.0	9.4
Manufacturing	6.3	6.9
Construction	5.4	6.1
Transportation / Warehouse	4.3	5.7
Data: Teikoku data bank		

Company & Organization News

Build the world's first "ship that carries electricity", instead of submarine cables

PowerX Co., Ltd. (Tokyo), which develops new businesses for the spread of renewable energy, electricity storage and power transmission, will start a project to build an "electricity-carrying ship" that is unprecedented in the world.
It was announced on the August 18. The company has two major projects, one is the in-house development of the electricity carrier "Power Ark" and the other is the construction of a large storage battery factory in Japan. Of these, the ship that carries electricity is based on the idea of storing electricity in a container-type storage battery and "transmitting" it by ship, with the aim of expanding offshore wind farms.

In the past, electricity was transmitted from the power plant to the land using a submarine cable, but there is a possibility that a ship will replace the submarine cable. "Construction of submarine cables that conduct high-voltage electricity has a large environmental impact, but electric carriers have lower transmission costs than cables, and it is possible to realize transmission at an early stage," the company said. The "Power Ark 100" planned for the first ship is about 100m long, equipped with 100 ship container type storage batteries, and can store 220MWh. This is about one city (22,000 households) for one day's electricity. In the event of a large-scale power outage during a disaster, the ship will be the power source for emergencies.

A larger ship is also planned, and a 220m-class ship that can hold 3,000 containers can carry 5,660MWh of electricity. It is said that the cruising range of the ship is 100 to 300 km with Power Ark 100 and it is expected that it will be possible to sail 1,000 km by combining fuel such as clean diesel. The first ship is scheduled to be completed in 2025. PowerX's business mission is to "realize the explosive spread" of renewable energy through this "transportation of electricity." Prior to that, they will develop another pillar, the construction of a storage battery factory.

To realize its vision, Power X will also be building a giga-scale battery assembly

facility in Japan to mass-produce batteries for the Power Transfer Vessel. With an acceleration toward decarbonization across the globe, the demand for large energy storage is soaring. High performance cells will be outsourced and packaged at PowerX's factory based on the use case, which includes EV fast-charging, grid and marine batteries. The annual production capacity will achieve 1GWh by 2024, and will eventually reach 5GWh by 2028. Productions lines will be automated to mass-produce at a low cost

Power X website:
https://power-x.jp/en/press/PowerX_20210818.pdf

Image of Power Ark 100 from Power X website

Construction of "battery power plant" in Hokkaido, capacity of 6,095kWh, operation in 2022, Tesla

Tesla Motors Japan and Global Engineering (Fukuoka City) announced on August 19 that they will build a storage battery power plant in Chitose City, Hokkaido. Except for storage batteries attached to substations and power plants, etc., it will be the first independent storage battery power plant in Japan

that supports the market, capacity market, supply and demand adjustment market. The operation is scheduled to start around the summer of 2022.

The output of the Tesla's Megapack system is 1,523.8kWh and the storage capacity is 6,095.2kWh. The power plant will be operated by Global Engineering. As an aggregator operator, Global Engineering balances renewable energy power generated by solar power generation, negative watt power generated by power saving, power generated by private power generation facilities, and stored power in Megapack. The weak point, fluctuations in the amount of power generated, will be absorbed by generators, storage batteries, etc. to stabilize the power system. In the event of a power outage, it plans to supply electricity to local residents in the neighborhood (charging mobile phones, PCs, temporarily place for evacuating, etc.) and operate it as a storage battery power plant that is closely linked to the local community.

Tesla has contributed to many battery power plant projects around the world, but this time it will introduce Megapack to storage battery power plants in Japan for the first time. In Japan as well, the company plans to accelerate its expansion into storage battery power plants in line with the start of the capacity market and supply and demand adjustment market. ENE-Vision (Nagoya City) received an order for EPC construction.

According to ENE-vision, the features of "Megapack" are that it can realize on-site construction saving all-in-one, that Tesla provides everything including software during operation, that it can be operated and controlled in the optimum scenario by the software developed in-house, and remote monitoring. And the modular design structure allows it to be expanded to fit the project.

PR Times website: https://prtimes.jp/main/html/rd/p/000000009.000043349.html

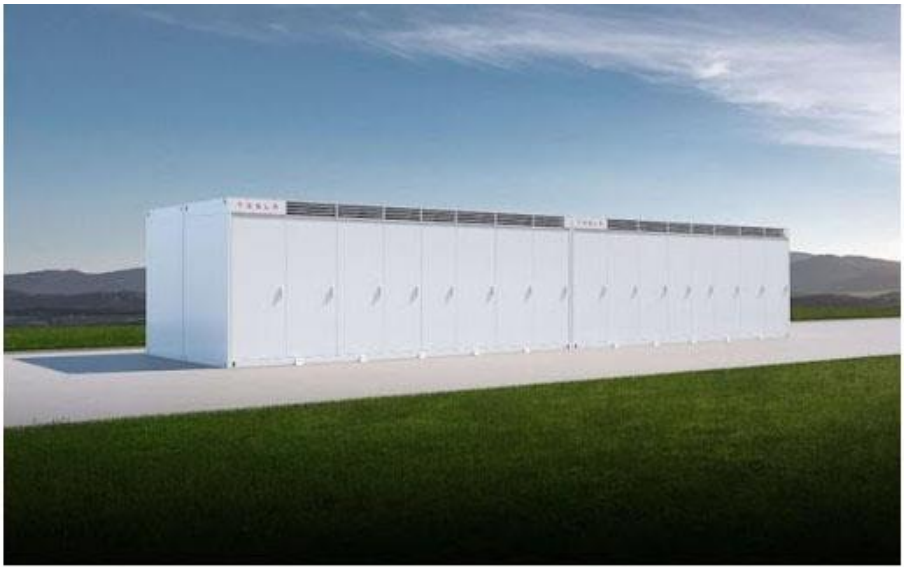


Image of Tesla Megapack from Tesla motors Japan website

Sumitomo Corporation collaborates with Rio Tinto to produce and utilize hydrogen at its alumina refinery in Australia

Sumitomo Corporation and resource giant Rio Tint (UK, Australia) announced on August 24, in a green hydrogen production project promoted by Sumitomo Corporation in Gladstone, Queensland, Australia, with Rio Tinto's Yarwan Alumina (UK, Australia). They will build a hydrogen test manufacturing plant at the (aluminum oxide) refining plant and have signed a partnership to consider the utilization of hydrogen at the plant.

If the project progresses as planned, the hydrogen produced from the test plant will be supplied to Sumitomo Corporation's Gladstone Hydrogen Ecosystem Initiative. The project is in line with and promotes the policies of the Australian Government and Queensland Government to "establish Gladstone as a future clean hydrogen hub."

The partnership is in line with Rio Tinto's recent feasibility study on a plan to replace natural gas with hydrogen in Yarwun's alumina refining process, and will be greater if good findings are obtained. The possibility of large-scale hydrogen utilization is expected.

"Reducing carbon emissions during the alumina manufacturing process is key to achieving our environmental numerical goals for 2030 and 2050," said Rio Tinto Australia.

Sumitomo Corporation expressed, "We are convinced that this study will play an important role in building a hydrogen ecosystem for local industries and communities. We are working toward the realization of a hydrogen society and would like to connect it to hydrogen exports from Gladstone. "

Sumitomo corporation website:
https://www.sumitomocorp.com/en/jp/news/release/2021/group/14990

Yarwun alumina refinery in Gladstone, Queensland, Australia
Image from RIO TINTO website

Kyoto University and Sumitomo Forestry aim to launch the world's first "wooden artificial satellite"

Kyoto University and Sumitomo Forestry announced on August 25 that they will conduct the world's first space exposure experiment on wood at the International Space Station (ISS) from December with the aim of launching a wooden artificial satellite. It’s for analyzing the deterioration of wood in outer

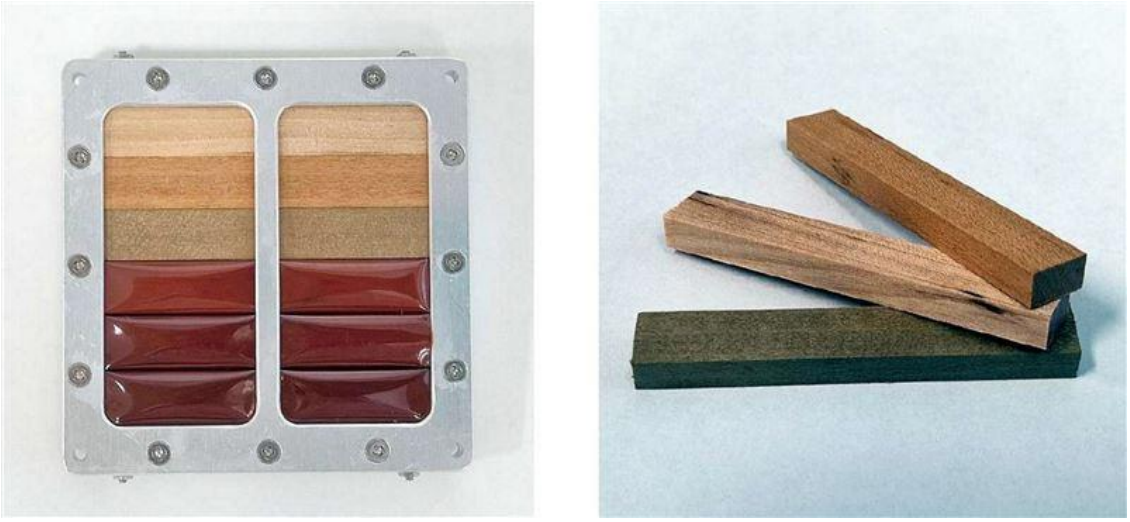
space. It's a part of the "Space Wood Project," a joint research project on tree growth and wood utilization in space, which began in the spring of 2020. They are aiming to launch the world's first wooden artificial satellite "LignoSat" in 2023.

Specimens of 56 mm x 8.6 mm x 5 mm were prepared from three types of wood with different densities, magnolia obovata, wild cherry tree and birch. They will be exposed to outer space for half a year and investigated the effects of surface disappearance due to atomic oxygen (AO), chemical changes due to cosmic rays, high vacuum, heat and ultraviolet rays. The mechanism of deterioration will be elucidated by measuring changes in intensity, observing the tissue structure with a microscope and analyzing the crystal structure with X-rays.

A test piece wrapped in a polyimide resin sheet capable of evaluating the influence from AO was also made. The effect of surface protection will be verified at the same time. They also compare gamma-ray irradiation on the ground and internal structural changes, and evaluate from various angles. It leads to the development of deterioration prediction and control technology.

Kyoto University explained that "wood is the only renewable resource that can be used in space and is suitable for artificial satellite materials." Antennas and attitude control devices can be installed inside artificial satellites because they are resistant to high temperatures and transmit electromagnetic waves and magnetic waves. After the operation is completed, it will be completely burned out by entering the atmosphere and will not leave any foreign matter. Based on these characteristics, both parties have a plan to sell wooden artificial satellites overseas.

Sumitomo forestry website (in Japanese):
https://sfc.jp/information/news/2021/2021-08-25.html



Three types of wood test specimens (right) are set for exposure experiments (left). The wood wrapped in the resin sheet (lower left half) is also experiment target
Photos from Sumitomo forestry website

ISS outboard exposure platform from
Sumitomo forestry website
©JAXA/NASA

Mitsubishi Shipbuilding and French Total develop liquefied CO2 transport ship

Mitsubishi Shipbuilding has started a feasibility study on the development of a liquefied CO2 transport ship (LCO2 ship) with French energy company Total Energy. It was announced on August 26. Mitsubishi Shipbuilding is actively

promoting the development and commercialization of LCO2 vessels. This joint project is expected to greatly contribute to the construction of a CO2 ecosystem in the CO2 transportation field, which is indispensable in this CCUS (carbon dioxide capture, effective utilization, storage) value chain.

In this joint project, Total Energy said, "We are pleased to be able to partner with Mitsubishi Shipbuilding, which has a reputation for shipbuilding technology, in order to consider large LCO2 ships. It is in perfect agreement with our ambitions for climate change to be completely zero. "

CCUS, which captures, stores, and converts CO2, is attracting attention as an effective means for realizing a carbon-free society. In its value chain, LCO2 vessels are responsible for transporting liquefied CO2 to bases that store and use it, and demand is expected to grow in the future.

Mitsubishi group has advanced gas handling technology accumulated through the construction of Mitsubishi Shipbuilding's liquefied gas transport vessels (LPG / liquefied petroleum gas transport vessels and LNG / liquefied natural gas transport vessels), and also CO2 capture technology by Mitsubishi Heavy Industries Engineering which has the world's top share. It is said they can contribute to the construction of a CCUS value chain that spans land and sea by gathering knowledge within the group.

Mitsubishi Heavy Industries website:
https://www.mhi.com/news/2102602.html

Image of an LCO2 carrier from Mitsubishi Heavy Industries website

DNP developed radio wave reflector to expand the reach area of 5G radio waves

Dai Nippon Printing (DNP) announced on August 31 that they has developed a radio wave reflector (hereinafter referred to as "reflect array") that expands the reachable area of millimeter waves by reflecting millimeter waves used in the 5th generation mobile communication system (5G) in any direction. Compared to general metal reflectors, this product can reflect millimeter waves in a more targeted direction, so there are fewer restrictions on installation, and it improves the communication environment in places where radio waves are difficult to reach, such as behind buildings. In addition, it has excellent design and can be designed in consideration of the installation environment.

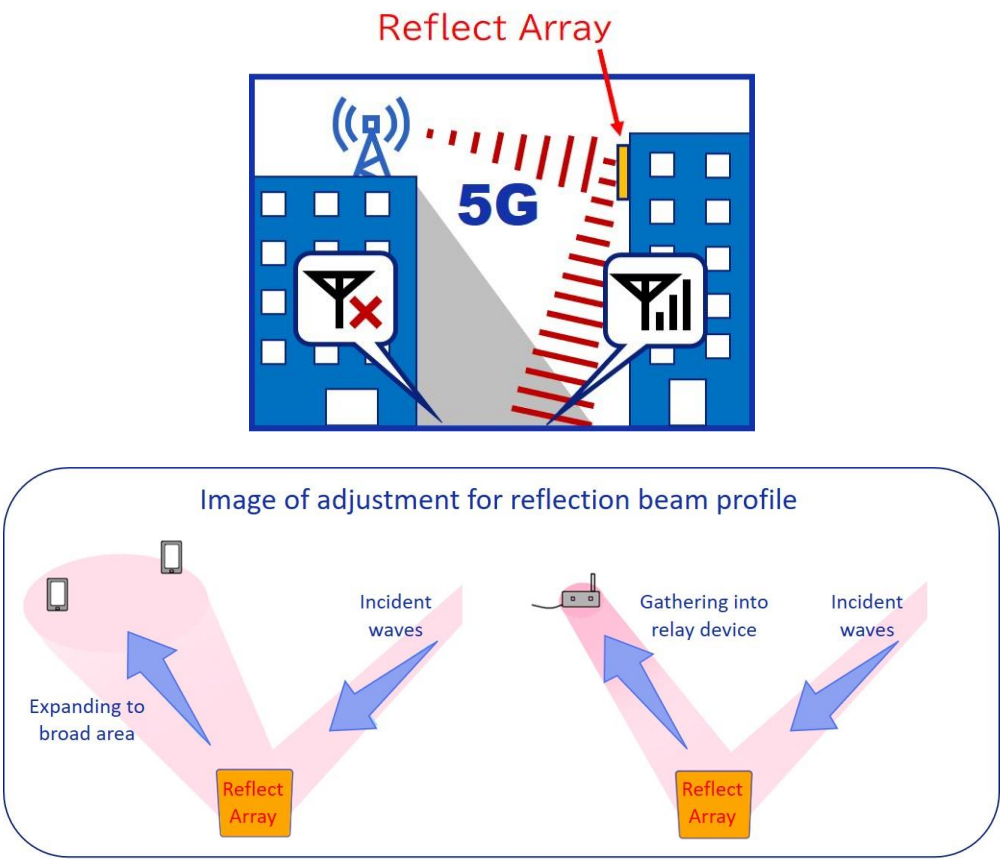
The millimeter-wave band radio waves (24GHz and above), which are higher frequencies than 4G and are used for high-speed, large-capacity communication of 5G, have a large information capacity, but are characterized by high straightness and a short reach. As a result, radio waves are blocked in areas such as behind buildings, making it difficult to ensure communication quality. In addition, when adding base stations and relay equipment to solve this problem, new problems such as large costs and securing of installation space have arisen.

To solve these problems, DNP makes use of its microfabrication technology, etc., and separates the "frequency selective reflection layer" and "reflection direction control layer" according to its own concept to control the characteristics of each layer. This product is cheaper than installing base stations and relay equipment, does not require a power supply, and can be easily installed in various locations, contributing to a significant improvement in the 5G communication environment.

This product is a radio wave reflector that can asymmetrically reflect radio waves of a specific frequency, unlike a metal reflector that reflects radio waves as a mirror. Since the frequency band to be reflected, the incident angle of the radio wave received from the base station, the reflection angle to deliver the radio wave and the spread of the reflected wave can be freely set, the radio wave can be effectively delivered to the place where the radio wave is hard to reach. In addition, since it does not require a power supply, it can be used even

when the installation location is limited.

DNP website: https://www.dnp.co.jp/eng/news/detail/10161357_2453.html



Images of “reflect array" from DNP website

NEC wins first place in the world for face recognition system

NEC announced on September 2 that it won the number one spot in the world in the latest benchmark test (IREX 10) of iris authentication technology conducted by the National Institute of Standards and Technology of the US (NIST). In this benchmark test, the error rate of personal authentication was measured to be 0.41% (in the case of both eyes) in the test for 500,000 registered people. This is the second time NEC has won first place in the NIST benchmark test, following 2018.

NIST has been conducting extensive tests since 2009 to evaluate the collation

accuracy of iris recognition technology. Since the certification technology of participating organizations is objectively and accurately evaluated by blind tests, the evaluation results are globally trusted at the national level.

This time, NEC has strengthened its robustness against images whose quality has deteriorated due to various disturbances that frequently occur in practical situations, making full use of AI-based authentication technology. As a result, they have succeeded in significantly improving the error rate compared to the performance of the conventional technology.

NEC plans to develop walk-through type iris recognition that is performed while walking without stopping, and multimodal biometric authentication that can be used to verify the identity of more than tens of millions of people by combining it with the world's most accurate face recognition technology. Multi-modal biometric authentication using the face and iris achieves high accuracy even while wearing a mask or hat, and because it is non-contact authentication, it meets hygiene needs. As a technology that supports safe and secure living, it is expected to be used for various purposes such as data centers that require high security management, payments at stores, factories for food and medicine that take hygiene into consideration, clean rooms, and medical sites.

NEC website:
https://www.nec.com/en/press/202108/global_20210823_01.html

Expanding use of high-precision face recognition technology
Image from NEC website

Nippon Sheet Glass succeeds in the world's first hydrogen energy building glass manufacturing experiment

Nippon Sheet Glass (NSG) announced on September 3 that it has succeeded in manufacturing architectural glass by conducting the world's first demonstration experiment of glass manufacturing using hydrogen energy at its UK plant. This demonstration experiment was conducted at the Greengate plant (St. Helens, UK) of the group company Pilkington United Kingdom Limited for three weeks from the latter half of August.

According to the company, experiments have succeeded in seamlessly switching between two different fuels, the current main fuels, natural gas and hydrogen, which achieves the same excellent melting performance of hydrogen as natural gas. It has been proved that it can be done and that the CO2 emitted from the glass melting kiln can be significantly reduced.

The company said that the success of the experiment is an important step in aiming for decarbonization, and by realizing fuel switching from natural gas to hydrogen in the future, the float kiln, which accounts for the majority of Group CO2 emissions, will be able to operate with overwhelmingly low emissions.

The company group aims to "become a global glass manufacturer that contributes to society with high-value-added" glass products and services, "and under the three-year medium-term management plan, CO2 emissions in 2030 will be reduced by 21% compared to 2018.

NSG website:
https://www.nsg.com/en/media/ir-updates/announcements-2021/ag-production-powered-by-hydrogen

Approximately 60 road tankers of hydrogen used for the trial
From NSG website

Nissan and Waseda University jointly developed recycling process for electrified vehicle motors

Nissan Motor and Waseda University announced on September 3 that they have jointly developed a recycling technology that efficiently recovers rare earth compounds from motor magnets for electric vehicles (EVs) and hybrid electric vehicles (HEVs) with high purity.

Since 2017, Nissan Motor has been collaborating with Waseda University, which has a proven track record in research on non-ferrous metal recycling and smelting, to recover rare earth compounds from the magnets of motors for electric vehicles. They started developing in fiscal 2019 and established a technology to efficiently recover high-purity rare earth compounds without disassembling the motor by using the "pyrometallurgy method" that handles melts at high temperatures.

The recycling technology process developed by both parties is as follows (see figure).

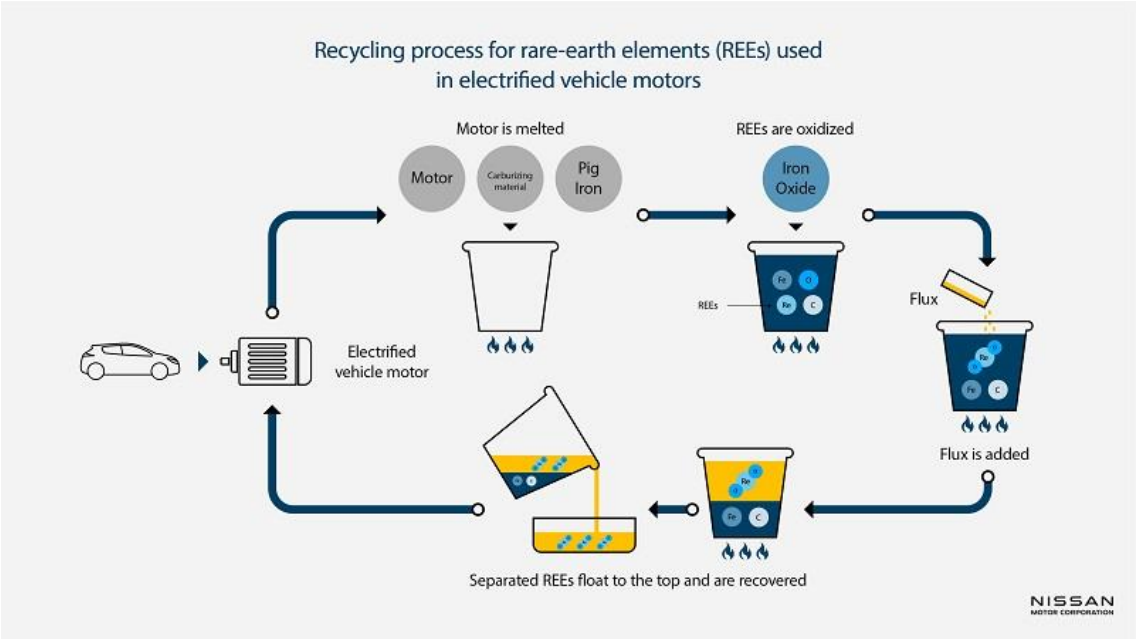
1. Add pig iron, which promotes heating and melting, and charcoal, which

lowers the melting point of iron, and melt the motor in a furnace heated to 1,400 ° C or higher.
2. Oxidize rare earths in the melt by adding iron oxide.
3. Add a small amount of borate-based flux to dissolve rare earth oxides.
4. Separate the "rare earth-containing oxide layer" and the denser "rare earth-free iron-carbon alloy layer".
5. Rare earth compounds are recovered from the oxide layer separated into the upper layer.

This recycling technology utilizes an inexpensive borate-based solvent that can melt a small amount of rare earth oxide at a low temperature and recover it at a higher rate. It is confirmed that this method can recover 98% of the rare earths used in the motor. In addition, the work of removing the magnetic force, and the work of disassembling and removing the magnet are not required, so the process can be simplified and the work time can be reduced by about 50% compared to the conventional method.

In the future, they will continue experiments aimed at practical application, and at the same time, proceed with the construction of a scheme to collect and recycle the motors mounted on used electric vehicles. Currently, in the process of removing rare earths from motor magnets, it is necessary to manually disassemble and remove the magnets. Therefore, in order to promote further recycling in the future, simplification of the process and reduction of recycling costs have been issues.

Nissan motor website:
https://global.nissannews.com/en/releases/nissan-waseda-university-in-japan-testing-jointly-developed-recycling-process-for-ev-motors



From Nissan motor website

Toray and Siemens collaborate on green hydrogen technology, jointly develop a new type of water electrolyzer

Toray Industries announced on Sept. 6 that it has signed a strategic partnership agreement with Siemens Energy of Germany for its "green hydrogen" technology, which uses renewable energy to produce carbon dioxide (CO2) without emissions. They develop green hydrogen production equipment and cooperate in building a global hydrogen supply network.

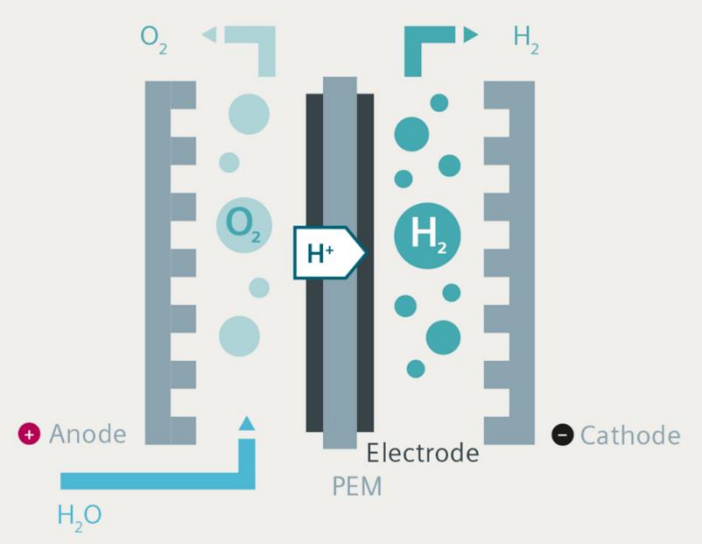
Green hydrogen is hydrogen produced by electrolyzing water with renewable energy, and since it does not emit CO2 during the manufacturing process, demand is increasing from the viewpoint of decarbonization. The two companies will jointly develop a type of device that uses an electrolyte membrane to extract hydrogen. Toray will supply its own electrolyte membrane "hydrocarbon electrolyte membrane" to Siemens Energy's large-scale water electrolyzer.

Siemens Energy already sells large hydrogen production equipment in Europe and elsewhere. By using Toray's electrolyte membrane, it is expected that the efficiency and safety of the equipment will be improved.

Since green hydrogen uses recycled energy, the problem is that the production cost is high. According to Toray, "It can be expected that the efficiency of the equipment will be dramatically improved and the operating rate will be improved, which will contribute to a significant reduction in green hydrogen (manufacturing) costs."

In parallel with the technological development of the equipment, a global supply network of green hydrogen will be developed. They will cooperate to build a supply network that connects regions with abundant renewable energy resources such as Australia, the Middle East and South America that can produce green hydrogen at low cost, and with countries and regions with high demand such as Japan and Europe.

Toray Industries website:
https://www.toray.com/global/news/details/20210906112831.html



Electrolysis scheme from Siemens Energy website

Chairman of the Japan Automobile Manufacturers Association criticizes the government's environmental goals, not based on the actual situation in Japan

Japan Automobile Manufacturers Association (JAMA) Chairman Akio Toyoda (President of Toyota Motor Corporation) held an online press conference on Sept. 9, saying that the government's goals for reducing greenhouse gas emissions are not based on the actual situation in Japan. He has been complaining about the policy of banning the sale of new gasoline-powered cars, but the tone of criticism has been raised.

At an online press conference, Mr. Toyoda said that the government "has set various goals, but only shows the target values, based on the actual situation in Japan" for COP26 to be held in Glasgow, Scotland from October 31. It's not a fixed way, it's a European way of doing things. "

"We have set a goal for renewable energy ratios, but we don't see a cost debate there. It sounds like that it's all private sector has to do everything," he said. Mr. Toyoda estimated that a total of about JP¥ 25 trillion of additional investment would be required by 2030, including the renewal of aging transmission lines, in order to achieve the target of introducing electricity derived from renewable energy in Japan.

Mr. Toyoda has often complained about the government's energy and environmental policies from the standpoint of the chairman of JAMA. At the April meeting, he said that it would not be possible to achieve the goal of virtually zero greenhouse gas emissions (carbon neutral) by simply banning the sale of gasoline-powered vehicles, as it would be necessary to deal with existing vehicles.

He also pointed out that the synthetic fuel produced from carbon dioxide (CO2) and hydrogen can also be used in gasoline-powered vehicles, and the technology cultivated in Japan can be utilized. He argued that CO2 reduction is possible even in areas where electric vehicle (EV) charging infrastructure is not in place.

JAMA website (in Japanese):
https://blog.jama.or.jp/?p=463

Mr. Akio Toyoda at the press conference on Sept. 9 from JAMA website