JBIC Today

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Special Feature

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JAPAN BANK FOR INTERNATIONAL COOPERATION

Challenge on Clean Energy

JBIC's initiatives in anticipation of the energy transformation, connecting Japanese companies' capabilities to the world

In October 2020, Japanese Prime Minister SUGA Yoshihide declared an aim of "carbon neutrality by 2050." This ambitious goal of net-zero greenhouse gas emissions by 2050 also represents a government policy of achieving that goal without undue restraint or limitation on economic activities, through measures that are integrated with growth strategy. What needs to be done to further disseminate and expand clean energy in a way that will contribute significantly toward decarbonization? JBIC will search for clues to game-changing innovations that will answer that question.

Hydrogen-related projects are the key to achieving carbon neutrality by 2050. This is a field where Japan has been taking on the challenge ahead of the rest of the world.

Japan's 2050 carbon neutrality declaration had quite an impact, but Japan is not the only country with such a goal. Both the EU and the United States have set 2050 as their target year for net zero. China, the world's largest emitter of greenhouse gases, has also declared its own target of net zero by 2060. As global average temperatures continue to climb, attention will focus even more on investment in clean energy as a way of balancing the realization of the global challenge of carbon neutrality with strategies for long-term growth.

The Green Growth Strategy Through Achieving Carbon Neutrality in 2050 formulated by the Ministry of Economy, Trade and Industry (METI) contains the phrase," Gone are the days when countermeasures to global warming are considered as a cost or constraint to the economic growth; the world has entered a new era to grasp them as a great opportunity for further prosperity." As this suggests, proactive consideration of countermeasures will be important.

With decarbonization of the power sector as a major premise, the Green Growth Strategy proposes the use and application of "renewable energies" and "hydrogen power generation," while describing a policy of promoting "electrification" in other sectors and responding to demand for heat with "hydrogenation" and "CO_2 capture." What should we do to hone the technologies needed for carbon neutrality, implement them in society, and disseminate them? The answer to this question may lead to major business opportunities.

Japan's strengths lie in hydrogen-related businesses in particular. Japan is leading the world in the commercialization of hydrogen and has contributed greatly toward the development of the market for fuel cell vehicles. Also in terms of policy, METI has formulated a Basic Hydrogen Strategy and a Strategic Road Map for Hydrogen and Fuel Cells. As stated in the Green Growth Strategy, "Hydrogen, which can be widely used in various sectors (power generation, industry, transportation, etc.) is a key technology to achieve carbon neutrality," the importance of hydrogen is expected to grow even further.

In anticipation of the global expansion of innovative corporate initiatives, JBIC has been developing the necessary programs to support hydrogen-related projects. In addition to the positioning of hydrogen as "a strategically important natural resource to Japan" in January 2020, the Enforcement Order of the Japan Bank for International Cooperation Act was revised, making it possible for JBIC to support a wide range of hydrogen-related projects in developed countries. JBIC has also expanded the sectors that are eligible for support through risk-taking under JBIC's "Special Operations" to include projects that use cutting-edge technologies and commercialization projects. Having established and launched the Post-COVID-19 Growth Facility in December 2020, JBIC will continue to support the overseas expansion of high-quality infrastructure toward a decarbonized society.

JBIC's goal is to support the development of an international hydrogen supply chain that connects hydrogen sources, carriers and transportation, and the use and application of hydrogen. One example of envisaged support is the blue hydrogen production project, in which hydrogen is produced from natural gas. Because carbon dioxide is generated during hydrogen production, it needs to be combined with carbon capture, utilization and storage (CCUS) technology. Green hydrogen, which produces hydrogen from renewable energy, a hydrogen carrier that transports the hydrogen produced, and a fuel ammonia production project will also be supported by this facility. In this way, focusing on hydrogen, we hope to create an environment that will lead to the expansion of business opportunities by leveraging the technological capabilities of Japanese companies.

Greenhouse gas emissions reduction targets in major countries and regions around the world

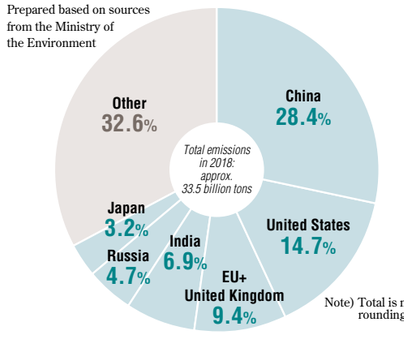
Source: Nikkei Inc.

	2030	2050
Japan	–46%	Net-zero
United States	-50% to -52%	Net-zero
China	Reverse growth in emissions –65% or more in per-GDP emissions	Net-zero (2060)
EU	–55% or more	Net-zero
United Kingdom	–68% or more (–78% by 2035)	Net-zero

Note) The base years for reductions by 2030 are FY2013 in Japan, 2005 in U.S. and China, and 1990 in EU and U.K.

Global CO_2 emissions from energy

Prepared based on sources from the Ministry of the Environment



Note) Total is not 100 due to rounding off of figures.

JBIC will seek to provide comprehensive support of entire clean strategies, leveraging its wealth of experience in individual energy sectors

Planning energy projects to suit individual countries and regions

Establishing renewable energy and power grids is another extremely significant theme.

JBIC has been supporting power generation projects in Asia, in particular Indonesia, and the Middle East since the 1990s. In the beginning, it dealt primarily with fossil-fuel projects, but there has been a gradual increase in the number of renewable energy projects. In Europe in particular, where there has been a marked rise in wind power generation, JBIC has been involved in offshore wind power generation projects in the Netherlands and UK. JBIC has also supported international renewable energy development projects in various sectors by Japanese companies, including onshore wind power generation projects in Egypt and Morocco and photovoltaic power generation projects in Middle Eastern countries such as Jordan, Qatar, and Saudi Arabia.

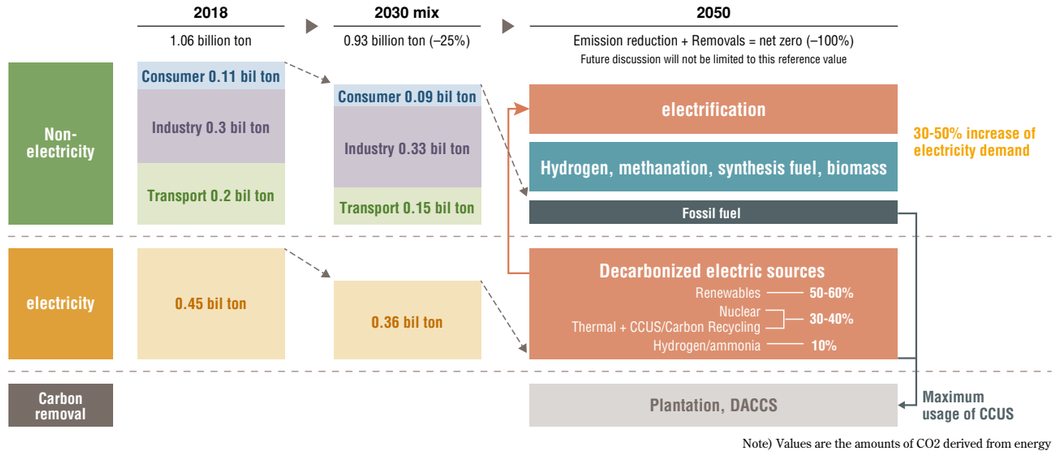
However, as power generated from renewable energy is not stable due to its reliance on natural energy such as wind conditions and sunlight, to date, it has been controlled by the power transmission side. In other words, the volume of electricity transmitted has been controlled, which has led generated power to go to waste. As such, more recently, the spotlight has been on the resilience of the power grid and mechanisms for control by the demand side. One example is a project in the island of Ireland for next-generation power battery systems for the adjustment of power supply and demand. In this project, in which JBIC invested last year, batteries with the fast response capability and high discharge capacity are used to provide ancillary power from renewable energy.

Renewable energy-related businesses will expand downstream, from generation to transmission and distribution of power, so many Japanese companies may find business opportunities there. JBIC mainly provides two types of finance—green finance that focuses on renewable energy and transition finance that supports existing businesses in the transition to low-carbon and zero-carbon operations. Roughly speaking, green finance, whose target has been expanded to downstream sectors, is mainly provided in Europe, while transition finance, which takes the energy circumstances of individual countries into account, is primarily provided in Asia.

Reducing greenhouse gas emissions is a global common goal, but the path to achieving carbon neutrality will naturally vary in individual countries and regions, given their differing energy circumstances. Going forward, engagement will be more important than divestment. JBIC sees its role as supporting the realization of carbon neutrality from the financial angle to meet the respective challenges facing individual countries, mainly in Asia.

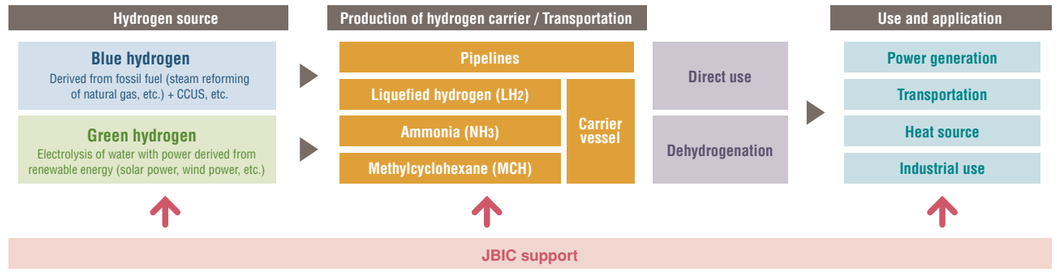
Japan aims to realize carbon neutrality in 2050. What is the roadmap for that?

Based on data from the Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, December 2020



Note) Values are the amounts of CO2 derived from energy

Various kinds of support are needed to develop the hydrogen supply chain



Collaboration with Companies with Outstanding Technologies and Networks JBIC Pursues Global Decarbonization

Accelerating the shared global race toward decarbonization will require collaborating with overseas companies, while also making use of the strengths of Japanese companies. JBIC interviewed MIZUKAWA Ko from Mitsui & Co., Ltd. and TAKAHASHI Yusuke from Hitachi Ltd.

Hydrogen supply infrastructure essential to expand use of fuel cell vehicles
Hydrogen stations being built in California, a state with high environmental awareness

MIZUKAWA Ko
General Manager,
Advanced Composite Materials Department
Functional Materials Division
Performance Materials Business Unit
Mitsui & Co., Ltd.

Mitsui & Co., Ltd. (Mitsui) and the Japan Bank for International Cooperation (JBIC) have jointly invested a total of USD48 million in FirstElement Fuel, Inc. (FEF), a US-based developer and operator of hydrogen refueling stations. California, where FEF is developing its business, has introduced unique environmental policies. The state's Zero-Emission Vehicle (ZEV) Requirements are a typical example. Under these regulations, automotive manufacturers that sell automobiles in California are required to sell ZEVs, such as electric vehicles (EVs) and fuel cell vehicles (FCVs), as a certain percentage of their California sales. This move has contributed toward California's growth into one of the world's largest FCV markets, with approximately 10,000 FCVs now on California's roads.

EVs are generally considered to be unsuitable for traveling long distances due to their short driving ranges. On the other hand, FCVs, which have long driving ranges and short charging times, are increasingly being used in various forms of mobility, including commercial vehicles, special vehicles, maritime, and locomotive, as well as passenger vehicles. As such, FCVs are being differentiated from EVs and are growing in popularity. The use of fuel cells for industrial purposes, such as emergency power for data centers, is also expanding, giving them a growing reputation as a technology that will contribute toward the realization of a hydrogen-based society.

Establishment of the hydrogen supply infrastructure is key to getting more FCVs on the road. As well as the ZEV Requirements, California has also introduced a carbon credit scheme aimed at the expansion of the hydrogen station network. Public funds are being provided to cover some of the installation costs of hydrogen stations, but, in addition, under the carbon credit scheme, station operators are given tradable environment value credits, which quantify the decarbonization effects of hydrogen sales. Conversely, producers of CO_2 emitting fossil fuels such as diesel fuel and gasoline, which are a burden on the environment, are required to pay penalties for that environmental burden by purchasing credits. This credit scheme provides a mechanism that circulates funds through the purchase of environmental credits by fossil fuel producers from hydrogen station operators.

The ZEV Requirements to encourage automotive manufacturers to sell environmentally friendly vehicles, the introduction of the credit scheme to promote the circulation of funds in the market, as well as the provision of public funds signify California's initiatives to support the establishment of infrastructure.

Mitsui started working with FEF in 2019. FEF is unique in providing one-stop-shop services, including engineering, design, and construction of hydrogen refueling stations, as well as their operation and maintenance.

In the operation phase, the operating status of all stations is monitored by remote control 24 hours a day. If a problem arises, the company's maintenance staff will be dispatched to the site immediately to resolve it. This system allows FEF to maintain high operating rates at its stations, as well as to accumulate various findings and data regarding maintenance. Through the provision of financial and other support to FEF's business in its pursuit of highly specialized and innovative initiatives, Mitsui hopes to leverage its knowledge, expertise, and networks in a wide variety of industries to accelerate the expansion of FEF's business.

There are currently 48 hydrogen refueling stations in California. FEF owns 28 out of those 48 stations and is planning to increase that number to 80 by 2025. In California, with the regulation of commercial vehicles such as trucks and buses set to tighten over coming years, FCVs are likely to attract even more attention. Mitsui continues to support FEF in its deployment of hydrogen stations for the popularization of FCVs through infrastructure development. Through FEF's business, we also hope to contribute toward the realization of a hydrogen-based society.

Two types of hydrogen fuel, 70MPa for passenger vehicles and 35MPa for heavy vehicles, are available.

Press release about this matter
https://www.jbic.go.jp/en/information/press/press-2020/0617-013499.html

Power grid business attracts attention due to acceleration of renewable energy
Synergy from collaboration with global market leader, Hitachi ABB Power Grids

TAKAHASHI Yusuke
General Manager,
Business Planning & Management Division,
Energy Business Administration Division
Hitachi, Ltd.

In July 2020, Hitachi, Ltd. (Hitachi) acquired the power grids business of ABB Ltd. (ABB) in Switzerland and established Hitachi ABB Power Grids Ltd.* (Hitachi ABB). Our hope is that we will be able to further enhance Hitachi's energy solutions business by leveraging the strengths of Hitachi ABB, with its global business base network and standardized business practices.

Hitachi ABB has four global business units. The Grid Automation business unit handles automation products and remote monitoring control systems, the Grid Integration business unit handles high voltage direct current (HVDC) systems, the High Voltage Products business unit handles high voltage switchgears/ components and generator circuit breakers, and the Transformers business unit handles power transformers and power distribution transformers. All four business units boast the top share in their respective global markets.

Particularly noteworthy is the HVDC system, which transmits power by high-voltage direct current. This is a proprietary technology that ABB developed more than 65 years ago. This system provides large-capacity power transmission over long distances with higher efficiency and less power loss. It also enables safe and stable power transmission between areas with different voltages or frequencies, such as between eastern and western Japan.

In December 2020, Hitachi ABB launched a trial energization of the NordLink project, the first interconnection project linking Germany and Norway, using one of the world's largest Voltage-Sourced Converter HVDC systems engineered by Hitachi ABB.

Both countries have their respective strengths, namely, wind and solar power generation in Germany and hydroelectric power generation in Norway, but renewable energies are subject to fluctuations in the amount of power generated. The NordLink project involves the installation of a 623-km long HVDC electricity interconnection with a capacity of 1,400 megawatts (MW) and voltage level of 525 kilovolts (kV), linking Germany and Norway. This project aims to contribute toward the expansion of renewable energy use by allowing the two countries to share electricity. For example, if wind conditions are good, Germany will send power to Norway, and in the event of spikes in Germany's electricity demand, Norway will supply hydropower-generated electricity to Germany.

The installation of Hitachi ABB's HVDC system nearly doubles the project's power transmission capacity compared with earlier systems, improving overall reliability and availability in the grid. As well as increasing the capacity of cross-border electricity trading in the future, HVDC will help to accelerate the use of bulk and distributed renewable energy sources.

While there are many plans for offshore wind-power generation aimed at a decarbonized society in Japan, Hitachi ABB's stable design and production technologies, the cultivation of which has been underpinned by the company's extensive track record overseas, will allow us to work on those plans without the need for massive capital investment.

Enhancing the use of renewable energy will require grid connections that link the consumption areas to the limited locations suited to power generation. For long distance transmission in particular, HVDC systems will be essential to minimize the power loss through transmission. Another challenge will be the adjustment of the supply and demand of generated power, which fluctuates according to weather conditions. By combining Hitachi ABB's tremendous expertise in grid solutions in the global market and Hitachi's digital solutions, we can resolve these challenges by providing new services that respond to ever-changing market needs.

Different countries and regions have different power source circumstances and areas of future growth. However, from the perspective of global macro trends, we believe that demand will likely increase in the electricity market in individual countries and that Hitachi ABB's wealth of expertise will allow it to contribute toward this trend. In the future, Europe will need power grids that can accommodate the expansion of EVs and EV Charging stations, as well as the hybridization of the railways. The Middle East will need initiatives for renewable energy and smart infrastructure in urban areas, and India will need the establishment and digitalization of National Grid.

Hitachi ABB already has indispensable expertise with well-established standardized work practices that are globally applicable. A year after the establishment of the new company, by taking advantage of their respective strengths, Hitachi ABB and Hitachi hope to contribute to achieving decarbonization with green power around the world.

HVDC system adopted for the interconnection project linking Germany and Norway

In Europe, environmentally-friendly grids responding to electrification in mobility are attracting attention.

*Hitachi ABB Power Grids will become Hitachi Energy in October 2021.

Production, Transportation, Storage, Utilization Global Supply Chain Underpinning a Hydrogen-based Society

Kawasaki Heavy Industries (KHI) has been working on hydrogen-related businesses for over 10 years. JBIC interviewed HARADA Eiichi, Managing Executive Officer of KHI, which is making progress toward the realization of a hydrogen-based society, from demonstration projects, including world-first trials, to large-scale demonstration projects and commercialization in 2030.

New development of hydrogen technology using LNG technology
Aiming to realize carbon neutrality without patience or sacrifice

HARADA Eiichi Ph.D. in Engineering,
Managing Executive Officer,
General Manager, Hydrogen Strategy Division,
Kawasaki Heavy Industries, Ltd.

KHI has been developing hydrogen-related technologies for quite some time, including the manufacture of hydrogen gas turbines and the development of liquefied hydrogen tank for H2 rockets. A major turning point came just before the Kyoto Protocol's first commitment period began in 2008. Amid rising expectations for renewable energies, we decided to take on the hydrogen challenge.

We focused on coal in Australia's Latrobe Valley. The abundance of the coal reserves does satisfy the criterion of availability in large quantities.

Price is another issue. To decrease the price, it would need to be used in massive quantities. At KHI, we decided that this problem could be surmounted by building a global hydrogen supply chain, namely to *produce* hydrogen, *transport* it to Japan, *store* it safely, and *utilize* it as energy. We are now working on this project with the aim of the commercialization in 2030.

At the supply chain's starting point of production, brown coal is treated at high temperatures to produce hydrogen gas, which is then liquefied. The CO_2 generated by that process is stored at the brown coal mining site using Carbon Capture and Storage (CCS) technology. For the transportation and storage stages, KHI has also developed a carrier to transport the liquefied hydrogen. For the utilization stage, we are considering various ways to utilize hydrogen, such as developing a co-generation system (CGS) using hydrogen gas turbines.

Our knowledge in liquefied natural gas (LNG) contributed greatly toward technological development. However, while natural gas changes to a liquid state at −162°C, hydrogen gas needs to be cooled to −253°C. This was a major departure from conventional technology.

The most challenging part of this project to that point had been the development of a liquefied hydrogen carrier. As this would be the first attempt to transport liquefied hydrogen in the world, there were no international standards. So we consulted Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and asked them to promote the establishment of international rules. Once approval was received from the International Maritime Organization (IMO) in 2016, building of the carrier accelerated, and demonstration trials at sea started in October 2020.

We have also been involved in setting up various organizations, such as the Japan Hydrogen Association (JH2A), to promote the adoption of hydrogen in society, and we joined the Hydrogen Council, a global initiative of 123 leading companies from around the world. In 2019, the latter organization announced a major target of growing the global hydrogen-related market to a scale of USD2.5 trillion in annual sales by 2050. Our hope is that, as more and more companies become involved in the Hydrogen Council, there will be more opportunities for the utilization of hydrogen, which will make the cost of using hydrogen more reasonable.

Reducing greenhouse gas emissions is an important theme. That hydrogen is initially expensive is an obvious fact. However, as many hydrogen-related technologies have been originated in Japan, the utilization of hydrogen will turn the cycle of the Japanese economy, which will, in turn, enrich the country. We are confident that we will be able to realize a hydrogen-based society that achieves a balance between economic and environmental prosperity.

Production Photo: Kawasaki Heavy Industries

Established the Hydrogen Technology Demonstration Center at the Harima Works in Hyogo Prefecture. KHI's technology in the handling of cryogenic materials and turbine technology are used in this facility.

Transportation Photo: HySTRA

Developed a liquefied hydrogen (−253°C) carrier using KHI's technology cultivated in the production of −162°C LNG carrier. In the future, KHI plans to build a larger carrier that will be powered by hydrogen.

Storage Photo: Kawasaki Heavy Industries

Cryogenic liquefied hydrogen storage tank that maintains −253°C conditions. With its vacuum-insulated, double-walled structure, this tank is designed to prevent temperature changes.

Utilization Photo: Kawasaki Heavy Industries

Hydrogen gas turbine power generation facility. KHI has developed proprietary combustion technology that uses a mixture of hydrogen and natural gas, as well as 100% hydrogen.

Contributing toward Global Climate Change Measures by Supporting Environmental Initiatives in Asia, while Considering Individual Countries' Circumstances

Today, countries around the world have set goals to achieve carbon neutrality between 2050 and 2060. Achieving such an ambitious goal may be difficult both technically and in terms of institutions if approached as an extension of the current situation, so what kind of efforts are these countries making? JBIC interviewed KOYAMA Ken, Senior Managing Director at the Institute of Energy Economics, Japan (IEEJ), who is an expert in the global energy situation.

KOYAMA Ken, Ph.D.
Senior Managing Director, Chief Economist, the Institute of Energy Economics, Japan (IEEJ), and Adjunct Professor, the Institute of Innovative Research, Tokyo Institute of Technology

Areas of research include analysis of the global oil and energy situation, analysis of energy markets and policy trends in the Asia-Pacific region, and energy security issues.

——For the past 18 months, the world has been at the mercy of the COVID-19 pandemic. Has energy policy also been impacted?

KOYAMA Definitely. In Europe, carbon neutrality through clean energy investment has been positioned as a long-term growth strategy of the Green Deal. With the added perspective of recovery from COVID-19, a three-pronged policy of climate change, long-term growth, and economic recovery has been proposed and endorsed by many countries. The United States now has the new Biden administration. If not for the COVID-19 pandemic, the US economy would likely not have suffered to such an extreme extent nor so many lives have been lost, and Donald Trump might have been re-elected as president. If that had happened, there would be no carbon neutrality policy in the US administration.

——Western countries and Japan are considering initiatives to achieve carbon neutrality by 2050, while China has set a target of 2060. What are your views of the respective situations in individual countries?

KOYAMA In the United States, the Congress holds the key. Implementing large-scale green energy investments requires a budget, which needs to be passed by the Congress. In the current Congress, the Democrats and Republicans are evenly matched and struggling for supremacy, which is making consensus-building difficult. China, meanwhile, will also probably take some longer time to realize carbon neutrality. In China, it may look like carbon neutrality will progress under the lead of the state, but that country in reality relies on coal for the most of its primary energy. China has achieved economic development with its abundant coal resources, so a complete shift away from coal will not be an easy task. There is a mountain of challenges for China to overcome to achieve its 2060 target. Japan, meanwhile, is currently in the process of developing its 6th Strategic Energy Plan. While Japan may be able to draw up a "vision" for targets, such as 46% reduction of greenhouse gas (GHG) emissions by 2030 and carbon neutrality by 2050, it also faces major challenges in formulating measures to realize that vision.

——How should companies view this situation? Does it represent a threat for them or an opportunity?

KOYAMA To realize carbon neutrality, we need innovation. Countries around the world are competing to have the superior technology over a long span of 30 or 50 years. Japan is attracting attention as the leader in CO_2 free hydrogen and ammonia and could potentially come out on top in the domination of technology in these fields.

As well as exploring new technology, there is also a need to consider the best use of existing infrastructure and supply chains. Energy industries such as electricity and gas are deeply involved in GHG emissions reduction policy, but their infrastructure and supply chains require large investments and have long service lives. Instead of immediately replacing these existing assets, we may be able to curb the increase in costs by making best use of them while transitioning. The question of how to use CO_2-free fuels, such as by burning CO_2-free ammonia and hydrogen by themselves or combining them with other fuels at thermal power plants, will not be an easy one to answer, but it is a challenge worth taking.

——What kind of innovations do you think will happen?

KOYAMA The first basic prescription in achieving carbon neutrality is promotion of energy efficiency improvement and energy savings together with promotion of non-fossil fuels, including renewable energies and nuclear power. Next prescription is electrification. Final energy consumption should be supplied by electricity as much as possible with the achievement of zero emissions in the power generation sector. These two prescriptions will enable substantial reductions in GHG emissions. Nevertheless, there are limits to how much existing technologies by themselves can achieve in reducing GHG emissions deeply enough to such extent of net zero emission, and technological innovation will be needed to overcome those limitations. Currently, hydrogen technology is attracting attention in Europe as well because hydrogen is essential to the realization of carbon neutrality. If Japan rests on its laurels, it will be difficult to maintain its current lead. Another technological trend attracting global attention is negative emissions, that is, technologies that directly reduce GHG. Specifically, these technologies include "direct air capture (DAC)," a technology that captures CO_2 directly from the air and removes it, and "bioenergy with carbon capture and storage (BECCS)," a process of storing CO_2 from biomass-fueled power generation underground.

——Both transitioning from existing technologies and developing new technologies are going to need tremendous amounts of investment, aren't they?

KOYAMA That's right. Financing will play an extremely important role in that regard. In Japan, initiatives based on the 6th Strategic Energy Plan will be taken, but there are limits to what private-sector companies can do by themselves, so public support will be needed. What will be required are measures to suit the circumstances of each country and region, so Japan should provide support for climate change initiatives in Asia, using technologies that have been cultivated to date. Providing financial support for these activities will be good for Japanese industry, for Japan, for Asia, and for the world, so I look forward to JBIC's support.

Applying Common Management Criteria for Operation of both Head Office in Japan and Local Subsidiary in Thailand Realizing Self-directed Improvement with the Growth of Local Staff

Oizuru Corporation

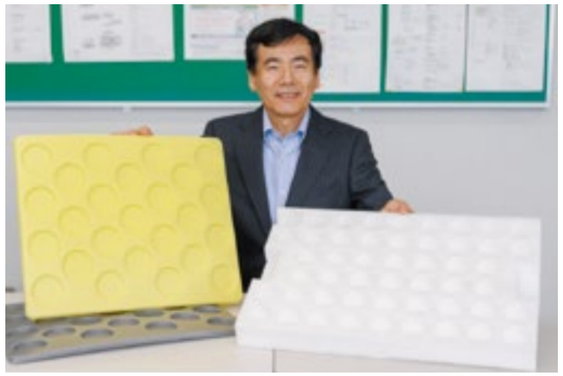
Oizuru Corporation produces and sells buffer packaging materials for a wide variety of products, including telecommunications equipment, medical devices, and automotive components. In its operations in Thailand, which began in 2002, the company is working to further expand its business by strengthening its product offerings in vacuum formed tray packaging materials.

Manufacture and sale of highly functional packaging materials
Resolving logistics challenges starts from the planning and designing stages

'There is a growing number of Japanese companies that are using the COVID-19 pandemic as an opportunity to review their supply chains and establish second production bases in Southeast Asia in addition to those in China. As a company doing business at our local subsidiary in Thailand, this presents a significant opportunity for us,' explains OIZURU Osamu, President and CEO of Oizuru Corporation, a manufacturer and distributor of packaging materials.

Oizuru Corporation established Oizuru (THAILAND) Co., Ltd. (OTC) in Thailand in August 2002 and has been pursuing business with automotive manufacturers and other customers. Despite demand plummeting in the first half of 2020 due to the COVID-19 pandemic, it is now recovering at an unexpectedly fast pace. The company is eager to use the changes in the post-COVID-19 business environment as a springboard for further growth.

Founded in 1958, Oizuru Corporation was started as a rubber product processing business by Mr. OIZURU's father. In 1968, the company was chosen by Asahi Chemical Industry Co., Ltd. (now Asahi Kasei Corp.) as a designated processing plant for the buffer packaging material, "SUNTECH FOAM." With this material, which offers excellent shock-absorbance and is suitable for the transportation of delicate equipment, Oizuru Corporation started selling to a major electric appliances manufacturer located near its head office in Nishitama-gun, Tokyo. With the growth in exports of telecommunications equipment and office automation equipment, Oizuru Corporation continued to grow. In the 1990s, its operations expanded to target businesses in other domains, such as medical devices, analytical instruments, measuring instruments, and automotive components.



President and CEO OIZURU Osamu

In 2013, it established a second plant in Iruma City, Saitama. Here, the company ventured into the development of a proprietary material that used corn starch as its main raw material. After perfecting this new material, "el-coco foam," which generates fewer CO_2 emissions and curbs the generation of harmful substances in incinerating processes, the company began offering it as a packaging material for food products.

Oizuru Corporation's strengths include its ability to offer integrated services from planning and design to mass-production and delivery and to resolve customers' logistics-related problems with a wide variety of buffer packaging materials. The employees who are qualified packaging professionals with expert knowledge in material mechanics and structural dynamics develop optimal packaging specifications to suit its customers' products and logistics environments.

Mr. OIZURU cites as an example a solution the company developed for a business that handles analytical instruments. 'We used highly-functional buffer materials, instead of the cheaper polystyrene foam to minimize packaging volume, to curtail transportation and storage costs. With design that enabled the shortest buffer distance and minimized the quantity of buffer material used, we reduced logistics costs by 20%.'

Expansion into Thailand with an attitude of "Things will work out once we get there"
Striving to differentiate with packaging materials that use vacuum formed trays

Oizuru Corporation's decision to expand into Thailand was prompted by the Toyota Motor Corporation's choice of Thailand as one of its production bases under the Innovative International Multi-purpose Vehicle (IMV) project. Mr. OIZURU recalls, 'The companies we had been dealing with were transferring their production bases to Asia one after another. As well as these moves coinciding with the stagnation of our sales, we were hoping to make use of our experiences and technological capability overseas. Our customers had not actually asked us to make this move, but we thought that, with over 700 companies in the industrial park there, things would surely work out once we got there. Looking back now, it was quite a reckless move, was it not?'

Oizuru Corporation's business in Thailand started to make headway when it started supplying to a Japanese company handling automotive components in 2004. Initially, it won the business with a proposal to reduce the customers' costs by cutting the number of cardboard boxes from more than 100 varieties to 60 through standardization and by reviewing the material the boxes were made from. After that, Oizuru Corporation also captured demand from a Japanese office equipment manufacturer and other customers and steadily increased its sales.

What Oizuru Corporation focused on in the promotion of its business in Thailand was its commitment to organizational operation and on-site environment creation using common management standards for both head office in Japan and OTC. Head office has established an integrated management system covering quality management, environmental responses, and business continuity, and Oizuru Corporation will work on establishing the same system at OTC. OTC will also introduce the same core system and sales support tools as those used at head office. In doing so, OTC will strive to establish an environment in which individual activities can be visualized and the two sites can mutually raise the standard of their activities.

Advanced initiatives have been generated voluntarily by local staff who have a deep understanding of the philosophy of site management and quality management in Japan. For example, the plant used to employ a manufacturing system in which production was carried out for all products one process at a time, including cutting, pressing, assembly, and packaging, but it has now shifted to a system of producing single products one at a time by teams of five to eliminate waste in storage and transport. This "single-item flow" process has contributed to an improvement in production efficiency of 34%. Since then, OTC employees have continued to engage in self-directed improvement on a daily basis, such as the five members of a team swapping the processes they are responsible for regularly.

Back-office operations are also performing excellent management. Having built good relationships with suppliers, the female assistant manager in charge of purchasing and procurement shares the production plans and confirms delivery deadlines and quality meticulously before giving instructions.

'Our five Japanese staff in Thailand develop the local staff by instructing them on key points of operation and management while building good working relationships with them through careful communication. Thanks to the efforts made by our excellent local staff, we have been able to overcome the various challenges we have faced,' Mr. OIZURU explains.

Oizuru Corporation used to excel at packing materials using foam, but is now stepping up its vacuum formed tray operations. Vacuum formed trays are widely used for food containers, but the demand for this product is expanding to packaging materials for precision components.

In March 2021, OTC received a syndicated loan from the Japan Bank for International Cooperation (JBIC) and Mizuho Bank, Ltd. Funds equivalent to approximately THB24 million in total will be used to upgrade production facilities for vacuum formed trays. With the introduction of machinery to make molds, OTC hopes to differentiate itself from its competitors by establishing production systems that enable speedy delivery of products.

Oizuru Corporation's overseas business base in Thailand established in 2002

Inside the Thai plant

'Someone from the Tokyo Metropolitan Small and Medium Enterprise Support Center suggested JBIC to us, and we were able to take advantage of a loan from JBIC for the first time. The loan is offered at a long-term fixed interest rate and can be funded in local currency, which allows us to avoid both interest rate volatility risk and foreign exchange risk, for which we are truly grateful. Because we were unfamiliar with the process, we kept making mistakes in the preparation of the application, but I really appreciated how kindly the people at JBIC responded to us,' said Mr.OIZURU.

Mr. OIZURU's main management focuses for the next decade will be "human resources" and "environment." 'I will devote my efforts to establishing a business in which our employees can sense their own growth through work and to initiatives for the 3Rs (Reduce, Reuse, Recycle).' By building management foundations for sustainable growth, Oizuru Corporation aims to achieve further growth and become the "leading company in packaging."

Oizuru Corporation

Head Office
1188 Ooaza Hakonegasaki, Mizuhomachi, Nishitama, Tokyo
URL
https://www.oizuru.co.jp/
Founded
January 1958
Capital
JPY10 million
Sales Volume
Approx. JPY1.2 billion (Year Ended December 2020)
President and CEO
OIZURU Osamu
Employees
Japan: 60; Thailand 135
Business
Production of soft plastic and foamed products, packaging technology services including package design, processing, and technical testing, distribution processing service

JBIC is engaged in an array of different projects in various parts of the world. JBIC's staff talked about their work on the front lines, their commitment to projects, and what they find most appealing as professionals in their respective fields.

The First Waste to Energy Project in Dubai, an Experience Full of Firsts
I Hope to Make it a Model Case for Project Financing for Future Waste to Energy Projects

Deputy Director, Division 4,
Social Infrastructure Finance Department

TAKEUCHI Kanae

I was responsible for the project financing for this project to build, own, and operate a waste treatment and power generation plant in Dubai's Warsan district for the treatment of waste and the generation and sale of electricity. In Japan, it is common to dispose of waste by incineration, but in many countries around the world, landfill is still the norm. In Dubai, which has achieved remarkable economic growth in recent years, most of the country's waste is buried in landfill, and it is facing an increasing shortage of land for that purpose.

Moreover, Dubai relies on gas-fired generation for more than 90% of its power needs, so there is a growing need to promote the introduction of renewable energies and diversify electricity generation. This project aims to provide a solution called "Waste to Energy" to resolve these issues. This facility is one of the largest of its kind in the world and has the capacity to treat as much as 45% of the waste generated in Dubai.

ITOCHU Corporation and Hitachi Zosen Corporation, the two key players in this project, have abundant experience in waste treatment and power generation overseas. Hitachi Zosen has undertaken design, procurement, and construction in many projects to date, but for this project, it will also be involved in the plant's operation and maintenance. This project will serve as a foothold for infrastructure system exports by Japanese companies in the areas of waste treatment and power generation. JBIC also wants to support the overseas roll-out of Japan's advanced infrastructure technologies. This project is truly significant in that respect, and I believe it will become a kind of model case for the future.

Waste to energy projects have different business risks from ordinary power generation. Various factors affect the stability of power supply and the profitability of the business, such as whether sufficient volumes of waste can be collected, whether the waste is properly separated, and whether the quality of waste suitable for incineration can be ensured. Moreover, as Dubai is one of the emirates that make up the United Arab Emirates (UAE), the credit risks that need to be assessed differ from those of national projects. Building a scheme based on these kinds of complex structural risks was a considerable challenge for us. To further complicate matters, we were unable to visit the site due to the COVID-19 pandemic, and all negotiations had to be conducted online. From my previous experience, I believed that communication between stakeholders was essential for this kind of negotiation, so I focused on sharing information with the parties concerned, both sponsors and lenders, and on making progress in the project with common goals and directions.

This will be Dubai's first waste to energy project. For JBIC as well, it will be our first risk-taking project in Dubai, and at the same time, our first project financing for a waste to energy project. Given its significance in the contributions it can make toward the realization of a circular, decarbonized economy, to be involved in a project that is so full of "firsts" and to help it reach the conclusion of such a satisfactory agreement makes me very happy both as a banker and as an individual human being, and it has been an invaluable experience. Going forward, we can expect to see more and more of these waste to energy projects around the world. JBIC hopes to contribute toward the realization of these projects by leveraging the knowledge and experience that this project will provide us.

Project Financing for Warsan Waste to Energy Project in the Emirate of Dubai, UAE
Supporting Japanese Companies' Participation in First Waste to Energy Project in Dubai

In March 2021, JBIC signed a loan agreement in project financing for up to approximately USD452 million (JBIC portion) with Dubai Waste Management Company P.S.C. (DWMC) in the United Arab Emirates (UAE), which is invested in by ITOCHU Corporation, Hitachi Zosen Corporation, and other entities. In this project, Dubai's first waste to energy project, DWMC will build, own, and operate one of the world's largest waste treatment and power generation plants in Dubai's Warsan district. The company will treat waste and sell the electricity produced by the plant for a period of 35 years following the completion of construction.

Image of the waste to energy plant

https://www.jbic.go.jp/en/information/press/press-2020/0329-014477.html

First Credit Line to Government of Republic of Benin under GREEN Operations
I Hope to Contribute toward Solutions to Social Problems in Africa through Environmental Preservation Projects

I was assigned to work on the finance needed for environmental preservation projects in Benin by extending a credit line to the government of Benin. This is JBIC's first project in that country. JBIC has been strengthening its support to expand social and environmental-related investments in Africa since 2019, and this project is consistent with this policy.

As the credit line covers environmental preservation projects, JBIC is able to provide a wide range of funds for environmental projects of a highly public nature that are led by the government of Benin. One thing expected from this project is the improvement of Benin's electric power situation. Benin has an electrification rate of just 41.4% (70.8% in urban areas and 18% in rural areas). Progress has been particularly slow in rural areas, due to the country's undeveloped power grid. Various options are currently under consideration, including the introduction of an off-grid power system that combines compact power grids for limited areas with a solar power system. Some may have an image of JBIC as mostly financing large-scale projects, but with this credit line, we are able to provide funds in flexible ways to smaller projects like this.

In the Fourth Medium-term Business Plan released in June 2021, JBIC announced that it would "address global issues toward realizing sustainable development for the global economy and society" as a key focus area. To achieve this, "green finance," which provides support to projects related to renewable energy and smart energy for the realization of a decarbonized society, and "social impact finance," which provides support to resolve social problems, are important. If clean and stable energy supply can be realized through this credit line, as well as the increase in electrification rate, it can be expected to have social impacts, such as power supply bringing about improvements in educational infrastructure and medical standards. In this respect, this project has aspects of both green finance and social impact finance.

Benin is located in Sub-Saharan Africa (south of the Sahara Desert), a region that faces challenges such as poverty and conflict, but it has a relatively stable political situation within the region. The government of Benin has some excellent people and is highly regarded internationally in the area of policy management. This is a country that is working on environmental policies in advanced ways, being quick to develop climate change action plans based on the Paris Agreement. JBIC has been working to build a relationship with the government of Benin, including inviting high-ranking officials from its Ministry of Economy and Finance to our JBIC seminar, an international exchange event that we hold every year (cancelled in 2020 due to the COVID-19 pandemic). It is a result of such people-to-people exchange efforts that this project has come to fruition.

Having dialogue with Benin's excellent policymakers through this project has been an invaluable experience for me. Based on my strong impression of Benin as a country with a high awareness of the SDGs (Sustainable Development Goals), I tried to tell them the social significance of this credit line as honestly and clearly as possible during the negotiation process.

As the talks proceeded, I was impressed by the Benin officials' passion in cherishing "people" for the development of the country. For example, most elementary schools in Benin's rural areas currently do not have electricity. If this project helps to improve the electrification rate of these schools and, in turn, the educational environment, it will lead to the development of the people who will lead the country into the future. I am honored to have been involved in a project that will contribute to the future of Benin.

Division 3,
Oil and Gas Finance Department (then)

HOHZOH Kaho

GREEN (Global action for Reconciling Economic growth and ENvironmental preservation): Operations aimed at supporting projects recognized to have a positive impact on the preservation of the global environment, such as significant impacts in the reduction of greenhouse gas emissions, with the aim of preserving the global environment, including the prevention of global warming.

First Credit Line to Government of Republic of Benin under GREEN Operations
Supporting Environmental Preservation Projects in Republic of Benin

In March 2021, JBIC signed a general agreement with the Government of the Republic of Benin to provide a credit line of up to EUR30 million, of which JBIC's portion is EUR18 million. The credit line, JBIC's first extended to Benin, is intended to provide, through the Government of Benin, the funds necessary to implement environmental preservation projects in Benin under GREEN operations.

Helping Benin's sustainable development

https://www.jbic.go.jp/en/information/press/press-2020/0325-014478.html

A "Hidden" Digital Innovation Giant Release of Report that Reveals the Real Power of the Nordic and Baltic Region

Start-up Ecosystem Supported by Cutting -Edge Technology and Social Transformation

In April 2021, JBIC IG Partners and JB Nordic Ventures Oy (NordicNinja VC) co-published a report titled "Digital Innovation and Social Transformation – Case Study of Nordic and Baltic Region."

In 2017, the Japan Bank for International Cooperation (JBIC) and Industrial Growth Platform, Inc. (IGPI) established a joint venture, JBIC IG Partners, which invests in foreign companies through investment advice to funds. NordicNinja VC is the second fund established by JBIC IG Partners. Since its establishment in January 2019, it has invested in 13 companies in the Nordic and Baltic region. The report features abundant information and findings obtained over more than two years of their activities.

The common images of the Nordic and Baltic region are "welfare" and "interiors," but it has many other facets. The region has produced the largest number of unicorn companies per capita in the world outside Silicon Valley and leads the world in the advancement of social transformation in digital and ESG domains such as E-government.

The report describes the characteristics of the region from four perspectives, namely "start-up ecosystem," "digital transformation of government and society," "strong awareness of sustainable development," and "effective utilization of human resources," presenting them with the latest trends and interviews with locals.

'This report is designed to provide an overall picture of the region, but what we want readers to focus on most is the section on sustainable development. The Nordic and Baltic region is a collection of small nations that has always been sensitive to the global agenda and ahead of the world in promoting sustainable development initiatives. There is much we can learn from the way they think about the circular economy, in which resources are used, recycled, and reused in a permanent cycle, and their efforts to achieve it.' (SOHARA)

Brings together the latest trends in innovation and social transformation in the Nordic and Baltic region

We have already received feedback from companies and organizations that have read the report.

'JBIC is seen as a traditional organization, but we are committed to supporting projects with a high policy significance through fund business, as well as by conventional efforts in the form of investments and loans. We want more people to know about these kinds of new challenges such as NordicNinja VC. We aim, through these activities, to enhance support for Japanese companies. We hope to expand the circle of that support beyond the conventional loans and investments.' (HIRAI)

HIRAI Yasushi
Director
Division 3,
Equity Investment Department (then)

SOHARA Tomosaku
Investment Director, JBIC IG Partners
Managing Partner, JB Nordic Ventures Oy (NordicNinja VC)

Visit the address below for the detail and download the PDF of "Digital Innovation and Social Transformation – Case Study of Nordic and Baltic Region" (available in Japanese only)
https://www.igpi.co.jp/2021/04/20/report_jbicig_20210420/

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4-1, Ohtemachi 1-chome, Chiyoda-ku, Tokyo 100-8144, Japan

Tel. +81-3-5218-3100 URL: https://www.jbic.go.jp/en/
Facebook https://www.facebook.com/JBIC.Japan/

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