Regions × Transition
～Wide-Area Strategies Centered on Energy and Related Industries～

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Chief Research Office

Introduction (Background and Purpose)1／2

Background and purpose of "Regions × Transition"

- The world faces an urgent need to address various sustainability issues. At the G7 Climate, Energy and Environment Ministers' Meeting held in April 2023, the Ministers agreed that they "call for urgent and enhanced action at all levels across all sectors to achieve the transformation towards net zero, circular and nature positive economies"[1] in light of "the unprecedented triple global crisis of climate change, biodiversity loss and pollution that are mutually reinforcing and intrinsically linked."[1]

- In particular, the need for actions to achieve net zero (carbon neutrality, or CN) for climate change mitigation is increasingly urgent. The Japanese government has adopted the Basic Policy for the Realization of GX through a decision by the Cabinet in February 2023. It sets forth that Japan will promote "the idea of Green Transformation, or GX, which will transform our entire industrial and social structures centering around fossil energy sources into ones based on clean energy,"[2] "based on the premise of ensuring a stable energy supply (energy security)"[2] and that "by strengthening Japan's industrial competitiveness, the country's economy can be put back on track for further growth, leading to future economic development and growth in jobs and income."[2]

- If Japan is to achieve medium- to long-term growth through GX, it is essential to unleash the potential of its regions. While Japan's three megalopolises are leading in GX initiatives, DBJ believes that other regions play a critical role in supporting the entire country. Efforts in each region should proceed through wide-area collaboration, effectively using regional characteristics (potential) and strengths derived from existing industries, in view of overall optimization with appropriate division of roles and functions. However, a look at the big picture of ongoing activities across Japan indicates that transition-related initiatives and their progress vary by area, due to a gap in awareness of relevant information between head-office staff and production staff of companies, or depending on the presence or absence of a company taking leadership.

- Against this background, this recommendation report focuses on regions other than the three metropolises (referred to as "regions with potential"), with attention to energy and related industries with a high impact on CN, and discusses the future direction for regions in Japan, with a view to facilitating the activities of the players driving each region, such as companies and supporting organizations (local governments, educational institutions, financial institutions, etc.).

(Note)"1" denotes quotes from the G7 Climate, Energy and Environment Ministers' Communiqué (Ministry of the Environment), and
"2" denotes quotes from the Basic Policy for the Realization of GX (Cabinet Office). Some of these quotes include supplementary text.

Introduction (Background and Purpose)2／2

Background and purpose of "Regions × Transition"

- For the achievement of CN, the report provides classification according to regional characteristics from the perspective of introducing and expanding the schemes key to realizing CN: renewable energy, hydrogen and ammonia, and carbon dioxide capture, utilization and storage (CCUS). Based on this concept, DBJ selected three model areas and formulated, while considering existing initiatives, hypothetical scenarios that can be used as a basis for discussion to further accelerate relevant initiatives in these areas.

- The framework proposed in this report is expected to help other areas that are similar to the model areas in regional characteristics, industrial structure, players, and other aspects in their future efforts to nurture industries and build energy infrastructure. For Japan, it is essential to have a platform through which players in different areas, although their strategies may vary, can share an awareness of the latest trends in Japan and abroad, the current situation, and a scenario to follow, as well as constantly update such awareness.

- The G7 Ministers also announced that "Acknowledging the vital role of subnational actors in realizing the transformation toward net-zero, climate-resilient, circular, and nature positive economies, furthering socioeconomic opportunities based on local capacity, needs and individual environmental conditions, we resolve to catalyze support for actions by subnational actors, encourage sharing best practices and promote city-to-city cooperation."[1] DBJ hopes that this report will help wide-ranging players across Japan to deepen their discussions toward medium- to long-term growth and to accelerate their actions.

- For implementing the proposed actions, there is a need to squarely face real-world issues, including the establishment of global supply chains, lost value of assets, the social burden from energy and other growing costs, transformation of the industrial structure, and concerns over the hollowing-out of industry, although the report does not cover these issued in detail. The DBJ Group intends to continue its support beyond the recommendations in this report, while discussing with various players how it can contribute to Japan's growth over the medium to long term.

(Note)"1" denotes quotes from the G7 Climate, Energy and Environment Ministers' Communiqué (Ministry of the Environment). Some of these quotes include supplementary text.

Topics and Sectors Covered by This Report

Focus on Carbon Neutrality × Energy Conversion/Industries/Transport

Focus

Sustainability topics

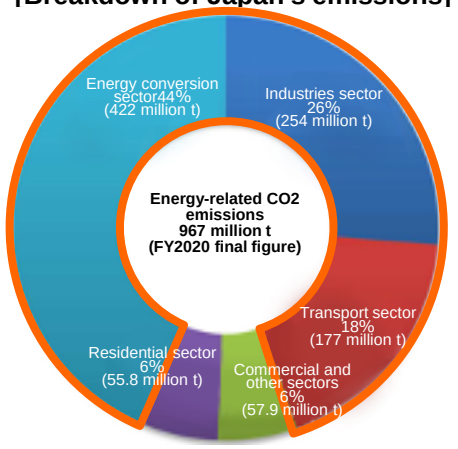
Climate change	Biodiversity loss	Pollution
Net zero (Carbon neutrality)	Nature positivity (Restoration of natural capital)	Circular economy

×

Sector

Energy conversion	Industries	Transport	Commercial and other	Residential
• Electricity	• Steel • Chemicals • Machinery • Other materials • Food and drink • Agriculture • Construction	• Automobiles • Railways • Ships • Aircraft	• Wholesale & retail • Healthcare & welfare • Hotels & restaurants • Education & learning • Daily life & leisure	• Lighting & household appliances • Water heating • Air conditioning • Cooking stoves

[Breakdown of Japan's emissions]



(Note)"G7 Climate, Energy and Environment Ministers' Communiqué" (Ministry of the Environment), "Breakdown of energy-related CO_2 emissions by sector" (Ministry of the Environment)

Objective of the Report

Support the transition of regions with potential that facilitates the transition of Japan

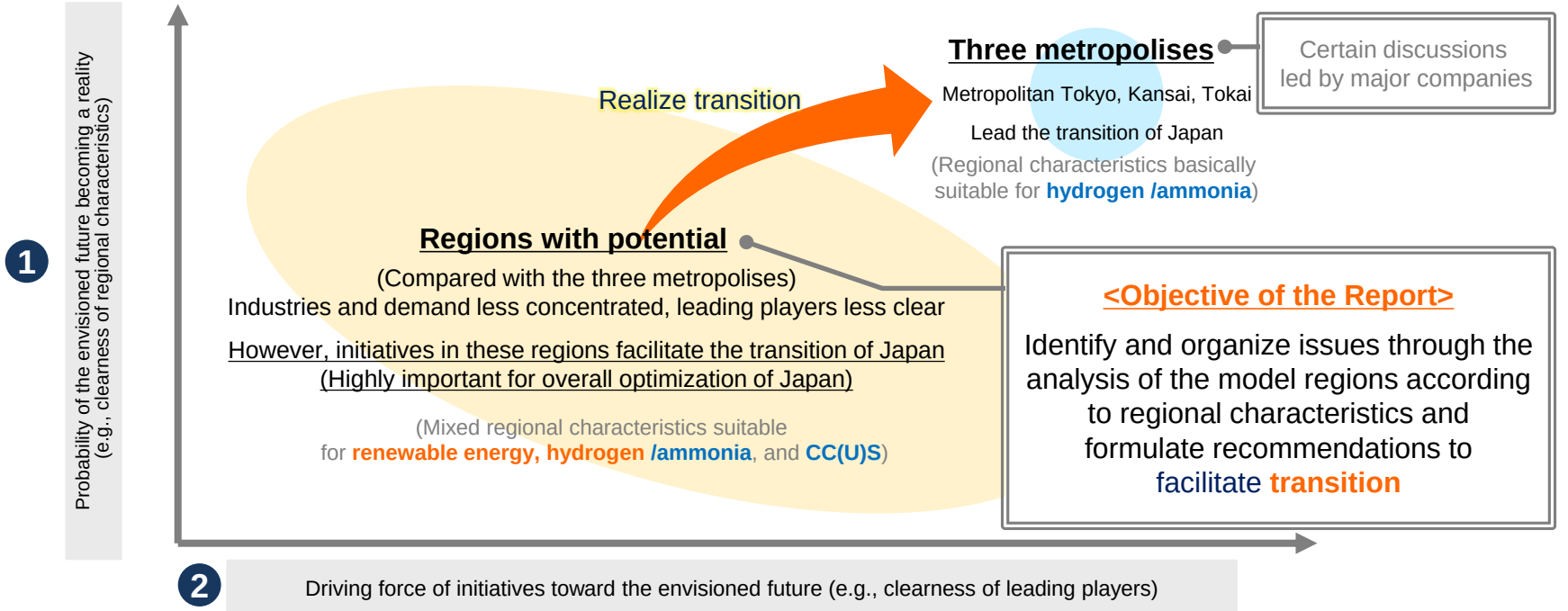
Steps toward transition

Envision the future → Implement initiatives for the future → Realize transition

Points

1. Clear regional characteristics (High predictability)
2. Clear leading players (Need for wide-area collaboration and government policy support)

Regional differences



(Note)Prepared by the DBJ Group

Overview of the Report (1)

To achieve CN, energy security, and economic growth, Japan's regions must share the roles and functions for overall optimization

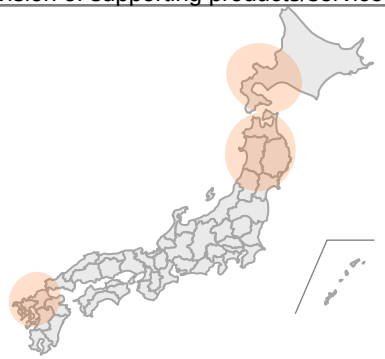
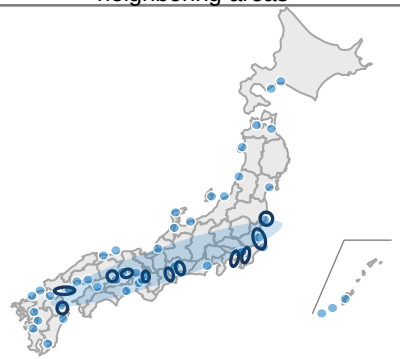
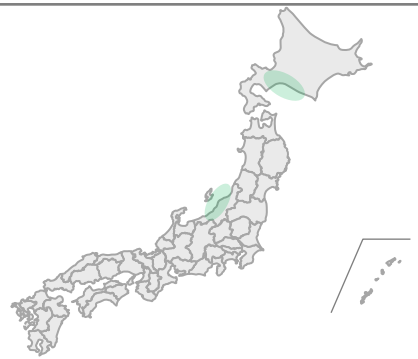
Goals	Description
Achieve CN by 2050	**Key elements for CN are renewable energy hydrogen/ammonia and CCUS** (Electrification of energy +) **Decarbonized energy sources**: Renewable energy + Storage/Adjustment (storage batteries, hydrogen/ammonia); Zero-emission thermal power; Hydrogen /ammonia; CCUS **Decarbonized hard-to-electrify energy** (e.g., high-temperature heat): Hydrogen/ ammonia methanation, etc.; CCUS **Decarbonized raw materials** (steel and chemicals): Hydrogen/ ammonia; CO_2 (CCUS) **Location discussions are key to maximizing the installation and utilization of these elements in Japan** For renewable energy/CCUS, suitable locations are unevenly distributed, depending on natural/geographical characteristics For hydrogen/ammonia, which is dependent on imports and requires newly built infrastructure, strategic and efficient formation of receiving hubs is required
by securing	
Energy and Economic Security	Need for **appropriate regional distribution** in determining the **locations** (e.g., north-south, Japan Sea side or Pacific Ocean side)
and	
Adequate Competitiveness and Economic Growth	Need to consider **concentrations of energy/raw material consumer industries** (power generation, oil, petrochemicals, steel, etc.) and **competitiveness of each candidate area** (i.e., whether to take advantage of it) in determining the **locations**
for	
Japan	**Roles and functions shared among regions for overall optimization** in a way that their respective strengths, e.g., regional characteristics and existing industries, can be leveraged

This report **takes a view of how the roles and functions should be shared among different regions (a future vision)**, **selects specific regions for analysis and identification of issues**, and then proposes a **hypothetical framework by which to provide the support needed for resolving these issues.**

(Note)Prepared by the DBJ Group

Overview of the Report (2)

In three model areas, effective strategies are wide-area collaboration to bring together local and external resources and support for local companies; joint ventures for procurement, infrastructure ownership, etc.; and honing CCS capabilities

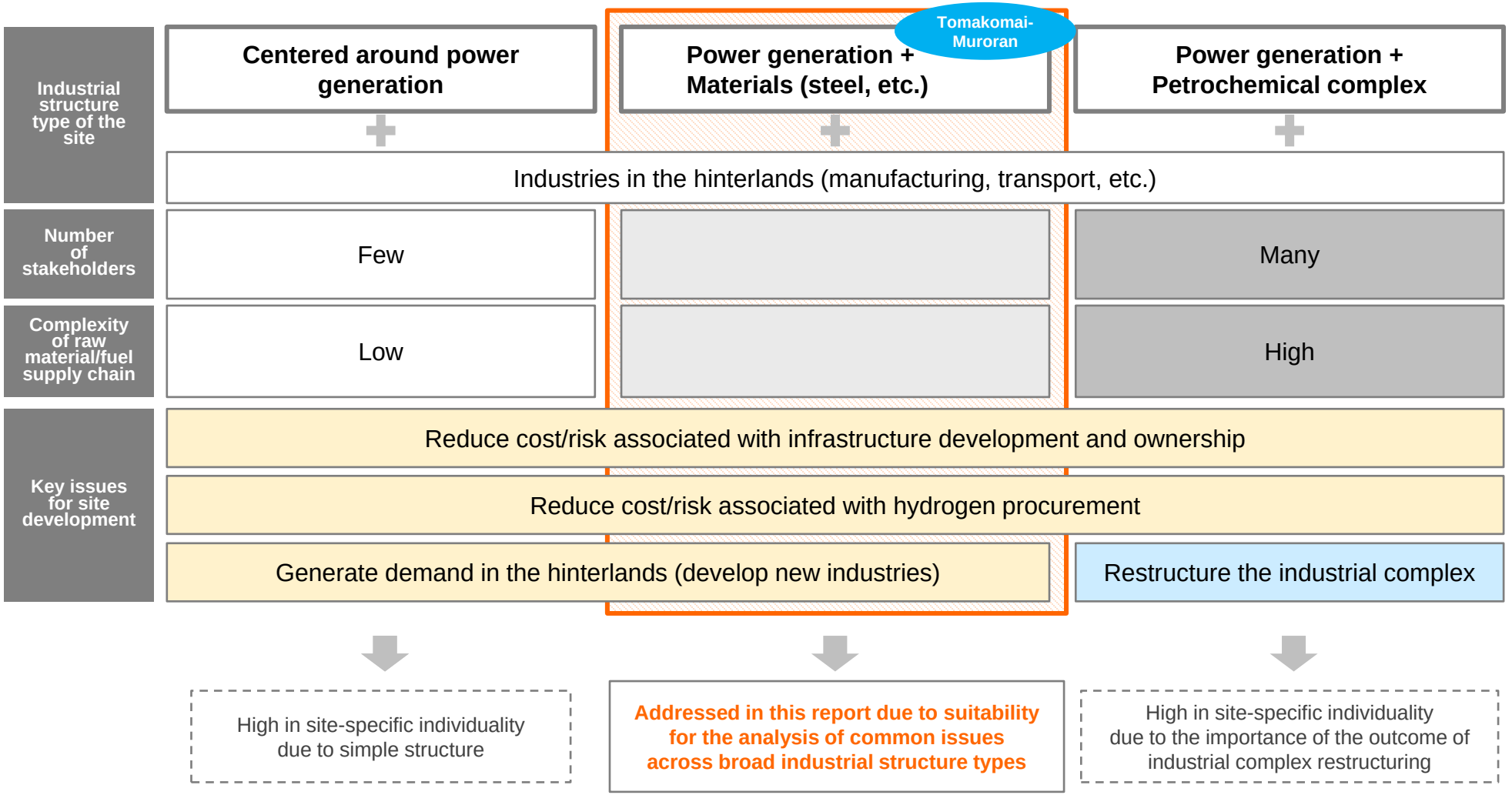
Keywords	Renewable energy [Large scale renewable energy candidate sites] **"Industrial value chain building" type**	Hydrogen/ammonia [Large scale power plants/industrial clusters + CNP candidate sites] **"Hub function for areas with distributed consumption" type**	CC(U)S [Large scale CCS candidate sites] **"CCUS potential" type**
Roles/Functions	Maximum installation of renewable energy, supply to neighboring areas, and provision of supporting products/services	Receiving of imported hydrogen/ammonia (domestic hydrogen production) and supply to neighboring areas	Receiving, storage and use of domestic CO_2 emissions
Potential areas			
Referenced overseas region	UK, Germany	UK	North America
Model areas	**Kitakyushu**, Nagasaki, Tohoku (Akita), etc.	**Tomakomai-Muroran**, Tohoku, Hokuriku, etc.	**Niigata-Joetsu**, Tomakomai, etc.
Issues **(Focus in this report)**	Maintain and develop regional industries according to the progress of transition	Energy transition in distributed energy consumer areas where industrial competitiveness needs enhancement	Establish technologies, reduce CCS costs, build business models
Hypothetical scenario for transition	■ **Building a new industrial value chain** ● Regional industry development driven by both demand (suitable location for renewable energy) and supply (industrial cluster)	■ **Integration/collaboration of energy consumers to enhance industrial competitiveness** ● Serving as an energy receiving hub to lay the groundwork for enhancing industrial competitiveness	■ **Formation of pioneering CCS hubs** ● Hubs for the establishment of technologies, human resources, and business models, in view of overseas business opportunities
Recommendation	**Wide-area collaboration to bring together local and external resources and support for local companies**	**Joint ventures for procurement, infrastructure ownership, etc. (Closer collaboration among energy consumers)**	**Honing CCS capabilities (Regional potential × government support)**

(Note)Prepared by the DBJ Group

[Reference] Classification of Hydrogen/Ammonia Hubs (power generation/industry-related demand type)

The Tomakomai-Muroran region is suitable for analysis of common issues across broad industrial structure types

Site types and topics in this report



(Note)Prepared by the DBJ Group

[Addendum] Remaining Issues

Various issues that are not covered by this report but need to be addressed before implementation of the proposed actions

Remaining issues

Situation in Japan

- Industrial structure/processes optimized for fossil fuels/raw materials
- Limited potential for renewable energy

Likely events

- Additional costs required for transition（R&D、CAPEX）
- Need to import energy while making utmost use of domestic potential
- Rise in the cost of energy and products

Issues

- Lost value of existing /transition assets, etc.
- More social burden from higher costs
- Transformation of industrial structure, hollowing-out of industry, changes in employment (just transition)

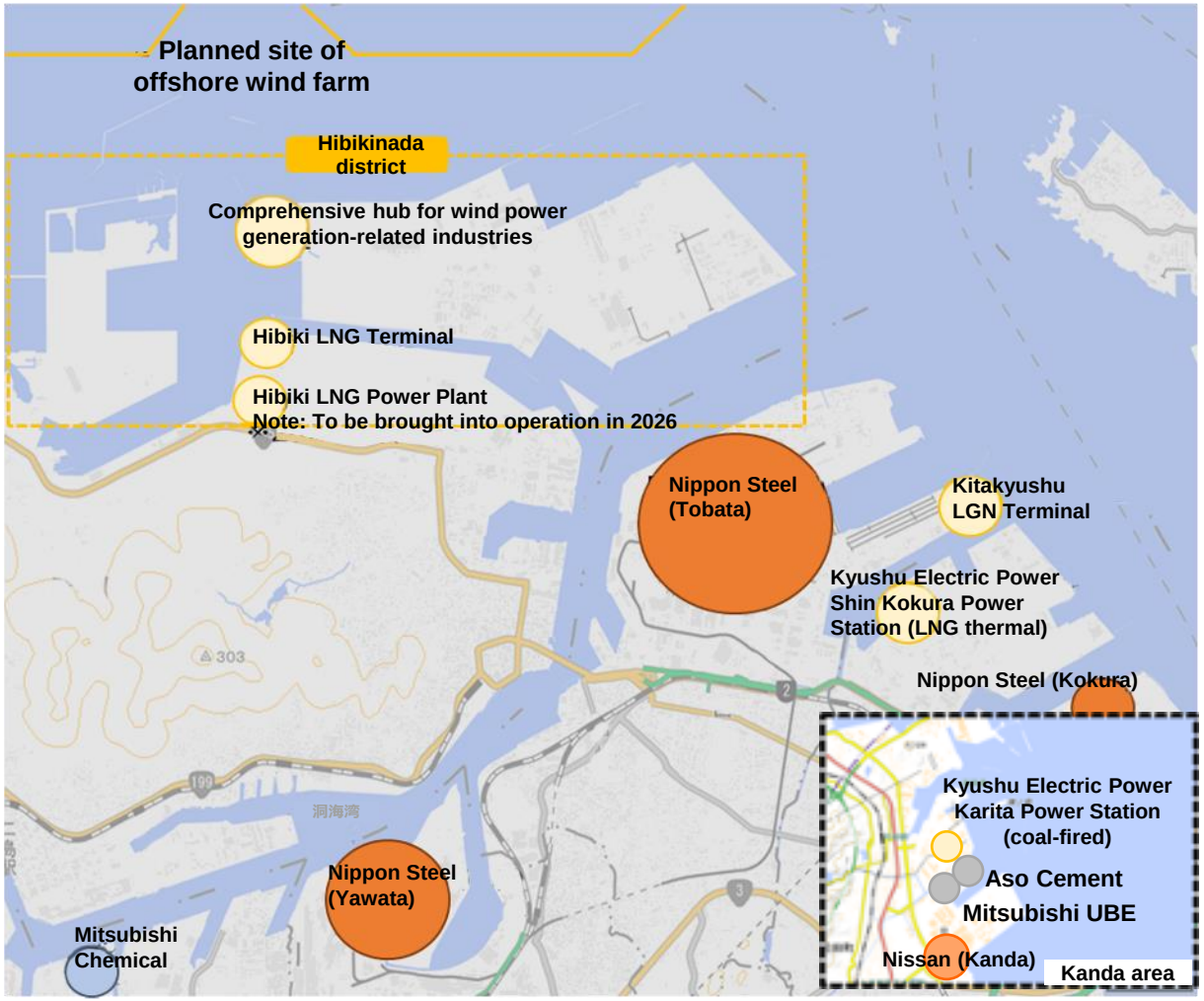
Need to squarely address these issues before implementation of the proposals in each region, although this report does not cover them.

(Note)Prepared by the DBJ Group

Kitakyushu｜Current Situation～Infrastructure Map

Clustering of industries (e.g., thermal power plants and steel), with a candidate site for offshore wind power generation

Infrastructure Map



Characteristics

- **Leading industrial cluster in Kyushu (Manufacturing base)**
  - The region has been supported by power plants, steelworks and their surrounding industries, chemical industry, cement industry, auto manufacturing, etc., but it will need to respond to structural changes in demand and CN actions.
- **Prospective area for renewable energy development** Issue
  - The Hibikinada district has LNG terminals and many renewable energy facilities (wind power, solar, biomass, etc.), and has even been selected as a preparatory stage area for offshore wind power generation.
  - With the presence of steel/auto industries, the area has a potential for building an offshore wind power supply chain.
- **Presence of neighboring areas**
  - Renewable energy development sites and related industries in Saga and Nagasaki

Envisioned future (hypothetical scenario by DBJ)

- **A leading energy and industry hub in Kyushu, based on renewable energy potential**
  - Supply power generated from renewable sources to the area
  - Build a value chain for renewable energy (offshore wind power)
  - Supply hydrogen to the area (domestically produced + imported hydrogen)

Global perspective：
Build a global supply chain including Asia

(Note)Prepared by the DBJ Group, based on maps from the Geospatial Information Authority of Japan and information available from relevant companies

Kitakyushu｜Recommendations for a Region of Industrial Value Chain Building Type

Effectiveness of building a platform for wide-area collaboration through which to bring together demand and manufacturing infrastructure in and around the region

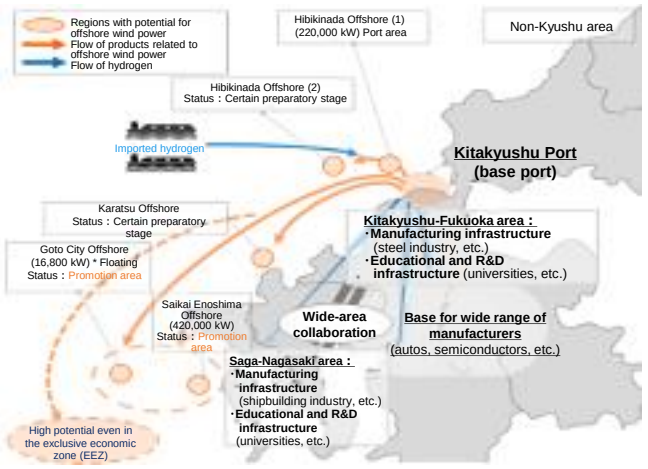
- Recommendation to build a platform for wide-area collaboration by which to bring together the manufacturing infrastructure and capture demand in and around the region

Regional issues｜Maintain and develop local industries aligned with CN

- Steel and auto industries that have supported the local economy need to adapt to structural changes in demand and CN trends

Vision of regional functions｜Building a new industrial value chain

- Play a central role in a new industrial value chain that supplies neighboring areas with renewable energy (offshore wind power) and clean energy (e.g., hydrogen/ammonia) and that supplies neighboring offshore wind power plants with various products and O&M services



Recommendations for the envisioned future｜Wide-area collaboration platform & support for local companies

- Build a wide-area collaboration platform through which neighboring regions can mutually complement resources (for R&D, industries, etc.) lacking in each region and through which different actors can organically implement their initiatives under a comprehensive strategy
- While building such a platform, allow regional financial institutions to fulfill their connection functions to incorporate local companies into a new industry value chain

WGs operated under a governing platform

- Enable organic collaboration of different actors by developing a wide-area comprehensive strategy + forming thematic WGs

Wide-area collaboration platform for offshore wind power
(Develop a comprehensive strategy => Propose to the national government)

(Regional business group expected to serve as the platform operator)
Local governments, universities, companies, and financial institutions join according to the theme and conduct specific discussions/implementation

O&M personnel development WG	Manufacturers, maintenance companies, local governments
R&D WG	Universities, manufacturers, etc.
Industrial development & VC building WG	Manufacturers, local governments, financial institutions

Potential value of regional financial institutions

Help local companies (especially Tier 2 or higher parts manufacturing and O&M) to join

- Provide end-to-end support based on business relationships with local companies, including finding potential participants, matching with wind turbine manufacturers and Tier 1 (large companies), and financing

Example of specific initiatives : Preparation of local company diagnosis report

- Work with experts (e.g., industry associations) to create a format of the company diagnosis report that contains information needed by wind turbine manufacturers and Tier 1 suppliers
- Approach target companies to promote and complete the preparation of company diagnosis reports+Work with neighboring regions by using the same format
- Give advice for participation or matching services, based on information contained in company diagnosis reports
- Financing for capital investment, etc.

Collaboration with megabanks and government-affiliated financial institution

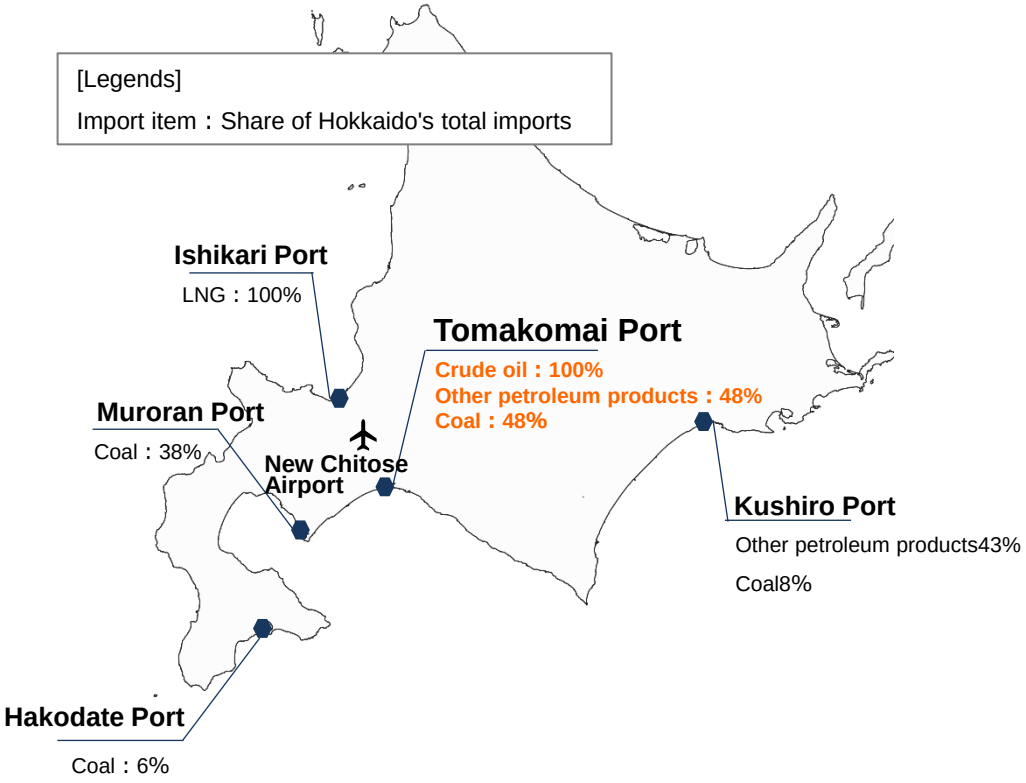
(Note)Prepared by the DBJ Group

Tomakomai-Muroran｜Role as an Energy Hub

Function as Hokkaido's energy receiving hub and Importance of collaboration with surrounding regions

- Tomakomai Port serves as Hokkaido's energy receiving hub: Of the energy sources imported by Hokkaido, those transferred to internal locations via Tomakomai Port account for 48% of coal, 100% of crude oil, and 43% of petroleum products. Its carbon neutral port (CNP) development plan sets out the goal of making the port an energy hub for different parts of Hokkaido and for Northern Japan, based on the existing network.
- Collaboration with surrounding areas and hinterlands is also considered a key issue in the Ministry of Economy, Trade and Industry's initiative to develop hydrogen/ammonia hubs.

Breakdown of Hokkaido's major energy imports by port



Note: Other petroleum products: Petroleum products except for volatile oils, other oils, and LNG.

Vision for Tomakomai Port as a CNP

[Future as an energy hub]

- Next-generation energy supply hub for different parts of Hokkaido
  - ⇔Tomakomai Port handles about 50% of the total amount of cargo arriving in ports in Hokkaido and has an established land transport network connected to Sapporo and other parts of the prefecture.
- Next-generation energy supply hub for Northern Japan
  - ⇔Has a domestic marine transport network, mainly connecting to Northern Japan by ferry.
- Next-generation energy storage hub for Japan (e.g., for emergency supply to affected areas)
  - ⇔Is the only oil refinery site in Hokkaido and has an oil storage function.

[Reference: Other perspectives]

- A port selected by the world for its environmental value
- Formation of a carbon recycling complex

Key points in regional collaboration

Preconditions and evaluation items for the Ministry of Economy, Trade and Industry's hydrogen/ammonia hub development

Feasibility	Local impact	Quantity of hydrogen/ammonia handled	CO_2 reductions	Innovation

Preconditions

- Contribution to the local economy through introduction of hydrogen/ammonia

Evaluation items

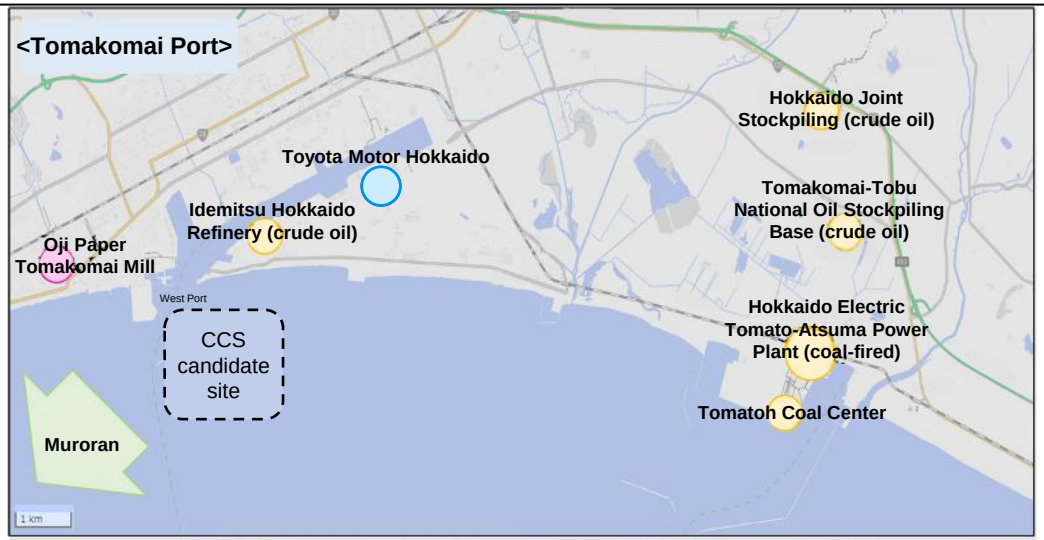
- **Potential for regional collaboration**, potential for expansion into less-developed areas, etc.

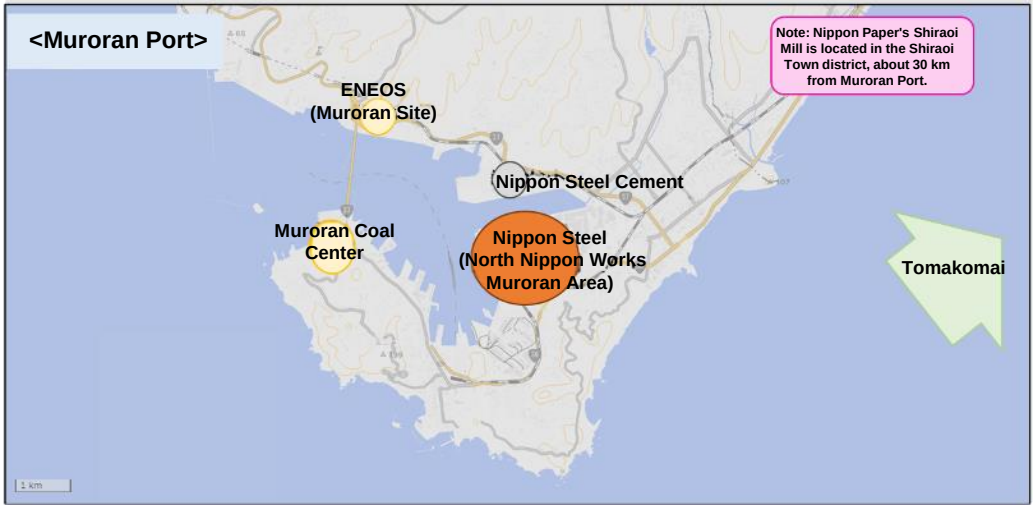
(Note)Prepared by the DBJ Group based on "FY2019 Bulk Cargo Movement Survey Results" (May 2020, Ministry of Land, Infrastructure, Transport and Tourism), "Tomakomai Port CNP Development Plan (Outline)" (September 2022), and "Interim Report by the Hydrogen Energy Policy Subcommittee/Subcommittee on Policy for Ammonia and Other Fuels for Decarbonization" (December 2022, Ministry of Economy, Trade and Industry)

Tomakomai-Muroran｜Current Situation～Infrastructure Map

Hokkaido's Largest industrial cluster and energy receiving hub

Infrastructure Map





Characteristics

- **Hokkaido's largest cluster of industries**
  - Considerable demand for fuel and raw materials, with a power plant, steel works, oil storage/gas/coal terminals, refinery, gas field, and paper mill
  - Smaller scale of clustering than the metropolises and medium to small size of industries
- **Hokkaido's energy receiving/supply hub**
  - Demand from the local power plant and industries (above) expected, with the medium- to long-term potential for supplying fuels and raw materials for SAF and agricultural machinery
- **Candidate site for renewable energy development**
  - Additional industries and hydrogen production in view
- **Candidate site for CCUS promotion**
- **Abundant natural capital**

Issue

Envisioned future (hypothetical scenario by DBJ)

- **Hokkaido's comprehensive energy hub**
  - Supply hydrogen to the area (domestically produced hydrogen + imported hydrogen)
  - Supply clean energy to the area
  - Promote CCUS

Global perspective：
Build a supply chain for imports from hydrogen/ammonia-producing countries

(Note)Prepared by the DBJ Group, based on maps from the Geospatial Information Authority of Japan and information available from relevant companies

Tomakomai-Muroran｜Recommendations for a Region of the Hub Function for Areas with Distributed Consumption Type

Effectiveness of a joint (procurement/infrastructure) scheme by energy consumers to strengthen industrial competitiveness

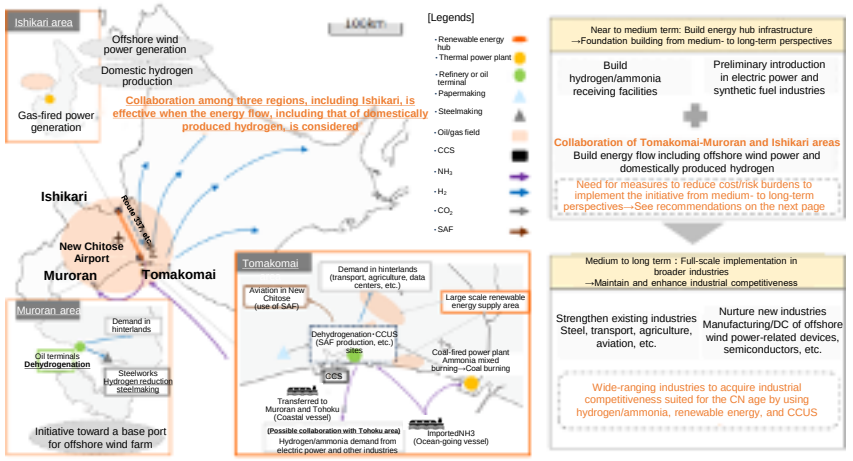
- Recommendation to enhance collaboration among local energy consumers to allow the region to serve as an energy receiving/production hub on which to build local industrial competitiveness over the medium to long term

Regional issues｜Energy transition in an area with distributed demand

- Smaller scale of clustering than the metropolises and distributed demand in the hinterlands hinder energy transition.

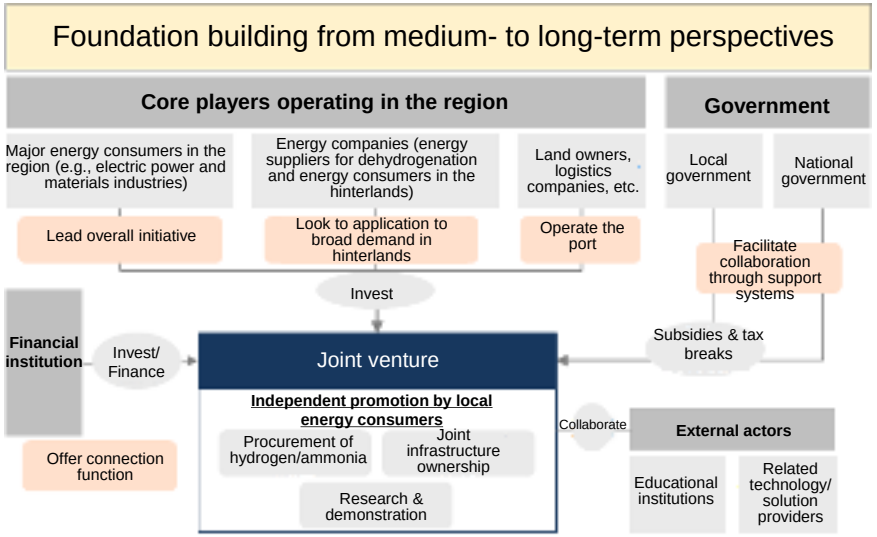
Vision of regional functions｜Collaboration to enhance industrial competitiveness

- Function as a receiving/production hub for hydrogen/ammonia and other energy sources and serve as the foundation on which to enhance the industrial competitiveness of Hokkaido, including its neighboring regions, over the medium to long term (fuel transition in existing industries, development of new industries related to offshore wind power and semiconductors)



Recommendations for the envisioned future｜Shared procurement/infrastructure

- Core players operating in the region (e.g., major energy consumers and energy companies in the region) should build a joint venture aimed at building and maintaining shared infrastructure and jointly procuring fuels. They should lay the groundwork for enhancing local industrial competitiveness over the medium to long term by sharing financial burdens and risks through the use of support from financial institutions and national/local governments.

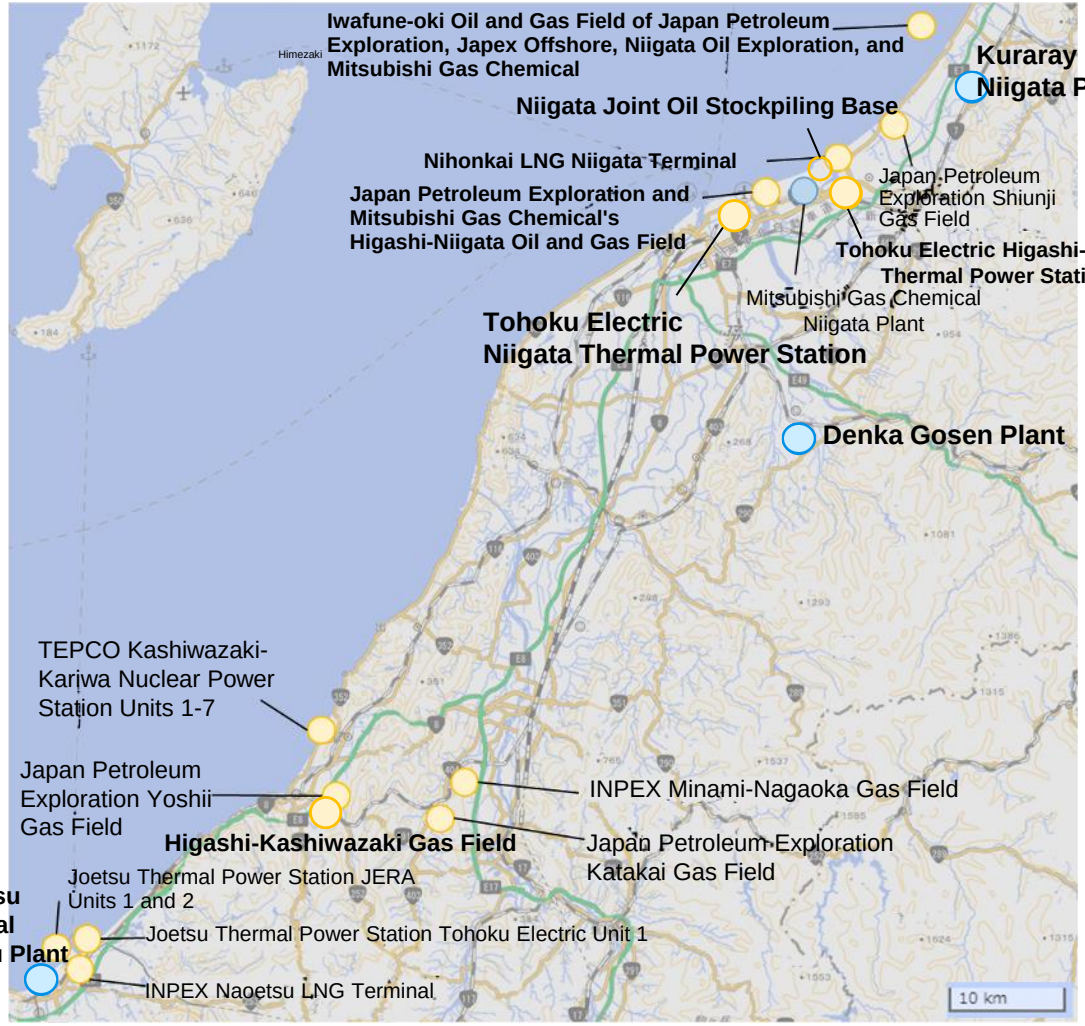


(Note) Prepared by the DBJ Group

Niigata｜Current Situation～Infrastructure Map

Cluster of Energy-related Facilities and Chemical Plants; High Potential as a Carbon Neutral Hub

Infrastructure Map



Characteristics

Niigata

- Has power plants (LNG thermal, wind), chemical plants, oil terminals, an oil stockpiling base, and Japan's leading gas fields
- Underwent CO_2 storage potential surveys
- Has chemical plants mainly producing high value-added specialty resins and pharmaceuticals. Also conducted demonstration experiments on methanol production from CO_2

Joetsu

- Has power plants (LNG thermal, nuclear) and cement and other industries. Also functions as an energy storage hub
- Possesses high pressure gas pipeline connecting Joetsu to Kanto. Has multiple gas fields. Conducted CCS feasibility evaluation/verification through injection of CO_2 into gas fields

Issue

➢ Establish CCS technology, reduce associated costs, and build a CCS business model

Envisioned future (hypothetical scenario by DBJ)

- Build an integrated supply chain for CN industry, using existing infrastructure, industries, and technologies
  - Develop offshore wind power, and receive/produce/utilize hydrogen
  - Potential for CCUS, using emission sources and gas fields

Global perspective：Globally extend technologies and business models

(Note)Prepared based on maps from the Geospatial Information Authority of Japan and information available from relevant companies

Niigata｜Recommendations for a Region of CCUS Potential Type

Need to hone CCS capabilities in view of overseas business opportunities

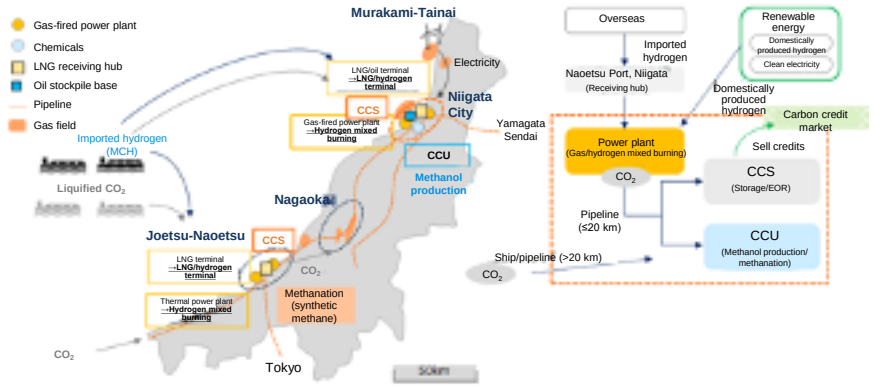
- Form a hub for honing CCS-related technologies, human resources, and business models ahead of other regions of Japan to become the leader in future development in Japan and abroad

Issues｜Establish technology, reduce associated costs, and build business models

- Need to establish CCS technologies, reduce associated costs, while building future business models

Vision of regional functions｜Formation of pioneering CCS hubs

- Play a unique role in helping Japan establish CCS technologies, human resources, and business models (i.e., hone CCS capabilities) by making utmost use of the regional potential and characteristics
- Established technologies, human resources, and business models to be expected to serve as the foundation for acquisition, development, and operation of CCS rights outside Japan



Recommendations for the envisioned future｜Honing CCS capabilities

Hone CCS capabilities

Build model scenarios for future acquisition and development of CCS interests outside Japan, as one of a few regions in Japan that have CCUS potential and suitable characteristics

Regional strengths

- Presence of some of the few sites in Japan that are suitable for storage (oil/gas fields)
- Clustering of large CO_2 emitter industries (e.g., energy, materials)

⇒ Geographical proximity of suitable sites to emission/capture sites

- Clustering of technologies and human resources related to energy development in oil/gas fields

Government support

- **Support by government funds**

➢ Support including OPEX needed for a CCS business to become viable

Use of credits

➢ In the future, include CCS in the scope of carbon credits and contribute to wide-area CN. Build a framework for CCS business continuation in Japan over the long term

(Note)Prepared by the DBJ Group

Terms Used in This Report (1/2)

Term	Explanation
GX	A government policy that is aimed at transforming the entire social system by shifting the fossil fuel-centered economy and industrial structure to clean energy-centered ones. Japan is said to need 150 trillion yen of GX investment across the public and private sectors. To partially contribute to it and attract investments, the government will issue 20 trillion yen of GX Economy Transition Bonds.
Transition	Refers to the phased transition toward carbon neutrality. It particularly refers to an initiative aimed at reducing carbon emissions in stages through such means as energy conservation and the use of low-carbon fuels, and at achieving decarbonization in line with a long-term strategy, especially in steel, chemicals, thermal power generation and other sectors with high greenhouse gas emissions that are difficult to decarbonize in the near future.
Just transition	The idea of working toward a transformation as part of efforts to combat global warming and promote decarbonization in such a way that no one is left behind, managing the situation to prevent the resulting burden from falling on the most vulnerable. For example, it refers to the idea of aiming for a transition that takes into account changes in the local economy and employment arising from the transformation of the industrial structure.
Nature positive	Being nature positive refers to stopping biodiversity loss and putting biodiversity on the path to recovery. To achieve this goal, the Kunming-Montreal Global Biodiversity Framework (2022) confirms that urgent action should be taken by 2030, and states that implementing efforts toward carbon neutrality will help restrict damage to and loss of nature and ecosystems associated with climate change.
Natural capital	The idea behind the term is that things such as forests, plants, animals, air, water, and soil are considered as a kind of stock with economic value that has been formed by nature. This perspective is attracting attention in relation to climate change adaptation and mitigation and has led to specific activities such as prevention of deforestation and transition to sustainable agriculture.
Methanation	A technology to produce methane (synthetic methane) from hydrogen and CO2. Its advantage is the ability to use existing infrastructure for gas supply on an as-is basis.
Floating offshore wind power	A type of wind power generation system that uses offshore wind power facilities floating on the sea. In Japan, shallow waters (suitable for offshore wind power installations mounted on the sea bottom) are limited, and floating offshore wind power is, for it applicability to offshore deep waters, a technology that makes installation possible in wider sea areas. The technology is also gaining the spotlight because Japan's superior shipbuilding technology can be applied to the manufacturing of the foundation structure.
Company diagnosis report	A report that summarizes a company's expertise, production track record, and desired field of order taking to make such information available to wind turbine manufacturers and power generation operators. The aim is to promote local companies' entry into offshore wind power-related industries. An example is a brochure compiled by Nagasaki Prefecture to introduce local companies related to ocean energy.

Terms Used in This Report(2/2)

Term	Explanation
CNP	Carbon neutral port (CNP) refers to a port with zero CO2 emissions. In addition to decarbonizing its own port facilities (cranes, etc.), a CNP can also contribute to the decarbonization of nearby power plants and industrial complexes by serving as a receiving hub for hydrogen, fuel ammonia, etc.
Carbon recycling complex	An industrial complex equipped with technologies and facilities for carbon recycling. The concept is based on the idea of recognizing CO2 emissions from factories and power plants as a resource and collecting them for reuse as a raw material to produce chemicals and fuels.
SAF	Acronym for Sustainable Aviation Fuel, which is a type of biofuel. It is mainly produced from waste cooking oil and plants.
CC(U)S	Acronym for Carbon dioxide Capture, (Utilization,) and Storage. It refers to the capture, (utilization,) and storage of CO2. In North America and some other places, CC(U)S usually involves injecting CO2 into an existing oil/gas field.
EOR	A method used for CCS. Acronym for Enhanced Oil Recovery and refers to a method in which CO2 is injected into an oil field to extract crude oil.
Credits (carbon credits)	These refer to reductions in greenhouse gas emissions converted into a form tradable with other companies. Reductions are usually achieved through projects focused on issues such as forest preservation, energy conservation technology, or introduction of renewable energy. These credits allow buyers to increase their emissions reductions and to announce that their emissions are offset by the reductions.
CAPEX	Acronym for Capital Expenditure. It refers to expenditures (capital investments) made by a company to expand the value or economic life of its property, and recorded as assets (equipment, real estate, etc.).
OPEX	Acronym for Operating Expenditure/Expense. It includes labor costs and maintenance/repair costs related to equipment operation.

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