Tohoku Port Vision

- Creating a New Era of Environment and Energy,

Tohoku Port Determination –

March, 2021

New Tohoku Port Vision Exploratory Committee

Tohoku Port Vision
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Introduction

The year 2020 was expected to be a good opportunity for Japan to show its charms to the world. Facing the 10th anniversary of the Great East Japan Earthquake, which caused unprecedented disasters, intense efforts have been underway to promote the restoration and reconstruction of the devastated areas along the Tohoku region's Pacific coast. Although decommissioning of the reactors at the nuclear power station in Fukushima Prefecture is still only half way through, the tsunami-hit areas have displayed robust recovery with stronger defenses against disaster in the wake of the devastation that made headlines throughout the world at that time. Also, the Japanese economy, which has finally shrugged off long-term deflation and recession partly owing to the growing number of inbound tourists (exceeding 30 million a year), was poised to take a further leap forward by showing the picking up economy out of the long-last recession to people from home and abroad taking advantage of the 2020 Tokyo Olympic and Paralympic Games scheduled for that summer.

However, the worldwide COVID-19 pandemic stopped the flow of people and goods from country to country, including Japan, and consequently inflicted grave damage to world economy. As is the case with other countries, Japan needs to overcome this severe economic situation by protecting domestic employment and supporting industry while preventing COVID-19 infections from spreading further.

In contrast, the world industrial structure has shifted rapidly toward the realization of a green society through the virtuous cycle of economy and environment, with promotion of collaborative efforts among industry, academia, and government toward carbon neutrality. The Paris Agreement adopted in 2015 requires all countries to push efforts to reduce greenhouse gas emissions and has accelerated global movement toward realizing a decarbonized society. In Japan, the concept that fighting global warming is not a drag on economic growth but a springboard enabling proactive anti-warming measures to be initiatives for changes in industrial and socioeconomic structures and thereby driving significant growth, has already prevailed and stimulated the rapid conversion of fuels and introduction of renewable energy. Although Japan has lagged behind Europe and the United States in the field of offshore wind-power generation, recognizing the overriding potential of offshore wind-power generation to enable renewable energy to be the primary power source, private investments in offshore wind-power generation business have risen, particularly on the coasts along the Sea of Japan in the Tohoku region owing to favorable wind conditions.

Looking at the world economy before COVID-19 arrived, Japan's socioeconomic situation was in a state of major flux. In the field of international maritime transport, there had been rapid consolidation of ports of call due to increases in the size of container ships and the reorganization of shipping alliances in addition to growth in sea cargo. As a result, competition among ports in East

Asia to maintain the patronage of cargo owners and shipping lines intensified. Furthermore, the Japanese tourism industry had experienced a fourfold increase in the number of inbound tourists, from 8.61 million in 2010 to the record high of 31.88 million in 2019.

The Ports and Harbours Bureau of the Ministry of Land, Infrastructure, Transport and Tourism summarized the discussions in the Ports Subcommittee under the Council of Transport Policy on the roles of Japanese ports from a broad perspective beyond conventional policy framework, and published its medium- and long-term port development policies, PORT 2030, in July 2018.

Regarding the ports in the Tohoku region, the Tohoku Port Vision Exploratory Committee summarized the new "Tohoku Port Vision" in March 2015. The Tohoku Port Vision showed the goals to be achieved by the ports in Tohoku region in 10 to 15 years to promote reconstruction after the earthquake disaster, improvement of region's attractiveness, and contribution to regional development.

The situations surrounding distribution and industry in Tohoku region have changed in the 5 years since the Tohoku Port Vision was formulated. In the First Reconstruction and Revitalization Period ending March 2021, the distribution network has been developed through reconstruction projects comprising the improvement of ports and development of reconstruction roads mainly in the areas along Tohoku's Pacific coast, which has accelerated new private investment, job creation, and expansion of corporate activities. Under these circumstances, the cargo-handling volumes at the Tohoku region's ports have remained at a higher level than the period before the Great East Japan Earthquake. Furthermore, local industry has shown a significant upward trend due to the establishment of private companies engaging in offshore wind-power generation and an increase in the demand for cruising.

In light of the changes in the situations surrounding the Tohoku region's ports, in this report the New Tohoku Port Vision Exploratory Committee clarifies the challenges to be addressed by the ports in Tohoku region with reference to the effects of improvements in social capital made during the First Reconstruction and Revitalization Period and the basic principles shown in the medium- and long-term port development policies, PORT 2030; and conducts a follow-up study on the implementation of the Tohoku Port Vision. In addition, from the viewpoint of preventing further spread of COVID-19 infections, the Committee summarizes the strategies to take maximum advantage of the ports in the Tohoku region in order to climb out of the harsh situation that has forced socioeconomic activities to stop and to stimulate future economic growth in the country.

[Outline of the medium- to long-term port development policies, PORT 2030]

The Outlook on Socioeconomic Conditions at Home and Abroad

- ✓ Expansion of emerging markets and southward shift of production bases, increase in inbound tourists
- ✓ Population decline, arrival of super-mature society, labor-force shortage
- ✓ Development of the 4th industrial revolution
- ✓ Aggravation of competition for access to resources and shift toward a low-carbon society
- ✓ Imminency of mega-disasters and aging deterioration of infrastructure

Basic Principles of Port Policy

- ☆ Focused attention on geopolitical changes and global trends
- ☆ Policy-making together with local people
- ☆ Transition from "policies to provide facilities" to "policies to provide solutions"
- ☆ "Smart" use of infrastructure
- ☆ Policy for further "evolution" of ports

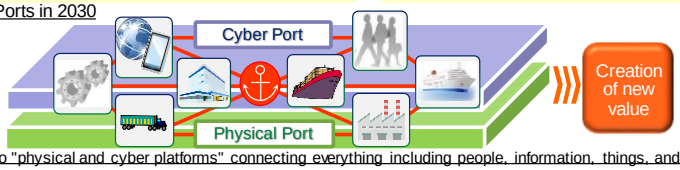
I. Ports Connecting and Opening the Japanese Archipelago to the World [Connected Ports]

- Global earning through global SCM, export of agricultural, forestry, and fishery products, cross-border EC, etc.
- Support for domestic transportation to cope with labor-force shortages
- Incorporation of circular economies such as export of recycled parts, cross-border repair services, etc.
- Further capture of Asian cruise demand, nationwide increase in cruise ships calling at Japanese ports, cultivation of domestic cruise market

II. Spaces for Creating New Value [Premium Ports]

- Development of spaces for aesthetic "event creation" that helps to boost local value and attract visitors and local people
- Development of new industries generating new added value, with logistics as the core
- Visionary energy creation ahead of global changes in resource and energy chains and revitalization of industrial complexes
- Preservation of the global environment and maritime interests

○ Ports in 2030



Evolution to "physical and cyber platforms" connecting everything including people, information, things, and spaces

III. Platforms Leading the 4th Industrial Revolution [Smart Ports]

- Enhancement of the intelligence and resilience of ports through introducing AI and IoT to the entire cycle of port administration including construction, maintenance, and operation
- Evolution of ports into platforms supporting "Connected Industries," aiming to create new added value through various connections, and promotion of overseas expansion of the platforms and introduce smart technologies into the platforms

Directions of Medium- to Long-Term Policies (8 Pillars)

1. Establishment of marine transportation networks supporting global value chains
2. Establishment of domestic distribution system creating new sustainable value
3. Connection of the Japanese archipelago through cruise networks
4. Formulation of spaces for creating brand value
5. Establishment of bases to receive and supply new resources and energy
6. Introduction of green technologies into port and distribution activities
7. Enhancement of port intelligence and resilience through using information communication technologies
8. Innovative changes in port construction and management technologies and their overseas development

I. Situation Changes since the Previous Vision and the Perspectives of the New Vision

1. Progress of Restoration and Reconstruction of Ports in Tohoku

The restoration projects for ports in the Tohoku region that were severely damaged by the Great East Japan Earthquake began with the elimination of channel obstacles in order to ensure safe ship navigation immediately after the earthquake. This was followed by urgent restoration works to ensure distribution functions and then full-scale restoration works in series. It took almost 7 years until the damaged front-line breakwaters at Kamaishi, Ofunato, and Soma Ports were completely restored. While supporting recovery and development of the severely damaged regional economy, the reconstruction projects to further reinforce port functions were implemented concurrently with the restoration projects, and quaywalls have been developed to cater to the growing cargo demand at Sendaishiogama and Onahama Ports.

In Fukushima Prefecture, the designation of Onahama Port as the international bulk strategic port in May 2011 led to development of one of Japan's deepest quays. This was followed by several efforts to reinforce the functions of Onahama Port as the distribution base for imported coal in eastern Japan to ensure a stable and inexpensive fuel supply. Conventionally, large-scale coal carriers had to reduce their load when calling at Onahama Port, or medium-scale coal carriers had been used instead. However, the completed deep-water quaywall equipped with large-scale cargo-handling machines made it possible for a fully-loaded large-scale coal carrier with capacity of 120,000 DWT to call at Onahama Port for the first time in October 2020.

In Miyagi Prefecture, the earthquake had caused Sendaishiogama Port to undergo large reduction in cargo-handling capacity to a level of about 100,000 TEU, less than 50% of pre-earthquake times. Owing to the rapid recovery in exports of automobile parts and paper products to North America, the cargo-handling volume at the port hit a record high of about 290,000 TEU in 2019, which was the 11th highest container-handling volume among all Japanese ports. Based on these situations, a wharf reconstruction project comprising the extension of a quaywall, expansion of a terminal, and revision of the facility layout has been in progress to address the increasing number of ship calls arising from the increase in cargo-handling volume.

In Iwate Prefecture, the prefecture's first gantry crane entered service in 2017 at Kamaishi Port. Together with a functional reinforcement that included increasing the number of reefer outlets to cater to the growing demand for the export of agricultural, forestry, and fishery products, Kamaishi Port hit its record-high containerized cargo-handling volume of about 9,000 TEU in 2019. Also, owing to progress in the development of the road network linking reconstruction roads and reconstruction assistance roads, companies located at inland industrial parks in Kitakami City, Kanegasaki Town, and Tono City have started using Kamaishi Port, and the number of companies doing so has been increased from only three in 2010 to 113 in 2020.

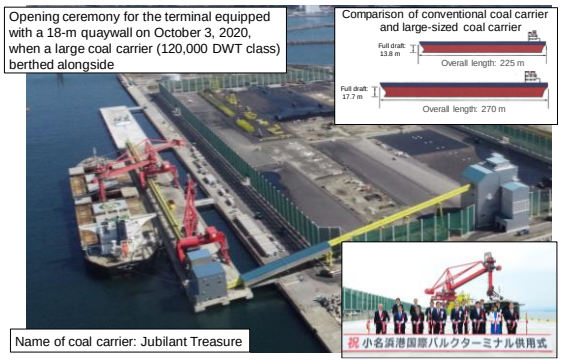
In Aomori Prefecture, Hachinohe Port has achieved efficient distribution and stable cargo handling at quaywalls as well as better harbor calmness and sufficient depth for navigation by large-scale ships through the expansion of a container yard and development of port infrastructure including breakwaters, channels, and basins. These upgrades have triggered massive private investment and expanded employment opportunities in coastal areas. Also, the establishment of an LNG base has contributed to a stable fuel supply and reduction of environmental loads through fuel conversion at thermal power generation plants. In Hachinohe City, many manufacturers have established their production bases in the port district of Hachinohe Port. Therefore, the development of port infrastructure has directly contributed to nurturing local industry and economy.

Along with progress in social capital development through restoration and reconstruction projects, the zones around these ports and areas with improved convenience have attracted new businesses and prompted existing ones to expand their factories. The additional private investment throughout the entire Tohoku region during reconstruction following the earthquake amounted to about 800 billion yen and contributed to the increase of revenue from real-estate, corporate income, and other taxes by more than 6 billion yen per year, plus the creation of about 7,500 jobs.

[Kamaishi Port, breakwater at the port entrance (after completion of restoration works)]

[Soma Port, offshore breakwater (after completion of restoration works)]

[Onahama Port, port of call for a large-scale coal carrier (120,000 DTW class)]



[Sendaishiogama Port, Takasago Container Terminal]

[Kamaishi Port,
Iwate Prefecture's first gantry crane]

[Hachinohe Port, port development and
major private investments]

2. Changes in the Situations and Issues Surrounding Ports in Tohoku

(1) Further upgrading of distribution functions at ports to support the Tohoku regional economy

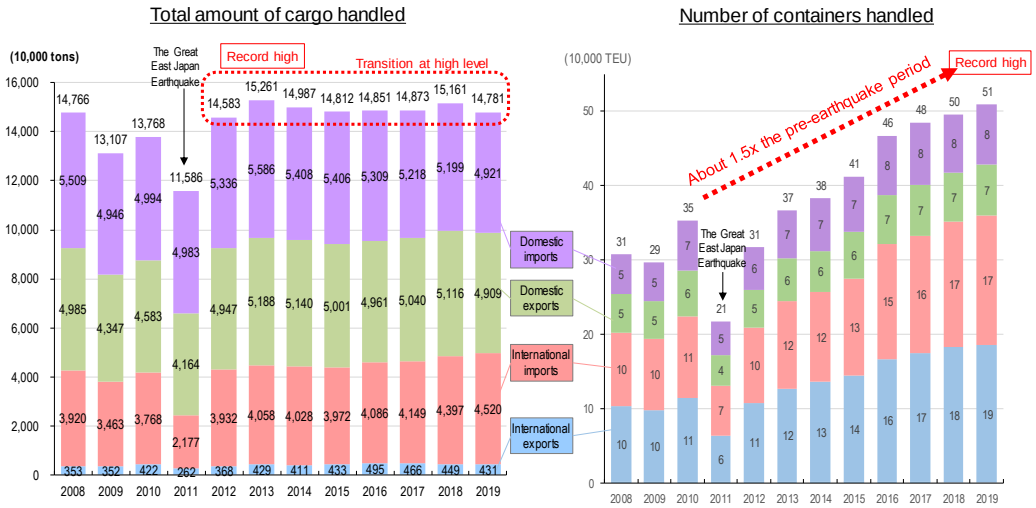
Recently, the cargo transportation volume in the Tohoku region has recovered to a level close to what it was before the earthquake. In particular, the containerized cargo-handling volume hit a record high in 2019. Under these circumstances, the improved road networks in the hinterland of Tohoku's ports have attracted new industries to the area. Considering that the COVID-19 pandemic will motivate many companies to restructure their supply chains to prioritize domestic suppliers, it is necessary to promote the development of ports to act as distribution bases for these businesses.

Regarding container distribution, it is necessary to attract the demand for container distribution from new manufacturing and distribution bases that have been under development in Iwate Prefecture, etc. Because Tohoku has a large share of Japan's agricultural, forestry, and fishery industries, the number of food manufacturers in the region is growing. In addition, manufacturing industries targeting markets in the countries across the Sea of Japan have expanded their operations in areas along Tohoku's Sea of Japan coast. In terms of bulk cargoes, it is necessary to address the new demand for importing fuels for biomass power generation in addition to coal and metallic ores that the region's ports traditionally handled. There is also a need to improve the convenience of the ports to promote stable operation and increased use of ferry and RO-RO services.

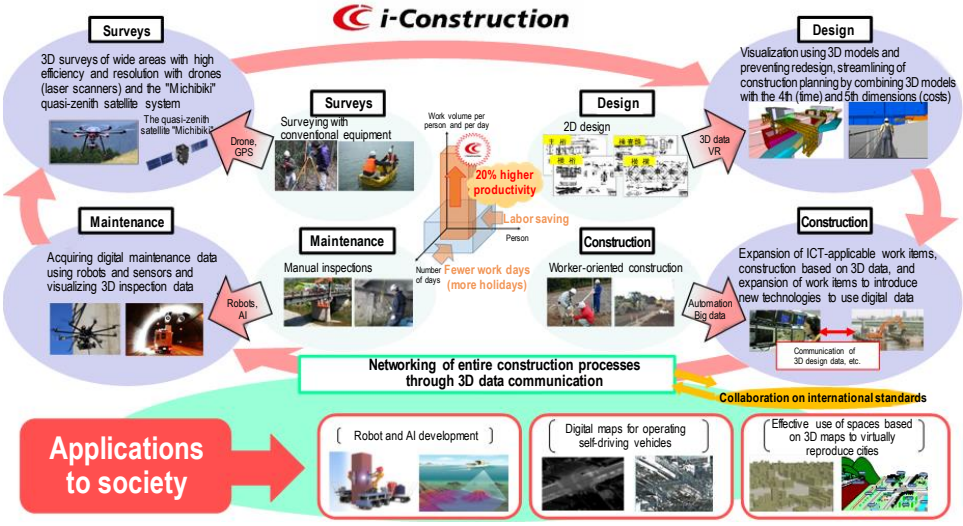
In contrast, according to the current decline of Japan's population coupled with the high aging rate, it is estimated that Japan will have a super-aging society unprecedented elsewhere, with elderly people comprising almost 40% of the population by 2050. To achieve economic growth under these circumstances, the Ministry of Land, Infrastructure, Transport and Tourism has promoted "i-Construction" as a new approach to lift the productivity at construction sites to achieve productivity high enough to counter the falling production stemming from the shrinking workforce. In particular, i-Construction promotes ICT civil engineering, etc. as part of the "comprehensive utilization of ICT" so as to achieve thorough utilization of three-dimensional data and ICT construction machinery in all construction processes.

Also, to address another serious issue—the shortage of truck drivers who support distribution services—it is necessary to carry out a study on using IoT in port operations to make the most of existing port facilities and cultivate new demand for marine transportation. Specifically, there is a need to examine efficient use of the congested container terminal at Sendaishiogama Port and efficient distribution systems to assist regional ports vulnerable to the workforce shortage.

[Trends in overall cargo handling and containerized cargo handling volume at ports in the Tohoku region]



[Outline of i-Construction]



(2) Changes in energy policy and efforts toward the SDGs

At the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21) held in 2015, the Paris Agreement was adopted as the new framework under which all countries are requested to participate in reducing the emissions of greenhouse gases from 2020 onward. Also, at the United Nations Sustainable Development Summit held in the same year, all of more than 150 affiliated countries agreed on the 2030 Agenda for Sustainable Development, which set the Sustainable Development Goals (SDGs) as the universal goals for realizing a sustainable society with “no-one left behind.” In December 2016, the Japanese government established the SDGs Promotion Headquarters chaired by the prime minister, and the headquarters published the “SDGs Action Plan” in December 2018 for the implementation of SDGs in Japan.

The SDGs comprise 17 goals to be achieved for realizing sustainability in three main aspects, namely social, economic, and environmental sustainability by 2030. For environmental sustainability, there are goals not only for climate change but also for energy and marine resources. To realize sustainable development inside and outside the country, Japan also needs to promote decarbonization. In the general policy speech at the opening of the 203rd session of the Diet in October 2020, Prime Minister Suga declared that Japan would achieve carbon neutrality and a decarbonized society by 2050. Following the declaration, in December 2020, the Ports and Harbours Bureau of the Ministry of Land, Infrastructure, Transport and Tourism proclaimed its policy to make efforts to turn all the ports in Japan to "carbon-neutral ports" that neutralize greenhouse-gas emissions as a whole through upgrading port functions. This will involve considering decarbonization and promoting mass importation, storage, utilization, etc. of next-generation energy sources such as hydrogen and ammonia at the ports serving as nodes and industrial bases for international distribution.

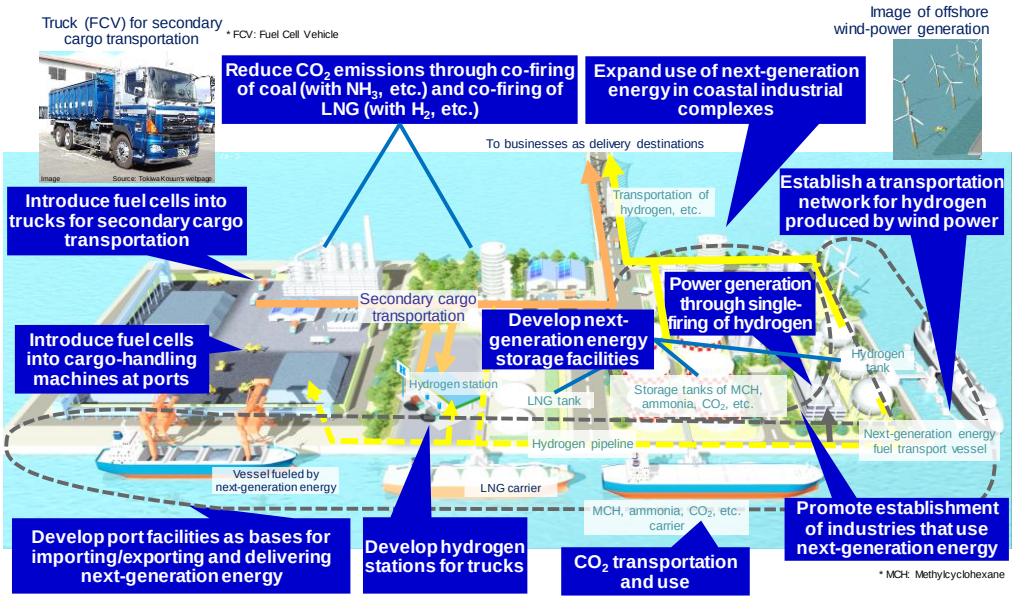
The utilization of renewable energy is also underway in Japan. In particular, offshore wind-power generation has garnered attention due to expanded use of it abroad, centering on Europe, and the potential to introduce it at large scale and reasonable cost as well as to strongly impact the overall economy. In November 2019, the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities (hereinafter referred to as "the Act on Marine Utilization for Renewable Energy") took effect. Then, based on deliberations in a government and private-sector joint conference established in July 2020 to strengthen industrial competitiveness in the field of offshore wind-power generation, Offshore Wind Industry Vision (Ver. 1) was published in December 2020. Taking advantage of the newly established occupancy system, respective regions with prospects for promoting offshore wind-power generation have started preparations for using marine areas for offshore wind-power generation.

Also, the Tohoku region has seen development of power stations using IGCC[1] technology to provide a stable power supply after the Great East Japan Earthquake. It is expected that IGCC technology, to be promoted as a next-generation clean-coal technology in Fukushima on the basis of the Guidelines for Accelerating the Reconstruction of Fukushima following the Nuclear Accident (revised), released by Cabinet in June 2015 for the restoration of Fukushima Prefecture, will lead the world in the field of IGCC. Nakoso IGCC plant and Hirono IGCC plant, each with a capacity of about 540,000 kW, are scheduled to enter service in 2020 and 2021, respectively, as a head start. Because of its capability to fire coal with low ash melting points, which conventional coal-fired power generation plants have had difficulty in firing, IGCC can contribute to reducing the risks associated with energy importation by diversifying the types of coal available as fuels. Also, the revision of coal-

[1] Integrated Coal Gasification Combined Cycle is a technology for gasifying coal and generating power with it through a power generation plant combining a gas turbine and a steam turbine and thereby achieving higher power generation efficiency than conventional technologies by about 15% while reducing CO_2 emissions.

fired power generation has been in progress to realize a decarbonized society. Because coal has long been handled in many Tohoku ports, they need to take appropriate measures to join the trend toward a decarbonized society. Thus, the region's ports are expected to contribute to their local economies through providing a stable energy supply with diverse means of power generation.

[Image of a carbon-neutral port]



[Outline of Offshore Wind Industry Vision (Ver. 1) (December 2020)]

Outline of Offshore Wind Industry Vision (Ver. 1)

Significance and Issues of Offshore Wind-Power Generation

- Offshore wind-power generation is expected to be the primary power source for renewable energy because it can be developed at **(1) large scale, (2) low cost, and with (3) economic ripple effects.**
- **Expanded global introduction centering on Europe,** with expected **rapid growth in Asian markets** particularly in China, Taiwan, and Korea. (**Global** installed capacity should increase from **23 GW in 2018 to 562 GW in 2040 [24-fold increase]**)
- Currently, though **offshore wind-power industry has been established mainly abroad**, there are **prospective domestic suppliers in Japan**.

Basic Strategies to Boost Industrial Competitiveness of Offshore Wind-Power Generation

1. Create a favorable domestic market

Set targets for public and private sectors

(1) Clarify the government's targets
- Devise projects for 10 million kW by 2030 and 30 to 45 million kW by 2040

(2) Accelerate project formulation
- Government-led push to promote projects (Japanese original centralized method)

(3) Systematically develop infrastructure
- Realize the primary grid connection master plan
- Perform a detailed study on direct-current transmission
- Systematically develop port facilities

2. Promote investment and create supply chains

(1) Target-setting by industry
- Achieve a domestic procurement ratio of 60% by 2040
- Aim for power-generation cost by offshore windmills installed on seabed of 8 to 9 yen/kWh by 2030 to 2035

(2) Boost supplier competitiveness
- Evaluate ability to supply stable power through public tender
- Provide financial assistance for facility investment through grants and tax schemes (under preparation)
- Promote business collaboration among companies at home and abroad (by JETRO, etc.)

(3) Develop business environments (revise regulations and standards)

(4) Promote programs to nurture human resources for offshore wind-power generation

3. Develop next-generation technologies and international collaboration to reach Asian markets

(1) Develop next-generation technologies such as floating windmills
- Establish a "technical development roadmap"
- Fund financial assistance for technical development

(2) International standardization and intergovernmental dialogue
- International standardization
- Bilateral dialogue to cultivate future markets
- Provide public financial assistance

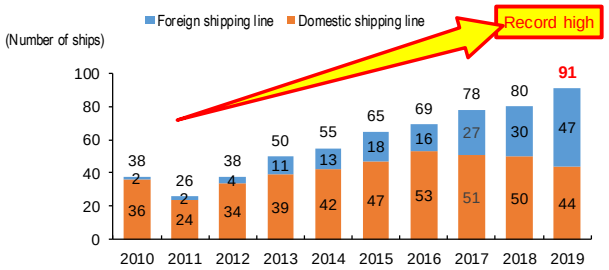
(3) Increase in inbound tourists and expansion of interpersonal exchange

There had been a rapid increase in the number of inbound tourists in recent years, and 2019 was the record year in terms of the highest number of inbound tourists. They numbered about 31.88 million and spent about 4,813.5 billion yen. Compared with the nation's largest export earners in 2019—about 12 trillion yen from automobiles followed by about 4 trillion yen from electronic components such as semiconductors—the total amount consumed by inbound tourists has already reached the level of economy comparable to a major domestic industry.

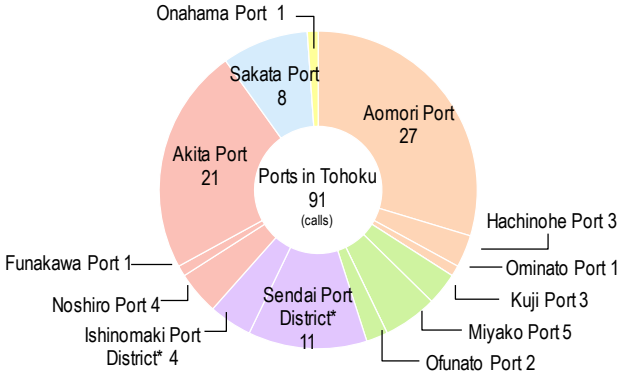
Inbound tourism is a very important industry for taking advantage of the rapidly growing Asian economy. Tohoku is an area endowed with rich nature, and inter-regional collaborative efforts to promote tourism have taken place based on recognizing that discovering attractive tourism resources and optimizing indigenous resources are beneficial for regional revitalization. Owing to these efforts, the number of cruise ships calling at ports in the Tohoku region reached a record high of 91 in 2019. Akita Port, for example, is promoting sightseeing around the port area by operating the "Akita Port cruise train" which uses the freight rail line between the port and Akita Station. Also, in the case of Aomori Port, part of the efforts to meet increasing demand for cruising have included a project in progress to develop a tidal flat in front of Aomori Station and expand the capacity of Shinchuo Wharf that would be able to accommodate large 130,000-ton cruise ships.

However, the COVID-19 pandemic has drastically changed the situation surrounding the cruising industry, and this business is expected to face tough times until demand recovers. Under these circumstances, the ports in the Tohoku region need to start promoting cruising by accepting the entry of domestic cruise ships upon implementing infection control measures while discovering extra attractions to motivate interpersonal exchange among not only foreign but also domestic tourists. In addition, there is a need to examine how to utilize the seaside area and enable tourists to experience the local atmosphere of port towns.

[Trend in the number of cruise ships calling at ports in Tohoku]



[Number of port calls by port (2019)]



* Port district in Sendaishiogama Port

(4) Aggravation of disaster intensity and aging of infrastructure

Natural disasters have increased in frequency and severity in various parts of the country, requiring higher levels of disaster preparedness. Taking the year of 2018 for example, torrential rain hit western Japan in July, and wide areas of the Chugoku and Shikoku regions suffered from record severe damage. In August, Typhoon No. 21 caused Kansai International Airport to stop functioning due to a storm surge in Osaka Bay. Then, in September, the Hokkaido Eastern Iburi Earthquake caused the widespread power outage, "blackout," all across Hokkaido due to the concurrent occurrence of the shutdowns of a thermal power generation plant and disruptions of power transmission lines leading to the shutdown of plural hydraulic power generation plants. As this example shows, there have been frequent large-scale disasters causing severe damage to important infrastructure indispensable to the lives and economic activities of the people to levels that require suspension of their functions. To cope with such intensifying natural disasters, a government-wide emergency inspection was conducted to check whether important infrastructure that ensures disaster preparedness and supports the nation's economy and lives would reliably function when a disaster strikes. Then, based on the inspection results, the Three-year Emergency Measures for Disaster Prevention/Mitigation and National Resilience was published in December 2018. As part of the three-year emergency measures, breakwaters have been constructed at Sakata and Akita Ports in Tohoku. In August 2020, the Council of Transport Policy submitted a report titled "Comprehensive Implementation of Soft and Hard Measures for Disaster Prevention and Mitigation at Ports" on the new disaster prevention and mitigation measures to be taken at ports to cope with increasing disaster risks.

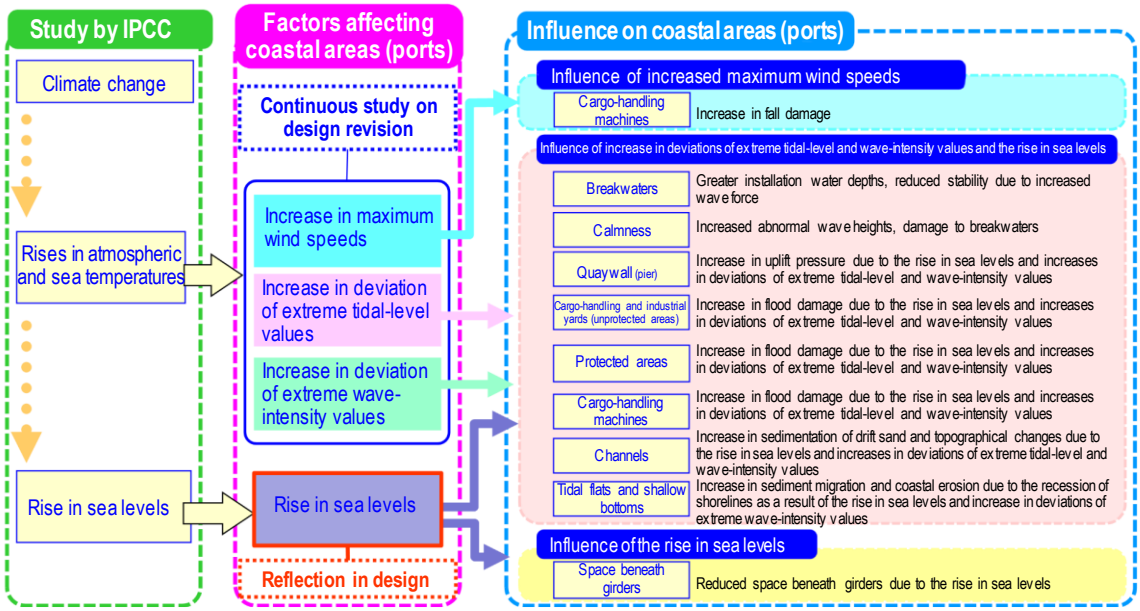
The blackout caused by the 2018 Hokkaido Eastern Iburi Earthquake disrupted distribution services inside Hokkaido with freight trains disabled. In response, ports in the Tohoku region with ferry connections, such as Sendaishiogama Port, fulfilled their disaster response function by acting as logistics bases for transporting rescue vehicles of the self-defense force and ambulances as well as disaster relief to the ports in Hokkaido and bringing evacuees stranded in Hokkaido back to the mainland. In turn, when Typhoon No. 19 directly hit Tohoku in October 2019 and caused severe damage at several locations, Hakodate Port in Hokkaido played the role of a disaster response logistics base by dispatching rescue vehicles to Aomori and Sendaishiogama Ports by ferry. Also, Onahama Port served as a distribution point for disaster relief, such as emergency water supplies, with the Maritime Self-Defense Force vessels berthed at the east port quay that had only just entered service. As described above, ports at respective areas have collaborated with each other in times of emergency and contributed to providing livelihood support to local people, as well as helping with the quick restoration and reconstruction of disaster-stricken areas.

In addition, when Typhoon Faxai hit the Boso Peninsula in Chiba Prefecture in 2019, high seas exceeding the design wave heights caused heavy damage to ports in Tokyo Bay. In its special report

published in September 2019, the IPCC[2] predicts that the worldwide mean sea level will rise by about 1.1 m by 2100. Thus, there will be increasing risks of damage due to storm surges and high waves in the future. Therefore, considering the increased frequency of devastating natural disasters, it is important to establish a wide-ranging collaborative marine transportation system centering on ports to swiftly respond to the need to transport and dispose of disaster waste and thereby contribute to the quick restoration and reconstruction of disaster-stricken areas.

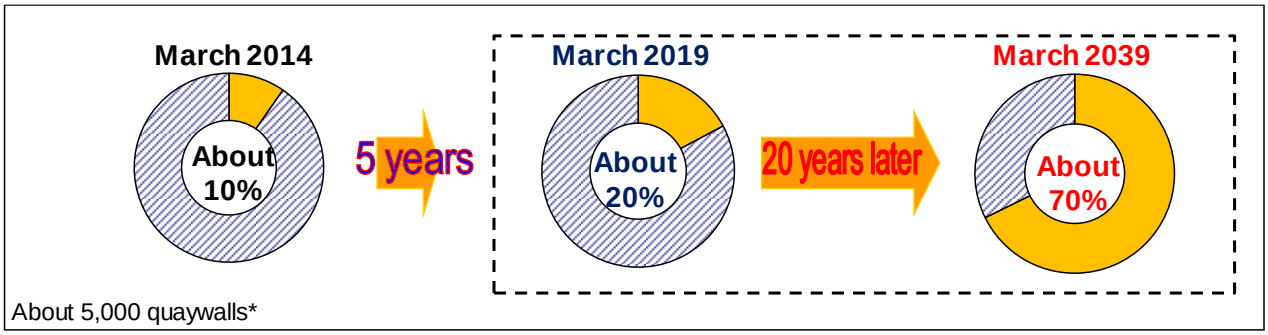
In Japan, the social infrastructure developed during the period of high economic growth is estimated to become functionally obsolete all together in the near future. There are about 5,000 public quaywalls with water depths of 4.5 m or deeper in ports across the country. Among them, those that will have been in service for more than 50 years will account for about 70% in 2039. Considering the fact that defects like caving-in of quaywall aprons and accidents thought to be caused by the aging deterioration of facilities are reported at ports across the country every year, there is a need to ensure the safety and security of the public and reduce the total cost by systematically maintaining and renewing aging infrastructure.

[Impacts of climate change on ports]



[2] Intergovernmental Panel on Climate Change.

[Trend in the composition ratio of public quaywalls in service for 50 years or longer]



* The number of public quaywalls at strategic international ports, central international ports, major ports, and regional ports (with water depths of 4.5 m or deeper)

II. Targets and Strategies of the New “Tohoku Port Vision”

The following three targets which show the future directions of port development in the Tohoku region have been set with a focus on their original role of leading the Tohoku economy as distribution and industrial bases against the backdrop of (a) the promotion of local industry in the Tohoku region after the First Reconstruction and Revitalization Period; and (b) the trend of reviewing supply chains and prioritizing domestic production due to the influence of the COVID-19 pandemic, as explained thus far.

○ Target 1: Formulation of Distribution and Industrial Bases to Drive the Economies of Tohoku

○ Target 2: Creation of Vibrant Communities and Formulation of Enriched Environments

○ Target 3: Creation of Safe and Secure Ports

What follows are the details of particularly important measures to take in the next 10 to 15 years as strategies to achieve respective targets at the ports in the Tohoku region.

Target 1: Formulation of Distribution and Industrial Bases to Drive the Economies of Tohoku

This target is to establish new supply chains capable of catering to diverse market needs for different types of marine transportation such as container, bulk, ferry, and RO-RO vessels through: reinforcing the marine transportation network by optimizing the geographical advantage of the Tohoku region, which is easily accessible to both the Pacific Ocean and the Sea of Japan; and improving port operation efficiency, such as cargo handling, by utilizing information technology.

Also, the target involves formulating major energy production bases of not only renewable energy but also hydrogen and other new types of energy through: facility development that contributes to the promotion of wind-power generation to take advantage of Tohoku's favorable wind conditions; and promotion to attract and establish energy-related industries.

[Strategy 1-1] Reinforcement of the Marine Transportation Network to Cater to Local Industry and Market Needs

<Current status and issues>

The influence of Asian countries, particularly China, on the world economy and distribution market has been growing in recent years. Also, the economically vital area is expected to expand from Southeast Asia to South and West Asia in the future. For Tohoku's industries to develop a competitive advantage over companies in those countries, it is necessary to improve the container transportation network in a way that extends it to the ports across the Sea of Japan and ports in Southeast Asia as well as Taiwan. In addition, because ports in the Tohoku region have been suffering from the suspension of the North American line since April 2019, they need to establish new sea route systems to ensure sufficient service that caters to the needs of cargo owners while strengthening the network with Keihin Port. Furthermore, the ports in Tohoku need to be provided with quaywalls with water depths that can handle the container ships and bulk carriers that have increased in size to cope with the growing need to reduce transportation costs through streamlining.

Being easily accessible to both the Pacific Ocean and the Sea of Japan, Tohoku's ports can assume an important role in connecting the extensive Tohoku region to other parts of the country and the world, and streamline marine transportation and reinforce collaborative networks with other ports by optimizing their individual strengths and advantages. As is the case with Hachinohe and Sendaishiogama Ports, which have collaborated to attract shipping lines by taking advantage of the geographical proximity between them, cooperative efforts like these, in addition to individual ones, are important when trying to attract new cargo owners and opening up new shipping routes. However, there has been an excess of import cargo volume over export cargo volume. Thus, it is also necessary to increase export cargo volume to rectify the trade imbalance.

Owing to vigorous foreign demand and growing interest in Japanese foods, the export value of Japanese agricultural, forestry, and fishery products has shown a steady increase and broken records year after year for 6 years in a row since 2013. The export value hit another record high of 912.1 billion yen in 2019, and is expected to keep growing. About 80% of the exported agricultural, forestry, and fishery products were transported by ships and mostly in marine containers. When exporting these products, special containers (reefer containers) capable of controlling the temperatures inside them are used to ensure quality during transportation. Thus, in their role as bases of marine transportation, ports need to be provided with facilities capable of supplying electric power to these containers. Also, because agricultural, forestry, and fishery products, processed foods, and Japanese liquor are exported in small lots unlike other export products, ports need to have warehouses and other facilities that enable these small-lot cargoes to be consolidated into full containers. In addition, because the export volume of agricultural, forestry, and fishery products is subject to seasonal changes, it is important that multiple ports, including those outside the Tohoku region, collaboratively collect these export products so as to secure export cargoes throughout a year.

Tohoku's ports also need to maximize the use of existing quaywalls for bulk cargo handling. For coal cargo, Onahama Port opened an international bulk terminal capable of accommodating 120,000 DWT-class coal carriers in October 2020. Conventionally, physical constraints on the port facilities caused inefficient coal transportation by restricting vessels to medium-sized carriers or large-sized carriers with their drafts adjusted by intentionally reducing the loads. The new international bulk terminal, however, enabled the mass transportation of coal to be delivered with large-scale coal carriers. In addition, considering that stock farming has been prospering in Tohoku and large volumes of cattle feed needs to be imported, the formulation of efficient and effective transportation network is crucial.

Furthermore, it is expected that the lead time and transportation costs of overall supply chains, including port operation, can be reduced through utilizing the port-related data interaction infrastructure, which is estimated to reduce the time required for port procedures per transaction by 38%, and other new technologies like IoT. In the Tohoku region, introduction of IoT suitable for container terminals at the respective ports has been studied through cooperation among industry, academia, and government. In terms of improving the productivity at construction sites, UMVs[3] and UAVs[4] have been used in channel and basin dredging at Hachinohe Port. These efforts are expected to contribute not only to improving the productivity and working environment of field work in the distribution and construction industries, but also to recruiting human resources. Thus, it is also important to seek opportunities to reduce costs through improving work environments.

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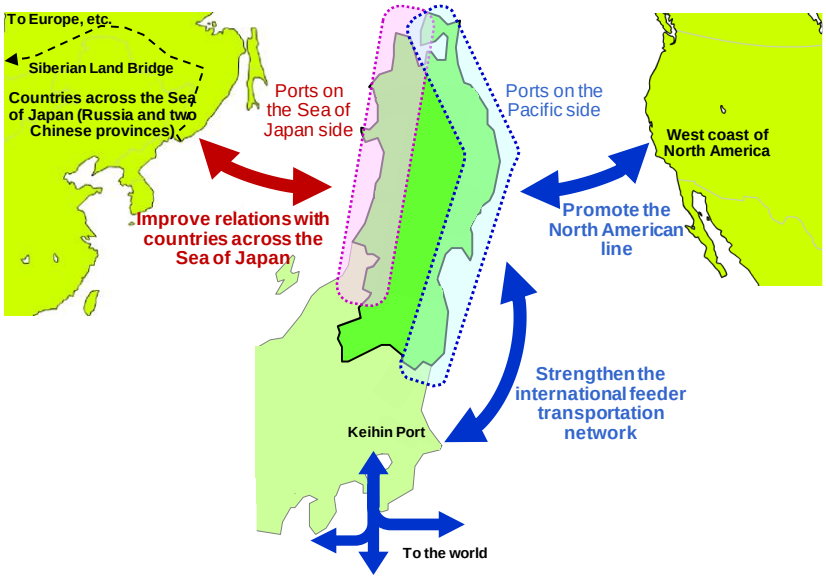
[3] Unmanned Marine Vehicle.

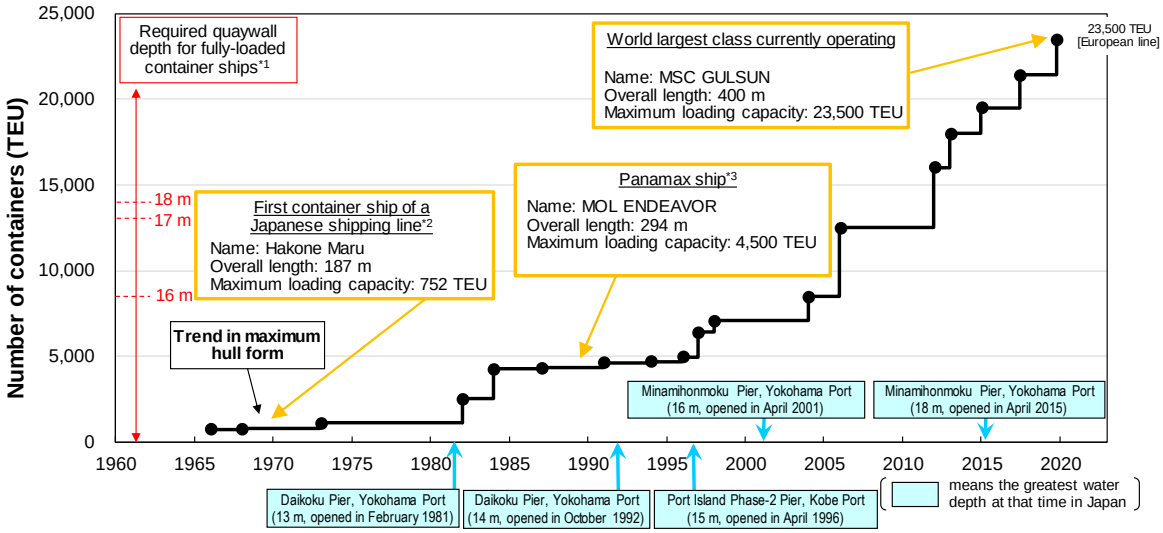
[4] Unmanned Aerial Vehicle, commonly called a drone.

In addition, ferry and RO-RO services can play the important role of transporting emergency relief goods, as was the case when the 2018 Hokkaido Eastern Iburi Earthquake struck, and they are less susceptible to damage caused by natural disasters like earthquakes. Thus, it is necessary to enhance these services and improve receiving systems so that new technologies like automatic ship handling, etc. can be introduced smoothly.

[Tohoku region's geographical advantage of being easily accessible to both the Pacific Ocean and the Sea of Japan]



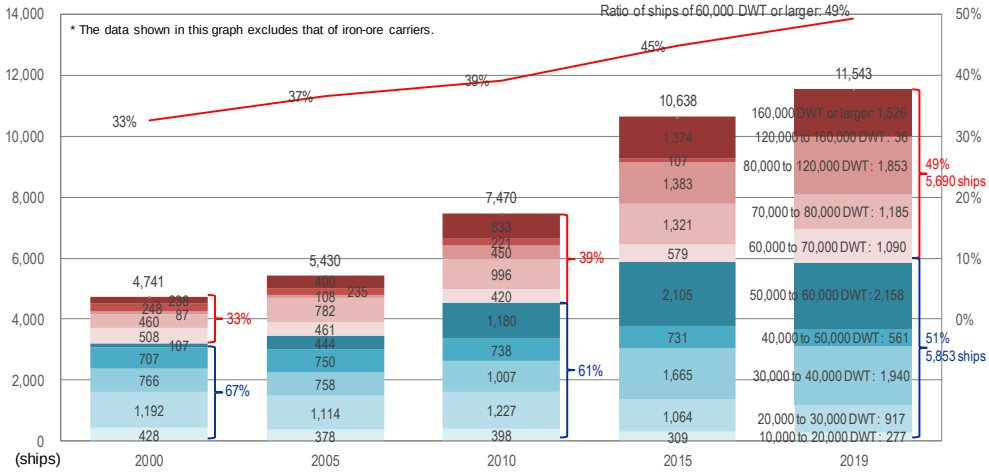
[Trend in the maximum hull forms of container ships]



*1: The required quaywall depth for fully-loaded container ships is based on the "number of containers that can be loaded" on container ships with general hull forms according to the "standard values of main dimensions of design object ships" in the "Technical Standards and Commentaries for Port and Harbour Facilities in Japan (May 2018)." Note that container ships having less loading capacity may require deeper quaywall depths than those shown above.
*2: The first container ship of a Japanese shipping line, owned and operated by NYK Line.
*3: The maximum hull size (overall length of 294 m or less and width of 32.3 m or less) that could pass through the Panama Canal before the new Panama Canal entered service (in June 2016).

Source: The Japan Maritime Research Institute, "Study on the Increase in the Size of Container Ships," etc. for the data before 2004. After 2004, it is based on the MLIT's Ports and Harbours Bureau from information published by Ocean Commerce and on the webpages of respective shipping lines.

[Trend in hull forms of bulk carriers]

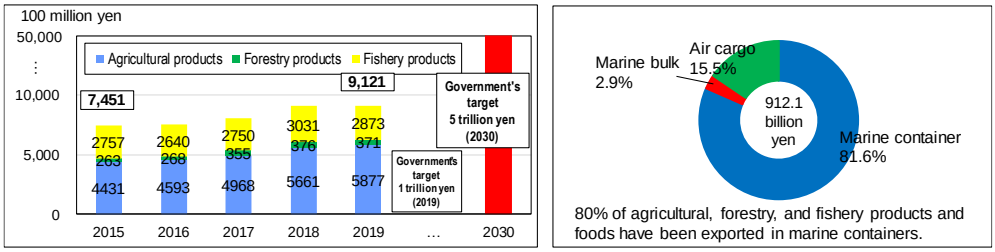


Classification of hull form (DWT)	10,000 to 20,000	20,000 to 30,000	30,000 to 40,000	40,000 to 50,000	50,000 to 60,000	60,000 to 70,000	70,000 to 80,000	80,000 to 120,000	120,000 to 160,000	160,000 or larger
Average draft in 2019 (m)	8.4	11.5	104	10.9	12.4	13.1	14.4	14.2	14.6	18.3

* DWT (Dead Weight Tonnage): The maximum weight of cargoes, expressed in tonnage, that can be loaded on ships, mainly cargo ships

Source: The MLIT's Ports and Harbours Bureau, based on the Lloyd's Register of Ships online.

[Trend in exported amounts of Japanese agricultural, forestry, and fishery products by means of transportation (2019)]



Source: The MLIT's Ports and Harbours Bureau, based on the materials of the Ministry of Agriculture, Forestry and Fisheries of Japan, the Trade Statistics of Japan, and 2018 Nationwide Survey on Containerized Freight Transportation.

<Specific measures>

○ Maintenance and expansion of shipping routes to ports across the Sea of Japan and ports in Southeast Asia and Taiwan based on the geographical advantage of Tohoku region being easily accessible to both the Pacific Ocean and the Sea of Japan as well as extensive road networks owing to reconstruction projects; development of facilities required to ensure safe navigation and cargo handling in order to cater to the needs of cargo owners through stable operation of transportation networks with North American markets, in collaboration with Keihin Port; and promotion of the Tohoku ports' competitive edges to reduce transportation lead time and total transportation costs.

○ Realization of collaborative transportation with ports in western Japan that have extensive shipping routes to Asian ports to promote the export of agricultural, forestry and fishery, products and foods from Tohoku; strengthening of marine transportation networks, including expansion of direct shipping routes to ports in Southeast Asia; and promotion of the development of facilities supporting distribution through cold chains such as reefer outlets, cargo transshipment facilities, HACCP[5]-compliant facilities, etc.

○ Promotion of the development of facilities required to achieve inexpensive and stable bulk cargo transportation, and the safe navigation and cargo handling of large-sized coal and LNG carriers.

○ Promotion of AI and IoT for gate and storage control as well as cargo-handling operation in order to improve productivity and efficiency in container terminal operations.

○ Promotion of i-Construction in the development and maintenance of port facilities to improve productivity and working environments.

○ Promotion of Tohoku ports' competitive edge as nodes with nationwide connections to local industry in Hokkaido, the Tokyo Metropolitan area, and western Japan in order to maintain and expand ferry and RO-RO shipping routes; development of facilities required for safe navigation and cargo handling of ferry and RO-RO ships; and the promotion of new technologies such as automatic mooring and ship handling.

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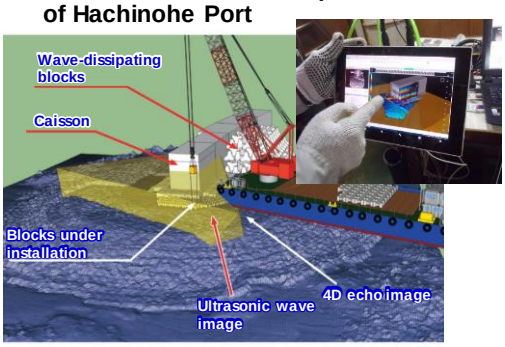
[5] Hazard Analysis and Critical Control Point. A sanitary control method implemented by food manufacturers to ensure the safety of their products in a manner that requires the manufacturers themselves to identify risk factors (hazards) such as contamination with bacteria that cause food poisoning and foreign matter inclusion, and selectively applies sanitary control measures to particularly crucial processes among the processes throughout, from the arrival of raw materials to the shipping of final products in order to eliminate or reduce risk factors.

[Examples of construction through ICT at Tohoku ports]

◆ **Construction work on (central) breakwater in the outer port district of Hachinohe Port**



Checking the installation status of armor blocks with a 4D echo image

◆ **Dredging work on channel and basin (-18 m) in the eastern port district of Onahama Port**

Checking the dredging status with GNSS and a tidal level observation system

[Strategy 1-2] Establishment of Supply Chains for More Efficient and Inexpensive Cargo Transportation

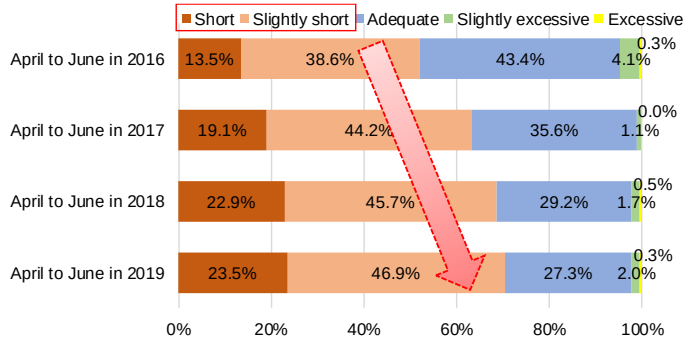
<Current status and issues>

To avert the negative impacts of prolonged deflation and appreciation of the yen as well as to seek cheap labor, Japanese manufacturers have moved to China and ASEAN countries. This has led to Japanese industry to further hollow out. On the other hand, the COVID-19 pandemic has: (a) prompted Japanese manufacturers to recognize their vulnerability in putting production bases abroad; and (b) motivated them to reinforce their supply chains in a way that brings functions requiring geographically concentrated operations for manufacturing final products, components, or intermediary materials back to Japan.

Tohoku has a faster population aging rate than other regions and decline in the productive population. Amid the escalating labor force shortage in many fields of industry, the port transport industry has been facing an acute shortage of truck drivers. The shortage of truck drivers is expected to worsen nationwide. As one countermeasure to cope with this shortage in truck drivers, the Tohoku International Distribution Strategy Planning Team—comprising the members from industry, academia, and government—has been conducting a study on container round use to streamline distribution.

Efficient utilization of ports also needs to be promoted in collaboration with freight forwarders and cargo owners to make the most of existing port facilities. To optimize the development effect of the Onahama International Bulk Terminal, which has Tohoku's deepest quaywall, efforts between the government and the private sector, and among the private sector, for example, are needed to coordinate transportation in a way that reduces raw-material procurement costs in the resource and energy industry in the hinterland of ports. It is also important to continuously strive to identify and solve issues faced by ports in the Tohoku region, including: analysis of data and statistical information on cargo distribution related to the unit loads of container, bulk, ferry, and RO-RO ships; studies on realizing transportation of 40-ft containers by JR Freight; collection of new data contributing to the expansion of port use in Tohoku; and studies on the regional revitalization through collaborative utilization of ports by the government and businesses.

[Changes in labor shortages in the trucking industry]



Source: The Japan Trucking Association; Business Confidence in the Trucking Industry (Preliminary Report)

[Prediction of demand for truck drivers]

	2017	2020	2025	2028
Demand	1,090,701	1,127,246	1,154,004	1,174,508
Supply	987,458	983,188	945,568	896,436
Shortage	-103,243	-144,058	-208,436	-278,072

Source: The Railway Freight Association; "2018 Board Committee Report" (May 2019)

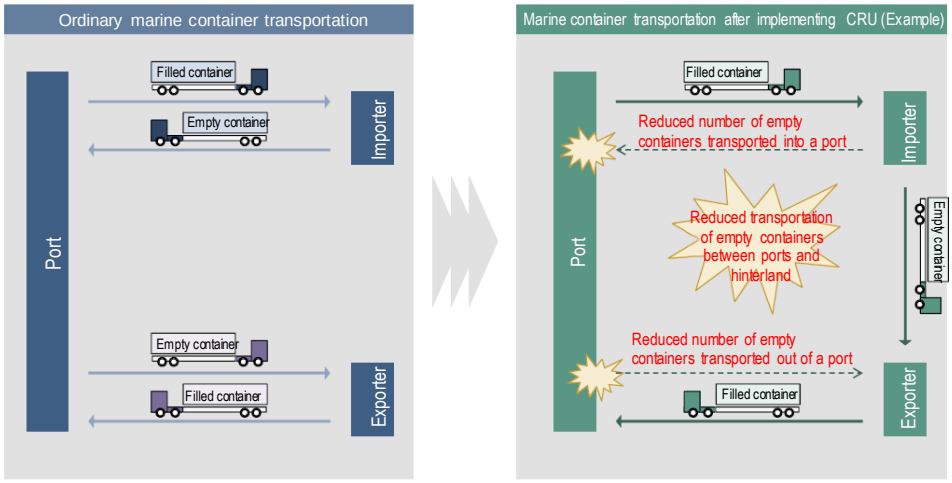
<Specific measures>

○ Establishment of efficient transportation systems to cope with the labor shortage in the port transport industry through introducing autonomous vehicle operation in the areas around ports, contributing to improvements in distribution productivity and streamlining the supply chains by the private sector.

○ Promotion of the reduction in overland transportation of empty containers through container round use (container matching) to streamline and revitalize distribution in the hinterland of ports.

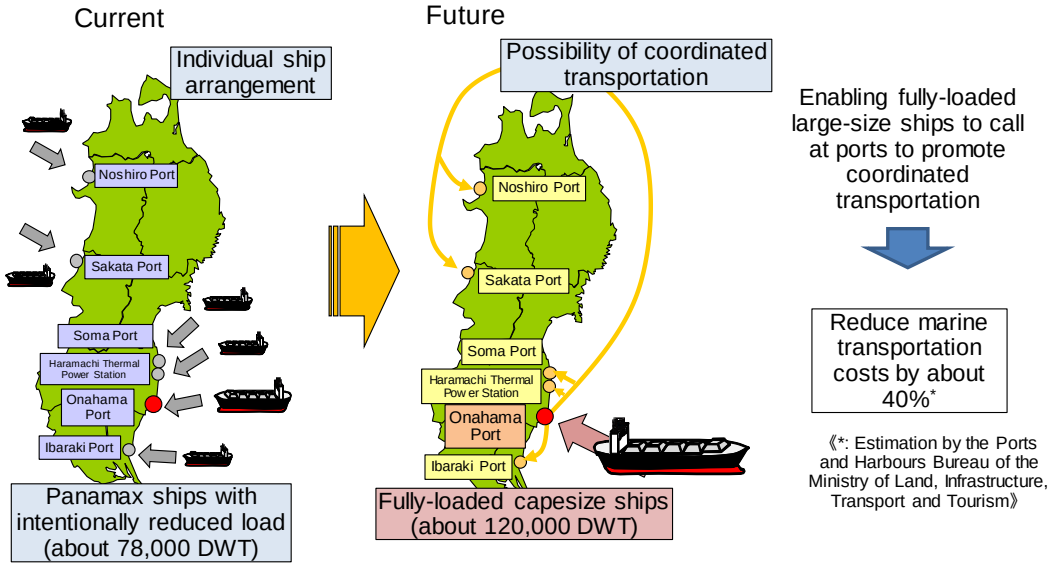
○ Promotion of collaborative coal transportation in eastern Japan through cooperation between the government and the private sector or among the private sector, utilizing the Onahama International Bulk Terminal to reduce fuel procurement and transportation costs associated with the resource and energy industry.

[Outline of container round use]



Source: The Japan Institute of Logistics Systems: “2015 Guidelines for the Promotion of Container Round Use”

[Outline of collaborative coal transportation through the development of Onahama International Bulk Terminal]



[Strategy 1-3] Formulation of New Resource and Energy Industrial Bases to Exert Regional Potential

<Current status and issues>

The Offshore Wind Industry Vision (Ver. 1) published in December 2020 clearly states the government's targets for formulating offshore wind-power generation projects, with a total capacity of 10 million kW by 2030 and 30 to 45 million kW by 2040. Offshore wind-power generation is expected to enable the country to fight against global warming, ensure a stable power supply, and contribute heavily to the development of local economies in the form of attracting related industries and creating new jobs.

Endowed with favorable wind conditions for wind-power generation, the Tohoku region is expected to generate large medium- to long-term demand for offshore wind-power generation in addition to the onshore wind-power generation already in operation at various locations and thereby producing large ripple effects on related industry. In particular, ports in Akita are expected to be used as the development and maintenance base for windmills, which would support the commercialization of ongoing projects by independent power producers in the coastal areas of the prefecture with great potential for offshore wind-power generation. In December 2019, a joint entity was established by a group led by a major trading company in Akita City to develop offshore power generation facilities in Akita Port and Noshiro Port. The entity is aiming for a total power output of about 140,000 kW at two locations, which corresponds to one thermal power station. In January 2020, another entity was established in Noshiro City to maintain offshore wind-power generation facilities. Currently, wind-power generation projects for a planned output capacity of 1.8 million kW in total have been in the pipeline along the coast of Akita Prefecture. The prefecture estimates that these projects will attract direct investment of about 270 billion yen. These offshore wind-power generation projects are expected to generate large ripple effects not only on business for the maintenance of wind-power generation facilities as mentioned above, but also on entire local industries such as manufacturing, construction, transportation, commerce including retail, and services including restaurants. Also, depending on the level of growth in corporate demand for wind power generation, there will be further expansion of economic ripple effects and job opportunities.

From the viewpoint of developing local supporting industries, the promotion of offshore wind-power generation in Tohoku will attract related industries to the region. If the local production of windmills for local use becomes possible, it will generate stable corporate investment and further expand investment opportunities. When not only the offshore power generation industry but also its supporting industries become entrenched in local communities, there will be innovative changes in the industrial structures of entire regions. Also, there has been an increase in the number of new onshore wind-power generation projects in the Tohoku region, including the Abukuma area in Fukushima Prefecture. These onshore facilities are expected to generate new demand for the renewal of some windmills that have already been operating for a few decades since their initial installation.

Transporting long and heavy windmill components will require loading and unloading operations at ports, so it is necessary to ensure sufficient port functions according to demand and to establish transportation networks that integrate ports and roads. In Aomori Prefecture, one of the nation's largest onshore wind-power generation stations, with an output capacity of about 120,000 kW, started commercial operation in April 2020. In this project, Tsugaru Port was used for unloading generators. Thus, considering that even onshore wind-power generation will require the use of port facilities nearby when newly developing or maintaining wind-power generation facilities, it is important to cater to such demand through public-private collaboration involving the authority concerned, independent power producers, and logistics operators and to make efforts to attract related industries.

To promote the introduction of offshore wind-power generation, the north and south marine areas off Yurihonjo City, and the marine areas off Noshiro City, Mitane Town, and Oga City were designated as promotion zones in July 2020 based on the Act on Marine Utilization for Renewable Energy. In the same month, the marine areas off Happo Town and Noshiro City in Akita Prefecture, and the north and south marine areas of the Sea of Japan off Aomori Prefecture were nominated as prospective promotion zones. Another application for a promotion zone has been in a certain stage of preparation for the marine area off Yuza Town, Yamagata Prefecture. As described above, the demand for offshore wind-power generation has been growing at certain locations covering the general marine areas on Tohoku's Pacific coast.

Construction of offshore windmill facilities requires "Marine Renewable-Energy Power-Generation Facility Base Ports" (hereinafter referred to as "Base Ports") provided with quaywalls that have certain functions. At these Base Ports, components like nacelles with generators installed in them, windmill blades, tower components supporting nacelles and blades, etc. imported from abroad by ships are unloaded at quaywalls, and towers are assembled in the yards on wharves. Thus, the Base Ports need to have wharves with sufficient bearing capacity to enable the assembly of towers weighing up to 500 tons on them and quaywalls capable of accommodating the SEP vessels[6] to be used for transporting and installing assembled offshore windmill components to and at planned marine areas. Currently, four ports have been designated as Base Ports, including Akita and Noshiro Ports. At Akita Port, an independent power producer has already been using a wharf to construct offshore wind-power generation facilities since September 2020.

Also, in the face of the need to revise the role of coal-fired thermal power stations in the global movement toward decarbonization, it is necessary to pay attention to the government's energy policies and the market trends in the power-generation industry to adjust the future of the ports handling coal as one of their major cargoes. On the other hand, the use of hydrogen has been promoted

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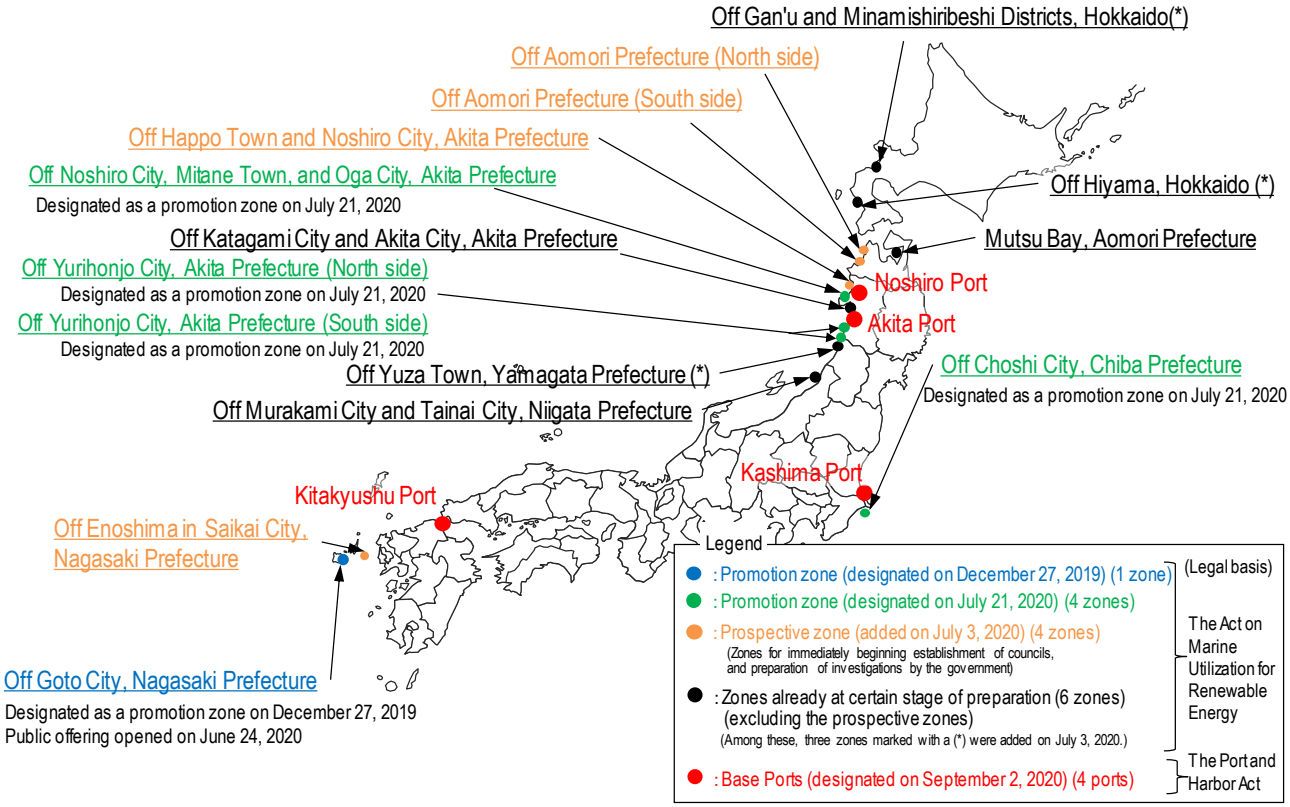
[6] Self-Elevating Platform. A working vessel equipped with legs and capable of moving its own hull up and down above the sea surface.

as next-generation energy. Hydrogen can be produced from any type of energy source, transported as gas, and used for various purposes including fuel for transportation. In addition, hydrogen can optimize renewable energy, which inevitably fluctuates in output, in a way that produces hydrogen by using the power generated from renewable energy when the demand for power through the grid is low. In the Fukushima Hydrogen Energy Research Field, a verification test has been conducted for a hydrogen energy operation system with an optimal combination of producing and storing hydrogen as well as using hydrogen as a buffer to adjust power supply and demand in place of storage batteries. In contrast, the Tohoku region has been slow to promote hydrogen utilization, with only four hydrogen stations installed out of the total of 135 across the country as of December 2020. Thus, it is necessary to make maximum use of the existing industrial presence in the port areas to introduce the hydrogen energy operation system, expand the use of hydrogen as fuel for trucks and cargo-handling machines and examine the possibility to develop systems to receive hydrogen-fueled ships which have a chance of being materialized in the future in order to create major next-generation energy centers in Tohoku, which has great potential for renewable energy, together with the progress of several related policies.

In sectors other than energy, it is also necessary to establish support for businesses in areas attracting global interest, such as research institutes like the ILC[7]. The Kitakami mountain range stretching from southern Iwate Prefecture to northern Miyagi Prefecture has been nominated as a candidate site for the ILC in Japan. If actually implemented, the ILC is expected to generate major economic benefits including unloading of a huge number of measuring devices, detectors, and accelerators at neighboring ports, construction of research facilities, transportation and migration of people concerned.

[7] International Linear Collider. The next-generation linear collider, which has been designed and developed under an international cooperation program. The Kitakami mountain range (in Iwate and Miyagi Prefectures) has been nominated as the optimal candidate site to install the ILC in Japan. (the ILC site evaluation committee, 2013)

[Designated promotion zones and Base Ports for nationwide offshore wind-power generation
(as of September 2020)]



<Specific measures>

○ Promotion of the development and use of Base Ports toward formulating offshore wind-power generation with output capacity of up to 45 million kW in Japan, to contribute to the installation of offshore wind-power generation facilities and regional industrial development through the establishment of related industries.

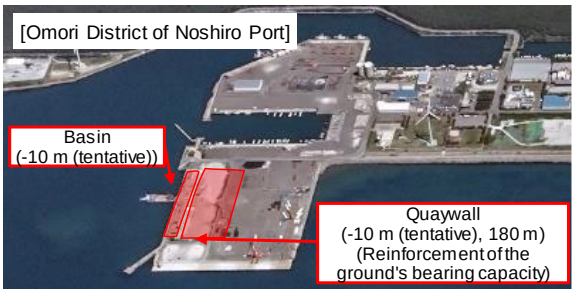
○ Promotion of facility development necessary for attracting a wide range of industries related to offshore wind-power generation, including maintenance and renewal of wind-power generation facilities, taking advantage of Tohoku's favorable wind conditions for wind-power generation.

○ Promotion of port use to help accelerate establishment of the resource and energy industry and revitalize local industries for creating energy bases in the areas around ports.

[Outline of the development of Base Ports at Akita and Noshiro Ports]

○ Akita Port

○ Noshiro Port



[Example of an overseas Base Port (Esbjerg Port in Denmark)]

Source: Webpage of Esbjerg Port

Target 2: Creation of Vibrant Communities and Formulation of Enriched Environments

This target is to create attractive spaces that take advantage of the potential of respective regions to promote local revitalization through the utilization of Minato Oases and cruising businesses integrating Tohoku, based on the growing cruising market and expansion of interpersonal exchange while implementing thorough infection-prevention measures.

An additional aim is to realize carbon-neutral ports contributing to the reduction in greenhouse gas emissions and the creation of rich coastal environments through promoting the utilization of renewable energy, the establishment of transportation networks using next-generation energy like hydrogen, and efforts to revitalize coastal environments.

[Strategy 2-1] Creation of Attractive Spaces in Harmony with the History and Culture of the Tohoku Region

<Current status and issues>

Some areas around ports with warehouses that retain traces of their history and culture hold potential as sightseeing spots, and other areas close to fish markets could be places for sharing interesting information about local food culture.

When promoting ports as sightseeing resources, it is necessary to consider them not as individual "spots" but as "lines" to elicit the collaboration of communities and to establish spaces integrating collaborative efforts. Moreover, they need to be seen as "planes," further integrating multiple Minato Oases and people or organizations linked to tourism promotion, such as DMOs[8] in respective areas, thereby optimizing the potential of ports and surrounding areas as sightseeing destinations. The "Iwaki Onahama Minato Oasis" had already been developed as a tourist attraction before the Great East Japan Earthquake, and the featured facilities, "Iwaki Lalamew" and the environmental aquarium (Aquamarine Fukushima), had been bases of interpersonal exchange for about 2.5 million guests a year. However, even though the number of guests has shown a gradual increase after the earthquake, it has not reached pre-quake levels. Under these circumstances, the excursion boat business closed down in September 2019. However, the eagerness of local people to promote the excursion boat business as one of the area's main attractions supported the establishment of a new company, resuming the business in April 2020. This is a good example of the discovery of a local resource attracting people from home and abroad, and the materialization of the resource into an attraction by local people. Also, because Tohoku's fisheries industry is prospering, there have been

[8] Destination Management/Marketing Organization. A specialized organization or function to continuously and strategically promote tourism in a region.

the cases of efforts to develop sightseeing content attractive even for local people through, for example, collaboration with facilities serving marine products landed at local fishing ports.

The Ministry of Land, Infrastructure, Transport and Tourism's Ports and Harbours Bureau has promoted the use of existing breakwaters as tourism attractions by allowing people to fish on them, and has designated ports for promoting fishing culture as a way to revitalize local communities as model ports for promoting fishing culture. In the Tohoku region, Aomori, Akita, Onahama, and Soma Ports were designated in March 2019, and the actions to open up port facilities to the public to promote fishing have been taken at these locations.

Problems with attracting cruise ships include the shortage in port functions. Owing to the growing demand for cruising, there has been an increase in the number of cruise ships calling at ports in western Japan. In contrast, some ports in Tohoku have been forced to decline the entry of cruise ships because they lack the quays to accommodate them. Thus, it is necessary to improve existing quaywalls normally used for cargo handling relatively simply by adding fenders and bollards to enable them to accommodate large cruise ships. When terminal buildings are developed by shipping companies, the CIQ procedures can be simplified by using the legal system to create international cruising bases through private-public initiatives, making public quaywalls available for priority use to accommodate cruise ships. Furthermore, it is possible to develop new quaywalls to attract cruise ships to Tohoku that already call at ports in western Japan.

While promoting cruising business, it is also necessary to take measures to prevent COVID-19 through reliable compliance involving washing hands, wearing masks, and disinfecting hands in terminal buildings and particularly in cruise ships. On September 18, 2020, the Ministry of Land, Infrastructure, Transport and Tourism published an interim report on measures to ensure the safety and security of the passengers of cruise ships and persons related to the ports accommodating cruise ships. The report arose from a hearing with experts in infectious diseases and risk management. Also, the Japan Oceangoing Passenger Ship Association compiled measures for cruise ship lines to take in the Guidelines for Oceangoing Cruise Ship Operators to Prevent COVID-19 Infection ahead of the resumption of cruise ship operations. Also, the Ports and Harbours Association of Japan compiled measures for the administrators of ports to take to prevent infection in passenger terminals in the Guidelines for Preventing the Spread of Infection in Passenger Terminals Accommodating Cruise Ships.

To ensure repeat customers for cruise trips and expand excursion areas, it is also important to promote the installation of multilingual signs, wireless LAN, western-style toilets, etc. as services that enhance the enjoyment of port visits, and consult with people involved in tourism from the planning stage so as to come up with attractive programs. Such programs should encourage tourists to visit to not only sightseeing spots in the hinterland of ports but also scenic places inside ports, such as historic warehouses. In addition, considering that being a frontier of renewable energy is another

sightseeing resource for the Tohoku region, it is necessary to find many ways to domestically and internationally publicize the efforts of Tohoku in promoting environmental preservation, such as offshore wind power generation and carbon neutral ports.

[Example of a project menu for developing environments to receive inbound tourists]

Aid projects to promote inbound tourism to boost tourist spending in local areas

* Subsidy rate: 1/3

■ **Functional improvement of information centers**

(Facility development and improvement, installation of tablet terminals, multilingual information signs, digital signage, webpages, and broadcast programs, staff training, installation of free Wi-Fi)

[Eligible applicants]

- Municipalities and private companies including public transportation operators, etc. (that have been or are expected to be certified as Category I organizations or higher by the Japan National Tourism Organization)

■ **Installation of western-style lavatories at public toilets**

(including replacement of lavatories basins concurrently with building renovations)

[Eligible applicants]

- Municipalities and private companies, including public transportation operators, etc.

■ **Functional improvement of tourist attraction information and facilities for interpersonal exchange**

(Facility development and improvement, installation of tablet terminals, multilingual displays, information signs, digital signage, webpages, and broadcast programs, installation of free Wi-Fi)

[Eligible applicants]

- Municipalities and private companies, including public transportation operators, etc.

■ **Functional improvement of baggage rooms for hands-free sightseeing**

(Multilingual information signs, digital signage, webpages, and broadcast programs, installation of baggage rooms, etc.)

[Eligible applicants]

- Municipalities and private companies, including public transportation operators, etc. (that have been or are expected to be certified as promoters of the common logo for promoting hands-free sightseeing)

Source: The Tohoku Regional Development Bureau, based on the webpage of the Ministry of Land, Infrastructure, Transport and Tourism's Japan Tourism Agency

<Specific measures>

○ Promotion of: the further utilization of Minato Oases as bases for sharing the attractiveness of port towns, encompassing the hinterland of ports, inside and outside local areas through, for example, proactive collaboration with local events; collaborative efforts with relevant people in Tohoku to create a lively atmosphere with visitors by raising the visibility of port towns; and utilization of facilities that make people feel close to ports, such as opening breakwaters up to the public for recreational fishing.

○ Enhancement of safety and security against the spread of COVID-19 infections, etc. to prepare for the resumption of cruise ship calls at ports in Tohoku through implementation of guidelines involving: checking temperature with thermographs inside terminal buildings; shielding check-in counters with acrylic boards and transparent plastic curtains; and spacing passengers waiting for departures.

○ Expansion of the functions of cruise terminals to accommodate large cruise ships, and development of facilities like parking spaces for large buses to accept large numbers of cruise passengers.

○ Establishment of cruise passenger transportation networks as convenient means of secondary transportation for the passengers disembarking from cruise ships, including rental cars and cruise trains that utilize port railroads.

○ Planning and promotion of extensive excursion routes through collaborative efforts with relevant people in Tohoku to increase the number of domestic and international cruise passengers and repeat visitors.

[Initiative at Akita Port to operate a cruise train]

[Examples of the facility developments for receiving cruise ships and activities to welcome cruise ship passengers (at Aomori, Sendaishiogama, and Sakata Ports)]

▲ International Cruise Terminal at Aomori Port

▲ Sendaishiogama Port (Ishinomaki District)
A "story teller" delivering a talk about her disaster experience

▲ Sakata Port, sightseeing guidance by high school students

[Strategy 2-2]　Utilization of Ports to Create a Healthy Environment

<Current status and issues>

The efforts toward realizing the aforementioned carbon-neutral ports play crucial role in achieving the SDGs from the environmental aspect. Also, achieving carbon-neutral ports requires the collaborative efforts of relevant people in Tohoku because this involves importing, storing, and utilizing next-generation energy sources such as hydrogen and ammonia in large quantities, and reducing greenhouse gases through the accumulation of environmentally-aware industries in coastal areas.

The Ministry of Land, Infrastructure, Transport and Tourism's Ports and Harbours Bureau selected candidate ports that have container and bulk terminals in six districts, with accumulations of industry in diverse fields, to promote them as carbon-neutral ports. Furthermore, for Onahama Port, which was selected as a candidate port in Tohoku, the Bureau established a review meeting with experts from the public and private sectors in January 2021. Regarding the area around Onahama Port, important future tasks for realizing a carbon-neutral port include the collaboration with the world's largest hydrogen-production verification facilities in Namie Town. In addition, similar efforts need to be made not only in the Onahama area but also in all other parts of Tohoku to take advantage of the regions' potential with respect to renewable energy resources.

In the meantime, the ESG investments[9] have attracted attention in light of the global trend of supporting activities to achieve the SDGs. Thus, the Tohoku region expects to see growing demand for power supplied from renewable energy sources such as offshore wind-power generation. To do this, a system will need to be established to support the promotion of ESG investments for "the local production of energy for local consumption" and the establishment of industries that will consume Tohoku's renewable energy. The High Level Panel for a Sustainable Ocean Economy, comprising the leaders of various maritime nations including Japan, has advocated the concept of a "Blue Recovery" and, linked to this, recommended promoting marine renewable energy, particularly offshore wind-power generation, as a prospective way to generate sustainable recovery of the maritime economy. For example, there has been a case of a construction company that invested in building an SEP vessel by issuing green bonds (to fund projects or products with positive environmental and climate benefits) to cater to the growing demand for installation of offshore windmills. Thus, following ESG-conscious corporate activities and the global trend toward environmental awareness such as Blue Recovery, it is important to proactively propagate the advantageous potential of the Tohoku region for offshore wind-power generation and stimulate the establishment of new industries.

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9 Investments made on the basis of the evaluation of not only conventional financial viability but also Environmental, Social, and Governance aspects of the private sector. ESG enables investors to evaluate latent risks of investment locations which cannot be evaluated only by financial information and thereby facilitating stable medium- to long-term asset management.

Recently, there has been increasing demand for scrap iron among West Asian countries. Normally, 30,000 DWT-class cargo vessels have been used for long-distance exports to these countries. Consequently, Tohoku's ports need to be equipped with facilities to accommodate cargo vessels of that class as part of efforts to create a recycling-oriented society through the reduction of CO_2 emissions, thereby helping to realize efficient transportation and reduce transportation costs.

It is also necessary to: (a) promote the recycling of industrial byproducts generated in large quantities in coastal areas as construction materials and materials for developing artificial tidal flats; and (b) proactively preserve, restore, and create healthy natural environments along coasts to enhance the ability of blue carbon ecosystems (seaweed beds, etc.) to be CO_2 sinks. Introduction of the aforementioned offshore wind-power generation is expected to contribute to restoring marine resources in the form of seaweed beds on the submerged foundations of towers. It is also important to balance the creation of a healthy environment with corporate activities through applying carbon-offset schemes that enable corporate activities to contribute to CO_2 reductions. Furthermore, methods to measure CO_2 reduction at ports need to be established to quantitatively evaluate the effects of the above efforts and to demonstrate tangible results of CO_2 reduction efforts to the public.

<Specific measures>

○ Promotion of: the utilization of renewable energy generated in the Tohoku region to achieve carbon-neutral ports; establishment of hydrogen transport networks; and attraction of SDG- and ESG-conscious companies to port hinterlands.

○ Promotion of coordinated transportation through consolidation of cargoes to align with increases in the size of cargo vessels used for carrying recycling cargo, thereby contributing to the creation of a recycling-oriented society.

○ Creation of lively spaces filled with visitors, by restoring seaweed beds and development of tidal flats for the promotion of blue carbon ecosystems and regenerating coastal environments, and promotion of the development of facilities equipped with environment-creating functions.

[Activities to restore eelgrass beds in Matsushima Bay]

[Development of a tidal flat in front of Aomori Station at Aomori Port]

Target 3: Creation of Safe and Secure Ports

Based on experience with the Great East Japan Earthquake, this target is for realizing safe and secure ports through the reliable implementation of: (a) facility development as a hard measure against disasters and improvement of Port BCPs[10], as well as the establishment of collaboration systems as soft measures against disasters in preparation for large-scale and complex disasters; (b) streamlined facility inspections by applying ICT; and (c) maintenance of structures at normal times, focusing on life-cycle costs.

[Strategy 3] Strengthening of Ports to Protect Lives and Livelihoods

<Current status and issues>

In Tohoku the region, the disaster restoration projects for ports directly under the control of the national government damaged by the Great East Japan Earthquake were completed by March 2018. These restoration projects included structural improvement of the breakwater at the entrance of Kamaishi Port so that it can elastically resist even the maximum design tsunami. Also, Port BCPs have been created for all the ports in Tohoku designated as major ports or higher. The Port BCPs are plans established collaboratively by the port administrators, port transportation providers, and companies established around ports with respect to “measures to take in emergency situations” and “measures to take in normal times.” This enables respective ports to minimize their loss of functions even after large-scale earthquakes. Assuming that large-scale disasters will occur, the Tohoku Wide-Area Port Disaster Prevention Conference has been conducted every year by gathering administrators of respective ports in Tohoku, the Ministry of Land, Infrastructure, Transport and Tourism, the Japan Coast Guard, and other relevant agencies to identify and solve problems that involve improving the feasibility of the “Tohoku Wide-Area Port BCP” applied collectively to all ports in Tohoku. In addition, based on the experience of using ports on the Sea of Japan side of Tohoku as alternatives to ports at the Pacific side damaged by the Great East Japan Earthquake, disaster drills have been implemented to improve the collaboration between ports of both sides of Tohoku to ensure redundancy in emergency situations. Furthermore, to accurately obtain tsunami observation information used by relevant authorities and local people to prevent tsunami damage, it is necessary to install, maintain, and update reliable GPS wave gauges.

In addition to the importance of continuously promoting measures against earthquakes and tsunamis based on experience and lessons learned from the Great East Japan Earthquake, there has been a rising need to take effective and efficient action to prevent or minimize the damage to citizens’

[10] Business Continuity Planning.

lives and property against risks presented by other types of disasters such as typhoons, which have increased in frequency and intensity, as well as storm surges and sea level rise due to climate change. Also, in the areas with heavy snowfalls in winter like those along the Sea of Japan in the Tohoku district, it is important to establish a response system, for example snow clearance teams, in normal time so as to make the port roads serviceable in critical time of heavy snow and thereby minimizing the impacts of heavy snow on distribution.

Tohoku's port facilities were mostly constructed quickly during the high economic growth period, and have aged to a level that has caused quaywall aprons to collapse and accidents in some ports every year. To enable important infrastructure approaching its renewal deadline to continuously fulfill its functions, there is a pressing need to properly inspect, diagnose, and renew it by shifting the maintenance system to preventive maintenance, which is also effective for curbing the increases in life-cycle costs. The preventive maintenance system is expected to reduce the frequency of facility renewal and enable the ports to be used without interfering with distribution and business activities such as cargo handling and shipping operations. Also, serious concern has arisen about the shortage of engineers capable of properly maintaining the facilities due to the falling population. Thus, facility management needs to be streamlined through introducing ICT and new technologies, lessons learned from successful performance, and new ideas and innovations. One example is the Onahama Marine Bridge, built at Onahama Port in March 2017. In addition to its design, which considers the landscape's aesthetic value, an advanced management system has been implemented to ensure long-term soundness. This system incorporates not only hard measures such as multiple rust-proof treatments of diagonal cables, but also review meetings to manage bridge facility maintenance after the bridge enters service in a way that makes visual inspections easier by marking crucial inspection points on the main tower and the diagonal cables. In addition, it is important to review the arrangement of functions within ports when renewing aged port facilities in a way that appropriately adjusts port development plans by, for example, consolidating dispersed functions, converting purposes of use, upgrading quality, and adding functions tailored to local needs such as basins for small watercraft.

Considering that the memories and experiences of disasters, as well as behavioral psychology motivating people to evacuate, have faded from people's awareness over time, it is important to record and pass them on to future generations because they play a key role in enhancing disaster response. In the case of the 1983 Middle Japan Sea Earthquake, the liquefaction and tsunami after the earthquake caused severe damage to the area around Akita Prefecture, including damage to quaywalls, etc. in Akita and Noshiro Ports. The damage to these ports was recorded in a report prepared by what was then the Ministry of Transport's Port and Harbour Research Institute (currently the National Institute of Maritime, Port and Aviation Technology). In the case of the Great East Japan Earthquake, various detailed records have been kept, including video records owing to the prevalence of information terminals, research on earthquake generation mechanisms, and data on damage

conditions. The Tohoku Regional Development Bureau, together with four prefectures and one city hit by the earthquake, established the “Earthquake Disaster Memorial Initiatives Network Council” in July 2018 to encourage collaborative networking to achieve effective and efficient handing down of the records and experience of earthquake disasters to the next generation. In addition, opinions on the three initiatives of the Earthquake Disaster Memorial Initiatives Network Council were collected from a wide variety of fields such as scholars, officers of municipalities hit by the disasters, and industry, through the “Earthquake Disaster Memorial Initiatives Review Conference” established under the council in December 2018. Based on these efforts, the council has promoted the following three initiatives: (a) operation of a network to hand down memories of earthquake disaster and creation of “Densho Roads (activities under such network)”; (b) creation and development of a foundation for disaster prevention programs; and (c) regional revitalization and support for disaster reconstruction.

<Specific measures>

○ Ensuring of required performance of important facilities requiring urgent measures by verifying, for example, their wave resistance performance based on the latest knowledge to improve their resistance to the adverse effects of climate change such as rising mean sea levels.

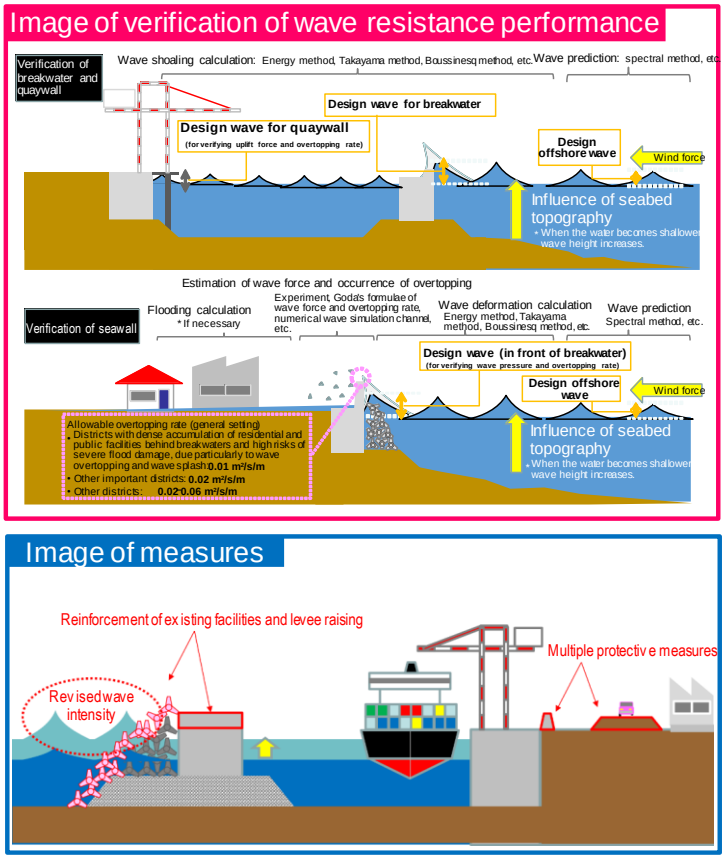
○ Continuous improvement regarding disaster preparedness by: (a) revising the BCPs of respective ports to cope not only with damage due to earthquake and tsunami disasters but also the damage due to storm surges, high waves, and rainstorm disasters; and (b) implementing disaster drills based on the geographical advantage of Tohoku's easy access to both the Pacific Ocean and the Sea of Japan to raise the effectiveness of the Tohoku Wide-Area Port BCP.

○ Establishment of a system to comprehensively manage: (a) promotion of the development of quaywalls with high earthquake resistance; (b) initial disaster responses, including the transportation of emergency goods based on Port BCPs; (c) inter-regional disaster waste disposal, to provide ports with both hard and soft measures against large earthquakes, tsunamis, and aggravating weather disasters.

○ Full-scale transition to preventive maintenance so that port infrastructures can fulfill their functions for a long time, and promotion of ICT adoption, etc. to properly carry out facility maintenance and renewal as well as to streamline inspection work.

○ Sharing of traditional know-how and lessons obtained from the people in Tohoku through their concerted efforts to cope with the severe earthquake disaster with the next generation and people in other regions; promotion of port tours to publicize the roles of ports in emergency situations; and proactive dissemination of information through Disaster Memorial Facilities and various events.

[Image of measures to secure safety of port facilities against waves]



Tohoku Port Vision, Creating a New Era of Environment and Energy, Tohoku Port Determination, Outline

Background of revision

- The year 2020 is the last year of the First Reconstruction and Revitalization Period
- The effects of the restoration and reconstruction (increases in the number of containers handled and the establishment of private companies)
- The advent of new needs (offshore wind power generation projects and increase in the port calls of cruise ships)
- The establishment of the medium- and long-term port development policies, "PORT 2030"

Changes in the Situations and Issues Surrounding Ports in Tohoku

(1) Further upgrading of distribution functions at ports to support the Tohoku regional economy

- Increase in the number of containers handled, establishment of new industry and the trend of bringing manufacturing functions back to Japan
- Growing demands for the export of agricultural, forestry, and fishery products and the import of biomass power generation fuels
- Marked escalation of social problems with the population decline, aging and labor shortage as well as congestion at ports
- Growing needs for the improvement in the safety and comfortability of ferries and RO-RO ships

(2) Changes in energy policy and efforts toward the SDGs

- International and domestic movement toward the promotion of SDGs
- Enhanced utilization of sea areas for the promotion of the introduction of offshore wind power generation
- Operation of a next generation technology, IGCC power generation plant

(3) Increase in inbound tourists and expansion of interpersonal exchange

- Expectation on positive influences of the increase in inbound tourists on the expansion of tourism demand and the regional revitalization
- The number of cruise ships calling at ports in the Tohoku district which has broken records
- Spread of the infection of COVID-19

(4) Aggravation of disaster intensity and aging of infrastructure

- Increase in the frequency of severe disasters causing functional losses of important infrastructures across the country
- Growing importance of inter-regional collaboration and the utilization of transportation networks on the occurrence of disasters
- Necessity of repairing existing facilities affected by climate changes and progress of aging deterioration

Sendaishiogama Port, Takasago Container Terminal (Image)

Onahama Port, Coal handling machine (unloader)

Akita Port, Ceremony using Kanto paper lanterns to welcome passengers of cruise ship calling at the port

Offshore wind power generation plant in Nederland (Source: JWPA)

The medium- and long-term port development policies, "PORT 2030"

① Formulation of marine transportation networks supporting global value chains
② Formulation of domestic distribution systems creating new sustainable values
③ Promotion of cruising through the Japanese archipelago
④ Development of spaces creating brand values
⑤ Formulation of bases to receive and supply new resources and energy
⑥ Greening of ports and distribution activities
⑦ Promotion of smart ports utilizing advanced communication technologies and improvement of resilience of ports
⑧ Innovation of port construction and maintenance technologies and overseas expansion of such technologies

[Target 1] Formulation of Distribution and Industrial Bases to Drive the Economies of Tohoku

[Strategy 1-1] Reinforcement of the Marine Transportation Network to Cater to Local Industry and Market Needs

(1) Catering to needs through the maintenance and expansion of ocean routes as well as the securing of transportation networks ⇒ "promotion of facility development" and "enhancement of promotion"
(2) Support for the promotion of exporting agricultural, forestry and fishery products and foods ⇒ "reinforcement of marine transportation networks" and "promotion of facility development"
(3) Realization of reasonable and stable bulk cargo transportation ⇒ "promotion of facility development"
(4) Productivity improvement and streamlining of container terminal operation ⇒ "promotion of the introduction of AI and IoT"
(5) Improvement of the productivity and work environment in port development and maintenance ⇒ "promotion of i-Construction"
(6) Maintenance and expansion of ocean routes for ferries and RO-RO ships ⇒ "enhancement of promotion," "promotion of facility development" and "promotion of the introduction of new technologies"

[Strategy 1-2] Establishment of Supply Chains for More Efficient and Inexpensive Cargo Transportation

(1) Improvement of the productivity of distribution and streamlining of corporate supply chains ⇒ "formulation of high performance transportation systems"
(2) Streamlining and revitalization of distribution in hinterland ⇒ "promotion of the reduction in the overland transportation of empty containers"
(3) Reduction in the transportation costs incurred by resource and energy industry to procure fuels ⇒ "promotion of coal transportation through joint effort of the public and private sectors"

[Strategy 1-3] Formulation of New Resource and Energy Industrial Bases to Exert Regional Potential

(1) Promotion of regional industry through the development of offshore wing power generation facilities and establishment of related industry ⇒ "promotion of the development of utilization of base port facilities"
(2) Utilization of wind power generation potential taking advantage of favorable wind condition ⇒ "attraction of wind power generation related industry" and "promotion of facility development"
(3) Formulation of energy bases in the areas around ports ⇒ "promotion of industrial establishment" and "promotion of the utilization of ports"

[Target 2] Creation of Vibrant Communities and Formulation of Enriched Environments

[Strategy 2-1] Creation of Attractive Spaces in Harmony with the History and Culture of the Tohoku Region

(1) Further utilization of Minato Oases, raising of the visibility of port towns and creation of a lively atmosphere with visitors ⇒ "integrated efforts of persons concerned" and "promotion of the utilization of facilities"
(2) Ensuring of safety and security in preparation for the resumption of the operation of cruise ships calling at port in Tohoku ⇒ "thorough implementation of infection prevention measures"
(3) Response to the increases in the size of cruise ships ⇒ "functional expansion and development of the environment to accept cruise ships"
(4) Improvement of secondary transportation for the passengers disembarking from cruise ships ⇒ "establishment of passenger transportation networks"
(5) Increase in the number of cruise passengers and tourists from home and abroad who repeatedly visit Tohoku ⇒ "planning of extensive excursion routes and promotion for attracting tourists"

[Strategy 2-2] Utilization of Ports to Create a Healthy Environment

(1) Realization of carbon neutral ports ⇒ "promotion of the utilization of renewable energy," "establishment of hydrogen transportation networks" and "promotion of the attraction of environment conscious companies"
(2) Formulation of recycling-oriented society ⇒ "promotion of joint transportation of recycling cargoes"
(3) Regeneration of coastal environments through the promotion of blue carbon ecosystems, etc. ⇒ "creation of lively spaces" and "promotion of the development of facilities with environment creation functions"

[Target 3] Creation of Safe and Secure Ports

[Strategy 3] Strengthening of Ports to Protect Lives and Livelihoods

(1) Response to climate changes such as rising mean sea levels ⇒ "ensuring of required performance of port facilities"
(2) Improvements of preparedness for disasters due to not only earthquakes and tsunami but also storm surges, high waves, and rainstorm as well as the feasibility of BCP ⇒ "revision of port BCP" and "improvement of Tohoku Wide-Area Port BCP"
(3) Hard and soft measures against large earthquakes, tsunamis, and aggravating weather disasters ⇒ "promotion of facility development" and "establishment of comprehensive response system"
(4) Continued fulfillment and appropriate maintenance as well as renewal of port infrastructure functions, and streamlining of inspection work ⇒ "full transition to preventive maintenance management" and "promotion of the utilization of ICT"
(5) Publicizing of the know-how on earthquake responses and the roles of ports in emergency situations ⇒ "sharing of know-how with the next generation and people in other regions" and "proactive dissemination of information"