# Summary of the Study Group on the Formation of Methanol Bunkering Hubs

March 2025

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## 1. Introduction

As the global movement toward decarbonization accelerates in response to the Paris Agreement, Japan declared in 2020 its goal of achieving carbon neutrality by 2050, marking the full-scale launch of its GX initiatives. The MLIT has newly proposed the concept of Carbon Neutral Port (CNP) and has begun efforts to strengthen port competitiveness through decarbonization.

Decarbonization in the maritime shipping is also progressing, with technological development and demonstrations of marine engines, etc. for transitioning to next-generation fuels such as LNG and ammonia. Additionally, efforts are underway, led primarily by the International Maritime Organization (IMO), to introduce greenhouse gas (GHG) emission regulations for international shipping. Ports around the world are also advancing the implementation of next-generation fuel bunkering facilities and onshore power supply systems to support these changes.

In Japan, where over 99% of import and export cargo passes through ports, there is a need to recognize the risk that any delay in responding to the global trend of strengthening port competitiveness in line with the decarbonization of the maritime shipping could undermine Japan's competitiveness.

Against this backdrop, methanol is gaining attention as a marine fuel due to its ease of handling and compatibility with existing technologies and infrastructure. Japan recognizes the importance of swiftly establishing a system that enables methanol bunkering through a unified effort between the private sector and government, and proactively promoting this initiative. Consequently, the "Study Group on the Formation of Methanol Bunkering Hubs" was established in September 2024.

This report summarizes the specific measures discussed by the Study Group for the implementation of methanol bunkering. While it reflects the knowledge gained at this stage, we aim to deepen and enhance our understanding through the advancement of concrete initiatives moving forward.

Study Group on the Formation of Methanol Bunkering Hubs
Secretariat: CNP Promotion Office, Industrial Ports Division, Ports and Harbours Bureau, MLIT

## 2. Current Status of Methanol Bunkering

### I. Trends in regulations on marine fuels

At the IMO, a convention to introduce new GHG reduction measures in international shipping are expected to be adopted in 2025and come into force in 2027. In the EU, which is taking the lead, regulations on GHG emissions from marine fuels have already been introduced.

Japan aims to reduce greenhouse gas emissions from domestic shipping by approximately 17% in FY2030 (compared to FY2013) in Plan for Global Warming Countermeasures. Besides, Maritime Bureau aims to reduce greenhouse gas emissions from domestic shipping by approximately 36% in FY2040 (compared to FY2013). It should be noted that this 2040 target also incorporates a plan to double the transport volume of domestic shipping over the next decade through a modal shift, as outlined in the "Emergency Package for Logistics Innovation" decided at the ministerial meeting in October 2023.

### II. Trends in next-generation fuels

Alternative fuels expected to be used for the decarbonization of ships include LNG, methanol, ammonia, hydrogen, and biofuels. However, there is no clear consensus on which specific fuel will become mainstream in the future.

Methanol remains a liquid at normal temperature and pressure, making it easier to handle as a fuel compared to LNG, hydrogen, and ammonia. On the other hand, like other alternative fuels, it is classified as a hazardous material under the Port Regulations Act, requiring careful handling.

Currently, methanol is primarily produced from natural gas, offering approximately a 10% reduction in GHG emissions compared to heavy fuel oil. However, for further utilization of methanol as a marine fuel aimed at deeper decarbonization, a key factor will be the extent to which "green methanol," produced without using fossil fuels, can be supplied and whether a sufficient quantity can be secured as fuel.

### III. Construction status of methanol-fueled ships

As alternative fuel ships for maritime shipping’s decarbonization, LNG-fueled ships, LPG-fueled ships, and methanol-fueled ships are already in operation. Methanol fuel has been widely adopted, particularly for container ships. (According to DNV, as of December 2024, 22 methanol-fueled ships are in service, with 216 more scheduled for construction.) As the share of alternative fuel ships is expected to increase further, some forecasts (such as the ABS View of the Emerging Energy Value Chains) predict that methanol-fueled ships could account for nearly 40% of the fleet by 2050.

## IV. Implementation status of methanol bunkering

With the completion of methanol-fueled container ships and other ships around the world, efforts to establish methanol bunkering hubs have been advancing since 2021, including pilot projects and infrastructure development in various regions. Additionally, dedicated methanol bunkering ships are already in operation in countries such as China and Singapore.

These initiatives are also aimed at appealing to shippers and shipping companies that prioritize environmental measures, promoting increased port calls and utilization. Furthermore, from the perspective of operational efficiency, bunkering is typically conducted as a simultaneous operation (SIMOPS), carried out alongside cargo handling and other activities. In Japan as well, there is a need to adopt a similar approach and act swiftly to avoid falling behind in the global maritime network, which could undermine Japan's international competitiveness.

In terms of bunkering for other next-generation fuels, Japan has already begun LNG bunkering using dedicated ships, and bunkering for ships powered by ammonia or biofuels is being carried out using the Truck-to-Ship method. The MLIT has prepared or is working on the following guidelines for these practices:

- LNG Bunkering Guidelines (prepared in June 2013, revised in May 2024)
- Ammonia Bunkering Guidelines (study initiated in January 2024)

## V. Methanol procurement and supply system

Methanol is widely used as a chemical feedstock, with global demand reaching approximately 90 million tons. The market is expected to grow by about 5% annually in the coming years.

From a decarbonization perspective, efforts are underway to develop "green methanol" through biomass utilization and chemical synthesis. As of December 2023, production of green methanol amounts to approximately 370,000 tons per year in China and approximately 120,000 tons per year in Europe. Most investments aimed at expanding production capacity are still in the conceptual stage, and future trends in manufacturing capacity will need to be closely monitored.

Japan relies almost entirely on imports to meet its methanol demand, with 1.74 million tons imported in 2022. As demand for methanol bunkering is expected to grow, there are possibilities for not only constructing new storage tanks but also repurposing existing refinery tanks, etc. for methanol storage.

Additionally, methanol can be synthesized from hydrogen and carbon dioxide. For such synthetic fuels (e-fuels), the METI aims to begin production by 2025 and commercialize the technology by the early 2030s. The ministry is also promoting support for demonstrations aimed at technological development, facility investment,

and the establishment of business models, as well as fostering international collaboration and developing an information platform.

## 3. Government Policy for the Utilization of Next-Generation Fuels

### I. Government strategy

The Basic Policy on Economic and Fiscal Management and Reform 2024 says that Japan will advance decarbonization in mobility-related field, such as zero-emission ships and so on. Additionally, the "Strategy for Promoting the Transition to a Decarbonized Growth-Oriented Economic Structure (GX Promotion Strategy)," approved by the Cabinet in July 2023, says efforts to advance decarbonization initiatives toward GX (Green Transformation) based on the premise of ensuring a stable energy supply. In zero-emission ships' field, in order to achieve net-zero GHG emissions for international shipping by 2050, clear the goals of the Plan for Global Warming Countermeasures, and other relevant purposes, requisite support programs will be introduced to spread the use of zero-emissions ships, and so on, in domestic and international shipping. Japan will lead international rule-making and other initiatives for achieving net-zero GHG emissions using both economic and technical measures and facilitate wider use of zero-emissions ships and so on that can make maritime industries more competitive. Furthermore, in the Sectoral Investment Strategy, which outlines GX directions and investment promotion measures for main field, the promotion of zero-emission ships and so on is emphasized as the GX direction in the maritime shipping. In the strategy, Japan aims to reduce greenhouse gas emissions by approximately 12 million tons and investments more than around ¥3 trillion over next 10 years from 2023.

### II. Initiatives by the MLIT

In the Maritime Bureau, Requisite support programs will be introduced to spread the use of zero-emissions ships, and so on, in international and domestic shipping.

The Ports and Harbours Bureau amended the Port and Harbor Act in 2022, adding facilities for supplying ships with alternative power sources such as hydrogen and fuel ammonia to port facilities governed by the act. This supports the decarbonization of the maritime sector. Furthermore, under the basic policies established by the Port and Harbor Act, accommodating low- and zero-carbon fuel bunkering has been designated as a basic matter related to strategically prioritized initiatives. Based on this, measures are being developed to form Carbon Neutral Port (CNP) Initiative and to promote the bunkering infrastructure for next-generation fuels, including methanol, as part of the International Container Hubs (ICHs) Policy.

### III. Initiatives by the METI

Methanol can be synthesized from carbon dioxide and hydrogen, and the METI is

aiming for the commercialization of such synthetic fuels (e-fuels). According to the roadmap outlined by the "Public-Private Council for the Promotion of Synthetic Fuel Introduction," the goal is to begin production by 2025 and achieve commercialization by the early 2030s. This will be supported through assistance for demonstration projects that help operators invest in facilities and establish viable business models.

4. Flow of Methanol Bunkering Implementation

The following outlines the process for implementing methanol bunkering with a focus on the Ship-to-Ship method.

It should be noted that this description is based on current knowledge and may require consideration of additional measures depending on specific conditions, such as the bunkering location or ship type. Furthermore, it will be necessary to periodically review and update this process to reflect future regulatory changes or the incorporation of new perspectives based on increased knowledge.

I. Standards for harbor master's permission procedures and safety measures

For conducting bunkering operations at ports, it is necessary to obtain approval from the harbor master (Japan Coast Guard). Given that methanol is classified as hazardous under the Port Regulations Act, appropriate safety measures must be implemented. These measures should be thoroughly communicated to waterway users and other relevant parties to foster understanding and support for the operations. The following outlines the key considerations:

i. Approach to safety assessments

Handling hazardous flammable liquids, including methanol, already has a well-established track record at dedicated hazardous material berths across various ports in Japan. Based on their experience with applications for hazardous material berth approvals, harbor masters nationwide are considered capable of conducting permission reviews without requiring individual safety assessments by third parties or other entities related to the operator.

However, if large bunkering ships other than existing chemical tankers are to be used, individual safety assessments by third parties will be necessary, taking into account the ship type and tank capacity.

ii. Standards for harbor master's procedures, etc.

Since methanol bunkering is classified as hazardous material handling, it requires approval from the harbor master under Article 22, Paragraph 1 of the Port Regulations Act.

As a standard for granting permission to handle hazardous materials at general berths, the harbor master sets the permissible handling capacity on a per-ship basis, unlike at dedicated hazardous material berths, where large quantities are routinely managed.

If the handling capacity exceeds the established limit, stricter safety measures equivalent to those required at dedicated hazardous material berths must be

implemented. These measures include establishing an appropriate safety management system, restricting access, and prohibiting the use of open flames.

iii. Safety measures, etc. – Basic principles –

It is essential to establish an appropriate management system by clearly defining the responsibilities of each stakeholder involved. The following specific measures should be considered:

<Main specifications of ships and berths>

Verification of the specifications of methanol-fueled ships and bunker ships, the location of the operation site (berth), and berth details (such as total length, water depth, etc.).

<Cargo handling plan>

Confirmation of the type of hazardous material handled (methanol), the maximum handling capacity per bunkering operation, and the cargo handling capacity (bunker ship's supply capacity per hour and the time required).

<Various equipment>

Verification of equipment related to cargo handling for methanol-fueled ships and bunker ships, electrical lighting systems, fire-fighting equipment (alcohol-resistant fire extinguishing agents, etc.), communication systems (explosion-proof compliance, etc.), and safety and disaster prevention equipment (such as surface thermometers, gas detectors, and anemometers).

<Cargo handling safety management system>

Confirmation of bunkering operation procedures verified by relevant parties, specific duties for each responsible person, the command and control system, and the accountability structure.

<Operational standards>

Verification of conditions for berthing, unberthing, and criteria for suspending bunkering operations.

iv. Safety measures, etc. – Cargo handling safety and maritime disaster prevention –

The established measures must be thoroughly communicated to waterway users and other relevant parties to foster understanding and support for the operations. The following specific measures should be considered:

<Cargo handling safety measures>

Establish restricted areas and zones prohibiting the use of open flames, following the advice of the harbor master.

<Measures for simultaneous cargo handling and bunkering operations>

Define and enforce hazardous zones and restrict unnecessary cargo handling activities and limit crew access within designated areas.

<Maritime disaster prevention measures>

Establish a system under the operator's responsibility to ensure strict compliance with the obligations for emergency response and preventive measures in the event of an accident or similar incident under the Act on Prevention of Marine Pollution and Maritime Disaster (Act No. 136 of 1970, hereinafter referred to as the "Marine Pollution Prevention Act");ensure adherence to the provisions of the Act, including maintaining and recording entries in the Harmful Liquid Substances Record Book, appointing a Harmful Liquid Pollution Prevention Officer (for ships with a gross tonnage of 200 tons or more), preparing, maintaining, or displaying Harmful Liquid Pollution Prevention Regulations onboard, and preparing, maintaining, or displaying an Emergency Response Manual for Harmful Liquid Pollution Prevention (for ships with a gross tonnage of 150 tons or more);and inform those engaged in handling harmful liquid substances among the personnel involved in operations related to the ship.

II. Equipment and seafarers' requirements for methanol-fueled ships and bunkering ships

For methanol-fueled ships, standards for equipment and qualification requirements for seafarers are determined from the perspective of ensuring safety. Similar requirements will also apply to methanol bunkering ships. The following outlines this approach:

i. Requirements for methanol-fueled ships based on "International Guidelines for the Safety of Ships Using Methyl/Ethyl Alcohol as Fuel ( MSC.1/Circ.1621)

The main requirements are as follows:

- Bunkering station: The bunkering station should be located on open deck so that sufficient natural ventilation is provided. Bunkering lines should not be led directly through accommodation, control stations or service spaces.
- Ships' bunker hose: Bunker hoses carried on board are to be suitable for methanol.
- Provisions for manifold: The bunkering manifold should be designed to withstand

the external loads during bunkering. The connections at the bunkering station should be of dry-disconnect type equipped with additional safety dry break-away coupling/self-sealing quick release.

- Bunkering lines: Bunkering lines should be arranged for inerting and gas freeing.
- Provision for fire fighting: The bunker station should have a fixed fire-extinguishing system of alcohol resistant foam type and a portable dry chemical powder extinguisher or an equivalent extinguisher, located near the entrance of the bunkering station.
- Provisions for bunkering control: Bunkering control should be from a safe remote location. At this safe remote location, tank level should be capable of being monitored. The remote-control valves should be capable of being operated from this location. An audible and visual alarm should be activated at the bunkering control location. If fuel leakage is detected in ducting enclosure or the annular spaces of the double walled bunkering lines, an audible and visual alarm and emergency shutdown of the bunkering valve should automatically be activated.
- Fuel handling manual: The ship should be provided with operational procedures including a suitably detailed fuel handling manual. The fuel handling manual should include emergency procedures.

ii. Requirements for methanol bunkering ships

Methanol bunkering ships are required to comply with construction and equipment requirements of chemical tankers.

iii. Seafarers' requirements

Seafarers on methanol bunkering ships shall hold a certificate in accordance with regulation V/1-1 of the STCW Convention. In addition, an appointment of a Harmful Liquid Pollution Prevention Officer is required under Article 9-4 of the Marine Pollution Prevention Act.

Seafarers on methanol-fueled ships shall hold a certificate in accordance with Japanese Law, which complies with regulation V/3 of the STCW Convention.

## III. Specific operational procedures, etc.

In implementing methanol bunkering, it is necessary to organize specific operational procedures based on the aforementioned safety measures. Below is a summary of relevant insights that can serve as references:

i. Insights gained from the methanol bunkering simulation

On September 18, 2024, Japan's first methanol bunkering simulation was conducted

at the Port of Yokohama. The simulation was carried out by Yokohama City, Maersk AS, Idemitsu Kosan, Mitsubishi Gas Chemical, Kokuka Sangyo, Uyeno Transtech, and Yokohama Kawasaki International Port. In this simulation, Kokuka Sangyo's ship "EIKA MARU" was brought alongside Maersk AS's "ALETTE MAERSK" to test the hose connection method assumed for Ship-to-Ship methanol bunkering.

The results showed that using existing domestic chemical tankers for bunkering was feasible without significant obstacles, particularly for berthing and hose connection operations. The simulation also highlighted specific challenges and considerations that need to be addressed for actual operations.

It should be noted that the applicable insights and issues to be considered may vary depending on the ship type and class of both the receiving ship (international/domestic) and the bunkering ship.

<Fuel supply system and equipment>

- Ensure appropriate hose length for each receiving ship and secure storage space for hoses on the bunkering ship.
- Determine suitable cargo hose handling methods tailored to each receiving ship (such as using electric hoists on the receiving ship or a crane on the bunkering ship).
- Consider whether a vapor return system is necessary (though there are examples of its implementation overseas, it is feasible to operate without it; however, for international ships in the simulation, fueling time increased without vapor return). If implemented, the bunkering ship must also be equipped with vapor return hoses.
- Verify the cargo pump capacity.
- Ensure the readiness of leak test equipment and system (including securing $N_2$ supply systems on the bunkering ship, ensuring sufficient capacity for nitrogen bundles, and providing adequate storage space).
- Prepare equipment for cargo hose connection (including verifying the presence of quick couplers and confirming flange and reducer sizes).

<Berthing and unberthing equipment and system>

- Mooring lines and anchor deployment (Implement safety measures considering freeboard differences, including the potential need for mooring boats.)
- Fenders (Address freeboard differences by adjusting fender placement according to the bunkering station position and the parallel body length of the ship.)
- Boarding system between bunker ship and receiving ship (Ensure safety measures for boarding operations considering freeboard differences, and secure necessary personnel to be dispatched to the receiving ship.)

<Regulations and procedures>

- Establish a timeline that accounts for obtaining the harbor master's approval, similar to regular refueling operations.

<Coordination system>

- Communication tools between bunker ship and receiving ship crew (Ensure the availability of transceivers, establish mutual understanding of fueling procedures through pre-operation meetings, and clarify the command structure on-site.)
- Clear division of tasks between both ships (Establish mutual understanding of fueling procedures through pre-operation meetings.)

<Other considerations>

- Appropriate sizing of the bunker ship. Regardless of the type of alternative fuel, select the most suitable bunker ship that balances safety considering freeboard differences, business needs, and cost-efficiency for bunkering operations.

ii. Guidelines from the International Association of Ports and Harbors (IAPH), etc.

The International Association of Ports and Harbors (IAPH), a global NGO comprising port administrators and stakeholders, publishes guidelines and reference materials aimed at supporting port operators and stakeholders worldwide.

The following guidelines are particularly relevant for methanol bunkering:

<Bunker Checklist：Alcohol Based Series>

The IAPH Clean Marine Fuels Working Group conducts discussions to promote the use of next-generation fuels for decarbonization. Drawing on insights from LNG bunkering and other practices, a comprehensive checklist has been developed to ensure high-quality and responsible bunkering operations. This checklist covers all verification items for each stage of the bunkering process.

<Port Readiness Level for Marine Fuels (PRLMF) assessment tool>

Jointly released by the IAPH and the World Ports Climate Action Program (WPCAP) in July 2024, this tool can be used to self-assess the port's readiness for next-generation marine fuel bunkering on a nine-level scale and identify areas that require further development.

iii. Handling as bonded goods

The operational framework for procedures related to loading vessel’s stores (fuel) that constitute foreign cargo onto vessels engaged in foreign trade was revised in April 2019 to improve efficiency. Under the revised system, fuel supply vessels can load fuel

comprehensively for specified multiple vessels engaged in foreign trade across multiple open ports for up to six months. This operational framework also applies to methanol used as marine fuel.

## 5. Toward the Formation of Methanol Bunkering Hubs

### I. Study on the formation of methanol bunkering hubs using Tokyo Bay as a model case

With the completion of methanol-fueled container ships worldwide, efforts are underway to establish methanol bunkering hubs through environmental infrastructure development, including pilot projects and the construction of dedicated bunkering ships.

In December 2023, Maersk AS, Mitsubishi Gas Chemical, and Yokohama City signed a Memorandum of Understanding (MoU) aimed at promoting the use of green methanol as a next-generation marine fuel, including the implementation of bunkering operations at the Port of Yokohama. This agreement focuses on advancing decarbonization in international shipping, supporting the International Container Hubs (ICHs) Policy, and establishing a carbon-neutral port at Yokohama.

Furthermore, the "Final Summary Report of the Study Committee on Advancing the New International Container Hubs (ICHs) Policy," released in February 2024, suggested exploring the establishment of bunkering systems for next-generation fuels such as methanol as one of the directions for specific measures.

In light of these developments, Tokyo Bay has been set as a model case for forming a methanol bunkering hub, and the challenges associated with establishing such hubs in Japan have been identified. Based on hearings with relevant operators, the MGC Terminal Chiba Facility in Chiba City, Chiba Prefecture, has been identified as the primary methanol supply base (*), with a scenario in which Ship-to-Ship bunkering could expand to various ports within Tokyo Bay.

*Depending on demand trends, other storage bases within Tokyo Bay may also be utilized.

Based on this scenario and the results of discussions with methanol suppliers, etc. operating in Tokyo Bay, the necessary infrastructure for a methanol bunkering hub has been outlined.

In the initial stage of demand, existing supply bases and chemical tankers could be repurposed, allowing operations to proceed without the need for significant new facility investments.

However, as methanol bunkering becomes more widespread and demand increases, it will be necessary to establish an economically viable and efficient bunkering system. This will likely involve constructing large bunkering ships (*) and enhancing the functionality of methanol supply bases (by expanding or modifying storage tanks and strengthening the capacity of loading jetties).

*These large bunkering ships could also be utilized for domestic shipping between bases.

### II. Establishment of an information aggregation and sharing system

To promote the formation of methanol bunkering hubs, a system will be established to consolidate progress on domestic and international initiatives, as well as technical insights, and disseminate this information via the MLIT Ports and Harbours Bureau's website.

i. Examples of information to be consolidated

- The significance of using methanol as a marine fuel (e.g., contributions to decarbonization, strengthening international competitiveness)
- Trends in methanol-fueled ship construction
- Introduction to ports conducting methanol bunkering and the associated procedures
- Operation manuals (including international examples)
- International initiatives in methanol bunkering
- Support programs available for developing bunkering hubs

ii. Examples of information utilization methods

- Establishment of a system for information sharing among the members of the Study Group
- Establishment of an information contact point
- Links with industry associations
- Introduction during collaboration with international organizations and other countries

III. Collaboration with international partners

To facilitate smooth bunkering operations for international ships and enhance technical expertise, it is considered effective to collaborate with overseas ports regarding their implementation and examination of bunkering. For example, this collaboration could involve promoting awareness of Japan's efforts, exchanging views on standardizing operational challenges, equipment specifications, crew qualifications, and safety measures for bunkering operations, and safety measures, as well as forming a global network of methanol bunkering hubs.

In terms of collaboration, various opportunities can be considered, including not only bilateral cooperation between countries, such as the formation of "Green Shipping Corridors," but also partnerships with international organizations and cooperation between port administrators and port authorities. In all cases, it is essential to promote integrated public-private initiatives.

IV. Future challenges

Although specific measures were not organized during the study group discussions for the formation of methanol bunkering hubs, the following potential issues have been

identified for future consideration:

i. Toward the implementation of methanol bunkering during nighttime or under limited visibility conditions

Future efforts should include examining safety measures and operational protocols to enable safe methanol bunkering during nighttime or under limited visibility conditions.

ii. Incentives for expanding demand

The frequent arrival of methanol-fueled ships and the execution of numerous bunkering operations are crucial for establishing a hub. One potential incentive is leveraging the ESI framework, which encourages port calls by environmentally friendly ships. Additionally, proactive sales activities targeting shipping companies could also be effective. These efforts would be more impactful if coordinated jointly by national authorities, port administrators, and industry stakeholders.

iii. Feasibility study

It will be necessary to assess future demand projections for methanol and evaluate whether methanol bunkering operations can be commercially viable for private enterprises.

iv. Support framework for hub formation

Based on the outcomes of the feasibility study in Paragraph iii, there may be a need to consider the structure and methods of public support.

v. Education, training, and human resource development

In recent years, a shortage of skilled personnel has become evident across various sectors, and the same applies to seafarers. Securing the necessary workforce will be a challenge when undertaking the new business of methanol bunkering. As securing skilled personnel in the short term is difficult, it is necessary to develop a systematic and planned approach.

6. Roadmap for methanol bunkering implementation

While it is necessary to further deepen our understanding in order to develop a comprehensive roadmap, the following is a roadmap proposed by the Study Group based on the knowledge currently available:

I. Short-term initiatives

First, it is important to promote the fact that the environment for methanol bunkering is being established in Japan and to raise awareness.

Following this, as methanol-fueled ships for domestic shipping are expected to be built from 2025 onward, the priority should be to conduct methanol bunkering using existing and available infrastructure and equipment to gain operational experience. Accumulating such experience will help ensure safety while facilitating the introduction of diverse and effective bunkering methods.

In addition, as this progress becomes widely recognized, it is expected to stimulate demand and represent a significant step toward establishing methanol bunkering hubs in Japan.

II. Mid- to long-term initiatives

As the number of methanol-fueled ships increases and bunkering demand expands, it will be necessary to advance medium- to long-term initiatives.

For bunkering large ships, the operation of dedicated methanol bunkering ships is expected following the development of new infrastructure. As improvements in the methanol bunkering environment progress, the formation of a global methanol bunkering network, extending beyond Japan, will become a realistic goal, potentially enhancing international shipping routes and strengthening global competitiveness.

If stable demand for methanol can be secured on a certain scale, it is also expected that the methanol supply system will be reinforced and production capacity expanded. This, in turn, will contribute to promoting the GX of industries, particularly within the chemical sector.

## 7. Conclusion

This report consolidates the knowledge currently available in Japan regarding methanol bunkering. As a result, it is considered that the necessary conditions for conducting methanol bunkering in Japan, including simultaneous bunkering and cargo handling (SIMOPS), have been established under certain circumstances. Moving forward, as these efforts are put into practice, it will be essential to leverage the insights gained so far to develop an environment that enables bunkering under a variety of conditions and to establish methanol bunkering hubs in Japan.

Collaboration between operators and government authorities will be crucial for implementing these initiatives. Specifically, it will be necessary to form networks that align with the roles of individual operators, while government authorities must also coordinate across jurisdictions to support and lead the operators engaging in this new field of methanol bunkering.

Furthermore, the decarbonization of the maritime shipping will not rely solely on methanol fuel but will involve a variety of complementary approaches. While these efforts entail significant costs, they also present opportunities for creating new business ventures and contribute to realizing GX. In addition, these initiatives will help strengthen the competitiveness of Japan’s ports and industrial sectors, making this report an important first step in that direction.

Finally, I would like to express my gratitude to all those involved, especially the members of the Study Group who contributed to the completion of this report. I look forward to continued collaboration as we work to enhance and expand these efforts in the future.

Study Group on the Formation of Methanol Bunkering Hubs
Secretariat: CNP Promotion Office, Industrial Ports Division, Ports and Harbours Bureau, MLIT

# List of members of the Study Group on the Formation of Methanol Bunkering Hubs

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# History of Meetings of the Study Group on the Formation of Methanol Bunkering Hubs

## September 25, 2024 – 1st Study Group Meeting

Purpose of the Study Group

Trends in methanol-fueled ships and bunkering

Bunkering simulation at the Port of Yokohama

Challenges in implementing methanol bunkering (Introduction of initiatives by each member)

## December 4, 2024 – 2nd Study Group Meeting

Introduction of initiatives by new members

Issues and considerations from the Yokohama Port bunkering simulation

Direction for hub formation in ports

Standards for harbor master permit procedures and safety measures

Equipment and crew requirements for methanol-fueled ships and bunkering ships

## February 19, 2025 – 3rd Study Group Meeting

Study on the formation of methanol bunkering hubs using Tokyo Bay as a model case

Summary of the Study Group