



# PORT OF KEELUNG

# ENVIRONMENTAL REPORT

TAIWAN  
INTERNATIONAL  
PORTS  
CORPORATION,  
LTD.



# 20 25

Port of Keelung  
▪ T A I W A N ▪





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# Environmental Policy



## Taiwan International Ports Corporation Environmental Policy

“Leverage innovation effectively to connect and communicate with global trade flows. Mature into a world-class port management group” is the vision of Taiwan International Ports Corporation (TIPC). TIPC manages and operates commercial ports in Taiwan and is engaged in maritime transport related services, free trade zones, and the development of relevant tourism and recreational projects.

While TIPC pursues business growth, we are well-aware of the importance of our social responsibility, which is to ensure both environmental and economic sustainability. With the goal to establish green and sustainable ports, we will proactively identify environmental risks that may be associated with our activities and manage the risks accordingly to minimize the environmental impacts.

We commit to:

1. Implement and follow through with the Green Port Policy to establish extraordinary world-class ports.
2. Comply with applicable environmental regulations to fulfill corporate environmental responsibility.
3. Execute pollution prevention, monitoring, and control mechanism to enhance environmental quality in and around port areas.
4. Reinforce environmental education to cultivate environmental awareness among employees.
5. Strengthen the communication with local communities, and pursue sustainable development for both the ports and the cities where we are operating.

Date: 2025 / 10 / 22

**Joe Y. Chou**  
Chairman of TIPC

Date: 2025 / 10 / 22

**Chin-Jung Wang**  
President of TIPC



# Port of Keelung, TIPC Environmental Policy

## Environmental Policies

### Port of Keelung (Including Keelung Port, Taipei Port, Suao Port)

The Port of Keelung acknowledges its responsibility, as a port management authority, to maintain and improve the environmental quality of the port. Environmental protection is regarded as an essential part of the port's sustainable operation. We are committed to proactively preventing any negative impact of port activities on the environment and to building a high-quality port that is environmentally friendly, sustainable, and progressive.

To minimize both potential and actual environmental impacts from port operations, the Port of Keelung identifies operational activities with the greatest environmental impact. A self-management approach is adopted to regularly review and continually improve environmental performance.

We commit to the following actions and will continue to promote them:

- Regularly review port operations to identify and monitor pollution generated by various activities.
- Establish environmental improvement objectives and continuously reduce environmental impacts caused by port operations.
- Comply with environmental regulations, fulfill our environmental responsibilities, and prioritize pollution prevention.
- Promote environmental education to enhance employees' environmental awareness and ensure policy implementation.
- Actively engage in external communication and cooperation, building partnerships to realize sustainable port development.

This environmental policy has been communicated with employees and relevant stakeholders of the Port of Keelung to ensure a full understanding of, and alignment with, the port's environmental commitments.

President of Port of Keelung, TIPC

*Song, I-Ching*

Date 2025 6 / 9

# Port of Keelung

## Environmental Objectives

### Environmental Objectives

#### Port of Keelung

To fulfill the commitments set forth in our environmental policy, the Port of Keelung has identified ten key environmental issues and established the following objectives:

##### Improving air quality in the port area

Monitor air quality through routine inspections and environmental monitoring to maintain clean air within the port area.

##### Enhancing hazardous cargo management

Increase the frequency of inspections and emergency drills to strengthen the management of hazardous materials and ensure port safety.

##### Reducing ship exhaust emissions

Continue promoting shore power use and vessel speed reduction, and implement green port incentive programs to reduce exhaust emissions from ships.

##### Reducing fugitive dust in the port area

Conduct regular road washing and enhance air pollution control measures in operational zones to effectively manage fugitive dust.

##### Reducing vehicular pollution in the port area

Improve cargo handling efficiency, enforce self-management of official vehicles, and promote electrification of the port's vehicle fleet.

##### Enhancing fuel operations management for ships

Regularly review and implement fuel operation management guidelines; establish a digital declaration platform for fuel tankers to ensure operational safety.

##### Controlling discharge of ship waste oil and sewage

Enforce proper collection of ship-generated waste oil and sewage; only licensed contractors are permitted to handle disposal to prevent marine pollution.

##### Reducing port-generated waste

Properly handle port area waste and promote recycling and reuse of resources.

##### Reducing operational noise within the port

Continuously monitor noise levels and strengthen supervision of cargo operations to improve noise control in the port.

##### Preventing cargo spillage

Strengthen supervision of terminal operations and inspections to reduce cargo spillage during handling.

The President of the Port of Keelung, TIPC, is responsible for implementing, maintaining, and communicating these environmental objectives. Based on the current environmental conditions of the port, this set of objectives will be periodically reviewed and adjusted to ensure compliance, continual improvement, and fulfillment of our environmental commitments.

President of Port of Keelung, TIPC

Date

Sang-I-ching  
2025/6/9



01



***Message from  
Port of  
Keelung***

In response to global climate change and the impacts of warming, port economic development has increasingly emphasized "green" and "sustainable" objectives, becoming significant issues among international port management authorities. Since 2013, the Keelung Branch of Taiwan International Ports Corporation, Ltd. (TIPC), which manages the Port of Keelung, Port of Taipei, and Port of Su-Ao, has been proactively promoting Taiwan's Green Port Initiative across its ports. This initiative aims to achieve environmental goals, fulfill corporate social responsibility, enhance communication and dialogue between port areas and surrounding communities, establish a positive corporate image, enhance core capabilities in environmental management, and progressively improve the port environment.

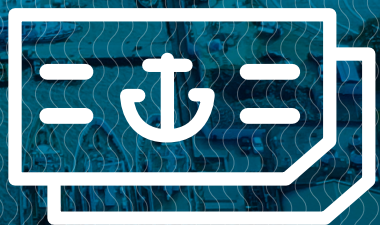
The Port of Keelung, positioned as the primary port for maritime cargo transportation in northern Taiwan and an international cruise port, pursues stable economic growth while actively transitioning toward green port management. Environmental planning, pollution prevention, and positive community relations are integral aspects of its sustainability efforts. The port is dedicated to mitigating the environmental impacts of port operations, enhancing the relationship between the port and the city, and advancing the goal of becoming an EcoPort through certification and renewal processes. By doing so, the Port of Keelung aims to align with international standards, foster global interactions, and create a harmonious and sustainable harbor-city community.



President of Port of Keelung  
Taiwan International Ports Corporation, Ltd



# 02



## **Port Profile**



## 2.1 Port Location and Port Area

Port of Keelung is the top maritime gateway of Northern Taiwan. Located on the northeastern tip of Taiwan (Longitude: 121°44'22.5" E, Latitude: 25°09'26.5" N), The total area of the port area is 570 hectares, the single-opening port covers 190 hectares of land territory and 380 hectares of waterway. The water depth varies between -15 and -20 meters with the tide contributing to a maximum 0.73 m of difference. A natural, landform harbor with a shoreline characterized by pebble

beaches, rocky shores and artificial seawalls, Port of Keelung benefits significantly from its sheltered water and strategic locale and the presence of critical industries (e.g. CSBC Keelung Shipyard, TPC Hsieh-ho Power Station). The proximity to the city of Keelung and recreational facilities is also noted as an advantage, as a readily available labor force is essential to the operation of the port.

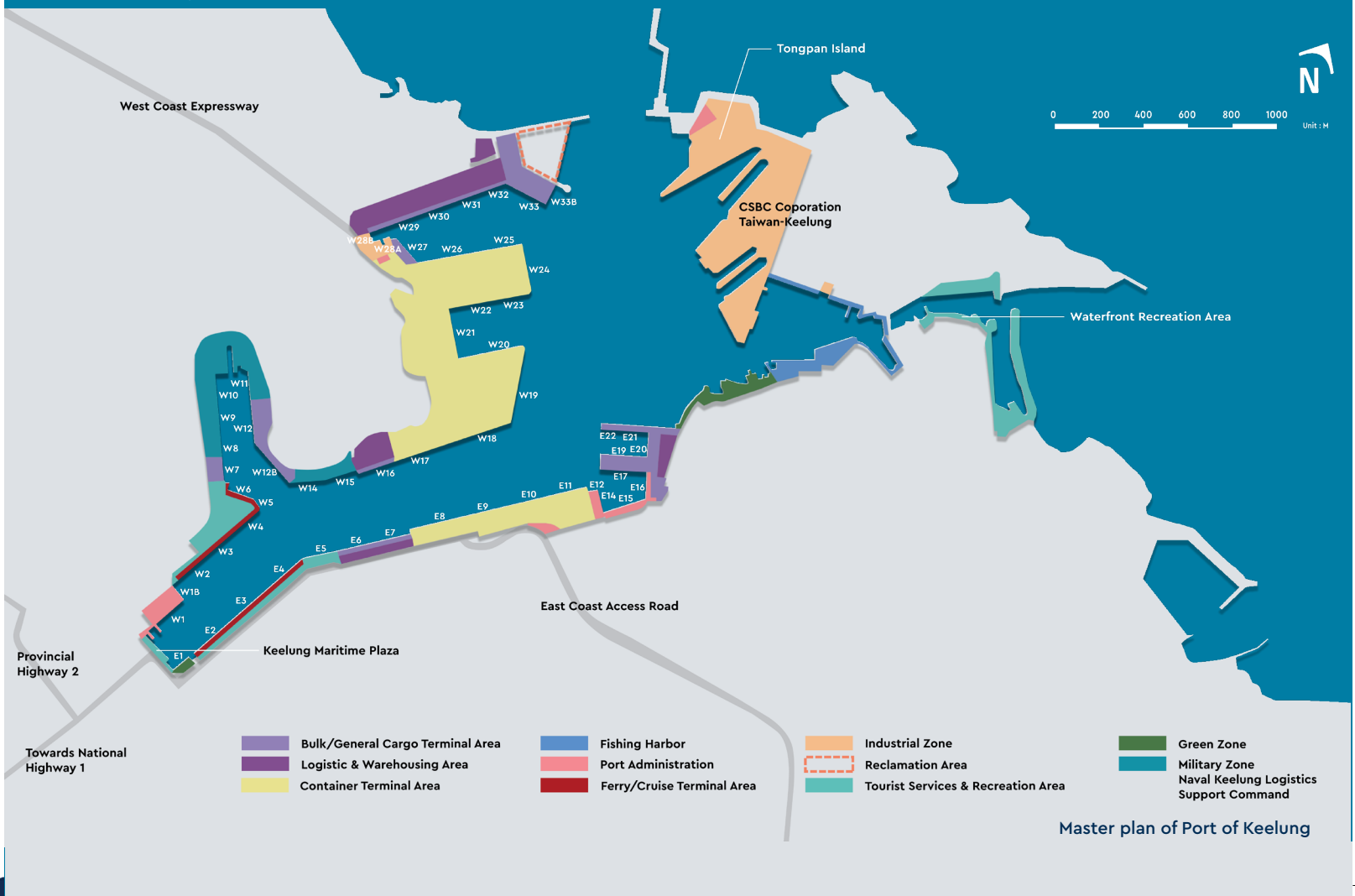


Geographical Map of Keelung Port

## 2.2 Legal Status and Port Operators

To advance the modernization and reform of our commercial port management system, Taiwan embarked on a new course in March 2012, adopting a "separation of government and enterprise" approach. This pivotal transition saw the original Harbor Bureau metamorphose from a governmental entity into the Taiwan International Ports Corporation. Ever since its establishment, the corporation has carved out three core strategic pillars: "Enhancing Core Operations," "Capturing Free Trade Opportunities," and "Developing Metropolitan Waterfronts." In a relentless pursuit to elevate operational efficiency, fulfill corporate social responsibility, and stride towards sustainable growth, the company introduced the "Green Ports

Initiative for the Taiwan Port Group" in 2013. With the endorsement of the Ministry of Transportation, this initiative meticulously addresses four primary facets of port operations: passenger services, cargo logistics, port environment, and urban/community outreach. By laying down a structured roadmap spanning short to long-term objectives, the corporation ardently drives the push for international Ecoports certifications. This dedication not only manifests a robust commitment to environmental stewardship but also cements its stature as a beacon of green and sustainable port management.



Master plan of Port of Keelung



## 2.3 Commercial Activities

The Keelung Port currently boasts a total of 56 berths, with 20 located on the eastern side and 36 on the western side. Out of these, 41 berths are operational, while the remaining 15 serve other functions. In terms of the type of operations at these berths, there are 14 container berths, 21 general cargo berths, and 6 passenger berths. Over recent years, the port has been evolving with a dual focus on both cargo and passenger

operations. The outer port is predominantly centered around short-sea container routes. The maritime functions encompass short-sea container routes, passenger and cargo vessel operations, logistics distribution centers for the Asia-Pacific region, and container storage and transportation. Bulk cargo operations mainly revolve around the handling of gravel, petroleum, cement, steel hardware, and vehicle loading and unloading.

Main Commercial Activities and Cargoes in Keelung Port

Commercial activities	
Aggregates (sand and gravel)	Building and Repair
Cruise industry/ Ferry services	General Manufacturing
Cargo stevedoring	
Dry bulk cargo	Perishable Goods
Trade Cars/ Vehicles	General Cargo
Petroleum/ Oil Products	Ro-Ro

## 2.4 Main Cargoes

In 2023 and 2024, the primary imports at Keelung Port were mineral products, base metals and their products, as well as chemical or related industrial products. The main exports were plastics and rubber and

their products, chemical or related industrial products, and machinery, electrical power, and electronic products and their related goods.

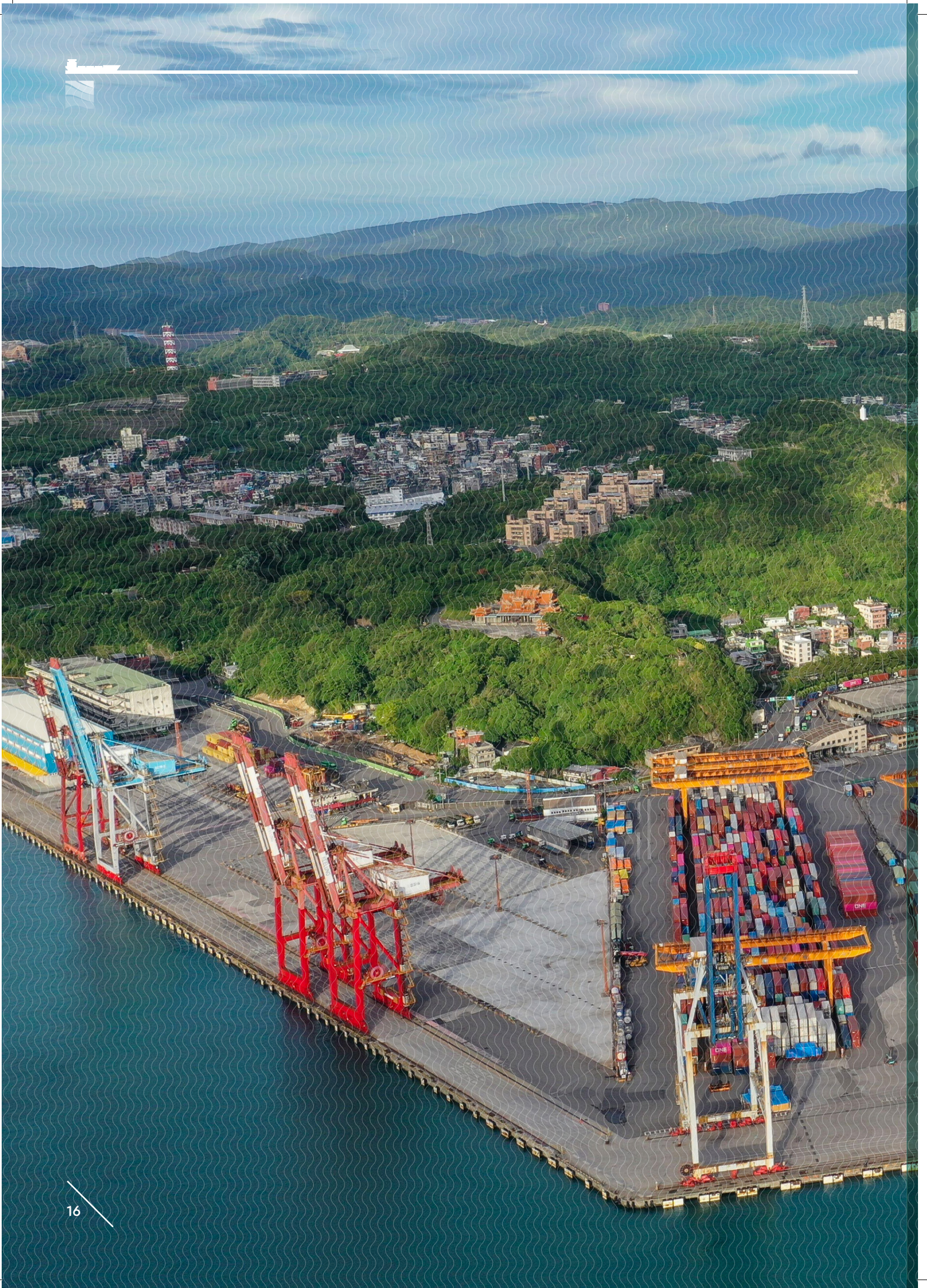
2023-2024 Main Import/Export Cargoes of Port of Keelung (Unit: Ton)

Type	Main Import Cargoes			Main Export Cargoes		
	Mineral Products	Base Metals and Articles of Base Metal	Products of the Chemical or Allied Industries	Plastic and Rubber Products	Chemical and Industrial Products	Machinery, Electrical appliances and their products
2023	1,064,690	1,144,108	904,006	718,050	618,702	328,057
2024	1,784,655	1,356,531	994,346	687,529	618,976	328,493

## 2.5 Port Business

Service Category		2023	2024	Difference between 2023 and 2024	
				Amount	%
Incoming and Outgoing Ships	Vessels	10,136	9,774	-362	-3.57
	Gross ton	153,946,373	170,211,314	16,264,941	10.57
Volume of Cargo Handled	International Cargo((Revenue ton)	55,184,085	59,386,329	4,202,244	7.61
	Dry bulk and groceries (Revenue ton)	3,813,877	3,656,964	-156,913	-4.11
	Pipeline cargo (Revenue ton)	3,364,929	3,248,461	-116,468	-3.46
	Total (Revenue ton)	62,362,891	66,291,754	3,928,863	6.30
Volume of Cargo Handled (International)	Imports (ton)	802,950.50	857,324.50	54,374.00	6.40
	Exports (ton)	730,170.75	792,573.75	62,403.00	8.55
	Total(ton)	1,533,121.25	1,649,898.25	116,777.00	7.62
Volume of Imports & Exports	International line (number)	9,469,160	10,781,396	1,312,236	13.86
	Domestic line (number)	4,731,272	4,260,145	-471,127	-9.96
	Total(number)	14,200,432	15,041,541	841,109	5.92
Incoming and Outgoing Passenger	Number of passengers on domestic routes (Person times)	100,493	134,564	34,071	33.90
	Number of passengers on international routes (Person times)	288,019	786,840	498,821	173.19
	Total number of passengers (passenger times)	388,512	921,404	532,892	137.16

Source: Statistical Data from the Official Website of the Keelung Branch, TIPC



# 03



## ***Environmental Management***





### 3.1 Organizational Structure

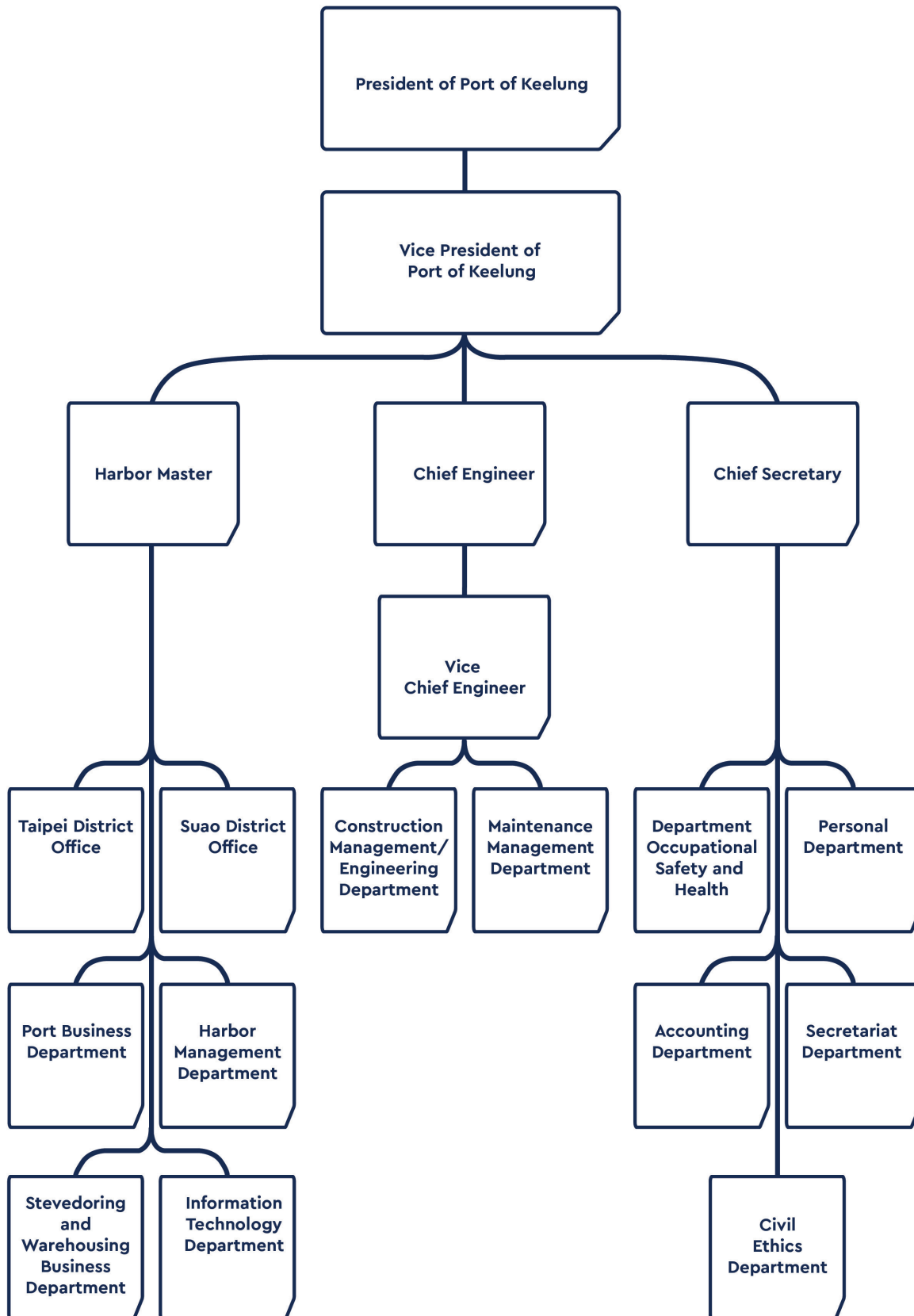
The management authorities responsible for the commercial port area of the Port of Keelung include the Keelung Branch of Taiwan International Ports Corporation, Ltd. (TIPC) and the Northern Navigation Center of the Maritime and Port Bureau, Ministry of Transportation and Communications. The Keelung Branch of TIPC is responsible for environmental issues related to port operations and management, while the Northern Navigation Center handles environmental matters involving public authority.

Environmental oversight agencies responsible for managing and monitoring both the port and its neighboring urban areas include the Ministry of Environment, the Ocean Conservation Administration

of the Ocean Affairs Council, and the Environmental Protection Bureau of the Keelung City Government.

Internally, the Keelung Branch of TIPC comprises thirteen departments: Secretariat Department, Construction Management/Engineering Department, Harbor Management Department, Stevedoring and Warehousing Business Department, Port Business Department, Accounting Department, Information Technology Department, Personnel Department, Maintenance Management Department, Department of Occupational Safety and Health, Civil Service Ethics Department, Taipei Port Branch Office, and Suao Port Branch Office.

Department	Description
Secretariat Department	Property, cashier, public relationship affairs and document management of the branch
Construction Management / Engineering Department	Port planning, design, construction, supervision and contracting out
Harbor Management Department	Port safety management and port affairs management
Stevedoring and Warehousing Business Department	Tourist services and private store operation
Port Business Department	Attraction of local investments, implementation of port functions, and creation of benefit
Accounting Department	Budget review and management of income and expenditures
Information Technology Department	Development and maintenance of IT systems and equipment
Personnel Department	Company human resource management
Maintenance Management Department	Civil/electrical engineering, harbor construction and electrical maintenance/management
Occupational Safety and Health Department	Port area environmental protection, pollution prevention and control, occupational safety and health management.
Civil Service Ethics Department	Enforcement of ethics and investigation
Taipei Port Branch Office of Keelung Port, TIPC	Taipei port operation and management
Suao Port Branch Office of Keelung Port, TIPC	Suao port operation and management



Organization Chart of the Port of Keelung, TIPC



### 3.2 Environmental regulations

The Keelung Port follows relevant international specifications, such as International Convention for the Prevention of Pollution from Ships(MARPOL73/78), London Dumping Convention, International Convention for the Control and Management of Ships' Ballast Water and Sediments, International Convention on the Control of Harmful Anti-fouling Systems on Ships etc. In addition to the international environmental

specifications and conventions, the Keelung Port collaborates with local authorities in compliance with relevant environmental laws and regulations in Taiwan.

Conventions	Objective	Corresponding to the domestic legislation
International Convention for the Prevention of Pollution from Ships (MARPOL73/78)	Prevent pollution from ships	The Law Of Ships(article 101) The Commercial Port Law(article 75) No. 10150137211, 10150138211, 10150138451, 10250048611, and 10798000011 Administrative Law of the Ministry of Transportation and Communications Official Letters No. 10798000181, 11198000974, and 11298301111 issued by the Maritime and Port Bureau, Ministry of Transportation and Communications
London Dumping Convention	Regulate marine dumping	Marine Pollution Control Act(article 23, 27) Regulations Governing Permission and Management of Marine Disposal
International Convention on the Control of Harmful Anti-fouling Systems on Ships	Terminate the use of toxic hull paint	Prohibition of the use of tributyltin oxide in manufacturing marine antifouling paint, specified in the "List of Prohibited Toxic Chemical Substances" of the Toxic Chemical Substances Control Act
International Convention for the Control and Management of Ships' Ballast Water and Sediments	Prevent the invasion of alien species along with ballast water, and protect marine ecology and biodiversity	Regulations on Equipment of Ships (article 174, 215, 216) The Ministry of Transportation and Communications announced the adoption of the "International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004" on August 20, 2015. The Ministry of Environment announced on January 20, 2016, the designation of Taiwan's territorial waters as marine control zones prohibiting ballast water exchange, along with related pollution control measures. On June 16, 2025, the Ocean Conservation Administration, Ocean Affairs Council announced the "Designation of the Territorial Waters of the Republic of China (Taiwan) as a Marine Control Area for Ships' Ballast Water and Related Pollution Control Measures."

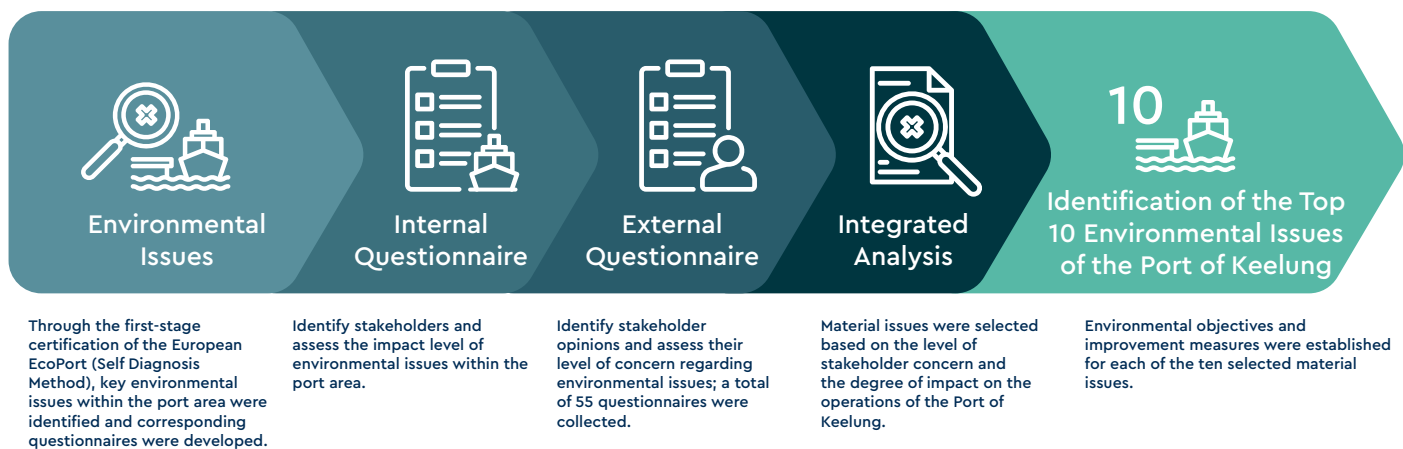
Department	Laws Title		Central Competent Authority	Local Law Enforcement Agencies
Sectors in the Ministry of transportation and communications	The Commercial Port Law	2021/06/28	Ministry of Transportation and Communications	North Maritime Affairs Center, Maritime and Port Bureau, MOTC
	The Law of Ships	2018/11/28		
	Shipping Act	2014/01/22		
	Act for the Establishment and Management of Free trade zones	2019/01/16		
Sectors related to agricultural	Wildlife Conservation Act	2025/02/18	Ministry of Agriculture	Department of Economic Affairs (Keelung City)
Sectors in the Ministry of the Interior	Fire Services Act	2024/11/29	Ministry of the Interior	Keelung City Fire Department
				Keelung Harbor Fire Brigade
	Police Act	2002/06/12	Ministry of the Interior, National Police Agency	Keelung Port Police Brigade
Sectors related to environmental protection	Marine Pollution Control Act	2023/05/31	Ocean Affairs Council	Ocean Conservation Administration
	Basic Environment Act	2002/12/11	Ministry of Environment	Environmental Protection Bureau (Keelung City)
	Air Pollution Control Act	2018/08/01		
	Water Pollution Control Act	2018/06/13		
	Waste Disposal Act	2017/06/14		
	Environmental Impact Assessment Act	2023/05/03		
	Environmental Education Act	2017/11/29		
	Noise Control Act	2021/01/20		
	Indoor Air Quality Act	2011/11/23		
	Toxic and Concerned Chemical Substances Control Act	2019/01/16		
	Soil and Groundwater Pollution Remediation Act	2010/02/03		
	Environmental Agents Control Act	2016/12/07		
	Resource Recycling Act	2009/01/21		
	Climate Change Response Act	2023/02/15		
	Public Nuisance Dispute Mediation Act	2009/06/17		
Intersectoral Protection	Disaster Prevention and Protection Act	2025/05/28	Ministry of the Interior	Keelung City Government



### 3.3 Analysis of major environmental issues

To gain a comprehensive understanding of the thoughts of stakeholders and in response to the updated eco-port certification, Keelung Port has conducted surveys to establish the primary communication targets. This includes gathering opinions from employees, government bodies, customers, company, and the community. This serves as a foundation for subsequent investigations into the level of concern among stakeholders. The results of the importance of this investigation are presented in the table below.

Stakeholders	Number of Surveys	Percentage
Employees (Colleagues)	23	30%
Suppliers or Contractors	10	50%
Community or Local Groups	4	10%
Government	3	10%
Total	40	100%



### 3.4 Keelung Port

# Environmental Issues

1.

## Air quality

Indicator

- Qualification rate of air quality indices: suspended particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub>
- Number of inspections on fugitive cargo handling in the port area

2.

## Dangerous Goods Management

Indicator

- Number of Port Patrols, Cargo Leakage Emergency Response Drills, and Joint Safety Supervisions in the Port Area

5.

## Dust

Indicator

- Frequency of street washer dispatches and water sprayers facilities inspection
- Gravel and Stone Loading and Unloading Vehicle Cleaning Ratio
- Water Consumption of Car Wash Platforms and Sprinkling Equipment at the Gravel and Stone Unloading Pier

8.

## Vehicle Exhaust Emissions

Indicator

- Compliance rate for smoke emission tests of large diesel vehicles from Phases 1 to 3 transiting the Keelung Port area

3.

## Reducing Ship Exhaust Gas Emissions

Indicator

- Proportion of harbor service vessels using low-pollution fuel (including fuels with a sulfur content of 0.5% or below)
- Vessel speed restriction policy
- Ships deceleration target completion rate
- Ratio of service vessels using shore power

6.

## Ship Sewage Discharge

Indicator

- Number of Ships Serviced for Waste Oil and Sewage Collection
- Volume of Waste Oil and Sewage Collected
- Execution Rate of Ship Waste Oil and Sewage Cleanup by Qualified Contractors

9.

## Ship Refueling

Indicator

- Compliance Rate of Ship Refueling Operations with Safety and Environmental Regulations
- Number of Reported Abnormal Events in Ship Refueling Operations
- Annual Compliance Rate of Fueling Operators' Operational Plans
- Proper Disposal Rate of Waste Generated from Ship Refueling Operations

4.

## Waste/Port Waste Managementz

Indicator

- Execution Rate of Port Area Terrestrial Waste Collection
- Ship Waste Collection Efficiency Rate

7.

## Noise

Indicator

- Port Area Noise Quality Compliance Rate

10.

## Cargo Spillage

Indicator

- Ratio of Oil Boom Deployment for Chemical and Oil Tankers

Top 10

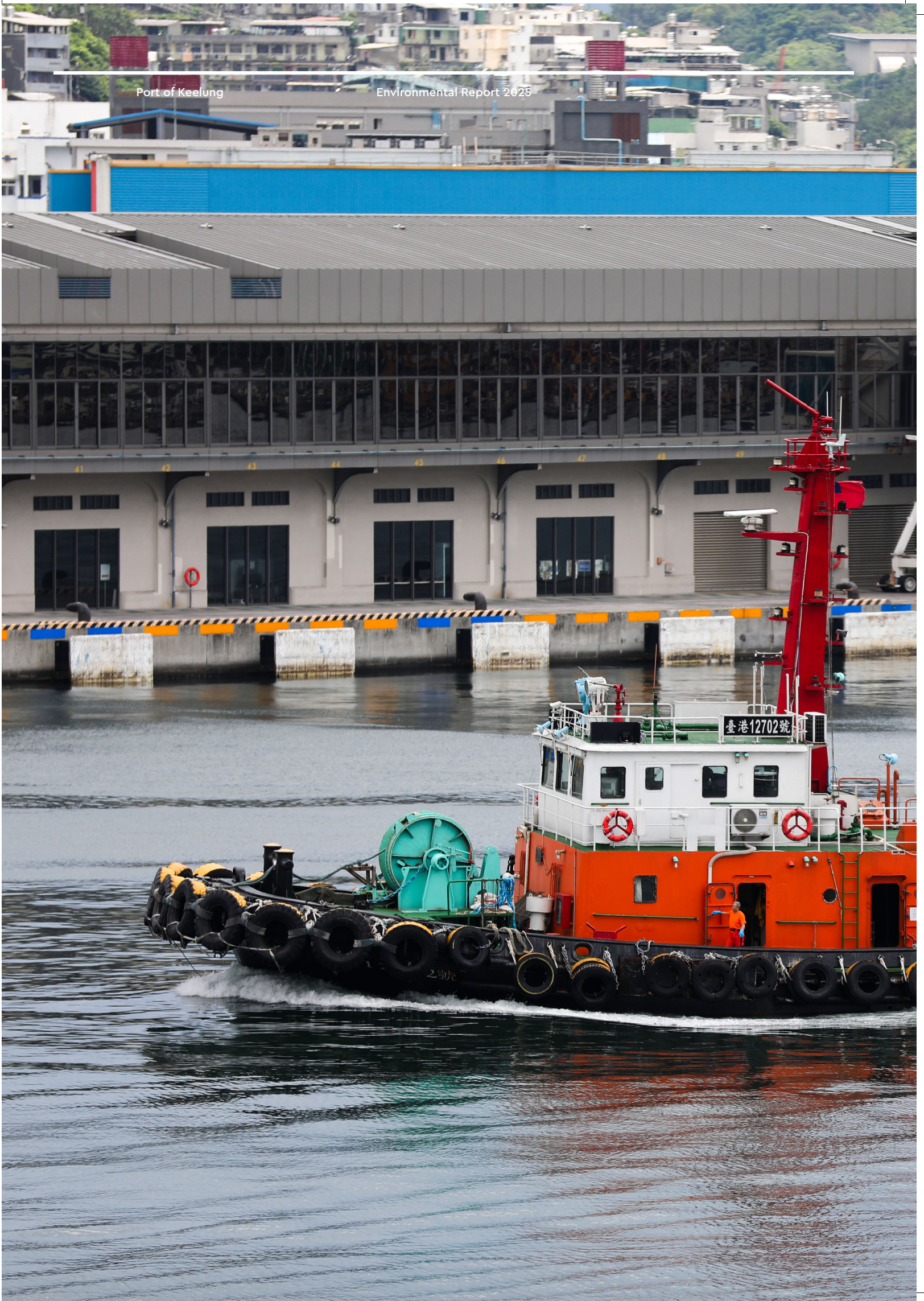


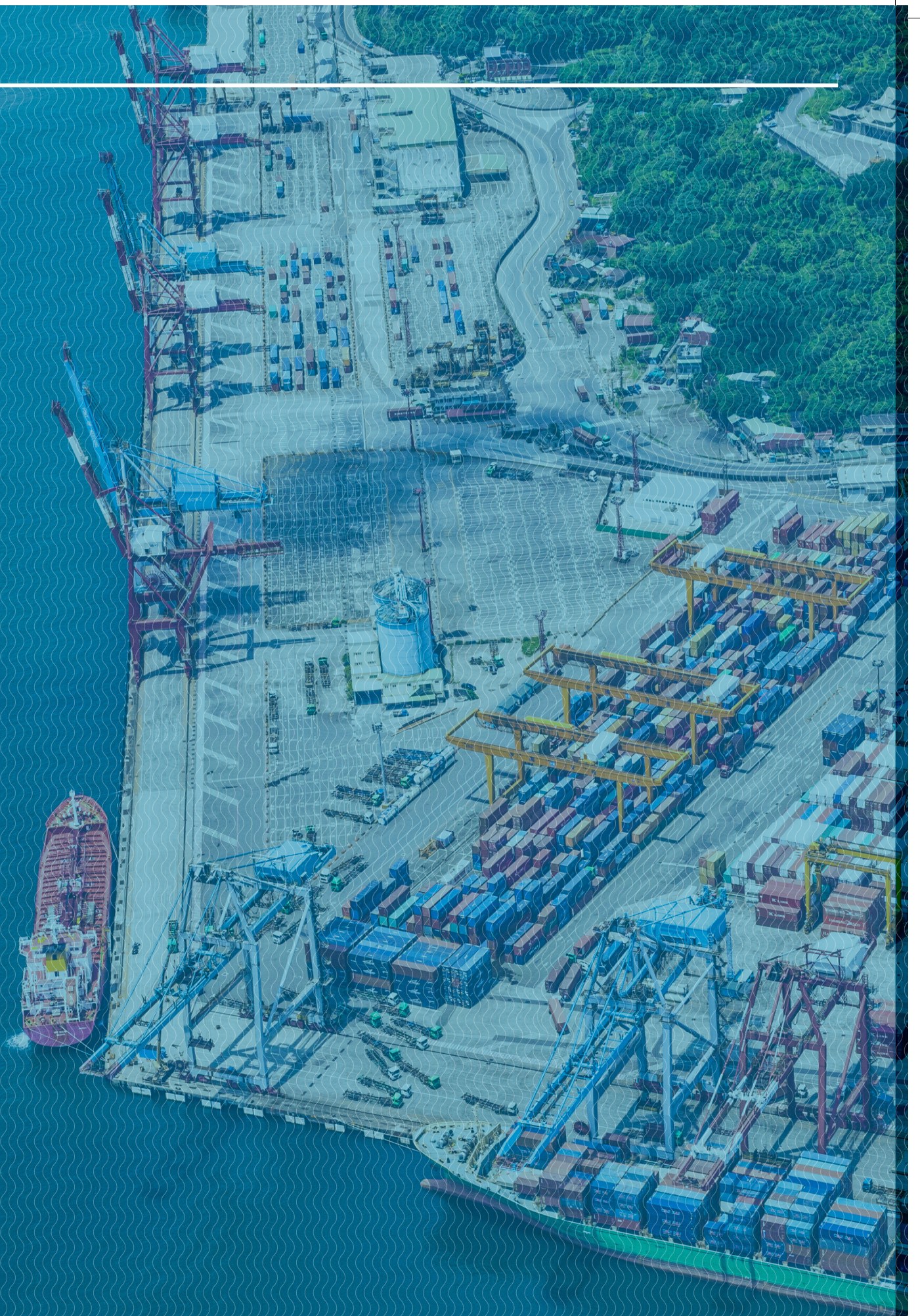
### 3.5 Stakeholders

The Keelung Branch of Taiwan International Ports Corporation, Ltd. places great importance on its stakeholders and actively engages in multi-channel communication to gather their concerns. These issues are considered and incorporated into the company's operations and environmental management strategies.

The Port of Keelung firmly believes that only by establishing smooth and effective communication channels with stakeholders can it stay attuned to the trends of the times, maintain port competitiveness, and create an ecologically sustainable green port.

Stakeholders	Concerns and the Corresponding	Top Ten Issues of the Port of Keelung
Employees (Colleagues)	Port air quality, dangerous goods management, dust, ship exhaust emissions, cargo spillage, etc.	<ul style="list-style-type: none"> <li>• Air Quality</li> <li>• Dangerous Goods (Handling/Storage)</li> <li>• Dust</li> <li>• Ship Exhaust Emissions</li> <li>• Cargo Spillage Volume (Handling)</li> </ul>
Suppliers or Contractors	Ship waste oil and sewage discharge, ship exhaust emissions, port air quality, vehicle emissions, ship waste discharge, etc.	<ul style="list-style-type: none"> <li>• Ship Sewage Discharge</li> <li>• Ship Exhaust Emissions</li> <li>• Air Quality</li> <li>• Vehicle Exhaust Emissions</li> <li>• Ship Waste</li> </ul>
Community or Local Groups	Port air quality, ship refueling operation management, dangerous goods management, ship exhaust emissions	<ul style="list-style-type: none"> <li>• Relationship with Local Community</li> <li>• Air Quality</li> <li>• Noise</li> <li>• River Pollution</li> <li>• Industrial Air Pollution Emissions</li> </ul>
Government	Port air quality, ship bunkering operations management, dangerous goods management, ship exhaust emissions, port development, ship ballast water discharge, and ship oily water discharge, etc.	<ul style="list-style-type: none"> <li>• Air Quality</li> <li>• Ship Refueling</li> <li>• Dangerous Goods (Handling/Storage)</li> <li>• Ship Exhaust Emissions</li> <li>• Port Development (Land-Based)</li> <li>• Ship Ballast (Water Discharge)</li> <li>• Ship Sewage Discharge</li> </ul>





# 04



## *State of the Environment*

## 4.1 Air Quality

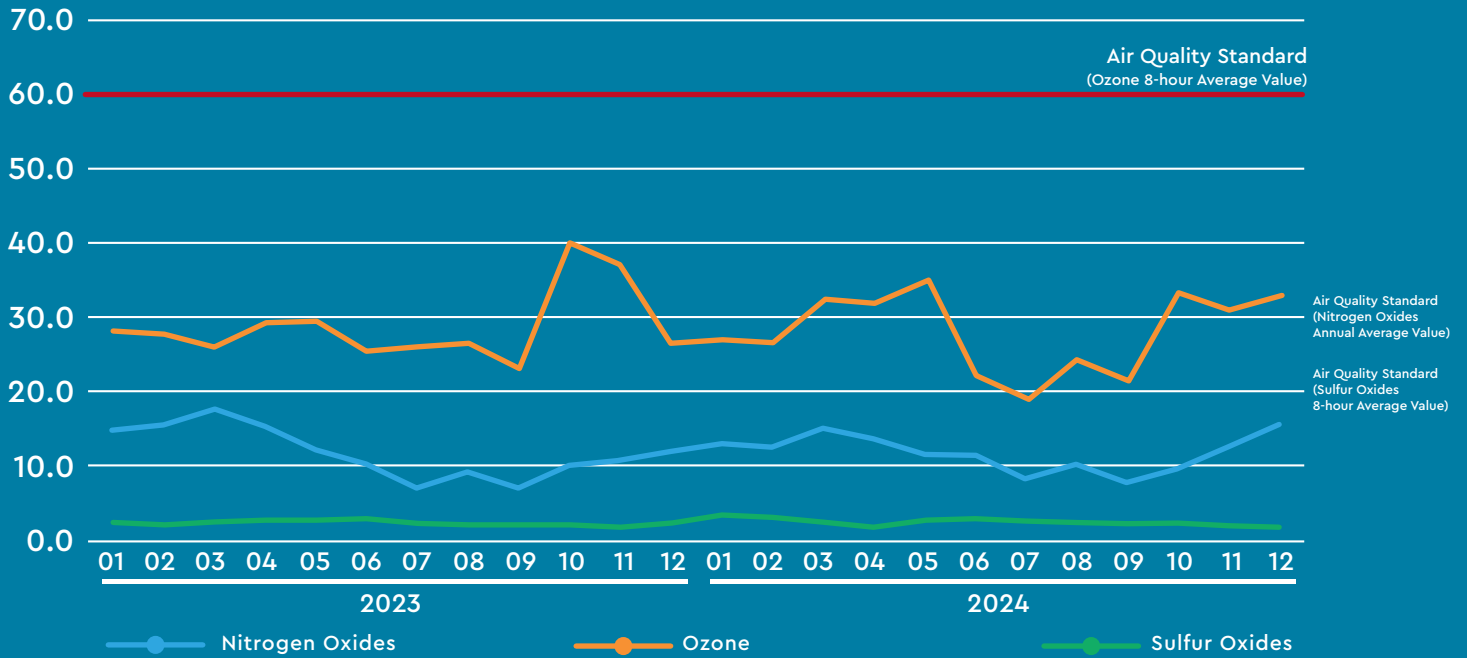
Air pollution in the Port of Keelung primarily originates from ship and vehicle exhaust emissions, cargo handling operations, and road dust. To improve air quality within the port, the Keelung Branch of Taiwan International Ports Corporation, Ltd. has been actively promoting the "Air Pollution Control Program for International Commercial Ports." In parallel, it assists the Environmental Protection Bureau of Keelung City in

regulating emissions from aging diesel vehicles. A 24-hour continuous monitoring station has been installed within the port area to monitor real-time air quality. The monitored parameters include particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), and wind speed.

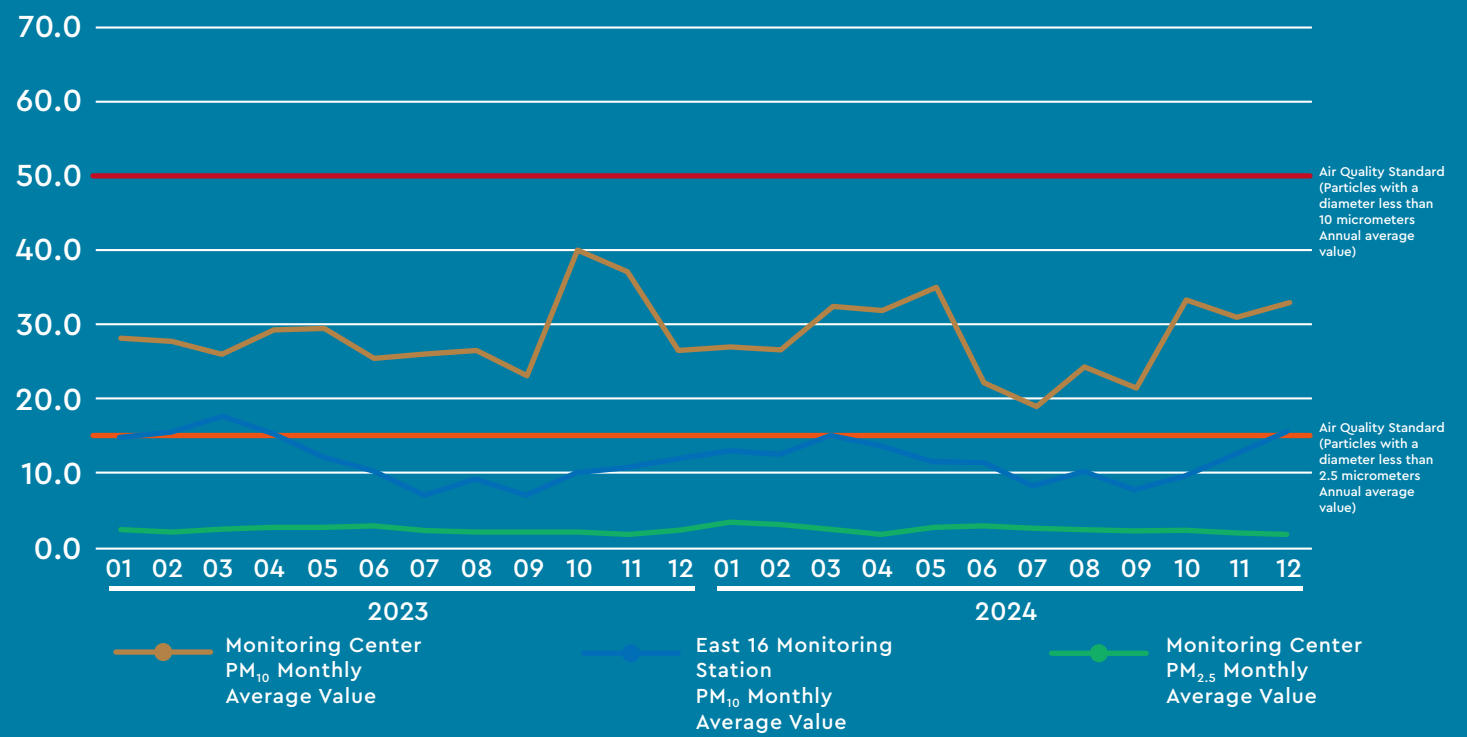


## 4.2 Air Quality Monitoring Results

Unit:PPb



Unit:  $\mu\text{g} / \text{m}^3$





### 4.3 Air Quality Improvement Strategies

To reduce the impact of ship exhaust emissions on air quality in the port area, the Keelung Branch of TIPC has, since 2018, continuously promoted ship emission-reduction measures—such as the use of low-sulfur fuel, expansion of shore power usage, and vessel speed reduction—in accordance with the “International Commercial Port Air Pollution Control Program.”

- low-pollution fuel

All ferries and tugboats operating in the Port of Keelung use low-pollution fuel. In addition, starting from 2019, ships entering the commercial port area of Keelung are required to use low-sulfur fuel with a sulfur content of 0.5% by weight or lower, or to adopt equipment or alternative fuels that achieve equivalent emission-reduction performance.

- vessel speed reduction

The Port of Keelung actively promotes vessel speed reduction, requiring ships to reduce their speed to an average of below 12 knots when navigating within 20 nautical miles of the port to reduce air pollutant emissions. In 2023, the vessel speed-reduction compliance rate reached 42.0%, achieving a carbon-reduction amount of 13,510.66 metric tons CO<sub>2</sub>e and reducing air pollutants by 396.93 tons. In 2024, the compliance rate was 42.2%, with a carbon-reduction amount of 13,425.21 metric tons and a reduction of 394.41 tons of air pollutants.

- Reducing Vehicle Exhaust Emissions

The Keelung Port area has been designated by the Keelung City Government as the air quality maintenance zone for the Keelung Port of Keelung City. All vehicles entering and leaving the port area are required to obtain the Diesel Vehicle Self-Management Label. Large diesel vehicles of Phases 1 to 3 under the jurisdiction of the Keelung Branch of TIPC undergo

annual smoke-emission inspections conducted by the Environmental Protection Bureau of Keelung City and are issued the Diesel Vehicle Self-Management Label. This measure not only reduces emissions from the vehicles themselves but also helps alleviate public concerns regarding diesel vehicles, thereby improving air quality in the port area.

In 2023, the inspection compliance rate reached 89%, and in 2024, the compliance rate was 80%. Compared with the period before 2022, the smoke-emission inspection compliance rate has remained above 80%.

- Shore Power Facilities

Currently, 13 piers in the Port of Keelung are equipped with low-voltage shore power facilities. Among these, 10 piers provide shore power exclusively for official vessels within the port (including cleaning boats, port service boats, customs vessels, coast guard, navy, etc.), with a usage rate of 100%. The remaining 3 piers provide shore power to cement carriers and domestic passenger and cargo ferries to reduce emissions while docked.

In addition, to promote the development of shore power infrastructure in Taiwan, the Keelung Branch has proactively collaborated with the Ministry of Environment and submitted the “Subsidy Program for Low-Voltage Shore Power Installation at the Passenger Terminal of the Port of Keelung.” This program received partial funding for the installation of low-voltage shore power equipment at West Pier No. 2, aimed at reducing ship emissions, improving the travel experience for passengers, and enhancing the air quality in surrounding port areas. This initiative also serves as a demonstration project for future national subsidy applications for shore power infrastructure in commercial ports.

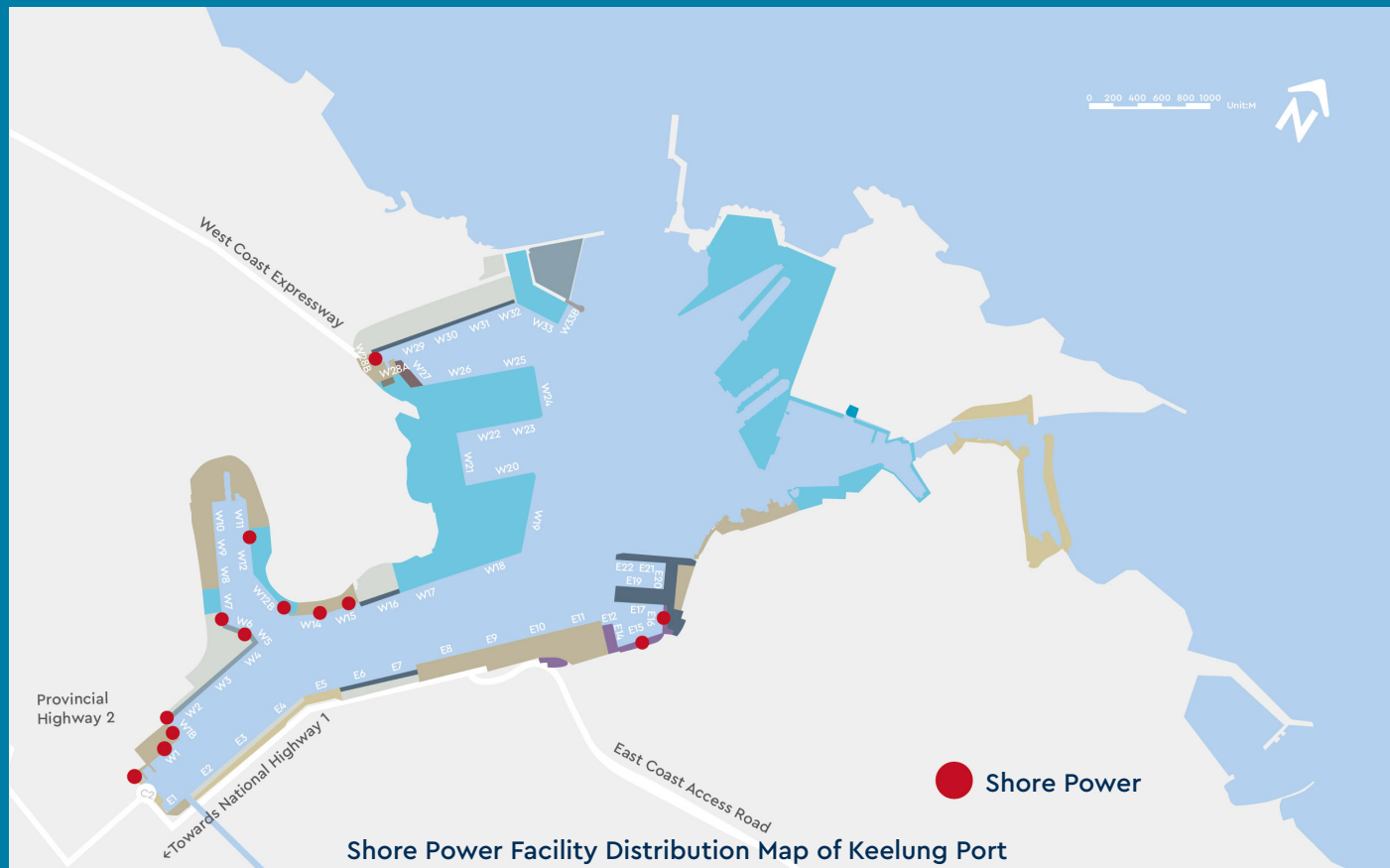


Keelung Port Shore Power Terminal Configuration

Usage by Unit	Cleaning Vessels/Touring Harbor Vessels/Small Boats	TIPC Marine Corporation, Ltd	Customs	Coastal Patrol	Navy	Cement Vessels/ Passenger & Cargo Ships
Pier	#West 1 Small Boat South Breakwater Wharf	#West1B #West5 #West28 #East15	#West1	#East16	#West11 #West14 #West15	#West2 #West7 #West12B

Keelung Port's Ship Speed Reduction Achievements and Benefits in 2023 and 2024

Year	(A)	(B)	(C)	Air Pollutant Reduction Effectiveness (Unit: ton)					
	Number of Vessels Meeting Deceleration Conditions	Number of Vessels with Average Speed	Deceleration Achievement Rate (%) (C=A/B)	Carbon Reduction (CO <sub>2</sub> e)	SO <sub>2</sub> (ton)	NOx (ton)	VOCs (ton)	PM <sub>10</sub> (ton)	PM <sub>2.5</sub> (ton)
2023	3,202	7,619	42.0%	13,510.66	125.59	218.41	9.75	23.99	19.19
2024	3,197	7,583	42.2%	13,425.21	124.79	217.03	9.69	23.83	19.07





## 4.4 Reduce Dust Pollution

To control dust and reduce air pollution, thereby maintaining a healthy working and living environment within both the port and surrounding urban areas, the Port of Keelung has implemented a series of measures. The Department of Occupational Safety and Health and the Stevedoring and Warehousing Business Department conducted inspections of port wharf operations, totaling 661 times in 2023 and 694 times in 2024. During these inspections, port shipping companies, cargo owners, transport vehicles, stevedoring companies, and other relevant operators were urged to comply with current environmental regulations and the provisions of the

Commercial Port Law.

In addition, the Port of Keelung has installed dust prevention equipment and vehicle washing platforms, and established the "Dust Control Work Management Procedures" to ensure stevedoring operators follow relevant operational regulations. Street sweepers and water sprinkler trucks are deployed daily to clean the bulk cargo handling areas and roads frequently used by transport vehicles within the port area, effectively reducing dust-related hazards.

### Dust Suppression Vehicle Control Strategy at the Port of Keelung

Aspect	Implementation Content
Vehicle Control	<ul style="list-style-type: none"><li>• The Port of Keelung collaborates with the Keelung City Government to implement the Diesel Vehicle Self-Management Program.</li><li>• License plate recognition and CCTV monitoring systems have been installed at port gate checkpoints.</li><li>• Regulations and supervision mechanisms are in place to ensure that dust covers on truck beds are pulled down by at least 15 cm and that vehicle exteriors are properly cleaned.</li><li>• Sprinklers have been installed to assist in dust suppression during gravel and stone ship loading and unloading operations, and a car wash platform is in place to clean gravel transport vehicles.</li></ul>
Equipment	<ul style="list-style-type: none"><li>• Number of sprinklers: 28 unit</li><li>• Number of vehicle washing stations: 1 unit</li><li>• Street washing vehicle: 1 unit</li><li>• Street sweeping vehicles: 2 units</li></ul>



Water Sprinkler Truck



Sprinkling Equipment



Water Sprinkler Truck



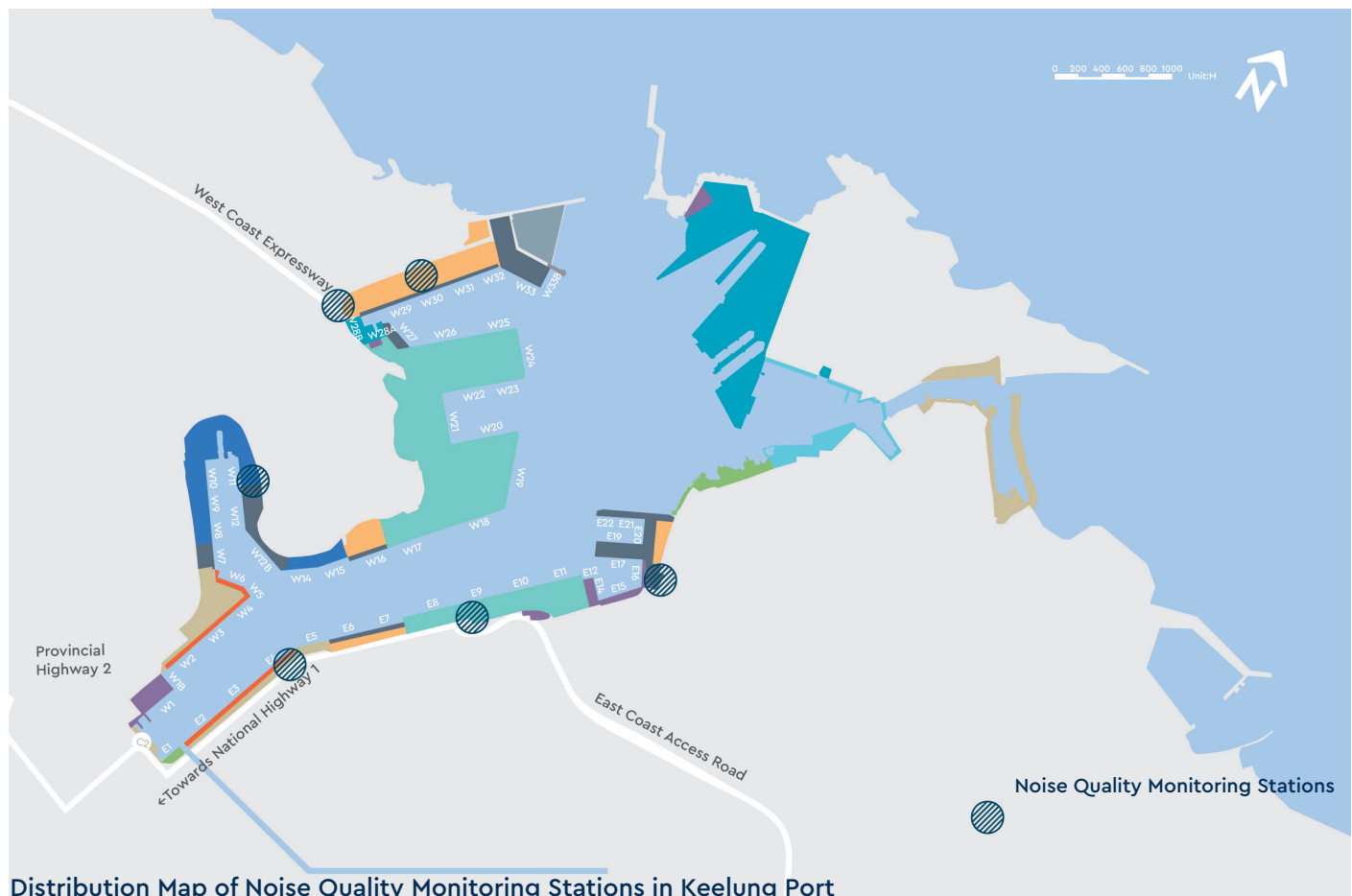
## 4.5 Port Noise

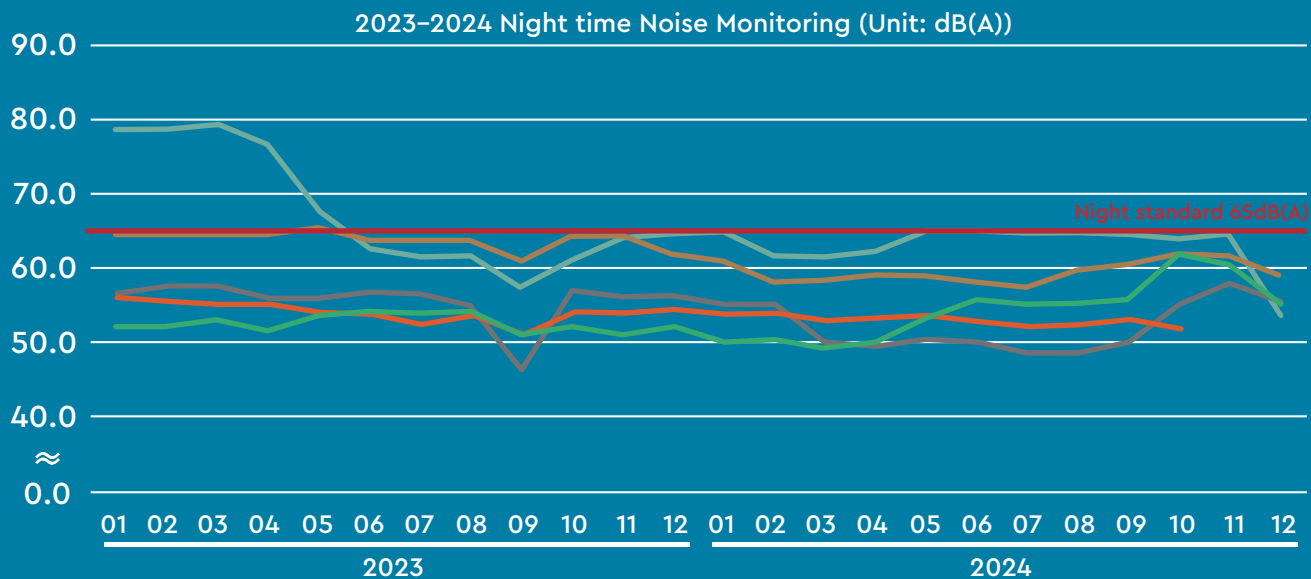
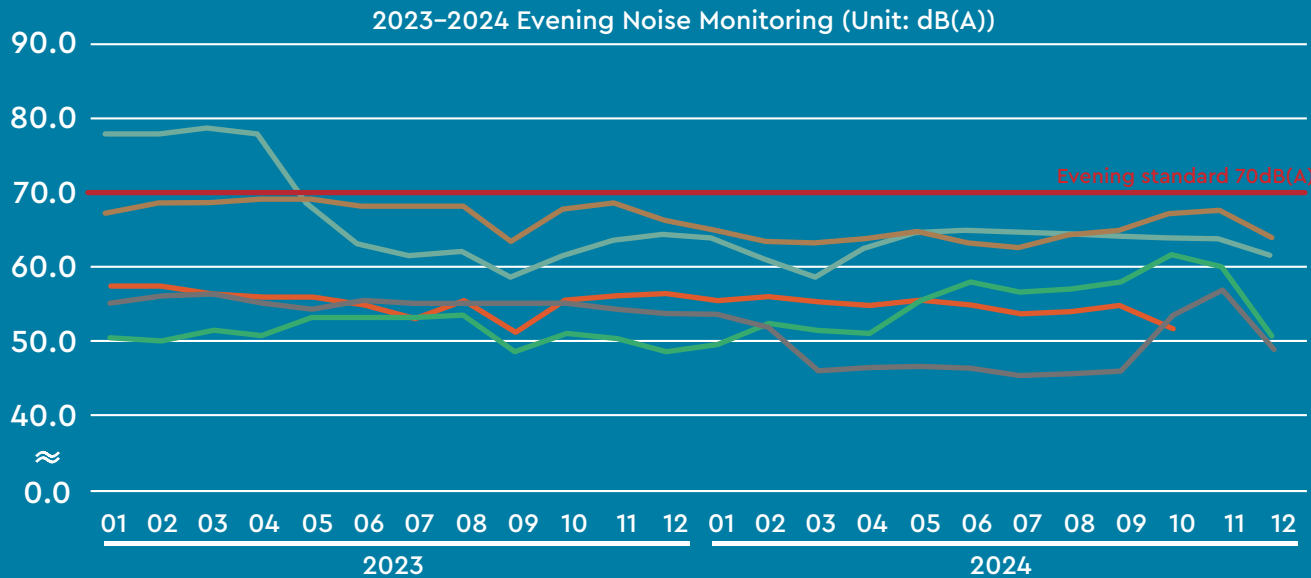
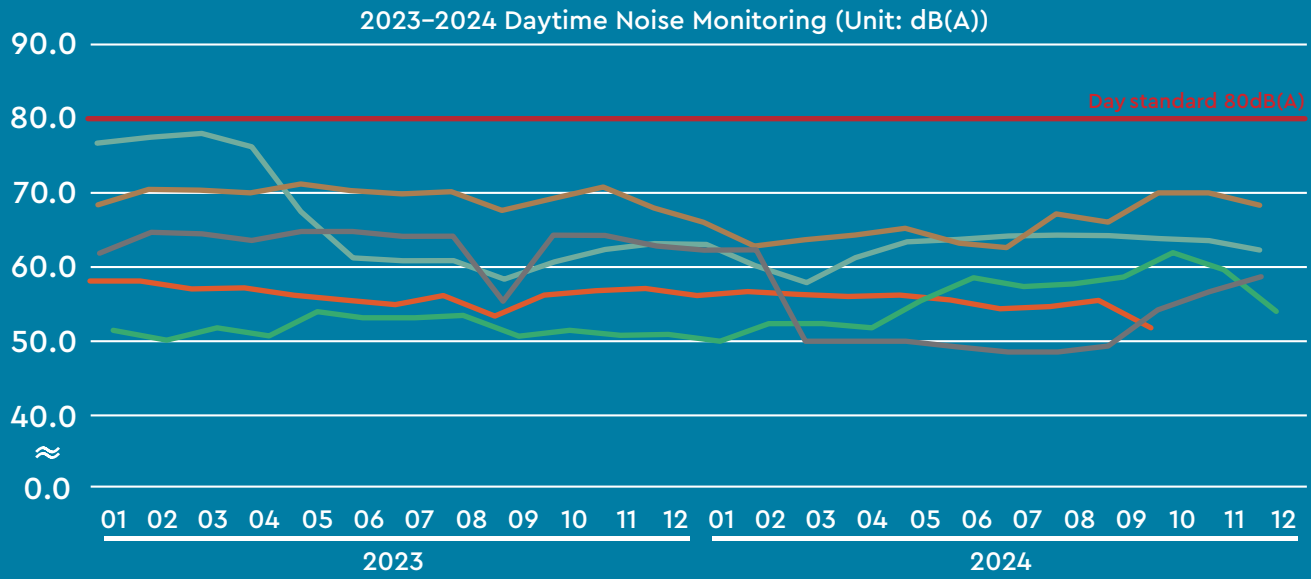
The Port of Keelung is located adjacent to the urban area of Keelung City, and noise generated by cargo handling, transportation activities, and traffic within the port area can easily affect the quality of life of nearby residents. To maintain the environmental quality of surrounding communities, the Port of Keelung requires all operators and vessels within the port area to comply with noise control standards during operations. In addition, to reduce noise from port-related vehicles, external transportation systems have been established on both the east and west coasts of the port to minimize the overlap between port traffic routes and residential traffic routes, thereby ensuring vehicle and pedestrian safety and maintaining community tranquility.

According to the announcement of the Keelung City Government, the Port of Keelung is designated as

a Category 4 noise control zone. Noise monitoring results for daytime, evening, and nighttime in both 2023 and 2024 were generally within regulatory limits. However, occasional exceedances were recorded at the central monitoring station during nighttime and evening periods, likely due to the influence of nearby construction zones causing abnormal monitoring values.

To reduce the impact of operational noise on surrounding residents, the Keelung Branch has installed noise monitoring devices at noise hotspots. In the event of anomalies, the source is investigated and addressed promptly. The branch also actively holds coordination meetings with stakeholders, encouraging adjustments to operational areas and working hours to mitigate noise disturbance.





Note: From January to May 2023, abnormal monitoring values were recorded due to the influence of nearby construction activities on the monitoring center equipment.



## 4.6 Reduce the Discharge of Ship Sewage

To prevent ships from discharging waste oil and sewage into the port area, the Port of Keelung requires all incoming vessels to properly manage their waste oil and sewage. In accordance with relevant regulations, waste (sewage), oil, waste materials, or other pollutants generated by ships must either be retained onboard or discharged to shore-based reception facilities, unless otherwise permitted to be discharged at sea by law.

In both 2023 and 2024, the ship waste oil and sewage reception operations at the Port of Keelung achieved a 100% compliance rate. In accordance with the "Port of Keelung Ship Waste Oil Disposal Guidelines," waste

oil and sewage from vessels are properly collected. In 2023, a total of 72 ship visits resulted in the collection of 950.1 metric tons of waste oil and sewage; in 2024, 123 ship visits yielded 1,335.23 metric tons.

Moving forward, the Port of Keelung will continue to collaborate with relevant authorities to conduct regular joint inspections of the environmental conditions of berthed ships, ensuring a 100% reception rate of waste oil and sewage, thereby preventing illegal discharge and protecting the water quality of the harbor.



## 4.7 Reducing Port Waste

To reduce port waste and promote waste minimization within the port area, the Port of Keelung actively implements resource recycling and reuse in line with the "Four-in-One Recycling Program" launched by the Ministry of Environment in 1997. In addition, the port enforces waste reduction measures and the "Mandatory Waste Sorting" policy introduced in 2005, which categorizes waste into three major types: recyclables, food waste, and general waste.

### Reduction of Land-Based Waste in the Port Area

Garbage bins are placed at designated locations near office areas throughout the Port of Keelung, with outsourced waste contractors responsible for regular collection and disposal. Business-related waste (including waste oil and water) generated by shipping companies, terminal lessees, and stevedoring firms must be disposed of through qualified waste disposal contractors.

In 2023, the total volume of general land-based waste collected was 1,307.994 metric tons, with 23.468 metric tons of recyclables collected, achieving a 100% collection execution rate. In 2024, the volume of general land-based waste collected was 1,188.705 metric tons, and 26.693 metric tons of recyclables were collected, maintaining a 100% execution rate.

### Reduction of Ship-Generated Waste

Ship-generated waste at the Port of Keelung is either collected by outsourced contractors arranged by the Keelung Branch of TIPC or, in the case of cruise liners and certain vessel operators, disposed of by contractors commissioned directly by the vessel operators or handled by the operators themselves. In 2023, the total amount of general ship waste collected was 672.28 metric tons, with 21.93 metric tons of recyclables collected, achieving a 100% execution rate. In 2024, the amount of general ship waste collected reached 763.98 metric tons, with 80.02 metric tons of recyclables, also achieving a 100% execution rate.



Garbage Bins within the Port Area



Garbage Collection by Cleaning Vehicles and Vessels



## 4.8 Strengthening Hazardous Goods Management in the Port Area

In the event of an incident involving hazardous materials within the Port of Keelung, the release of such substances may pose serious threats to the surrounding ecosystem and nearby residents. Therefore, proper cargo management and enhancing port safety are among the Port of Keelung's key environmental priorities.

In terms of management, the port follows the "Emergency Response Procedures for Toxic Chemical Leaks" issued by the Keelung Branch of TIPC. Regular coordination and communication are carried out with relevant units to enhance their response capabilities in the event of cargo leakage, thereby minimizing disaster impacts, protecting environmental and human safety, maintaining normal port operations, and reducing the risk of chemical-related incidents.

For cargo handling operations within the port, a designated hazardous goods zone has been

established in the container yard. Irregular inspections are conducted to ensure the proper management of dangerous goods. In both 2023 and 2024, a total of 12 supervisory inspections were carried out on the loading, unloading, storage, and transshipment operations of hazardous containers.

Regarding emergency response to cargo spills, a tabletop exercise simulating a hazardous material leak was conducted once in 2023. In 2024, an ethylene storage tank leak and fire emergency drill was conducted in coordination with the Maritime and Port Bureau's 2024 Keelung Port Large Passenger Ship Disaster Prevention and Rescue Drill.

Going forward, the port has set a target of conducting at least one emergency response drill per year and at least two joint safety supervisory inspections annually.



2024 Large Passenger Ship and Port Disaster Prevention and Rescue Drill at the Port of Keelung

## 4.9 Ship Refueling

For fueling operations involving tank trucks supplying fuel to ships or machinery within the Port of Keelung, the port has established the "Port of Keelung Tank Truck Fueling Application and Operation Management Guidelines." Tank truck operators must report their port entry and fueling operation details for each trip. Upon approval by the Keelung Branch, operators are required to provide or present the approved self-printed form for inspection by the designated entry control authority (Keelung Harbor Police Corps), if requested, and proceed along the designated route within the port to carry out fueling operations at the specified location.

In addition, the Keelung Branch conducts quarterly audits of fueling operators' activities and requires them to implement self-management procedures. These include verifying the safety setup of the fueling area prior to operations—such as the placement of oil containment booms or spill prevention barriers, safety railings, control station signage, availability of decontamination and firefighting equipment, and grounding cables. During fueling, compliance with the operational guidelines is monitored, and the post-operation condition of the fueling site is inspected to ensure cleanliness and prevent major pollution incidents in the port area.



Ship Refueling Operation Status



Tank Truck Fueling Operation for Ship (2,500 Liters of Ultra-Low Sulfur Diesel)



## 4.10 Cargo Spillage

The Port of Keelung follows the "Emergency Response Procedures for Toxic Chemical Substance Spills of the Keelung Branch of TIPC" to respond to chemical substance spill incidents or potential spill concerns within the international commercial port area. In coordination with the Ministry of Transportation and Communications and the Ministry of Environment, these emergency response measures aim to reduce disaster impacts, protect both the environment and human safety, maintain normal port operations, and minimize major hazards posed by chemical incidents.

Preventive and preparedness measures for chemical substance spill emergencies are implemented routinely, while coordination and communication with relevant support units are strengthened to establish

a joint emergency response system, ensuring the effective use of manpower and equipment resources. In 2023, there were 205 vessel calls involving chemical and dangerous goods; in 2024, the number increased to 219 vessel calls. For both years, the deployment rate of oil containment booms reached 100%.





deployment status of oil containment booms



2024 Keelung Port Large Passenger Vessel and Port Disaster Prevention and Rescue Exercise  
– Chemical Incident Response Scenario

## 4.11 Climate Change Response Measures

### Promotion of Corporate Sustainability

To implement corporate sustainability policies and strengthen sustainable development initiatives, Taiwan International Ports Corporation, Ltd. (TIPC) established the "Guidelines for the Establishment of the Sustainability Strategy Committee and Sustainability Promotion Committee of TIPC" in 2023. Under this framework, a three-tier governance structure was created, comprising the decision-making and advisory level "Sustainability Strategy Committee," the planning

and promotion level "Sustainability Promotion Committee," and the execution level "Sustainability Working Groups."

A "Sustainability Promotion Office" was also established, along with seven thematic working groups dedicated to environmental sustainability, workplace friendliness, social engagement, sustainable infrastructure, customer relations, risk management, and corporate governance, thereby advancing TIPC's overall sustainability development efforts.



TIPC Sustainability Governance Framework

### Greenhouse Gas Emission Inventory

Since 2013, the Port of Keelung has conducted a greenhouse gas (GHG) inventory every two years in accordance with ISO standards. For the Keelung Branch of TIPC, purchased electricity is the primary source of GHG emissions, while fuel consumption from machinery and vehicles is the secondary source. Together, these two categories account for more than 95% of total emissions.

The Port of Keelung has completed its GHG inventories for the years 2013 through 2023. The GHG inventory for 2024 is scheduled to be completed by the end of 2026.

Report Number: (TH24-013 / 第 1.0 版)

多項數據:

地址	直接溫室氣體排放量 (範圍 1)	能源間接溫室氣體排放量 (範圍 2)	間接溫室氣體排放量 (範圍 3)
臺灣國際港務股份有限公司 總公司	387,5310	309,8282	223,331,9607
臺灣國際港務股份有限公司 基隆港分公司	650,4484	4,232,6514	29,419,7754
臺灣國際港務股份有限公司 基隆港分公司 臺北港管理處	29,0692	1,391,2927	49,027,5364
臺灣國際港務股份有限公司 基隆港分公司 蘇澳港管理處	13,9461	234,7584	8,535,8678
臺灣國際港務股份有限公司 金中港分公司	345,2816	2,696,0839	755,116,4020
臺灣國際港務股份有限公司 高雄港分公司	2,132,3639	10,228,1059	210,460,6575
臺灣國際港務股份有限公司 高雄港分公司 安平港管理處	65,8816	674,6863	2,032,1194
臺灣國際港務股份有限公司 高雄港分公司 船隻管理處	32,8491	654,9616	891,8329
臺灣國際港務股份有限公司 高雄港分公司 內公管理處	18,6200	368,8625	4,583,9899
臺灣國際港務股份有限公司 花蓮港分公司	133,7293	609,8356	5,507,5406

第 4 頁 / 共 16 頁  
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Port of Keelung 2023 Greenhouse Gas Verification Statement

business item	emission factor (kgCO2e)		2023		2024	
	2023	2024	actual consumption (kWh)	carbon emissions (ton-CO2e)	actual consumption (kWh)	carbon emissions (ton-CO2e)
water consumption (m <sup>3</sup> )	0.158	0.150	140,179	22.1	171,986	9,774
electricity consumption (kWh)	0.494	0.474	8,929,644	4,411.2	10,055,561	4,766.3
fuel consumption (liters)	gasoline for vehicles	2,2631 (per liter)	101,711	230.1	110,370	249.7
Total			9,171,534	4,663	10,337,917	5,043

Note: Carbon emissions from resource consumption = (actual consumption × emission factor)

### Greenhouse Gas Emission Reduction Strategies

In line with the national 2050 net-zero emissions policy, the Keelung Branch has formulated carbon-reduction targets and measures for 2020 (baseline year) through 2030 (Scope 1 and Scope 2 GHG emissions). The reduction target is 4.2% for the period 2021–2025 and 5.8% for 2026–2030. These goals will be achieved through deep energy conservation, voluntary reduction measures, greenhouse gas inventory, installation of renewable energy systems, and carbon sequestration through vegetation planting.

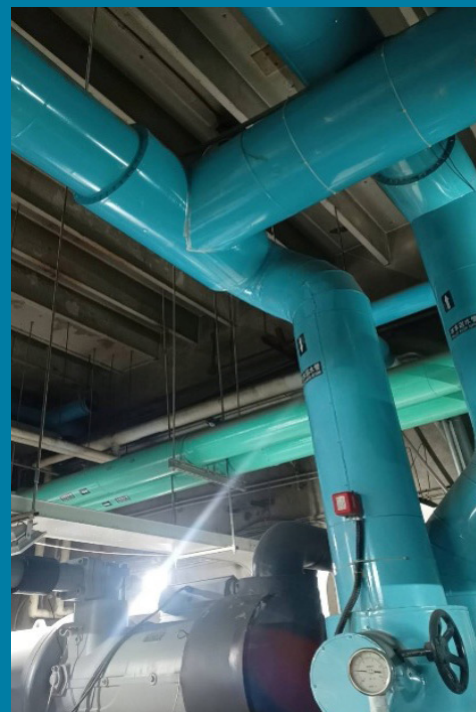
1. Deep energy conservation: Replacement of lighting fixtures, air conditioners, and chiller units.
2. Greenhouse gas inventory: Completing GHG inventory operations to understand the carbon footprint and develop management and reduction strategies.
3. Voluntary reduction: Establishing baseline monitoring data as the basis for voluntary reduction applications, helping reduce electricity use and carbon emissions.
4. Renewable energy generation: Installation of solar panels at West 27 of the Port of Keelung to achieve self-use power generation or renewable energy certificate trading, thereby reducing carbon emissions.
5. Vegetation-based carbon sequestration: Conducting a tree survey in 2025 and planning additional planting in the port area to absorb CO<sub>2</sub> and increase carbon sequestration, thereby reducing carbon emissions.



solar panels on the rooftop of West 7 warehouse



replacement of chiller unit



replacement of chiller unit



## 4.12 Keelung Port Environmental Performance Index

Ten Significant environmental issues of the Keelung Port		Index item	Calculation method	Index target
1	Air quality	Qualification rate of air quality indices: suspended particulate matter (PM <sub>10</sub> and PM <sub>2.5</sub> ), SO <sub>2</sub> , NO <sub>2</sub> and O <sub>3</sub>	Rate of air quality measurements meeting the Air Quality Standards (measured at harbor test stations)	<ul style="list-style-type: none"> <li>• Minimum standard for daily average PM<sub>10</sub>: 100.00%</li> <li>• Minimum standard for daily average PM<sub>2.5</sub>: 85.00%</li> <li>• Minimum standard for hourly average SO<sub>2</sub>: 99.95%</li> <li>• Minimum standard for hourly average NO<sub>2</sub>: 100.00%</li> <li>• Minimum standard for hourly average O<sub>3</sub>: 97.00%</li> </ul>
		Replacing old devices with energy-saving devices	Proportion of use of electric gantries or overhead cranes	Number of inspections reached 600 times per year.
2	Dangerous Goods Management	Number of Port Patrols, Cargo Leakage Emergency Response Drills, and Joint Safety Supervisions in the Port Area.	Number of Port Patrols, Cargo Leakage Emergency Response Drills, and Joint Safety Supervisions in the Port Area.	Inspecting the implementation of self-management by container yard operators at least 10 times a year. Emergency response drills shall be conducted once per year. Joint port safety supervision shall be conducted at least twice per year.
3	Reducing Ship Exhaust Ggas Emissions	Proportion of harbor service vessels using low-pollution fuel (including fuels with a sulfur content of 0.5% or below).	Number of port service vessels using low-pollution fuel (marine diesel oil or super diesel) ÷ Total number of port service vessels × 100%	Proportion of port service vessels using low-pollution fuel reaches 100%
		Vessel speed restriction policy	Number of Promotions for Vessel Reducing Speed Upon Entry	Maintain at least 100 sessions annually.
		Ships deceleration target completion rate	The automatic identification system for ship deceleration is applied to determine the deceleration of ships within 20 sea miles from the port	The achieved speed reduction rate was 40%
		Ratio of service vessels using shore power	Number of service vessels using shore power ÷ total number of service vessels × 100%	All service vessels using shore power

	SDG Alignment	Description of calculation	
		2023	2024
	SDG 13: Take urgent action to combat climate change and its impacts (SDG 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning)	<ul style="list-style-type: none"> <li>PM<sub>10</sub> daily average pass rate: 99.91%</li> <li>PM<sub>2.5</sub> daily average pass rate: 99.92%</li> <li>SO<sub>2</sub> hourly average pass rate: 100.00%</li> <li>NO<sub>2</sub> hourly average pass rate: 100.00%</li> <li>O<sub>3</sub> hourly average pass rate: 100.00%</li> </ul>	<ul style="list-style-type: none"> <li>PM<sub>10</sub> daily average pass rate: 99.93%</li> <li>PM<sub>2.5</sub> daily average pass rate: 99.95%</li> <li>SO<sub>2</sub> hourly average pass rate: 100.00%</li> <li>NO<sub>2</sub> hourly average pass rate: 100.00%</li> <li>O<sub>3</sub> hourly average pass rate: 100.00%</li> </ul>
		<ul style="list-style-type: none"> <li>Total number of inspections is 661 times.</li> </ul>	<ul style="list-style-type: none"> <li>Total number of inspections is 694 times</li> </ul>
	SDG 8: Promote inclusive and sustainable economic growth, employment and decent work for all (SDG 8.8: Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, particularly women migrants, and those in precarious employment)	<ul style="list-style-type: none"> <li>A total of 12 inspections were conducted to check the self-management situation of container yard operators in the port area.</li> <li>One tabletop exercise on hazardous material leakage was conducted in 2023.</li> <li>Two joint port safety supervisions were carried out.</li> </ul>	<ul style="list-style-type: none"> <li>A total of 12 inspections were conducted to check the self-management situation of container yard operators in the port area.</li> <li>In 2024, one ethylene storage tank leakage and fire emergency response drill for CSBC Corporation was conducted in conjunction with the Maritime and Port Bureau's "Keelung Port Large Passenger Vessel Disaster Prevention and Rescue Exercise."</li> <li>Two joint port safety supervisions were carried out.</li> </ul>
	SDG 13: Take urgent action to combat climate change and its impacts (SDG 13.3: Improve education, awareness-raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning)	<ul style="list-style-type: none"> <li>The ratio of port service vessels using low-pollution fuel is 100%.</li> </ul>	<ul style="list-style-type: none"> <li>The ratio of port service vessels using low-pollution fuel is 100%.</li> </ul>
		<ul style="list-style-type: none"> <li>Set the system to automatically send speed reduction notices to incoming vessels every hour, totaling 8,760 times.</li> <li>Advocacy during ship berth meetings, a total of 249 times</li> </ul>	<ul style="list-style-type: none"> <li>Set the system to automatically send speed reduction notices to incoming vessels every hour, totaling 8,760 times.</li> <li>Advocacy during ship berth meetings, a total of 249times.</li> </ul>
		<ul style="list-style-type: none"> <li>The achieved speed reduction rate was 42.0%</li> </ul>	<ul style="list-style-type: none"> <li>The achieved speed reduction rate was 42.2%</li> </ul>
		<ul style="list-style-type: none"> <li>Ratio of service vessels using shore power: 100%</li> </ul>	<ul style="list-style-type: none"> <li>Ratio of service vessels using shore power: 100%</li> </ul>



## 4.12 Keelung Port Environmental Performance Index (continued)

Ten Significant environmental issues of the Keelung Port		Index item	Calculation method	Index target
4	Waste/ Port Waste Management	Port Area Terrestrial Waste Collection Volume and Recycling Rate	<ul style="list-style-type: none"> <li>Port Area Waste Collection Volume</li> <li>Port Area Waste Collection Efficiency Rate</li> </ul>	Port Area Waste Collection Efficiency Rate: 100%
		Ship Waste Collection Efficiency Rate	<ul style="list-style-type: none"> <li>Ship Waste Collection Volume</li> <li>Ship Waste Collection Efficiency Rate</li> </ul>	Ship Waste Collection Efficiency Rate: 100%
5	Dust	Frequency of street washer dispatches and water sprayers facilities inspection	<ul style="list-style-type: none"> <li>Frequency of street washer dispatches</li> <li>water sprayers facilities inspection</li> </ul>	Street sweeper vehicles should be on duty for at least 240 days a year. The total distance covered by street sweeping should be at least 15,000 kilometers annually.
		Gravel and Stone Loading and Unloading Vehicle Cleaning Ratio	Annual target: Every year, the ratio of gravel and stone loading and unloading vehicles that pass through the car wash station before leaving the port area.	Expected ratio of vehicles passing through the car wash station before leaving the port area: 100%
		Water Consumption of the Sprinkling Equipment at the Gravel and Stone Unloading Pier	Water Consumption of the Sprinkling Equipment at the Gravel and Stone Unloading Pier	Annual Targeted Water Consumption for the Sprinkling Equipment: 35,000 units.
6	Ship Discharge (Sewage)	Number of Vessels Serviced for Waste Oil and Sewage Collection	Number of Vessels Serviced Annually	The execution rate of waste oil and sewage treatment by qualified contractors reached 100%.
		Volume of Waste Oil and Sewage Re-ceived	Annual Volume Re-ceived	
		Execution Rate of Waste Oil and Sewage Treatment by Qualified Contractors	Ratio of Waste Oil and Sewage Collection Executed by Contractors to Total Number of Accepted Service Requests	

	SDG Alignment	Description of calculation	
		2023	2024
	SDG 12: Ensure sustainable consumption and production patterns to promote a green economy (SDG 12.5: Substantially reduce waste generation through prevention, reduction, recycling, and reuse)	In 2023, the total waste collected from terrestrial areas was 1,307.994 metric tons, with a recycling volume of 23,468 metric tons, and a waste collection efficiency rate of 100%.	In 2024, the total waste collected from terrestrial areas amounted to 1,188.705 metric tons, with a recycling volume of 26,693 metric tons, and a waste collection efficiency rate of 100%.
		In 2023, the amount of general ship waste collected was 672.28 metric tons, with a resource recycling quantity of 21.93 metric tons. The collection efficiency rate was 100%.	In 2024, the amount of general ship waste collected reached 763.98 metric tons, with a resource recycling quantity of 80.02 metric tons. The collection efficiency rate was 100%.
	SDG 11: Make cities and human settlements inclusive, safe, resilient, and sustainable (SDG 11.6: Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management)	<ul style="list-style-type: none"> <li>The street sweeper vehicles were on duty for a total of 249 days.</li> <li>The total distance covered by street sweeping was 20,865 kilometers.</li> </ul>	<ul style="list-style-type: none"> <li>The street sweeper vehicles were on duty for a total of 249 days.</li> <li>The total distance covered by street sweeping was 21,337 kilometers.</li> </ul>
		<ul style="list-style-type: none"> <li>The number of gravel trucks entering and exiting was 119,320 vehicles, with a 100% passing rate through the car wash station.</li> </ul>	<ul style="list-style-type: none"> <li>The number of gravel trucks entering and exiting was 133,177 vehicles, with a 100% passing rate through the car wash station.</li> </ul>
		<ul style="list-style-type: none"> <li>Actual Water Consumption for one year: 23,148 units.</li> </ul>	<ul style="list-style-type: none"> <li>Actual Water Consumption for another year: 18,519 units.</li> </ul>
	SDG 14: Conserve and sustainably use the oceans, seas and marine resources to ensure biodiversity and prevent degradation of the marine environment (SDG 14.1: Prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution SDG 14.2: Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience and acting for their restoration to achieve healthy and productive oceans)	<ul style="list-style-type: none"> <li>A total of 72 vessel services were executed</li> </ul>	<ul style="list-style-type: none"> <li>A total of 123 vessel services were executed</li> </ul>
		950.1 metric tons of waste oil and sewage were collected	1,335.23 metric tons of waste oil and sewage were collected
		Execution rate: 100%	Execution rate: 100%



## 4.12 Keelung Port Environmental Performance Index (continued)

Ten Significant environmental issues of the Keelung Port		Index item	Calculation method	Index target
7	Noise	Daily qualification rate for harbor noise quality	Daily rate of qualified noise quality measurements at harbor test stations*the harbor plant site is a Type 4 noise control zone, meaning that noise is limited to 80 db during daytime (7 AM to 7 PM), 70 db during evenings (7 PM to 11 PM), and 65 db during nighttime (11 PM to 7 AM	Port noise quality: 100.00% seasonal daytime qualification rate, 95.00% evening, and 93.00% nighttime
8	Vehicle Exhaust Emissions	Compliance rate for smoke emission tests of large diesel vehicles from Phases 1 to 3 transiting the Keelung Port area.	Compliance rate for smoke emission tests of large diesel vehicles from Phases 1 to 3 transiting the Keelung Port area.	The compliance rate for smoke emission tests of Phase 1 to Phase 3 heavy-duty diesel vehicles transiting the Port of Keelung has exceeded 80% compared to prior to 2022.
9	Ship Refueling	Compliance rate of ship refueling operations with safety and environmental regulations	Number of refueling operations complying with Article 9 of the "Guidelines for Application and Operational Management of Oil Tank Truck Refueling in the Port of Keelung" ÷ Total number of refueling operations × 100%	The proportion of operations in compliance with regulations reaches 99%

	SDG Alignment	Description of calculation	
		2023	2024
	<p>SDG 11: Make cities and human settlements inclusive, safe, resilient, and sustainable (SDG 11.6: Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management)</p>	<ul style="list-style-type: none"> <li>Daytime equivalent sound energy level (Leq): 100.00%</li> <li>Evening Leq: 100.00%</li> <li>Nighttime Leq: 100.00% (excluding abnormal data)</li> </ul>	<ul style="list-style-type: none"> <li>Daytime equivalent sound energy level (Leq): 100.00%</li> <li>Evening Leq: 100.00%</li> <li>Nighttime Leq: 100.00%</li> </ul>
	<p>SDG 13: Take urgent action to combat climate change and its impacts through strengthened mitigation and adaptation measures.</p>	<ul style="list-style-type: none"> <li>Compliance rate for the test is 89%</li> </ul>	<ul style="list-style-type: none"> <li>Compliance rate for the test is 80%</li> </ul>
	<p>SDG 14: Conserve and sustainably use marine ecosystems to ensure biodiversity and prevent marine environmental degradation (SDG 14.1: Prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution SDG 14.2: Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, enhance their resilience, and undertake restoration actions to ensure healthy and productive oceans)</p>	<ul style="list-style-type: none"> <li>In 2023, a total of 454 applications were submitted for fueling vessels using tank trucks, with 1 violation reported.</li> <li>Execution rate: 99.7%</li> </ul>	<ul style="list-style-type: none"> <li>Compliance rate for the test is 80.2%</li> </ul>



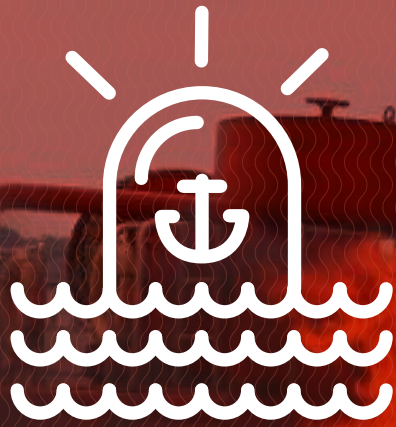
## 4.12 Keelung Port Environmental Performance Index (continued)

Ten Significant environmental issues of the Keelung Port		Index item	Calculation method	Index target	
9	Ship Refueling	Number of reported abnormal incidents during ship refueling operations	Annual total number of incidents caused by improper refueling operations, including oil pollution, equipment malfunction, fire intrusion, or lack of protective measures	No more than 1 incident per year	
		Annual compliance rate of fuel service providers' operational plan reviews	Number of qualified operators that comply with the "Guide-lines for Application and Operational Management of Oil Tank Truck Refueling in the Port of Keelung" and have pollution prevention and emergency response plans ÷ Total number of refueling service providers × 100%	100% approval rate in operational plan reviews	
		Proper disposal rate of waste generated from ship refueling operations	Number of refueling-related waste items properly disposed of by qualified contractors ÷ Total number of waste items generated × 100%	100% approval rate in operational plan reviews	
10	Cargo Spillage	Boom Deployment Rate for Chemical and Oil Tankers	Formula: Number of Boom Deployments for Chemical and Oil Tankers ÷ Number of Chemical and Oil Tanker Calls × 100%	Boom Deployment Rate for Chemical and Oil Tankers Reached 100%	

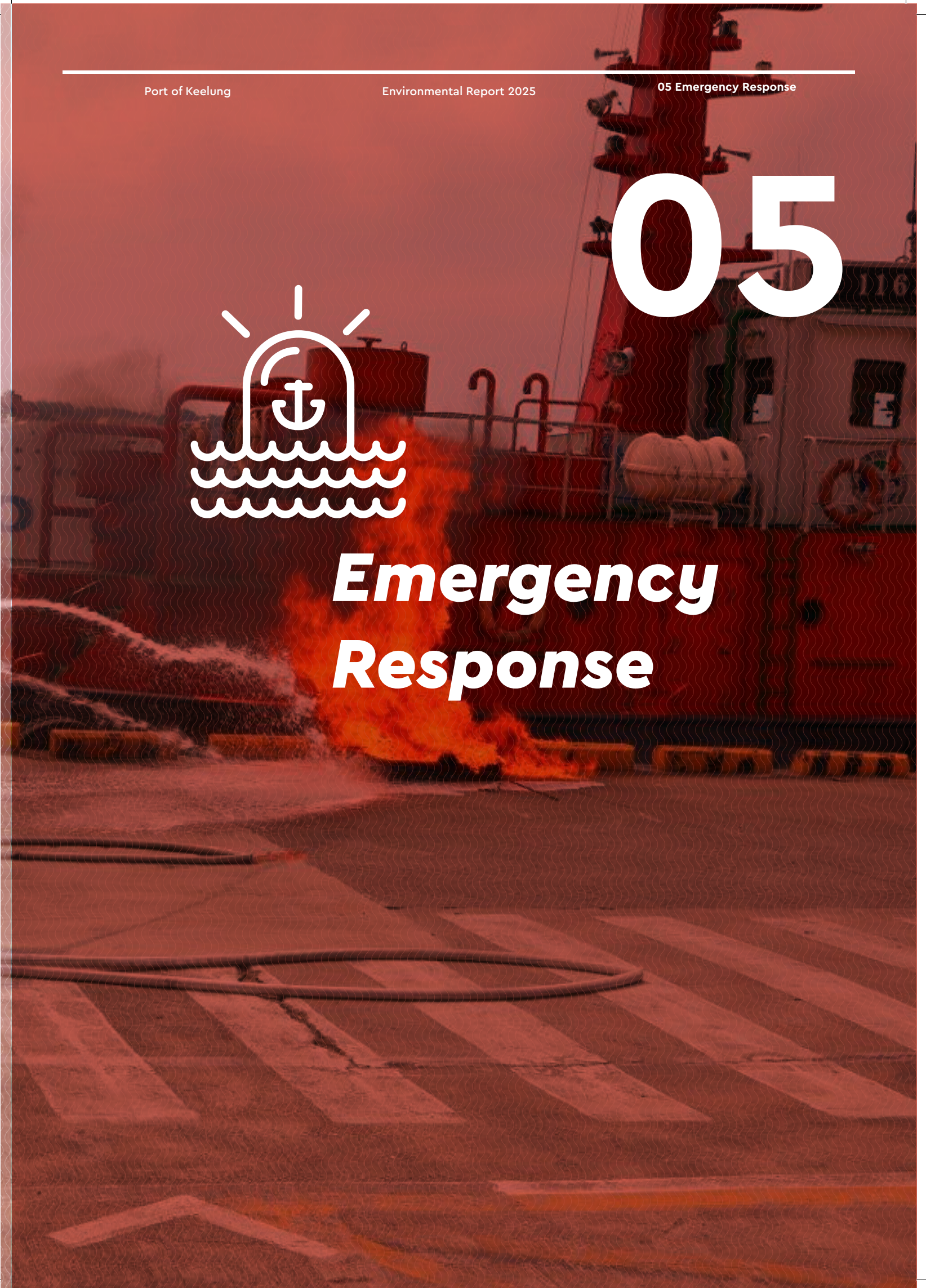
	SDG Alignment	Description of calculation	
		2023	2024
	SDG 14: Conserve and sustainably use marine ecosystems to ensure biodiversity and prevent marine environmental degradation (SDG 14.1: Prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution SDG 14.2: Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, enhance their resilience, and undertake restoration actions to ensure healthy and productive oceans)	<ul style="list-style-type: none"> <li>In 2023, a total of 454 applications were submitted for fueling vessels using tank trucks, with 1 violation reported.</li> <li>Execution rate: 99.7%</li> </ul>	<ul style="list-style-type: none"> <li>In 2024, a total of 406 applications were submitted for vessel refueling operations using tank trucks, with 1 violation reported.</li> <li>Execution rate: 99.7%</li> </ul>
		One violation occurred in 2023. On June 13, 2023, at West Pier No. 29 of the port, a newly purchased fuel hose ruptured while diesel was being refueled to the vessel "Dong Yong No. 8" using a tank truck, resulting in seawater pollution. The operator was fined by the Maritime and Port Bureau.	<ul style="list-style-type: none"> <li>In 2024, there was one incident: on April 5, during the refueling of the vessel Taima Star with low-sulfur fuel oil using a tank truck, a valve joint on the hose detached, causing fuel to leak from the tank onto the sea surface from the pier. The Maritime and Port Bureau imposed a penalty.</li> </ul>
		<ul style="list-style-type: none"> <li>In 2023, six operators applied for approval to provide fuel via tank trucks to vessels or machinery within the Port of Keelung, and all passed the qualification review.</li> <li>Qualification rate: 100%</li> </ul>	<ul style="list-style-type: none"> <li>In 2024, six operators applied to conduct vessel or machinery refueling using tank trucks within the Port of Keelung, and all passed the qualification review.</li> <li>Qualification rate: 100%</li> </ul>
	SDG 14: Conserve and sustainably use the oceans, seas and marine resources to ensure biodiversity and prevent degradation of the marine environment (SDG 14.1: Prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution SDG 14.2: Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience and taking action for their restoration in order to achieve healthy and productive oceans)	<ul style="list-style-type: none"> <li>A total of 205 chemical and oil tanker calls</li> <li>Boom deployment rate for chemical and oil tankers: 100%</li> </ul>	<ul style="list-style-type: none"> <li>A total of 219 chemical and oil tanker calls</li> <li>Boom deployment rate for chemical and oil tankers: 100%</li> </ul>



# 05



## ***Emergency Response***





## 5.1 Emergency Response

To maintain a safe operational environment in the port area, the Port of Keelung assigns personnel to conduct weekly inspections of the land-side environment. When suspected pollution activities are identified, personnel provide on-site guidance, initiate emergency response actions, or report the situation to competent enforcement authorities for penalties. In 2023 and 2024, most incidents within the port area involved vessel-related mechanical failures and vessel collisions.

For pollution and disaster-related incidents in the port area, the Keelung Branch of TIPC, the Environmental

Protection Bureau of Keelung City, and the Northern Navigation Center of the Maritime and Port Bureau all provide complaint and reporting channels for relevant units to communicate and respond. The Port of Keelung has also established emergency response procedures for port-related disaster events—such as vessel incidents, fires, explosions, and other major port accidents—to ensure appropriate crisis management in the event of an emergency.

### Environmental Inspection and Referral Statistics of the Port of Keelung

Inspection Count (times)	2023	2024
Port Environmental Inspection	661	694
Referral for Disposal	0	2

The Port of Keelung enforces controls on bulk cargo handling operations and the storage of hazardous materials. It strengthens cargo handling management to prevent overloading or spillage, enhances port area inspections, supervises operator practices, and reinforces communication and coordination mechanisms for emergency response among relevant agencies.



### Number of Accident Occurrences at the Port of Keelung

Accidents/Annual	2023	2024
Ship collision, sinking, capsizing, fire, oil pollution, and other chemical spills	5	5
Ship mechanical failures, operational malfunctions, tilting, and grounding	6	5
Significant warehouse and storage tank fires, explosions, and chemical spills	3	2
Person overboard, occupational safety accidents, marine debris, and others	5	3



Drill and Joint Supervision Records of the Port of Keelung from 2023 to 2024

Date	Drill Record	Content
2023.04.24 2023.06.01	2023 Joint Supervision and Inspection of Port Operators in the Northern Maritime Administration Jurisdiction	In accordance with Article 29 of the Regulations for Commercial Port Administration and the "Implementation Guidelines for the Safety Supervision of Dangerous Goods Operations in Port Areas" issued by the Maritime and Port Bureau, the Keelung Branch collaborates with the Northern Navigation Center to carry out joint supervision operations and conducts inspections of port area tenants.
2023.05.26	2023 Designated Drill for Critical Infrastructure Protection at the Port of Keelung	Through the simulation scenario of this drill, the Port of Keelung validated the responsibilities and response measures of its safety and security units when facing major man-made security incidents during peacetime and military crises during wartime. The exercise also tested the mechanisms for inter-agency coordination and emergency communication across peace and wartime, the wartime response actions of the Keelung Port Special Protection Corps, the maintenance of the port's core operational functions, self-defense and self-rescue capabilities, and overall operational resilience. By engaging all port safety and protection units along with military and police support units in jointly designing, discussing, and simulating the scenarios and response actions, the exercise also aimed to identify deficiencies in the Port of Keelung's Critical Infrastructure Protection Plan. This process allows for rolling updates to the security protection plan, thereby amplifying the effectiveness of the drill.
2024.03.18 2024.04.02	2024 Joint Supervision and Inspection of Port Operators in the Northern Maritime Administration Jurisdiction	In accordance with Article 29 of the Regulations for Commercial Port Administration and the "Implementation Guidelines for the Safety Supervision of Dangerous Goods Operations in Port Areas" issued by the Maritime and Port Bureau, joint supervision operations are carried out in coordination with the Northern Navigation Center to inspect and assess the operations of all port area tenants.
2024.07.04	2024 Large Passenger Ship and Port Disaster Prevention and Rescue Drill at the Port of Keelung	The Ministry of Transportation and Communications (MOTC) and the Keelung City Government jointly conducted the "2024 Large Passenger Ship and Port Disaster Prevention and Rescue Drill" at the Port of Keelung. The exercise scenario centered on a maritime disaster involving the New Taimar Ferry, which caught fire in the engine room while carrying 300 passengers off the coast of the Port of Keelung. The drill simulated a compound emergency incorporating helicopter hoist rescues, mass passenger evacuation systems, assistance from recreational fishing vessels for transport, mass casualty evacuation and triage, oil pollution response, and a drone attack scenario.



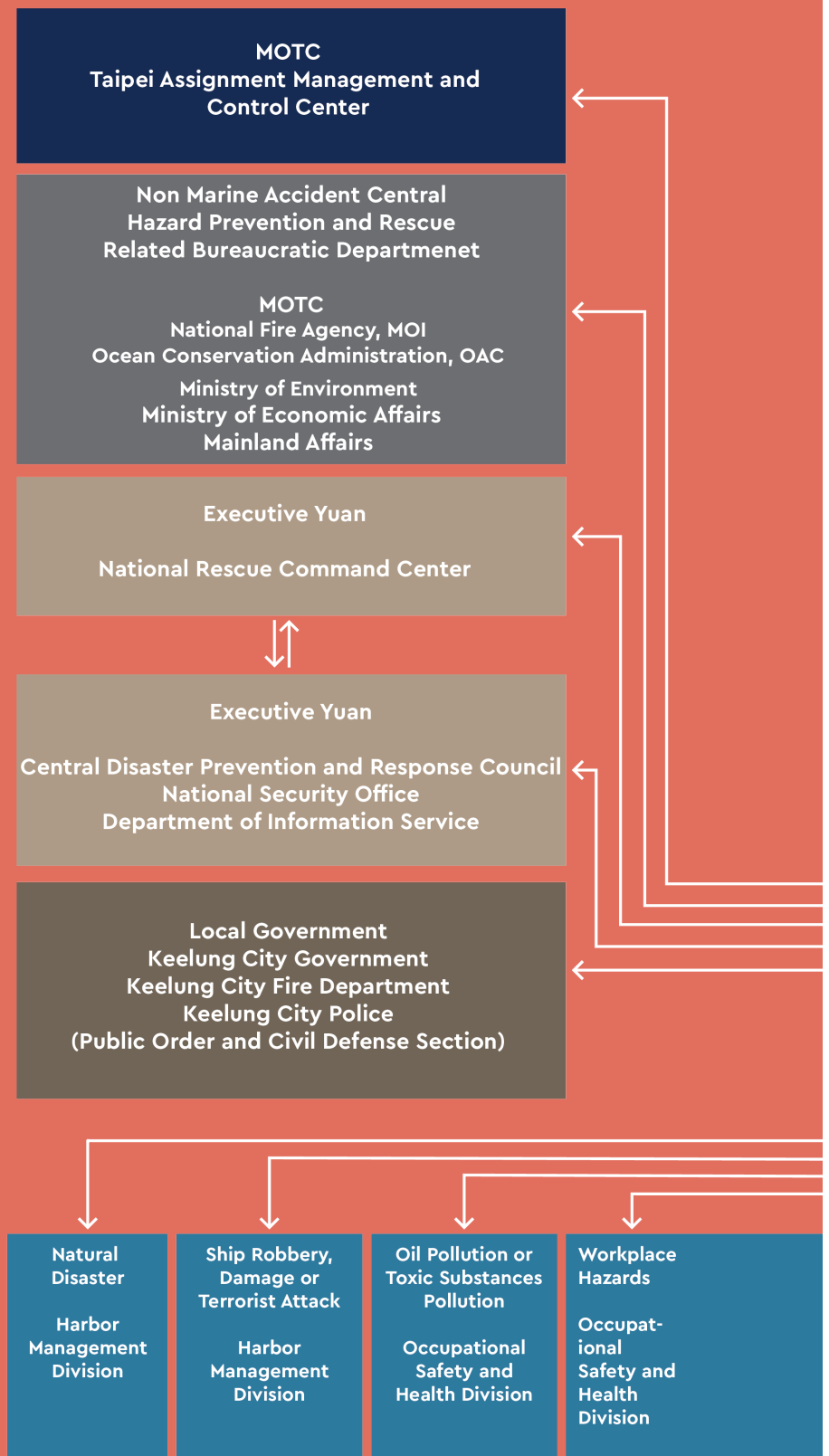
2024 Joint Supervision and Inspection of Port Operators in the Northern Maritime Administration Jurisdiction

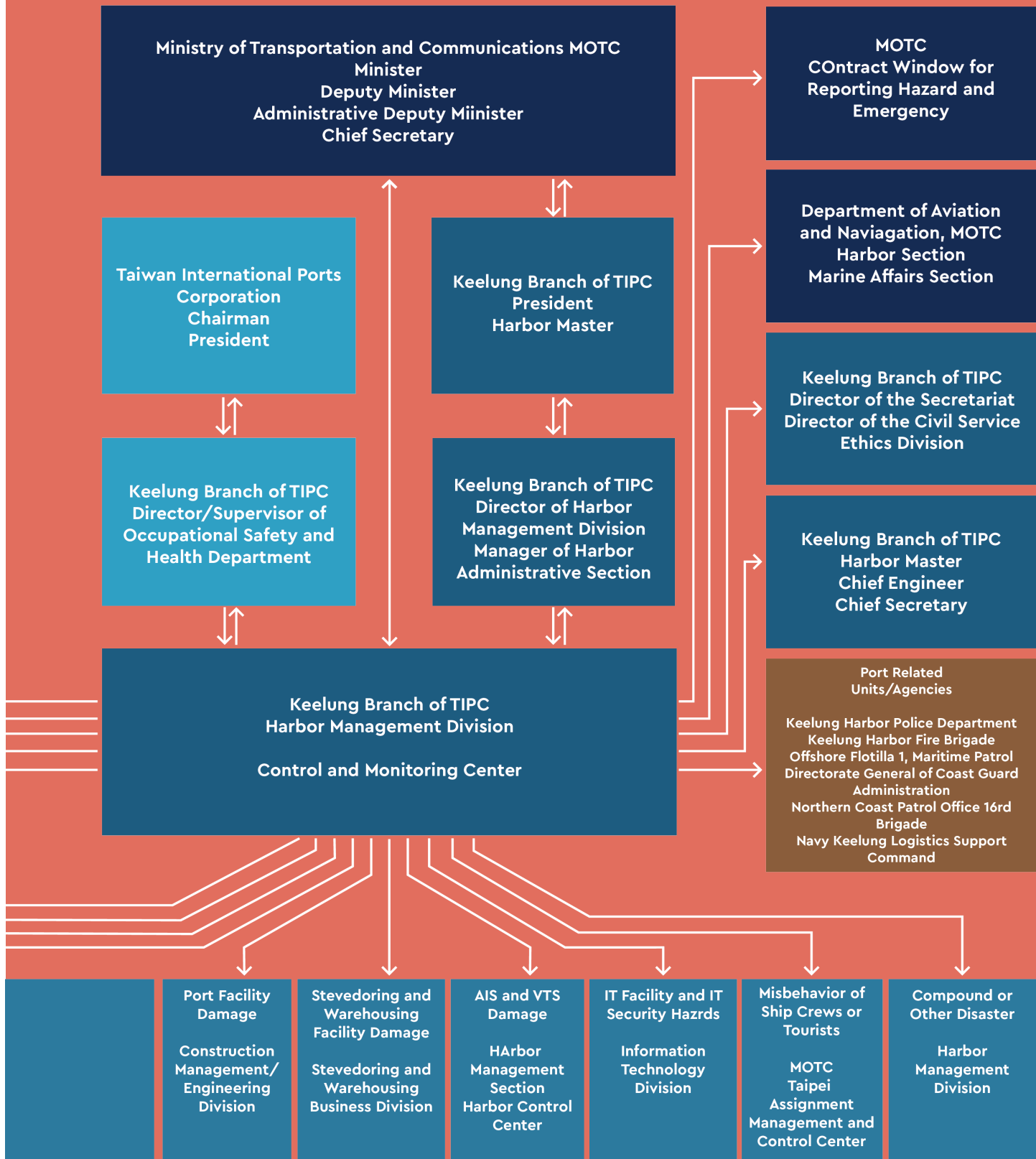


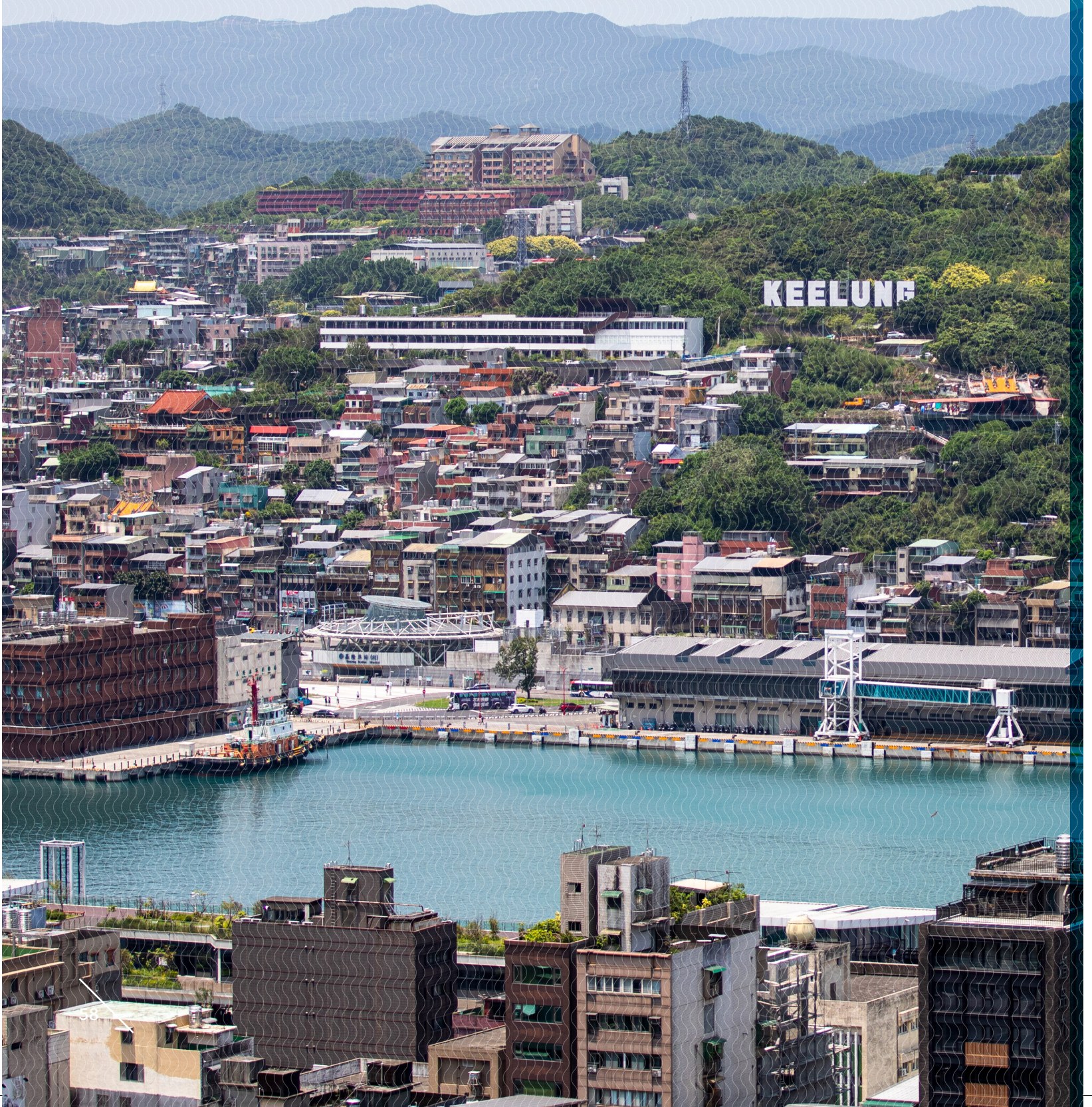
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## 5.2 Flow Chart for Disaster and Accident Notification in Port of Keelung







KEELUNG

# 06



## ***Involvement and Cooperation***





## 6.1 Smart Energy Management System

### A. Concerns / Motivation

In response to Taiwan's 2050 Net-Zero Emissions pledge and action plan, four major transitions have been identified as national goals: energy transition, industrial transition, lifestyle transition, and social transition. Among these, energy transition aligns with global trends and is particularly critical. To fulfill its ESG commitments and promote sustainable corporate development, the Keelung Branch has adopted the "Smart Port" framework as its core strategy and is actively implementing the "Smart Energy Management System" in two phases. Starting from foundational energy management, the system integrates AI and IoT applications to intelligently monitor and improve energy efficiency throughout the port.

### B. Solution

To address the energy management needs of its three ports—Keelung Port, Taipei Port, and Su'ao Port—the Keelung Branch implemented Phase 1 of the Smart Energy Management System between 2023 and 2024. This phase included the installation of smart water meters, smart electricity meters, substation security systems, water resource allocation systems, terminal facility monitoring, and public street lighting control. In Phase 2 (2025–2026), the system will incorporate electricity accountability zoning, smart air conditioning systems, and power generation systems. Each port collects data through its own subsystems, which are then integrated and uploaded to a unified Smart Energy Management System. The system provides real-time monitoring of water and electricity usage, lighting controls, air conditioning status, power generation and consumption from renewable systems, and alerts for abnormal events—facilitating effective energy management and the formulation of future energy-saving measures.

### C. Implementation / Timeline

- Phase 1 of the Smart Energy Management System: 2023–2024 (Completed)
- Phase 2 of the Smart Energy Management System: 2025–2026 (In Progress)

### D. Investment Amount

- Phase 1 (2023–2024): Investment amount was NT\$99,590 thousand.
- Phase 2 (2025–2026): Estimated investment amount is approximately NT\$205,700 thousand.
- Cost composition analysis for Phases 1 and 2 of the Smart Energy Management System project:



Cost Category	Item Description	Phase 1 Amount (Unit: NT\$1,000)	Phase 2 Amount (Unit: NT\$1,000)	Total	Percentage	Category
Hardware Costs	Smart Water and Electricity Meters	10,350	12,300	22,650	7.4%	61.0%
	LED Replacement for Work Lights	31,070	0	31,070	10.2%	
	Streetlight Monitoring	675	6,200	6,875	2.3%	
	Security Management	5,130	0	5,130	1.7%	
	Water Resource Management	1,350	0	1,350	0.4%	
	Energy Storage and Generation	1,580	57,500	59,080	19.4%	
	Central Air Conditioning	0	60,000	60,000	19.7%	
Transmission Costs	Physical Network Links	9,200	14,650	23,850	7.8%	11.4%
	Wireless Networks (4G, Microwave)	6,650	4,350	11,000	3.6%	
System Development Costs	Network Servers	3,700	3,480	7,180	2.4%	13.7%
	Cybersecurity Equipment / Licensing / Services	10,800	1,220	12,020	3.9%	
	Software Systems	9,485	13,000	22,485	7.4%	
Others	Others (Occupational Safety, Miscellaneous, Insurance, Warranty, Taxes)	9,600	33,000	42,600	14.0%	14.0%
Total		99,590	205,700	305,290	100%	100%



## 6.1 Smart Energy Management System (continued)

### E. Results / Benefits

- Benefit Analysis of Phase 1 of the Smart Energy Management System Project:

#### (1) Benefits of Installing Smart Water and Electricity Meters:

Benefits	Description
Statistical Reports	Saves approximately 72 man-hours per year for report generation (2 hours × 3 people × 12 months)
Billing Reports	Saves approximately 216 man-hours per year for report generation (6 hours × 3 people × 12 months)
Reduction in Outsourced Meter Reading Labor	Estimated cost savings of NT\$1 million per year
Detection and Tracing of Abnormal Electricity Usage (Including Electricity Theft)	When abnormal electricity or water usage is detected over a sustained period, the system sends an alert message to enable prompt investigation. It also continuously records abnormal usage patterns for future tracking and analysis.
Water Leak Detection and Source Tracing	

#### (2) Benefits of Lighting System Installation

Benefits	Description
Reduction in labor required for timer setting	Saves approximately 36 man-hours annually (6 hours × 3 people × 2 times)
Reduction in on-site labor for switching work lights	Saves approximately 1,800 man-hours annually (1 hour × 5 people × 360 times)
Electricity cost savings through LED lighting	Annual electricity savings of approximately 770,000 kWh (267 kW × 360 days × 8 hours)
Fast control via grouping and scheduled automation	Annual carbon reduction of approximately 364.98 metric tons CO <sub>2</sub> <sup>e</sup> (770,000 kWh × emission factor of 0.474 kg CO <sub>2</sub> <sup>e</sup> /kWh)
Recording of lighting usage hours	Customizable group control of lighting fixtures enables easier operational management.

#### (3) Benefits of Water Resource Management Installation

Benefits	Description
Digitized water-saving data	Annual water savings of approximately 12,000 kiloliters (Su'ao Port: 9,599 kl + Taipei Port: 2,342 kl)
Reduction in labor for checking water storage levels	Saves approximately 470 man-hours annually (1 hour × 1 person × 470 cruise ship calls)
(1 hour × 1 person × 470 cruise ship calls)	The system allows real-time monitoring of water storage levels and usage in tanks.
Monitoring of water storage in critical areas	When abnormal water levels are detected, the system sends alert notifications for prompt investigation, while continuously recording the anomalies for future tracking and root cause analysis.
Recording of water storage levels	Predictive lighting replacement schedules allow for advance procurement of spare parts, reducing downtime caused by equipment failure.



#### (4) Effectiveness of Abnormal Event Monitoring and Management

Abnormal Event Category	Number of Events	Event Analysis	Response and Countermeasures
Disconnection or Equipment Damage Due to Construction	<ul style="list-style-type: none"> <li>3 incidents of disconnection or damage due to construction</li> </ul>	<ul style="list-style-type: none"> <li>Damage to conduits, wiring, or equipment caused by construction negligence</li> </ul>	<ul style="list-style-type: none"> <li>Conduct on-site inspections prior to construction to confirm the locations of pipelines and equipment within the work area</li> <li>In the event of damage to water or electricity meter equipment, water and power supply will be shut off on-site, and the contractor will be required to compensate and carry out repairs</li> <li>Request equipment warranty (maintenance) vendors to enhance labeling and signage</li> </ul>
Lighting Fixture Malfunction	<ul style="list-style-type: none"> <li>10 circuit trips occurred</li> </ul>	<ul style="list-style-type: none"> <li>Due to the coastal environment, wiring in the port area deteriorates rapidly, leading to short circuits or overheating and resulting in occasional circuit breaker trips</li> <li>Circuit trips caused by overloads in the work light circuits or malfunctioning breakers</li> </ul>	<ul style="list-style-type: none"> <li>Prioritize replacement of aging wiring in areas with frequent circuit trips or critical zones, and continue to improve the port's lighting and electrical infrastructure</li> <li>Reconfigure lighting circuits and replace faulty circuit breakers</li> </ul>
	<ul style="list-style-type: none"> <li>4 incidents of lighting fixture or related equipment damage</li> </ul>	<ul style="list-style-type: none"> <li>Malfunctions in streetlights or related equipment</li> </ul>	<ul style="list-style-type: none"> <li>Schedule repairs for malfunctioning streetlights or equipment</li> </ul>
Substation Data Abnormality	<ul style="list-style-type: none"> <li>2 incidents of water accumulation</li> <li>1 incident of high temperature</li> </ul>	<ul style="list-style-type: none"> <li>Water accumulation inside the substation caused by heavy rainfall and poor drainage (no impact on substation equipment)</li> <li>Substation temperature exceeded 55°C</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced sealing of leak-prone areas and improved drainage by clearing pipelines</li> <li>Increased inspections, improved substation ventilation, and evaluated the need for installing air conditioning</li> </ul>
Abnormal Water and Electricity Data	<ul style="list-style-type: none"> <li>1 incident of abnormal electricity meter data</li> <li>1 incident of abnormal water meter data</li> </ul>	<ul style="list-style-type: none"> <li>Current transformer failure in the substation</li> <li>Pipeline water leakage</li> </ul>	<ul style="list-style-type: none"> <li>Replaced the current transformer and included it in the biannual high-voltage substation inspection schedule</li> <li>On-site inspection and repair of the leakage point</li> </ul>



## 6.1 Smart Energy Management System (continued)

- Benefit Analysis of Phase 2 of the Smart Energy Management System Project:

### (1) Electricity Accountability Zoning:

Evaluate various port locations—such as administrative buildings, piers, warehouses, and passenger terminals—and install smart meters or reconfigure power circuits to define electricity responsibility zones. This facilitates the classification and monitoring of office use, operational use, public use, and leased electricity use. By observing electricity consumption data from each smart meter, high-consumption patterns can be analyzed to reduce unnecessary power expenditure or formulate power-saving policies and mechanisms. The collected data also serves as a basis for future carbon inventory calculations and energy dispatch planning.

### (2) Integration of Smart Air Conditioning Monitoring:

Replace outdated central air-conditioning equipment such as chillers and pumps. Collect energy consumption data from the central air systems at the Keelung Port Tower, East and West Passenger Terminals, Navigation Control Center, and Taipei Port Administration Building. Through AI-powered intelligent analysis, the system can automatically adjust settings such as temperature, airflow, and operating zones. Efficiency is improved through both hardware upgrades and AI-based software control. Old and energy-intensive chillers are also replaced to enhance cooling performance and reduce electricity usage. Based on an emissions factor of 0.474 kg CO<sub>2</sub><sup>e</sup> per kWh, the estimated cumulative carbon reduction over 15 years is approximately 8,687.27 metric tons of CO<sub>2</sub><sup>e</sup>.

### (3) Renewable Energy Generation Facility and System Implementation:

In support of the national net-zero emissions policy, solar power systems will be installed at the following port locations:

-Keelung Port Warehouse No. 27 West (Installed capacity: 558 kW; Annual generation: 470,000 kWh)

-Taipei Port Administration Building Podium (Installed capacity: 129 kW; Annual generation: 120,000 kWh)

-Su'ao Port Warehouse No. 15 (Installed capacity: 125 kW; Annual generation: 120,000 kWh)

The power generated by the solar energy systems will be used locally within the port, reducing electricity

expenses while supporting sustainable development goals. With a total estimated annual solar power generation of 710,000 kWh and an emission factor of 0.474 kg CO<sub>2</sub><sup>e</sup>/kWh, the estimated cumulative carbon reduction over 20 years is approximately 6,091.37 metric tons of CO<sub>2</sub><sup>e</sup>.

### (4) Integration of the Smart Energy Management System:

Phase 1 and Phase 2 components will be integrated into a unified Smart Energy Management System. A centralized interface and consolidated data collection platform will enhance user accessibility. The system will support the generation of data reports and statistics, enabling the company to formulate future energy policies and energy-saving/carbon-reduction measures more effectively.

## F. Environmental Relevance

- Energy conservation, carbon reduction, and smart management contribute to the goal of sustainable development, promoting the digital transformation of port management toward a smart, green, and sustainable future.

## G. Stakeholders

- Port area operators.

## H. Related UN Sustainable Development Goals (SDGs)

- SDG 9 – Industry, Innovation and Infrastructure: Build resilient infrastructure.
- SDG 13 – Climate Action: Take urgent action to combat climate change and its impacts.

## I. Contact Information

- Director, Maintenance Management Department, Keelung Branch of TIPC
- E-mail: s002@twport.com.tw



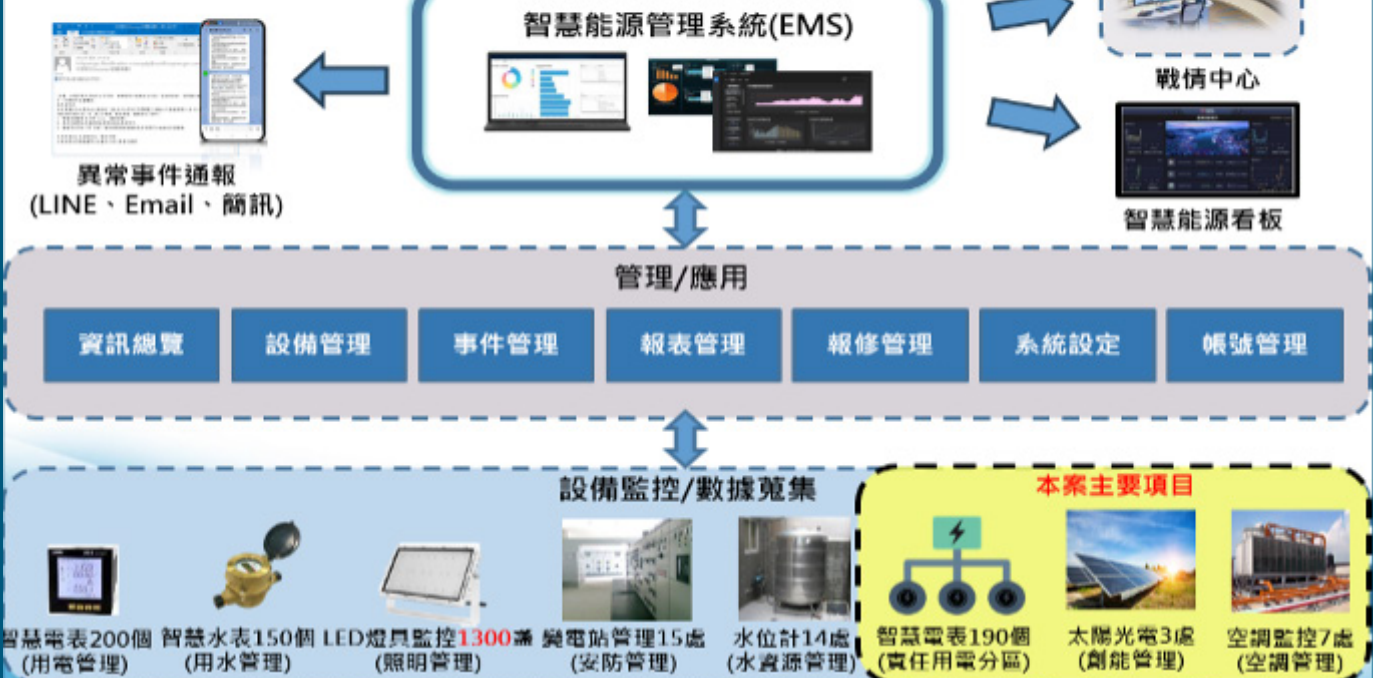
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建置期程:112年~113年·結算經費:99,590千餘元。



### 智慧能源管理系統(第二期)\_架構

建置期程:114年~115年·建置經費:205,700千餘元。





## 6.2 High-Voltage Shore Power for Cruise Ships

### A. Concerns / Motivation

In response to the "Taiwan Shore Power Pilot Program" launched by the Ministry of Environment in 2023, the Keelung Branch—positioned as a major international cruise home port—recognizes the global trend toward implementing shore power systems for vessels. Supplying shore power allows the port to meet the increasing electricity demands of cruise ships while significantly reducing air pollution and carbon emissions caused by fuel-based power generation during berthing. This initiative also aligns with the cruise home port policy, contributing to the national gateway image and advancing the goal of environmental sustainability.

### B. Solution

An Alternative Maritime Power (AMP) system will be installed at the port to provide grid electricity or renewable energy, thereby reducing environmental impacts during cruise vessel berthing. The engineering

design will follow the principles of simplicity, minimal environmental disturbance, and the shortest possible construction period, and will also take into account integration with the site of the Keelung City Government's East No. 4 Flood Pumping Station.

### C. Implementation / Timeline

- Start Date: Design phase initiated on February 26, 2025; construction phase begins on June 30, 2025.
- Completion Date: Expected to be completed by December 31, 2026.

### D. Investment Amount

- Cost Composition Analysis for High-Voltage Shore Power Installation for Cruise Ships:

Item	Unit	Quantity	Amount
High-Voltage Shore Power Substation Switchgear Equipment	Model	1	33,780
High-Voltage Tie Transformer	set	1	20,000
Cable Management System (CMS Shore Side) with Cable Handling Unit	Model	1	50,000
High-Voltage Shore Power Box	set	2	10,000
High-Voltage Cable and Conduit Works	Model	2	20,000
East No. 4 Pumping Station Building	Model	1	39,350
Provisional Works	Model	1	5,190
Contractor's Site Management, Profit, and Construction All-Risk Insurance	Model	1	23,180
Traffic Control, Quality Management, Occupational Safety, and Environmental Cleaning Fees	Model	1	8,020
High-Voltage Shore Power Substation Switchgear Equipment	Model	1	10,480
Total			220,000



### E. Results / Benefits

- Reduces air pollutants (PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, and CO<sub>2</sub>) generated by cruise ships during berthing using fuel combustion.
- With one completed shore power system, it is estimated that at least 20 cruise ship calls homeported in Keelung can connect to shore power each year, potentially replacing 12,000 metric tons of fuel (based on a 10,000-kW cruise ship berthing for 12 hours).

### F. Environmental Relevance

- Air quality preservation and net-zero emissions at the Port of Keelung.

### G. Stakeholders

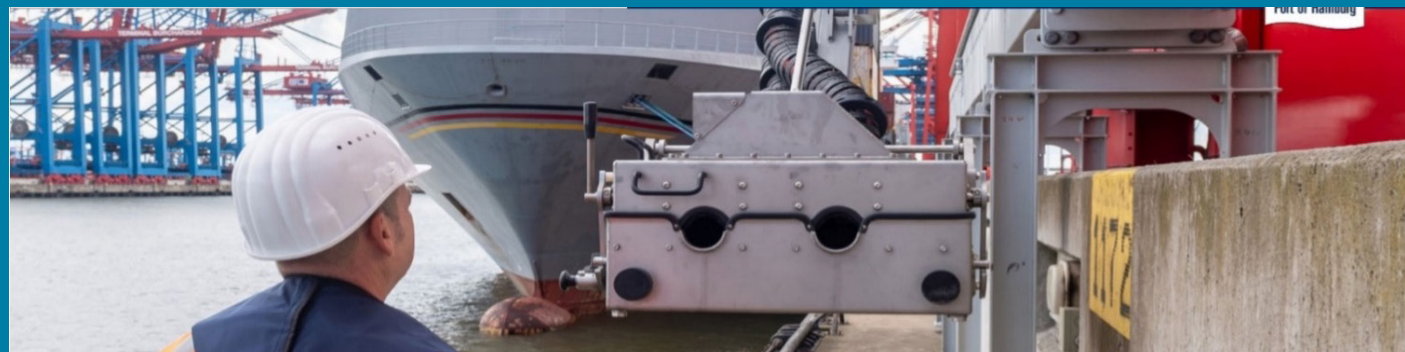
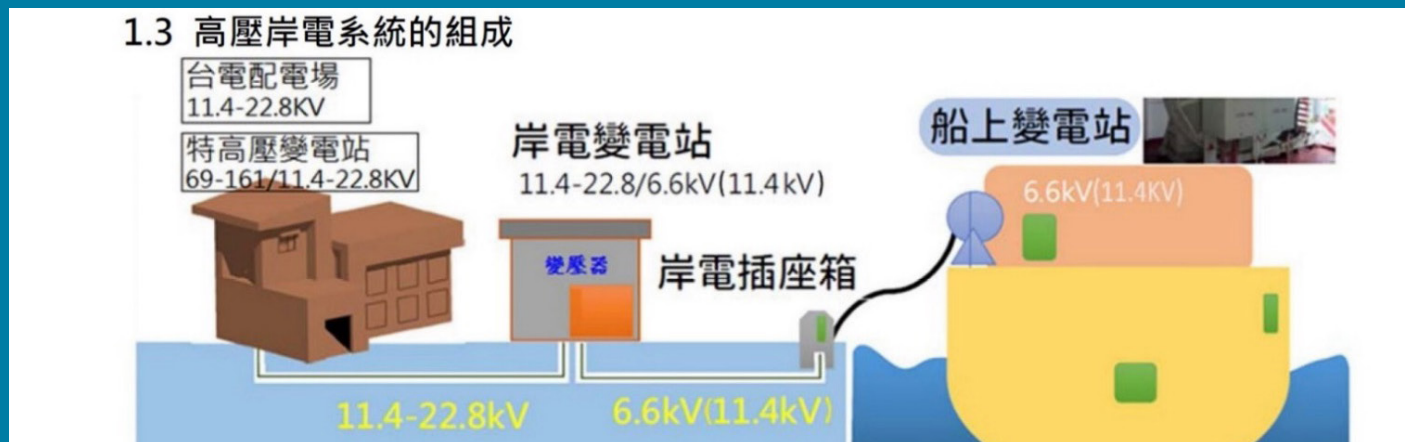
- Port operators, shipping companies, residents, and tourists.

### H. Related UN Sustainable Development Goals (SDGs)

- SDG 7 – Affordable and Clean Energy: Ensure access to affordable, reliable, sustainable, and modern energy for all.
- SDG 9 – Industry, Innovation and Infrastructure: Build resilient infrastructure.
- SDG 11 – Sustainable Cities and Communities: Make cities inclusive, safe, resilient, and sustainable.

### I. Contact Information

- Director, Engineering Department, Keelung Branch of TIPC
- E-mail: yhc@twport.com.tw





## 6.3 Involvement and Collaboration

The Keelung Port actively collaborates with both domestic and international organizations, including governmental agencies, academics, and industries. Besides sustainable development related

exchanges, there are also joint collaboration on technological research, investment, inspection, and academic seminar etc.

### International Associations



**Association of Pacific Ports (APP)**

The APP aims to gather port authorities along the Pacific coast to discuss Pacific marine transportation development, seeking solutions for problems.



**The International Association of Ports and Harbors (IAPH)**

The IAPH is a NGO with tremendous influence on global port authorities, IAPH also provide the advisory to the main bodies of UN (eg. ECOSOC, IMO, UNCTAD, UNEP, ILO, WCO). The IAPH holds biennial conferences alternately in America, Asian Pacific, and European and African regions.



**Wild Bird Society of Keelung**

The Port of Keelung, TIPC has allowed the Wild Bird Society of Keelung to conduct an observation plan in the port's aquatic areas as part of a project to reconstruct black kite ecology at Keelung port.

### Ports



**Port of Hakata**

The port of Hakata has been actively improving port affairs, IT systems, and relevant environmental protection measures in partnership with TIPC since 2014. For example, the ports have exchanged information on electrical RTG cranes, sunshades for mobile refrigerated containers, and hybrid straddle carriers.



**熊本県八代港  
Port of Yatsushiro**

**Port of Yatsushiro**

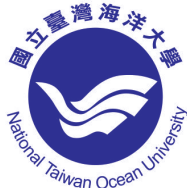
On August 10, 2015, Port of Keelung began sister port relations with Yatsushiro Port, becoming port partners. Together, they developed new shipping lines for container ships and cruise ships and mutually exchanged and cooperated in various areas, such as economies related to the development of the two ports



**Port of Dover**

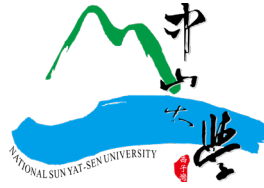
In 2011, the Port of Keelung, TIPC signed a memorandum of cooperation with the Port of Dover, which established a long-term relationship between the two parties in the areas of port risk management system deployment, risk management equipment development, safety management system development and audits, technical training, support, and environmental management systems.

## Academic Institutions



**National Taiwan Ocean University**

In order to enhance international competitiveness and transportation quality, create a sound educational and academic research environment, and allow the port and educational institutions to prosper together, Taiwan International Ports Corporation signed a memorandum of cooperation with three public universities in 2012. In the future, the parties to the memorandum will be involved in academic exchanges, research and development,



**National Sun Yet-Sen University**

cooperative undertakings between companies and educational institutions, education and training, student internships, and port operation seminars. In addition to enhancing training quality, the educational institutions involved can also provide intelligence to port affairs companies, and thus play an active role in assisting practical port management and operations, which will achieve a win-win outcome.



**National Cheng Kung University**

## Government



**North Maritime Affairs Center**

The Port of Keelung, TIPC and the Bureau of Environmental Protection of Keelung City collaborate in regular joint audits and drills in the port areas, and together assist the EPA in organizing relevant meetings and drafting proposals.



**Ministry of Environment**

The EPA, Executive Yuan collaborates with the US EPA in accordance with the "Agreement between the American Institute in Taiwan and the Taipei Economic and Cultural Representative Office in the United States for Technical Cooperation in the Field of Environmental Protection (1993)," and this partnership has led to development of a series of strategies relating to port environmental issues.



**Institute of Transportation, MOTC**

The Institute of Transportation has conducted research projects on such subjects as "Congestion Relief," "Capacity Increase," "Expansion and Use of Current Transportation Facilities," and "Establishing a Long Term Transportation Development Plan." In the past, the Port of Keelung, TIPC worked with the Institute of Transportation on many projects such as "How factors of port areas services in Keelung harbor affect cruise passengers' satisfaction" and "The real-time acoustic wave and current profile monitoring system," etc.



**Ocean Affairs Council**

To promote multilateral negotiation between Central and Local Governments, Ocean Affairs Council was inaugurated in 2018 and, serving as the official governing body in charge of the planning ("Smart Monitoring System in Harbor Establishment Project"), coordination and implementation of marine-related policies.



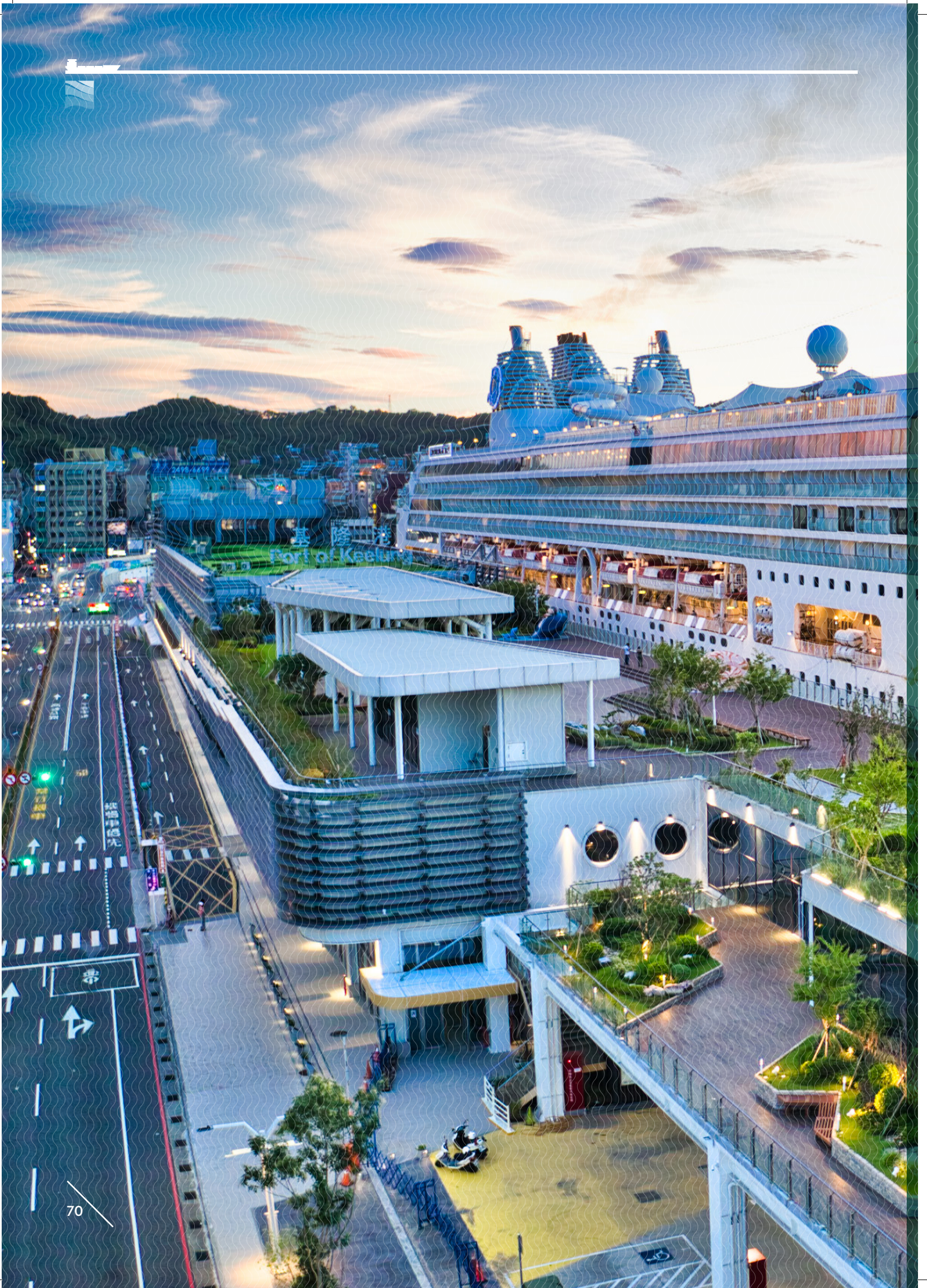
**Bureau of Environmental Protection, Keelung City**

North Maritime Affairs Center, Maritime and Port Bureau, MOTC is in charge of Port safety, disaster rescue, pollution prevention services, responsible of decree execution, evidence collection, conducts joint spot check and pollution prevention drills.

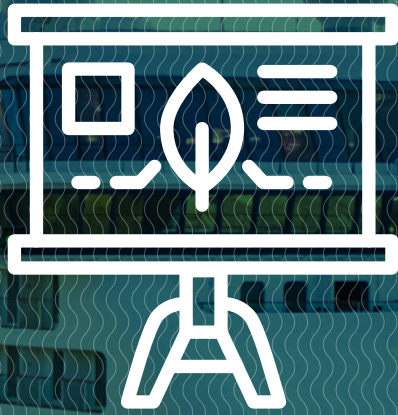


**First Bank**

First Bank established Taiwan's first environmental education pavilion themed on green finance. In response to the increasing issue of bird-building collisions ("window strikes") arising from modernization and technological advancement, First Bank launched its biodiversity conservation initiative, The First Guideline - Urban Bird Habitat Program, and partnered with the Keelung Branch of TIPC to establish a demonstration site.



# 07



## ***Training and Communica- tion***



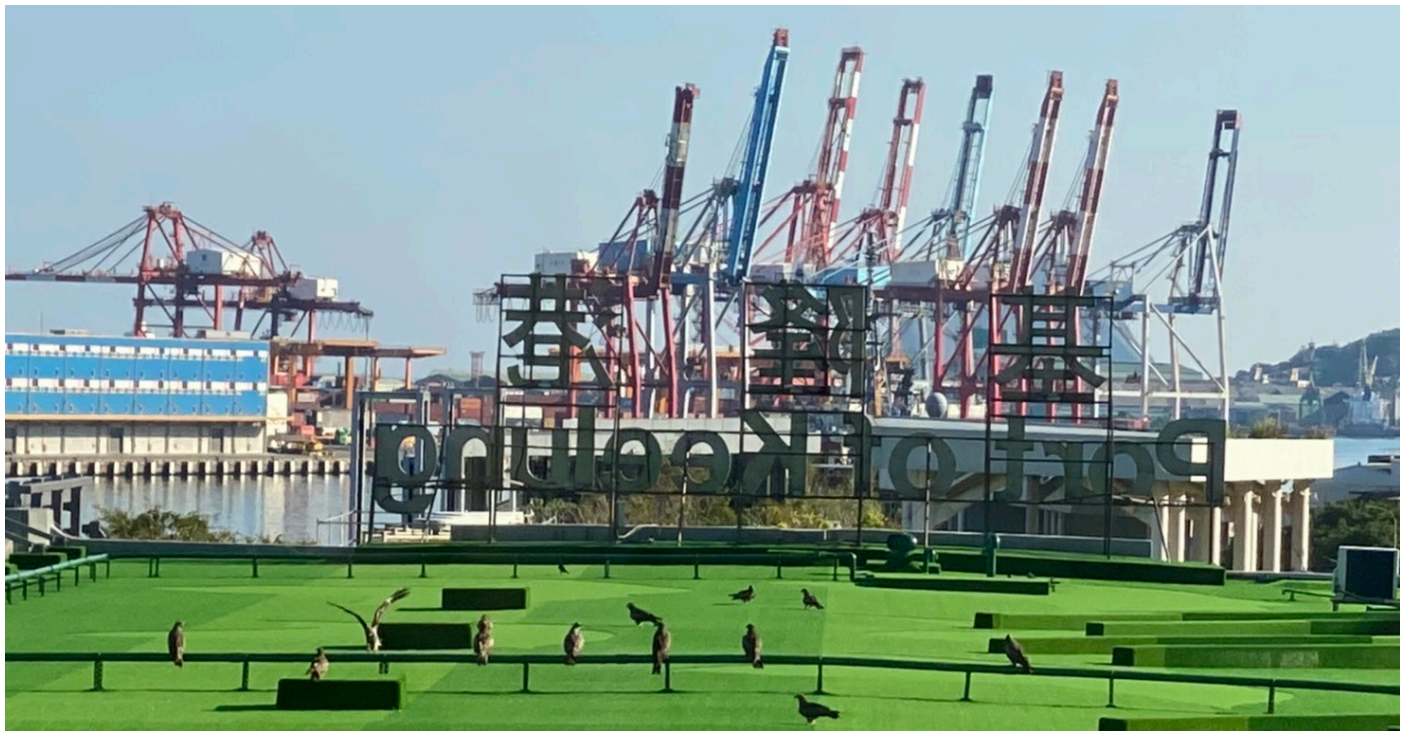
## 7.1 Enhancing Employees' Environmental Awareness

To enhance employees' environmental awareness, improve workplace safety, and promote lifelong learning, the Port of Keelung regularly conducts environmental education training. The Environmental Education Act, promulgated in 2010 and implemented one year later, requires public enterprises and related organizations to establish annual environmental education plans, with each employee required to complete more than four hours of environmental education per year.

In 2023 and 2024, the Port of Keelung organized environmental education courses for internal staff, with a total of 1,076 participants and 7,743.5 learning hours. The courses covered a wide range of topics, including educational videos, school and social environmental education, disaster prevention and response, nature conservation, pollution control, environmental and resource management, and greenhouse gas inventory.

Categories of Employee Environmental Education Training Courses, 2023–2024

Category	2023	2024
school and social environmental education	171	44
climate change	475	0
disaster prevention and response	276	211
nature conservation	1,344	1,576
pollution control	0	0
environmental and resource management	1,895	1,491
cultural preservation	8.5	244
community engagement	0	0
others	0	0



black kite ecology on the rooftop of the Keelung Port office building

## 7.2 Operation of the Keelung Port Environmental Education Park

The Keelung Port Environmental Education Park is rich in ecological port resources and unique port-related cultural heritage. After being certified by the Ministry of Environment in 2023, the park conducted a comprehensive review of Keelung Port's resources and developed selected marine environmental education courses to enhance public awareness of marine conservation and promote source reduction of marine litter.

### Course 1: Turning Oil Black Around – Cleaning Up the Port

- This course simulates oil pollution issues in the Port of Keelung and guides participants through hands-on activities to address or control pollution problems. Through practical experience, participants develop the skills needed to identify, investigate, prevent, and resolve environmental pollution issues.

### Course 2: The "Bustling" Port of Keelung – Secrets Behind the Containers

- This course uses public spaces within the Port of Keelung as outdoor environmental education zones. Through on-site facility demonstrations and guided learning, the program cultivates environmentally conscious and literate citizens while providing an information exchange platform on pollution-prevention equipment and related technologies.

Environmental Education Activities Conducted by Year

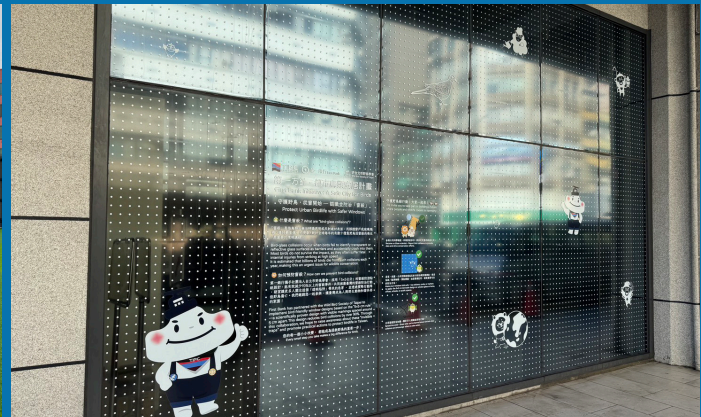
year	number of sessions held	number of participants served
2023	10 (including 3 co-organized sessions)	334
2024	11	270
2025	11	317



installation status of ecological cameras



site inspection for NKUAS banding survey



window-film demonstration site at the East Coast Passenger Center of the Port of Keelung



## 7.3 Community Relations Management and Stakeholder Communication

The Keelung Branch of TIPC has long been committed to strengthening community relations and enhancing communication with stakeholders. After its environmental education facility was certified, the branch began offering at least ten free sessions annually for government agencies, community groups, and organizations. Additionally, the Yang Ming Marine Transport Corporation Cultural Foundation collaborates with the Keelung Branch to provide participants with a comprehensive understanding of the Keelung Port area.

The Keelung Branch also organizes various community activities, such as waste-to-art creation events, a reuse art sharing seminar by Master Kang Mu-xiang, and mural painting activities in Dongnuan Village, while also assisting neighborhoods with environmental maintenance to enhance community relations. Keelung Port is also well known for its black kite-friendly ecological environment, and the Keelung Branch actively supports black kite conservation by cooperating with various organizations on ecological surveys.

- In 2024, the branch collaborated with the Keelung Wild Bird Society to promote black kite conservation. In 2025, it will assist in implementing the "Observation Project on the Relationship between Black Kites and Keelung Port," installing ecological cameras on the

rooftop of the Keelung Port office building to observe the balance between man-made structures and black kite behavior.

- In 2020, National Pingtung University of Science and Technology (NPUST) recorded Taiwan's first documented case of cross-border migration of a black kite, confirming the presence of migratory black kites in Taiwan. In 2024, cooperation with NPUST was initiated, providing a site at the port as a banding survey location for the project "Promoting Black Kite Conservation Action Guidelines – Monitoring and Satellite Tracking of Taiwan's Black Kite Population," to study the development of migratory black kite populations.
- In 2024, the branch held multiple exchanges on environmental education with the headquarters of First Commercial Bank and was invited to jointly participate in the "First Guideline – Urban Bird Habitat Program," supporting SDG 15 on biodiversity. In 2025, the Keelung Branch selected a pedestrian walkway frequently used by passengers and residents as a demonstration site and applied bird-collision prevention window stickers to reduce urban bird mortality by altering habitual flight behavior. The measure will also be considered for inclusion in the Keelung Port environmental education guided-tour curriculum.



Marine Environmental Education – Unpowered Water Recreation Activity



Health Promotion – Mountain Climbing Activity



Marine Environmental Education – Unpowered Water Recreation Activity



Health Promotion – Mountain Climbing Activity

## 7.4 Communication & Publication

To ensure ongoing engagement between the Port of Keelung and stakeholders, the port shares relevant information through various channels such as public service activities, seminars, lectures, publications, websites, and exhibition spaces. These efforts aim to provide transparency and serve as a reference for the general public, port operators, academic institutions, and related port business entities.



Ghost Festival Offerings Donation Activity



Eden Social Welfare Foundation Volunteer Service Activity



Production of 500 Mooncakes Donated to the Peppermint Care Association, R.O.C.



The 21st "Love for the Elderly, Love for Reunion" Lunar New Year Meal Packaging Charity Event

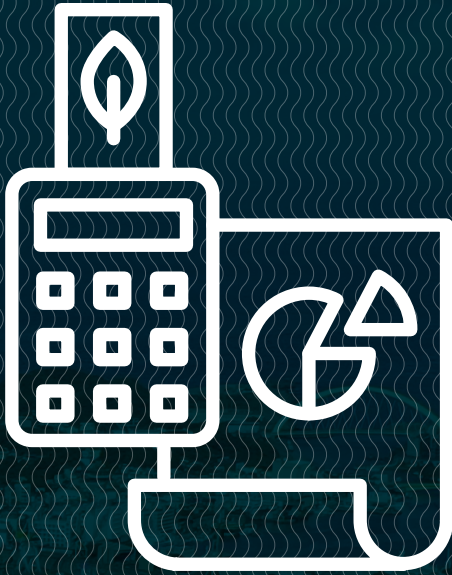


Organized a Spring Festival Calligraphy Event, presenting handwritten spring couplets to the Homeless Taiwan Foundation and the Eden Social Welfare Foundation.



Donated 240 pomelos to the Bali Psychiatric Center of the Ministry of Health and Welfare, Cardinal Tien Hospital, Ai-Wei Nursing Home of New Taipei City, Bali Ai-Hsin Care Institution of New Taipei City, and the Zhongshan Ai-Hsin Association of Keelung City.





08

***Green  
Accounting***



## 8.1 Environmental investment and cost

The Port of Keelung's environmental expenditures are primarily categorized into personnel, environmental maintenance and management, environmental monitoring, emergency response, and community engagement. These efforts aim to enhance employees' environmental awareness, maintain and improve environmental quality within the port area, strengthen emergency response capabilities, and increase public understanding of port operations.

In 2023 and 2024, the Port of Keelung allocated NT\$61,531,000 and NT\$64,829,000 respectively toward environmental initiatives—approximately €1,789,732 and €1,885,660, based on an exchange rate of NT\$34.38 to €1.

Environmental Expenditures of the Port of Keelung (NT\$1,000)

Items of Expenses	2023	2024
Employees	17,650	17,135
Environmental Maintenance & Management	42,474	46,542
Environmental Monitoring	1,190	934
Emergency Response	104	153
Communication & Publication	113	65
Total	61,531	64,829

- **Personnel:** Expenses related to staff involved in environmental matters, including their salaries and costs associated with environmental education and training.
- **Environmental Maintenance and Management:** Costs for harbor area environmental cleaning and waste disposal, harbor area planting and landscaping maintenance, cleaning boats, street sweeping vehicles, and patrol vehicles, as well as their repair and maintenance expenses.
- **Environmental Monitoring:** Monitoring and survey costs for air, noise, water quality, and sediment, among other environmental indicators.
- **Harbor Pollution Removal Supplies:** Expenses for accident management and materials used for emergency pollution handling in the harbor area.
- **Community Engagement:** Expenditures for public welfare, promotional activities, and public relations outreach materials.

## 8.2 Environmental assets

To develop the Port of Keelung into a hub for cross-strait passenger and cargo ships, an international cruise port, a logistics and distribution center in the Asia-Pacific region, and an environmentally friendly green port, the Keelung Branch of Taiwan International Ports Corporation, Ltd. has launched a series of port development projects. Some of these initiatives are directly related to environmental issues, including the construction of Warehouse No. 27 West at the Port of Keelung, the new road project between Lane 153 and Lane 167 of Zhongshan 3rd Road in Keelung City, and

the slope disaster reconstruction project at Lane 15, Guanghua Road, Keelung City.

In 2023 and 2024, the total fixed asset investment by the Keelung Branch in ongoing construction projects amounted to NT\$3,477,165,000, approximately €101,139,180, based on an exchange rate of NT\$34.38 to €1.

Fixed Asset Investment by the Port of Keelung in Environmental Projects (Unit: NT\$1,000)

Project Name	Implementation Period	Cost
Phase I of the Port of Keelung Military Pier and Weihai Base Relocation Project	2019 ~ 2024	679,990
Phase II & III of the Port of Keelung Military Pier and Weihai Base Relocation Project	2020 ~ 2024	1,128,616
Construction Project of Warehouse No. 27 West, Port of Keelung	2020~ 2023	197,400
2021 Dredging Project of Port Waters at the Port of Keelung (Including Future Expansion) ㄉ	2021 ~ 2023	16,983
New Road Construction Project between Lane 153 and Lane 167, Zhongshan 3rd Road, Keelung City	2021~ 2024	62,490
Restoration and Adaptive Reuse of the Historic Gaoyuan New Village Director's Residence	2021~2024	66,181
Waterproofing and Seismic Reinforcement of Aging Buildings	2024~	6,800
Roof Waterproofing Project for Warehouses and Office Buildings	2023~2024	16,353
Construction Project of Workplace Mutual Support Childcare Center	2023	7,978
Slope Disaster Reconstruction Project at Lane 15, Guanghua Road, Keelung City	2023~2024	29,212
Roof and Wall Repair Project for Building at No. 60, Zhongshan 3rd Road, Port of Keelung	2023	5,117
Demolition and Reconstruction Project of Niou-Chou Port Bridge, Port of Keelung	2023~2024	66,442
Replacement Project for Substation Equipment at North Container Yard, Port of Keelung	2023~2024	7,610
Rehabilitation Project of Tracks No. 17 and 18 West (including Tracks 16—18 and 20), Port of Keelung	2023~2025	83,920
Construction of Internal Access Road behind West 27, Port of Keelung	2024	8,696
Pre-Reconstruction Short-Term Maintenance Project for Wharves West 7, West 8, East 19, and West 33	2023~2024	42,800
Backline Landscaping Project for Warehouses West 2 and West 3, Port of Keelung	2024~	77,225
Slope Improvement Project near the Fuxing Tunnel Entrance, Port of Keelung	2023	12,531
Wharf Reconstruction Project (E5), Port of Keelung	2024~	526,935
Phase I Implementation of Smart Energy Management System at the Keelung Branch	2023~2024	97,886
New Construction Project of the Harbor Police Headquarters Office Building, Port of Keelung	2024~	336,000
	Total	3,477,165



# 09



## *Improvement Recommendations*

For the Port of Keelung, green and sustainable operations carry profound significance. Given the close integration of the port and city, Keelung benefits from a naturally allied relationship between its harbor and urban community. The Port of Keelung seeks to strengthen port-city collaboration and foster a friendly, coexistent relationship with local residents, thereby enhancing its competitiveness as an international green port. At the same time, it aims to promote the development of Keelung's tourism industry through the advancement of the international cruise sector.

Focusing on its core port services, the Port of Keelung aligns with global trends in port operations by pursuing business diversification. It strives to balance economic growth with environmental sustainability while fulfilling its corporate social responsibility. In partnership with the Keelung City Government, efforts are made to improve the port's aquatic environment, create a friendly waterfront space, and enhance the overall image of the port. These actions aim to build a high-quality and livable environment that attracts more cruise ships and tourists to Keelung, creating synergistic benefits greater than the sum of their parts through collaboration with local government, industries, and the community.



If you have any inquiries regarding this report, please contact us.



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