

Port of Taichung Environmental Report

The environmental report presents Taichung Port's achievements in environmental protection from 2017 to 2018 as well as the environmental policy, commitments and action plan of the Port of Taichung, Taiwan International Ports Corporation.

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

Taichung Branch of TIPC
No. 2, Sec 10, Taiwan Boulevard, Wuqi District, Taichung City, Taiwan (R.O.C.) 43501

Port of Taichung Environmental Report Work Team

Taichung Branch of TIPC: President, Chan-Yu Lu \ Vice President Wu-Cang Chen \ Chief Secretary Guo-Ying Wang \ Director Chih-Nan Hsieh \ Manager Ying-Tsai Tsai, Deputy Engineer Sheng-Fu Chang

Advised by Taiwan International Port Corporation, Ltd.: Executive Vice President Yingfeng Chung \ Senior Director Weichien Chang \ Manager Tsai, Tsung-Hsun \ Assistant Engineer, Chang-Jing Fen

Chief Editor: : Guo-Ying Wang
Executive Editor : Chih-Nan Hsieh
Layout Design: Sheng-Fu Chang
Aerial Photography: New Land Mapping Ltd.
Examine and Revise: Chih-Nan Hsieh, Ying-Tsai Tsai, Sheng-Fu Chang

Publishers: Taiwan International Ports Corporations, Ltd.
Address: No. 10, Penglai Rd., Gushan Dist., Kaohsiung City 804, Taiwan (R.O.C.)
Tel: +886-7-521-9000



Website

An aerial photograph of a port at dusk. The sky is a mix of light blue and orange. In the foreground, a long pier extends into the water, with several small boats and a larger vessel docked. In the background, there are industrial buildings and cranes along the waterfront.

CONTENTS

Taichung Branch of TIPC Environmental Policy / 01

Message from the President/ 02

Port Profile/ 05

Environmental Management / 11

State of the Environment / 17

Emergency response / 41

Innovation and Collaboration/ 47

Training / 55

Communication and Publication / 59

Green Accounting / 65

Improvement Recommendations / 68



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 Programme 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; and
5. Strengthen the communication with local communities, and pursue sustainable development for both the ports and the cities where we are operating.

Chung-Rung Wu
Chung-Rung Wu
Chairman of TIPC

Shao-Liang Chen
Shao-Liang Chen
President of TIPC

Port of Taichung Environmental Policy

The Taichung Branch of TIPC understands its role as a port management entity that is responsible for maintaining and improving the environment of the Port and regards environmental protection as a part of port management. Therefore, the Taichung Branch of TIPC commits to mitigating the impact of port operation on the environment and aims to build an environmentally-friendly, sustainable and advanced high-quality port. In order to keep the port environmental performances consistent with the policy, the following principles will be put into practice:

- Abide by environmental regulations and maintain the environment of the port;
- Realize environmental monitoring and control sources of pollution;
- Innovate pollution prevention technology and attain the status of a green port;
- Head toward autonomous management and achieve sustainable development.

To achieve our promise in the environmental policy statement, the following environmental objects are based on the ten major environmental impacts from the port:

- **Improve air quality in the port**
Implement autonomous air quality management plan to reduce air pollution.
- **Reduce fugitive dust emission**
Promote enclosed stevedore operations, road dust sweeping, and conduct wind-blown sand control.
- **Reinforce the management of hazardous cargos in the port**
Formulate hazardous cargo management zones and enhance emergency response mechanism.
- **Abate port vessel emissions**
Encourage vessel speed reduction, low-sulfur fuel, and shore power.
- **Implement waste reduction in the port**
Promote reduction and recycling of port waste.
- **Promote vessel waste recycling**
Promote separation and recycling of vessel waste.
- **Mitigate soil pollution in the port**
Continue to monitor and control polluted sites in the port.
- **Curtail port vehicle exhaust**
Install vehicle recognition systems and conduct vehicle and machinery scrutiny.
- **Strengthen community relationship**
Provide opportunities for public participation and increase interaction with local community.
- **Develop port land area in an environmentally friendly manner**
Develop waterfront tourism industry and promote port greening and landscape design

The President of Taichung Branch is responsible for the implementation, maintenance, and communication and exchange of the environmental policy. The President is also responsible for reviewing the environmental policy every year, so as to comply with the commitments, and continue to improve and achieve the environmental objectives. The environment policy will be effectively conveyed to the staff, shipping companies, lessees and residents, and is available on the Taichung Branch of TIPC website.

President of Taichung Branch of TIPC

Chen Yu Lu

Date

Aug. 14 2019

Taichung Branch of TIPC No.2, Sec. 10, Taiwan Blvd., Wuqi Dist., Taichung City 435, Taiwan (R.O.C.) 43501
Phone:886-4-2656-2611 Website: <http://tc.twport.com.tw/>



Message from the President

01/

Message from the President of Port of Taichung Taiwan International Ports Corporation ,Ltd

With the development of ports, ports worldwide have faced the challenge of balancing economic development and environmental protection. Port management has embraced ecological and sustainability-related concepts. Located at the center of Taiwan, the Port of Taichung of Taiwan International Ports Corporation (TIPC) is favorably positioned for wind power development. In compliance with the government's energy policy, TIPC constructed Taiwan's first wharf specifically designated for offshore wind power generation, representing a new milestone for local generation of offshore wind power in the country.

The Port of Taichung has been trying to exercise corporate social responsibility and to achieve the goal of a greener port. The company has devoted itself to maintaining a green zone area and to the greening and beautification of the port area. In addition, the introduction of Mitsui Outlet Park has achieved win-win prosperity for both the port and the city and has established an outstanding corporate image. According to the green port promotion program of Taiwanese ports, TIPC has dedicated itself to improving environmental management and has gradually improved the environment of the port area.

The Port of Taichung is a container port for near-sea trade and for commercial and cargo ships traveling between Taiwan and China. It is a port of call for transnational cruisers and an Asia Pacific logistics distribution center. As the port management continues to pursue steady economic growth for the port, concerns such as environmental planning, pollution control, and community relations are also considered integral to the sustainable management of the port. TIPC has been endeavoring to reduce the potential environmental load caused by the operation of the port and to strengthen friendly relations between the port and the city. By reapplying for EcoPorts Certification, the company wishes to achieve the objective of an ecological port with opportunities for international exchanges. The company shall adopt a benchmarking strategy to build a beautiful port-city homeland.

Chan-Yu Lu
President of Port of Taichung
Taiwan International Ports Corporations, Ltd.

Port Profile

02/



02/

Port Profile



Port Geographic Information

The Port of Taichung is located on the west coast of Taiwan. Its north begins from the south of Dajia River and south to the north of Dadu River and borders Lingang Road on its east side, stretching 12.5 kilometers from north to south and 2.5 to 4.5 kilometers from west to east. The total area is about 11,285 hectares (about 2,903 hectares land and 8,382 hectares water, in which 958 hectares of water the water area is surrounded by port infrastructure).

The Port of Taichung is the first man-made port completed by Taiwan and has an average tidal range of approximately 3.63 meters. The mouth of the port has high volume of silt and the marine area and seashore is mainly composed of intertidal beach, seawall, and beaches. The port is in proximity to port related industrial zone, the Gaomei Wetland Preservation Area, agricultural lands, and primary drainage channel mouths.

Legal Status and Port Operators

To promote modernized commercial port management system reforms, The Taiwan International Ports Corporation, Ltd. Establishment Act was promulgated on November 9, 2011. Taiwan amended the Commercial Port Law on December 28, 2011. It was then decided in March 2012 that the government should be separated from the enterprise for management of the ports. Public entities that used to manage the ports, including: Kaohsiung Harbor Bureau, Taichung Harbor Bureau, Keelung Harbor Bureau and Hualien Harbor Bureau, are integrated into a corporation (Taiwan International Ports Corporation, TIPC) to reduce legal and institutional restrictions on commercial port operations, enhance the ability of ports to respond to market changes, and increase their competitiveness. After the transformation, management of the Port of Taichung is now the responsibility of the Taichung Branch of TIPC. The Maritime and Port Bureau (MPB), Ministry of Transportation and Communications (MOTC) will be in charge of management issues related to public authority.

Map of Taichung Pot



02/

Port Profile



Main Commercial Activities

Taichung port is planned to have a total of 78 piers and currently has 54 piers built. These piers include grains, containers, bulk cargo, cement, coal, channel liquid cargo, chemical and oil products, scrap steel, and passenger and freight. Coal takes up most of Taichung's commercial activities. Main commercial activities include cruise and entertainment, chemical industries, general manufacturing, and container. Shipping routes are mainly between the two straits, and is the Taiwan international commercial port with the highest concentration of cross-strait shipping.

Port of Taichung Main Commercial Activities	
Ferry terminal/recreation	Petroleum processing and storage
General manufacturing	Chemical processing
Container	Dry and liquid bulk cargo (non-petroleum)
Automobile	Others

Port of Taichung Business Statistics from 2017-2018

Business Item		2017	2018	Comparison between 2017 and 2018	
				Actual Number	%
Incoming and outgoing ships (ton)	Total number of ships	15,794	15,407	-387	-2.45%
	Total tonnage	271,435,219	270,207,716	-1,227,503	-0.45%
Cargo Throughput (metric ton)	Imported cargo	62,259,370	58,718,344	-3,541,026	-5.69%
	Exported cargo	7,948,321	8,200,186	251,865	3.17%
	Domestic cargo	5,140,550	5,895,666	755,116	14.69%
	Total	75,348,241	72,814,196	-2,534,045	-3.36%
Cruise Passengers	Number of Travelers	62,566	78,351	15,785	25.23%

Main Cargoes

The primary import cargo at Port of Taichung for 2017 and 2018 was coal and metallic mineral, followed by grains and chemical or industrial products. Primary export cargo was chemical base and other non-container bulk cargo.



Port of Taichung Container Dock

Main Cargoes at Port of Taichung	
Petroleum	Pyrites minerals
Crude oil	Cement, Phosphates, Sulphur
Dry bulk	Liquid bulk (non-oil)
Grains, Scrap iron, Timber, Soya	Liquefied gases, Chemicals, LNG (liquefied natural gas)
Ores	Other
Coal, Metallic mineral	Cars/Vehicles



*Environmental
Management*

03/

03/

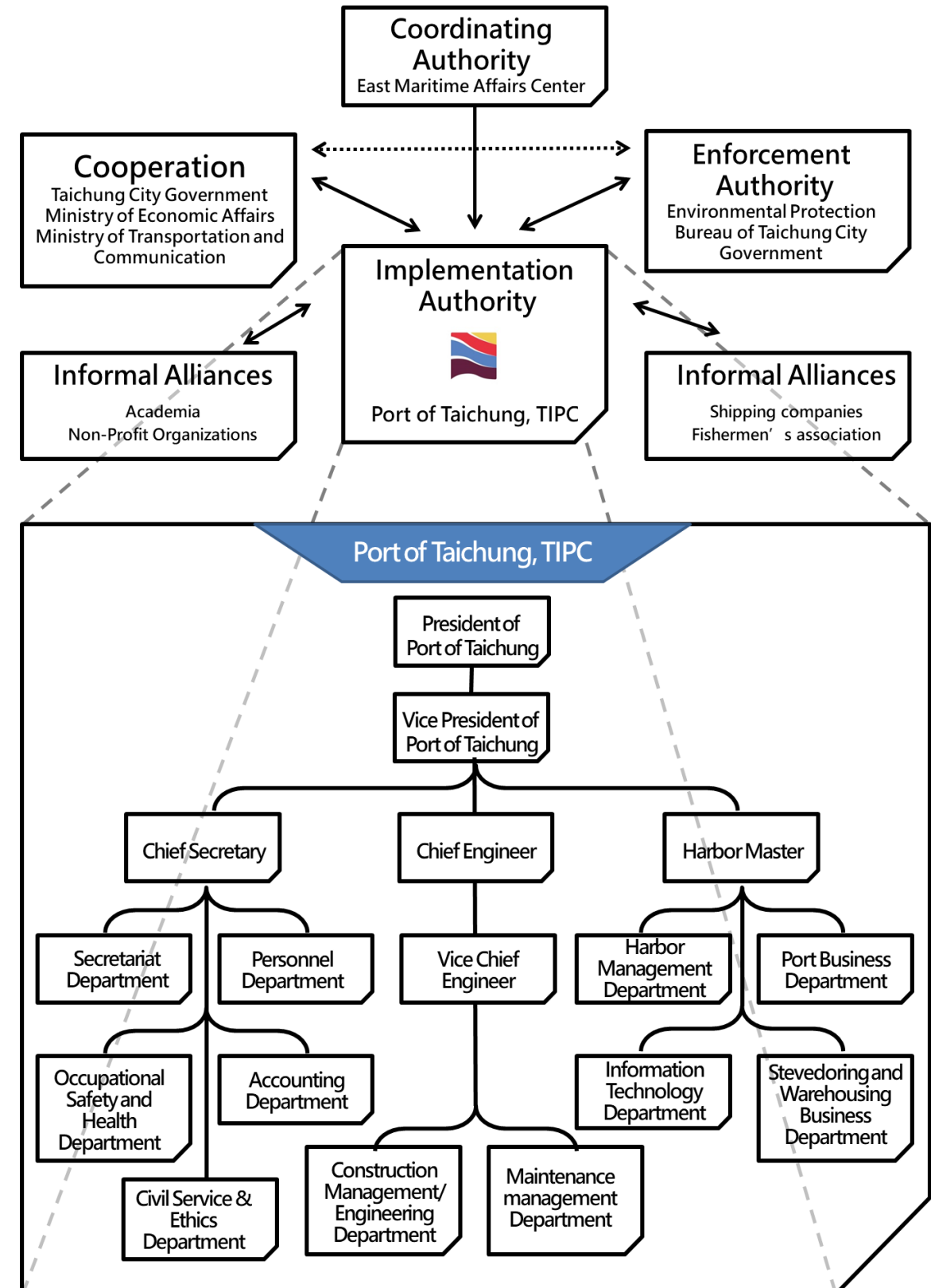
Environmental Management

Organization Structure

In addition to the Port of Taichung, TIPC, environmental issues within the Port of Taichung also involves the Maritime and Port Bureau Central Taiwan Maritime Affairs Center, the Bureau of Environmental Protection, the Environmental Protection Administration, the Coast Patrol Corps 3 and Offshore Flotilla 3 of the Central Coastal Patrol Office, the Taichung Harbor Police Office (National Police Agency, Ministry of the Interior), the Taichung Harbor Fire Brigade, the Taichung Export Processing Zone, the Taichung Customs, and the Centers for Disease Control Central Area Control Center – Taichung Harbor Office.

Department	Functions of the divisions at Taichung Port
Port Business Department	Attraction of local investments, implementation of port functions, and creation of benefit
Harbor Management Department	Port safety
Stevedoring & Warehousing Business Department	Tourist services
Information Technology Department	Development and maintenance of IT systems and equipment
Construction Management / Engineering Department	Port planning, design, construction and supervision
Maintenance management Department	Electrical mechanical engineering and communication management and vehicle equipment.
Occupational Safety and Health Department	Port environmental protection, pollution prevention and management of occupational health and safety
Personnel Division	Human resource management
Civil Service Ethics Department	Enforcement of ethics and investigation
Accounting Department	Budget review and management of income and expenditures
Secretariat Department	General affairs management

Authorization of environmental management units



Environmental Issues Related Regulations

Port of Taichung, TIPC adheres to international environment regulations and conventions, including adherence to relevant international shipping conventions such as the International Convention for the Prevention of Pollution From Ships (MARPOL73/78), the London Convention (Prevention of Marine Pollution by Dumping of Wastes and Other Matter), the International Convention for the Safe and Environmentally Sound Recycling of Ships, the

International Convention on the Control of Harmful Anti-fouling Systems on ships (AFS Convention), and the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

In addition to international environment regulations and conventions, the Port of Taichung, TIPC also complies with domestic environmental laws and cooperate with local law enforcement agencies in conducting harbor area environmental management. Domestic stevedore environment regulations are shown below.

Laws			Competent Authority	Enforcement Agencies
Ministry of transportation and communications	The Commercial Port Law	2011/12/28	MOTC	Division of Central Maritime Affairs Center, Maritime and Port Bureau, MOTC
	The Law of Ships	2018/11/28		
	Act for the Establishment and Management of Free Trade Zones	2018/01/16		
Ministry of the Interior	Fire Service Act	2019/01/07	Ministry of the Interior National Fire Agency	Taichung City Fire Bureau Taichung Harbor Fire Brigade
	Police Act	2002/06/12	Ministry of the Interior National Police Agency	Taichung Harbor Police Department
Agricultural Related	Wildlife Conservation Act	2013/01/23	Council of Agriculture	Taichung City Department of Agriculture
Economic Affairs	Petroleum Administration Act	2014/06/04	Ministry of Economic Affairs	Taichung City Economic Development Bureau
Environmental protection	Marine Pollution Control Act	2014/06/04	Ocean Affairs Council	Environmental Protection Bureau of Taichung City
	Air Pollution Control Act	2018/08/01	Environmental Protection Administration	
	Water Pollution Control Act	2018/06/13		
	Waste Disposal Act	2017/06/14		
	Environmental Impact Assessment Act	2003/01/08		
	Environmental Education Act	2010/06/05		
	Noise Control Act	2008/12/03		
	Indoor Air Quality Management Act	2011/11/23		
	Greenhouse Gas Reduction and Management Act	2015/07/01		
	Toxic and Concerned Chemical Substances Control Act	2019/01/16		
	Soil and Groundwater Pollution Remediation Act	2010/02/03		
	Public Nuisance Dispute Mediation Act	2009/06/17		
	Environmental Agents Control Act	2016/12/07		
Taichung City Self-governance Articles of Bituminous Coal Control and Petroleum Coke Prohibition in Public and Private Places		2016/05/09	Taichung City	Environmental Protection Bureau
	Taichung City Low Carbon City Development Self-governance Article	2014/05/09		Local Administrative Government
Intersectoral	Disaster Prevention and Protection Act	2019/05/22	Ministry of Interior	Taichung City Government

*State of the
Environment*

04/

04/

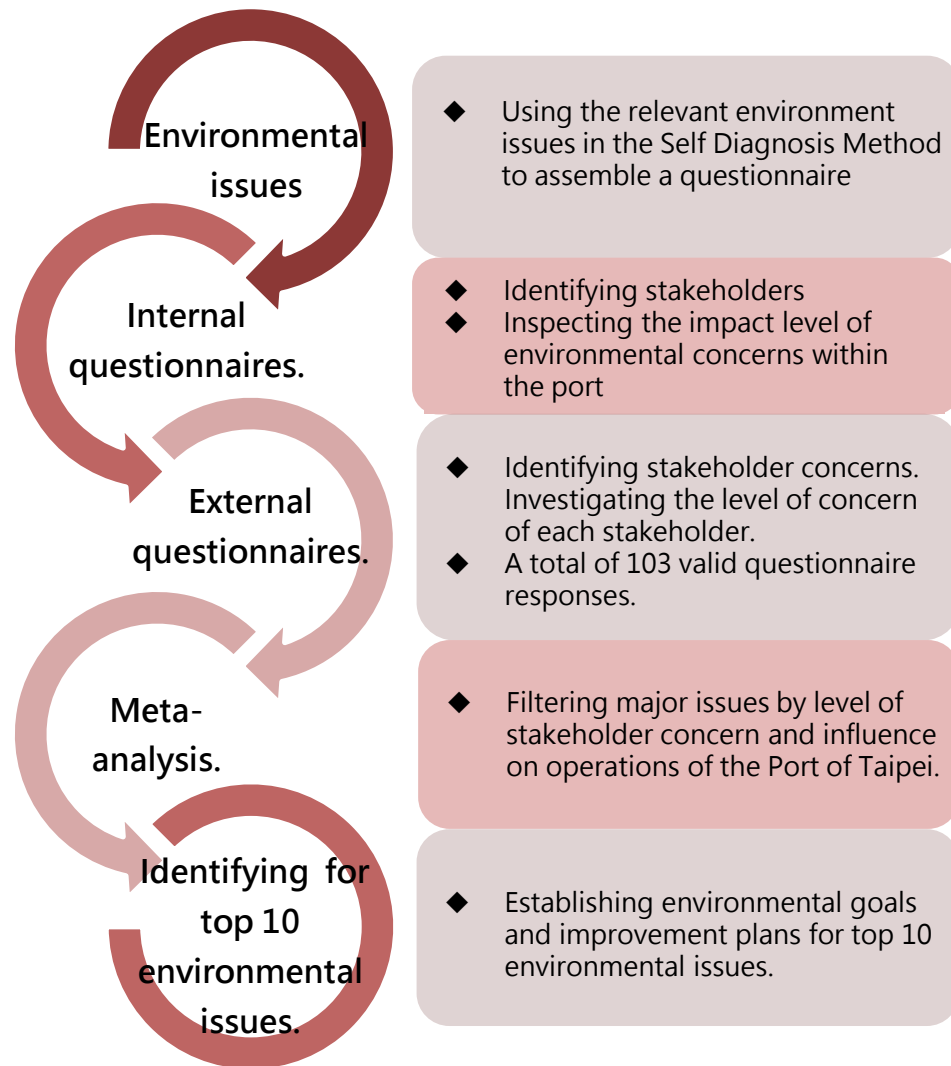
State of Environment



Analysis of major environmental issues

To fully understand the opinion of each stakeholder and adapt to the new EcoPort Certification, the Port of Taichung distributed internal questionnaires as an opinion poll among relevant stakeholders, including employees, the government, clients, and the community. The information obtained was used to evaluate the level of concern each stakeholder held. The data are plotted on the table to the right.

Stakeholder	Importance
Government	23%
Employee	40%
Customer	37%



Top 10 environmental issues in Taipei Port



Interview



Interview

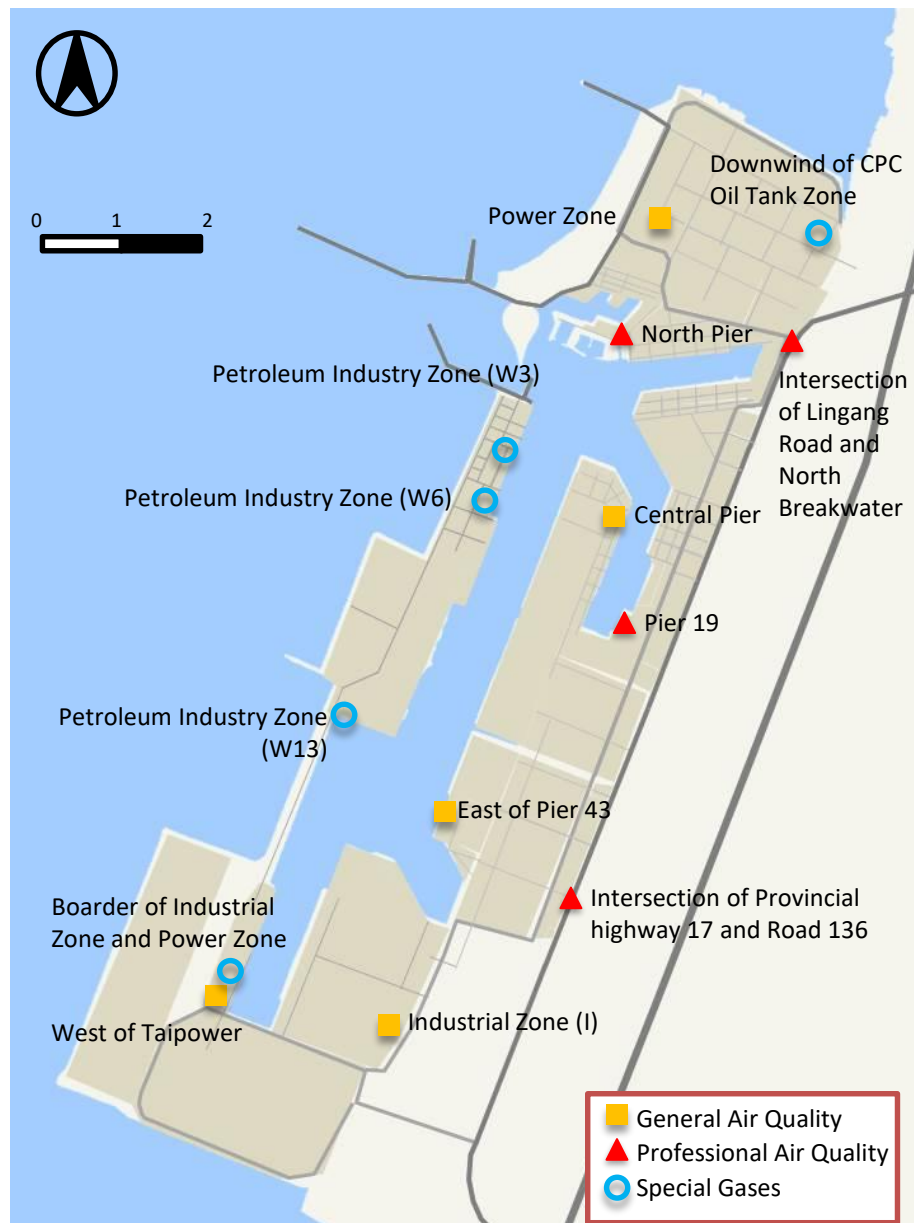
04/

State of Environment



Air Quality

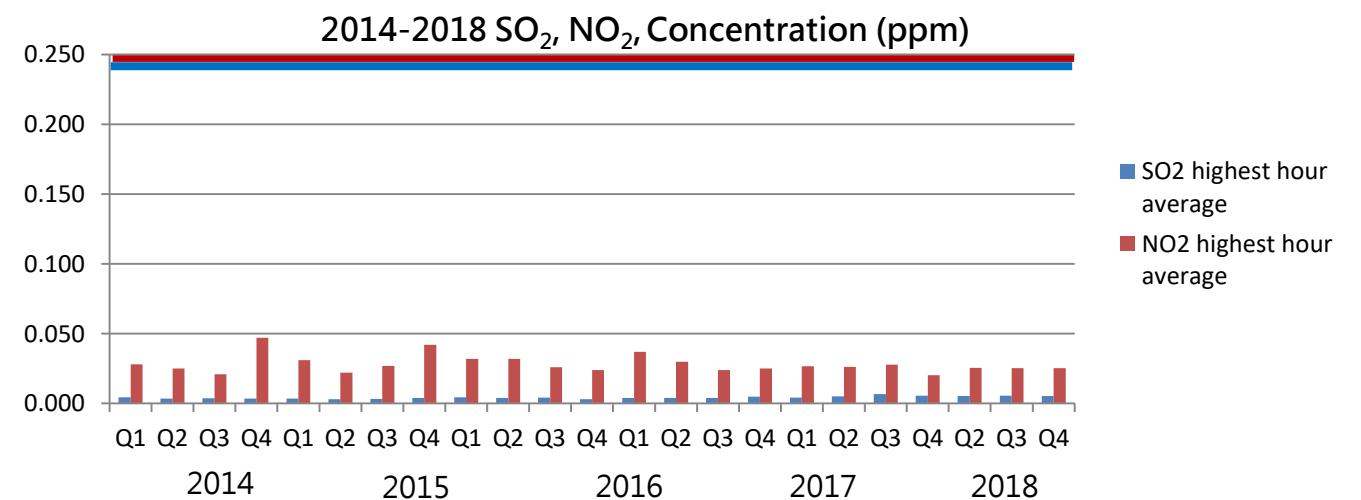
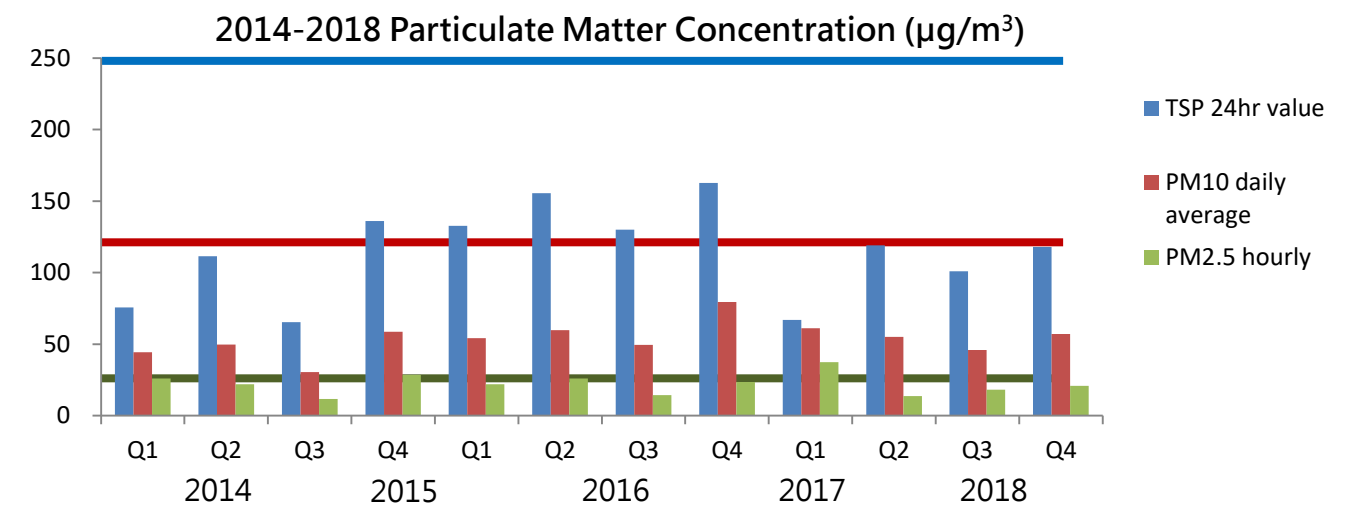
Air quality near the Port of Taichung is affected by transboundary pollution, open stacking, vessel emissions, vehicle exhaust emissions, dust emissions from handling cargo, photochemical reactions, and smokestack emissions from the Taichung Power Plant and Dragon Steel factories. To improve the air quality, the Port of Taichung, TIPC, has promoted numerous measures, including promoting vessel speed restrictions and advocating fuel conversions, shore power equipment planning, and self-management to reducing the number of emission sources for greenhouse gases and other air pollutants.



After implementing the aforementioned measures, the Port of Taichung, TIPC, achieved major air quality standards, demonstrating a substantial improvement in air quality. However, PM_{2.5} standards are yet to meet the specified requirements. This shortfall is due to the general increase in background readings in the surrounding atmosphere, which has obscured the true source of air pollution.

The Port of Taichung has multiple industrial zones and chemical storage tanks, transporting these chemicals may lead to fugitive emissions of VOCs. Therefore, the Port of Taichung has been regularly conducting long-term VOC monitoring at pier 4, 5, and 7 of the West Terminal.

Type	Frequency	Monitoring Items
General	Seasonal	Particulate Matter, SO ₂ , NO _x , CO, O ₃ , Wind Speed, Wind Direction, Temperature, Humidity
Professional	Monthly	



04/

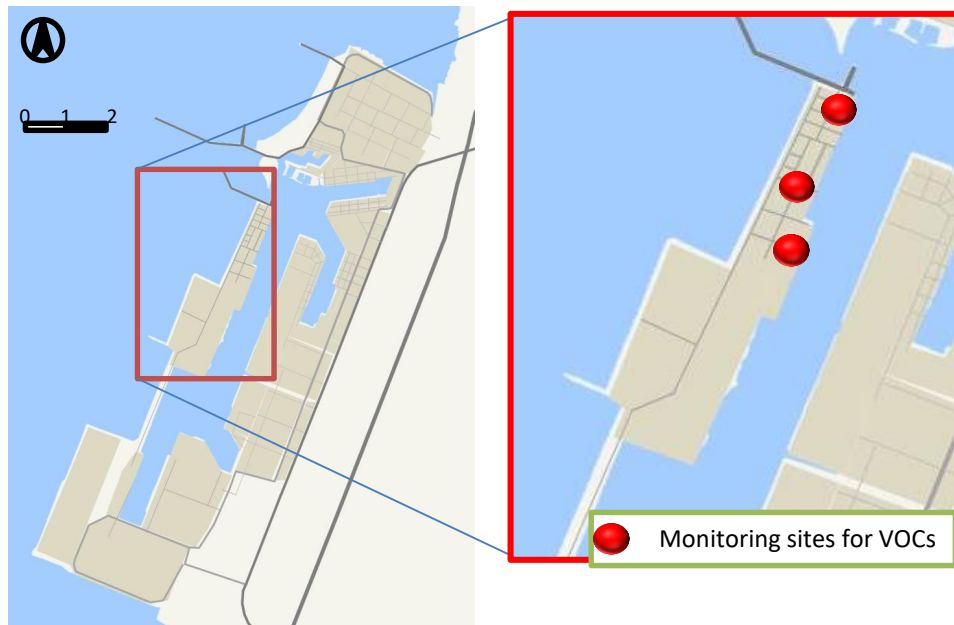
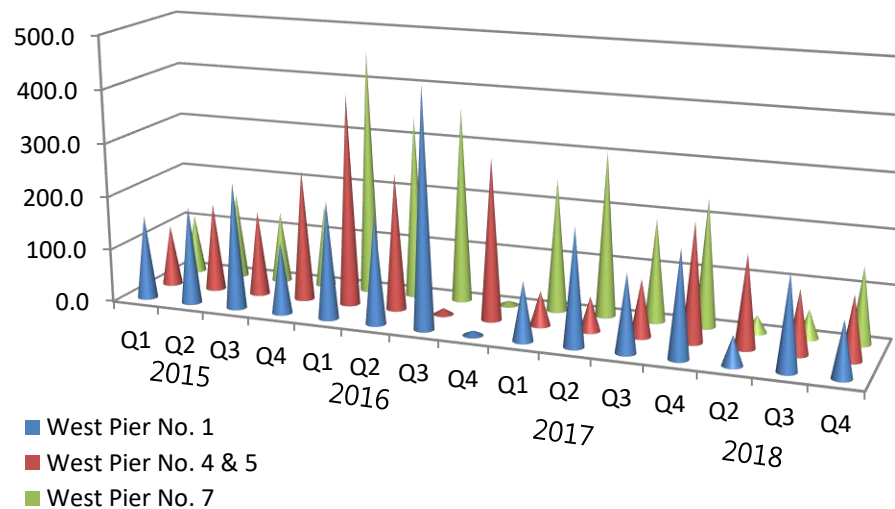
State of Environment



According to the data sampled by the Port in 2015 - 2018, VOC concentration is likely to be affected by port petroleum industries. However, the concentration is still within standards set by the EPA.

Main VOCs in the port include alkenes, olefins, aromatic, aldehydes, etc. Ketones are relatively scarce and low in concentration base on the sample.

2015-2018 Non-methane VOCs Concentration(ppb)

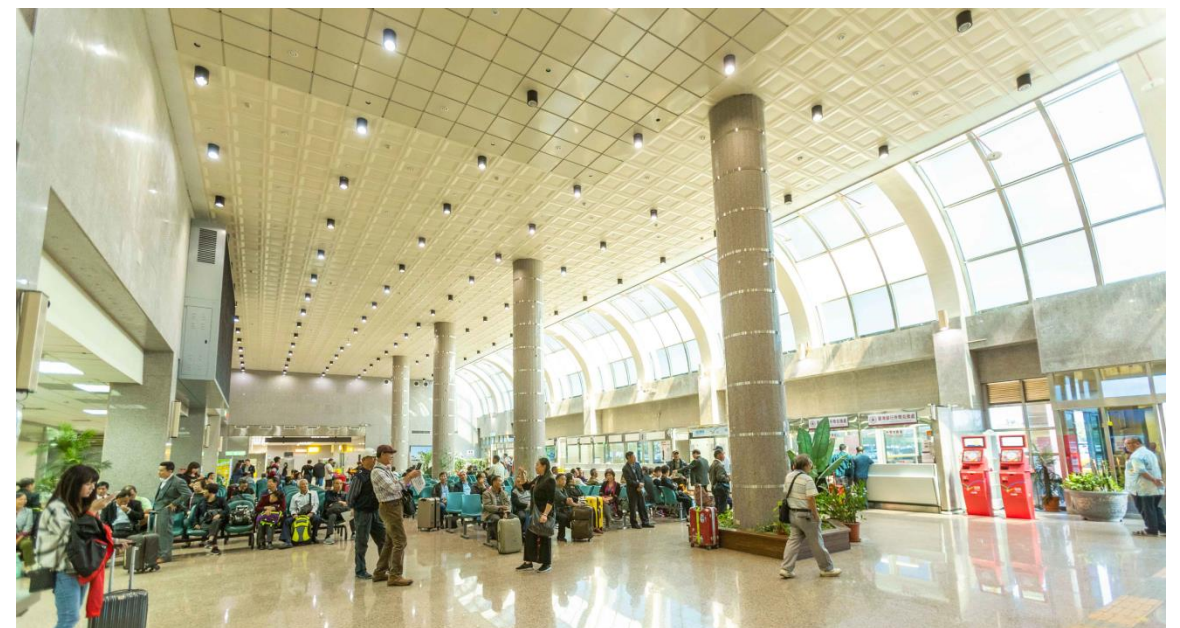


Indoor Air Quality

Tourist transportation has been one of the most important business for the Branch. Each year there are more than 10 or 100 thousands travelers. Thus, the environmental quality of the passenger terminal is important, and the Branch conducts periodic indoor air quality monitoring. The results in 2017 and 2018 show that the indoor air quality are mostly better than the standards.

Results of Indoor Air Quality Monitoring

Passenger Terminal Indoor Air Quality	CO ₂ (ppm)	O ₃ (ppm)	HCHO (ppm)	Fungi (CFU/m ³)	Bacteria (CFU/m ³)	PM ₁₀ (ug/m ³)	PM _{2.5} (ug/m ³)	
1F Lobby	2017	<0.1	0.012	<0.01	28	28	6	3
	2018	<0.1	0.014	<0.01	312	443	10	4
1F Arrival Office	2017	<0.1	0.016	<0.01	35	35	7	5
	2018	<0.1	0.014	<0.01	204	190	16	7
2F Arrival Entrance	2017	<0.1	0.010	<0.01	14	14	4	3
	2018	<0.1	0.014	<0.01	93	166	19	4
2F Departure Waiting Room	2017	<0.1	0.014	<0.01	21	21	4	4
	2018	<0.1	0.014	<0.01	157	296	14	4
Legal Standards	1000	0.6	0.08	1000	1500	75	35	





Greenhouse Gases Emissions

GHG Self-Governance Plan

On May 9 2014, the City of Taichung announced the “Taichung City Low Carbon City Development Self-governance Article,” and released the “Taichung City GHG emissions self-management ordinance on Jan 5 2017. According to this local ordinance, the Taichung Branch must submit a GHG self-management plan.

The scope of Taichung Port’s self Management Plan includes industrial sector, harbor operations, ship operations, and administrative emissions.

The Port of Taichung’s greenhouse gas emissions have been gradually decreasing through the years, indicating that the reduction goal of the voluntary management project has been achieved for both the fixed emission source and the mobile emission source.

2014-2018 Port of Taichung Greenhouse Gases Inventory

Items		2014 (baseline)	2015	2016	2017	2018
Stationary sources	Section A	4954.5	4813.3	4779.4	4782.7	4406.9
	Section B-1	22.9	25.9	27.2	29.5	28.0
	Section B-2	25.2	25.9	24.8	27.4	26.7
	Subtotal	5002.6	4865.1	4831.4	4839.6	4461.6
Mobile sources	Section A	0.3	0.3	0.3	0.4	0.4
	Section B-1	0.05	0.05	0.06	0.07	0.07
	Section B-2	19.8	19.8	18.3	18.4	17.9
	Subtotal	20.15	20.15	18.66	18.87	18.37

Unit : 10,000 tons

Port environmental planning

Readjusting Port Business Zones

To improve air quality in the harbor, the Port of Taichung recognizes the importance of good harbor zoning and planning practices. There will be some port zoning changes in the future, which include moving sand cargo handling units to pier no. 45, concentrating coal handling piers to pier no. 104-105, transferring copper soil handling pier to pier no. 43, and adding sustainable structures in the newly developed areas.

Set up wind power of the maintenance operation

Taichung Port cooperates with the government's green energy policy. At present, wind power transportation of the maintenance operation have been set up, and the working ship channels and shallow water ship channels are planned to be docks for wind power operation and maintenance ships to supply shore water and shore power systems. The land area of the maintenance operation is including the shipyards of the shipyard and the shores of shallow waterways. The larger area will be rented by wind power manufacturers and planned into office areas, exposed areas or factories. The Taichung Port also has established relevant management measures such as the berths of the kiwi site. In the future, wind power will gradually replace the firepower and nuclear energy to effectively manage the limited space within the operation and maintenance vessels and bases.

Items	Emission Coefficient (kgCO ₂ e per unit)	2017		2018	
		Consumption	Emissions (ton)	Consumption	Emissions (ton)
Water (m ³)	2017	23,900	3.6	25,916	4.2
	2018				
Power (kWh)	2017	6,373,900	3,531.1	6,425,000	3,424.5
	2018				
Gas (L)	2.36(per liter)	20,752	47.0	25,780	58.3
	2019 EPA				
Paper (pack)	2.8(per pack)	1,502	4.2	1,477	4.1
	Paper Star A4				
Total			3585.9		3491.1

Note: GHG emissions from resource consumption= 【consumption x emission coefficient】



Air Quality Improvement Strategies

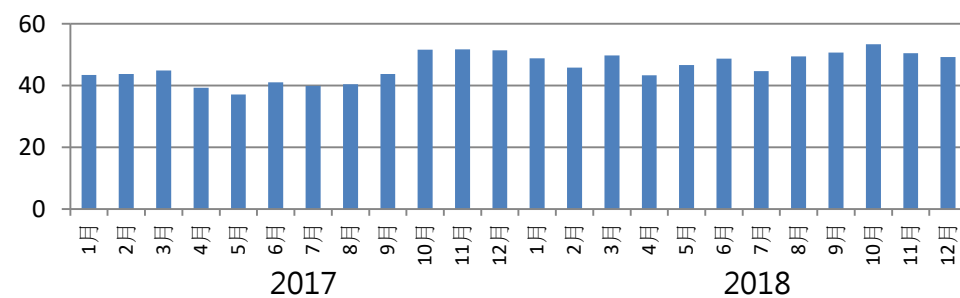
To improve the air quality, the Port of Taichung, TIPC, has promoted numerous measures, including readjusting port business zones, promoting vessel speed restrictions and advocating fuel conversions, shore power equipment planning, and self-management to reducing the number of emission sources for greenhouse gases and other air pollutants., 100% service rate for automatic vehicle access controls, and issue 700 personnel access cards per year.

Environmental Friendly Vessels

The Port of Taichung, TIPC built a speed-restriction check system in 2015 and has been put to use in 2016. Limiting vessel speeds substantially reduces the carbon emissions from fuel combustion engines; therefore, this policy has been actively promoted to shipping companies in the past 2 years. Since September 12th 2013, the port sends vessel speed reduction reminder text messages to ships entering the port once per hour and promotes the message at daily ship meetings. The statistics between 2017 and 2018 showed that number of ships complied with the vessel speed reduction rate were 44.1% and 48.46% respectively. Increase 4.4% and reduce carbon emissions by 18,120.43 metric tons. In addition, the Branch offered 117 EUR for VSR funds for ships that meet the VSR policy in 2018. 595 ships received the fund, totaling 69,831 EUR.

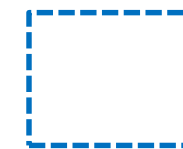
Moreover, fuel conversion concepts have also been periodically advocated to shippers to reduce SO₂ emissions since 2013. In 2017 and 2018, we maintain 100% use of low-pollution fuel in service vessels . Additionally, shore power equipment is available to prevent vessels from generating unnecessary fuel emissions. Accordingly, all service vessels used this service since 2013.

Monthly Vessel Speed Reduction Rate in 2017-2018 (%)



The calendar year usage of shore power

Year	2015	2016	2017	2018
Usage (kWh)	280,000	310,000	30,000	250,000



Area of shore power



Abate Dust Emission

In the Port of Taichung, emission-prone cargoes have always been handled with conventional grabs and funnels; the dust emission during the handling process easily causes particulate pollution, and the transportation using vehicles also contaminates the roads. The policy was implemented for coal, copper, and sand starting from January 1, 2017. The handling operations for other emission-prone cargoes were required to be in compliance with relevant environmental protection laws; for example, cement clinker and slag must be handled by a sealed unloader from June 30, 2019 onward. Other emission-prone cargoes should be handled using modified stevedoring machines and operation methods proposed in each company's improvement plans for handling emission-prone cargoes.

The loading and unloading company researches and improves the dismantling cargo loading and unloading operation improvement plan, and proposes loading and unloading methods and anti-pollution measures according to the goods contracted by itself. The branch of Taichung invited the Taichung City Government Environmental Protection Bureau and the Central Taiwan Maritime Affairs Center of Maritime and Port Bureau to form the "Exhaust Cargo Handling Equipment and Operation Anti-pollution Mode Review Team". In 2018, the loading and unloading improvement plans of each loading and unloading company were reviewed. Total of 9 review meetings were held.



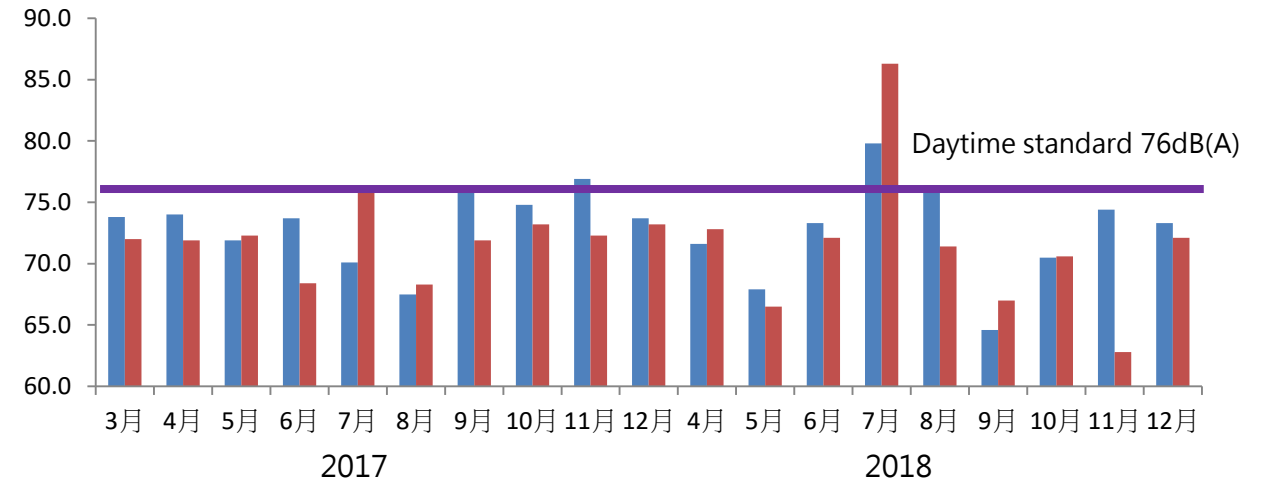
Port Noise

To ensure port environmental quality, two sites were chosen to monitor noise level in proximity to the port. These sites were all major intersections near the port area. In 2017, there were occasional over-regulations in the daytime; in July 2018, the time was higher than the road traffic noise standard. The other noise level required for these sections is the Class D Road Noise Level Standard. According to the noise environmental prediction mode, most results show that the noise level complies with the Class D Road Noise Level Standard beside one particular day, and the impact level of the transport vehicle is assessed as no influences.

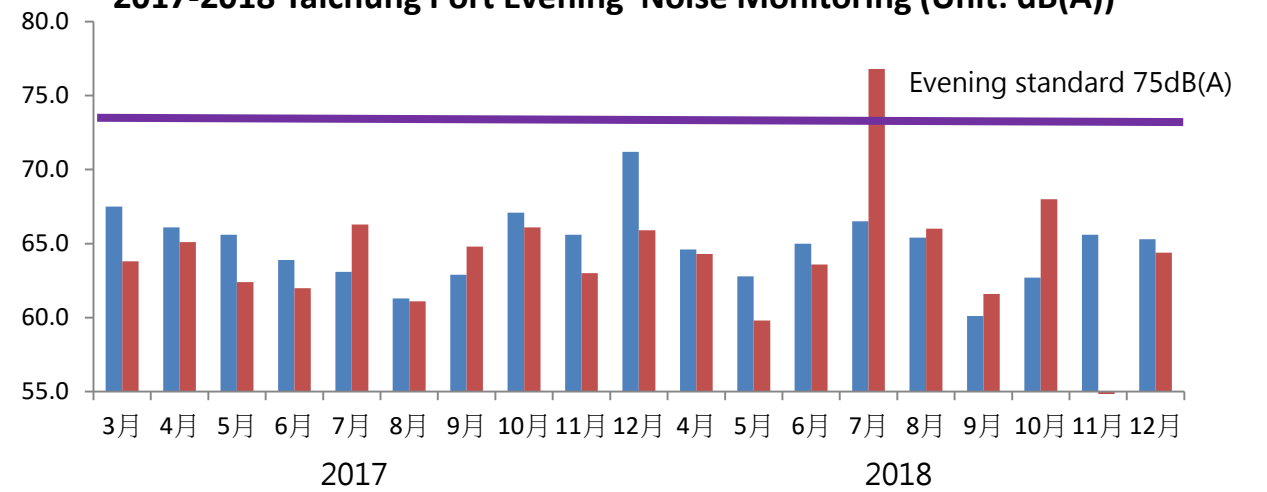
Port of Taichung Noise Level Monitoring Sites



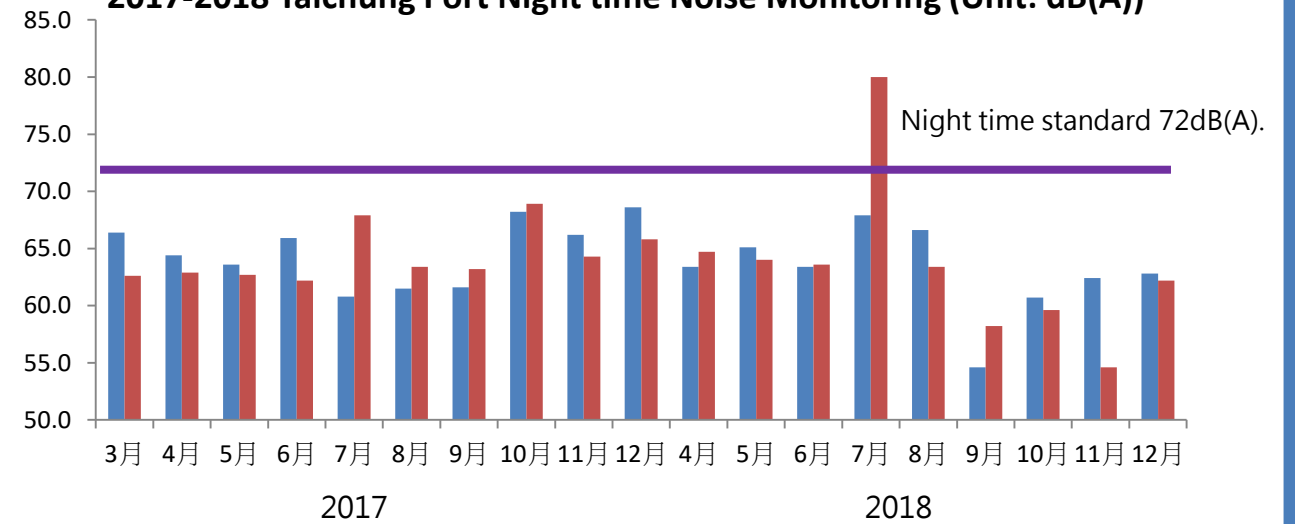
2017-2018 Taichung Port Daytime Noise Monitoring (Unit: dB(A))



2017-2018 Taichung Port Evening Noise Monitoring (Unit: dB(A))



2017-2018 Taichung Port Night time Noise Monitoring (Unit: dB(A))



04/

State of Environment



Port Water Quality

The Taichung Branch of TIPC samples land and sea water periodically to monitor port water qualities. According to the water pollution category, major drainage systems near the port have

all reached server level.

Insufficient dissolved oxygen level may be the combined influence of low tide period and intense runoff from the drainage after rain.

Items	Standard	2017 Meet rate(%)	2018 Meet rate(%)
pH	7.5~8.5	100	100
DO(mg/L)	≥5.0	95	100
BOD ₅ (mg/L)	≤3.0	100	100
Mineral oil(mg/L)	<2.0	100	100

Note 1: Class C Marine Water Quality Standard

Note 2: According to Taiwan Coastal Marine Water Body Classification, water bodies within 2 km proximity to a drainage systems may lower water 1 level of water quality standard.



Port Service Ship



Pollution Prevention Device



Environmental Monitoring

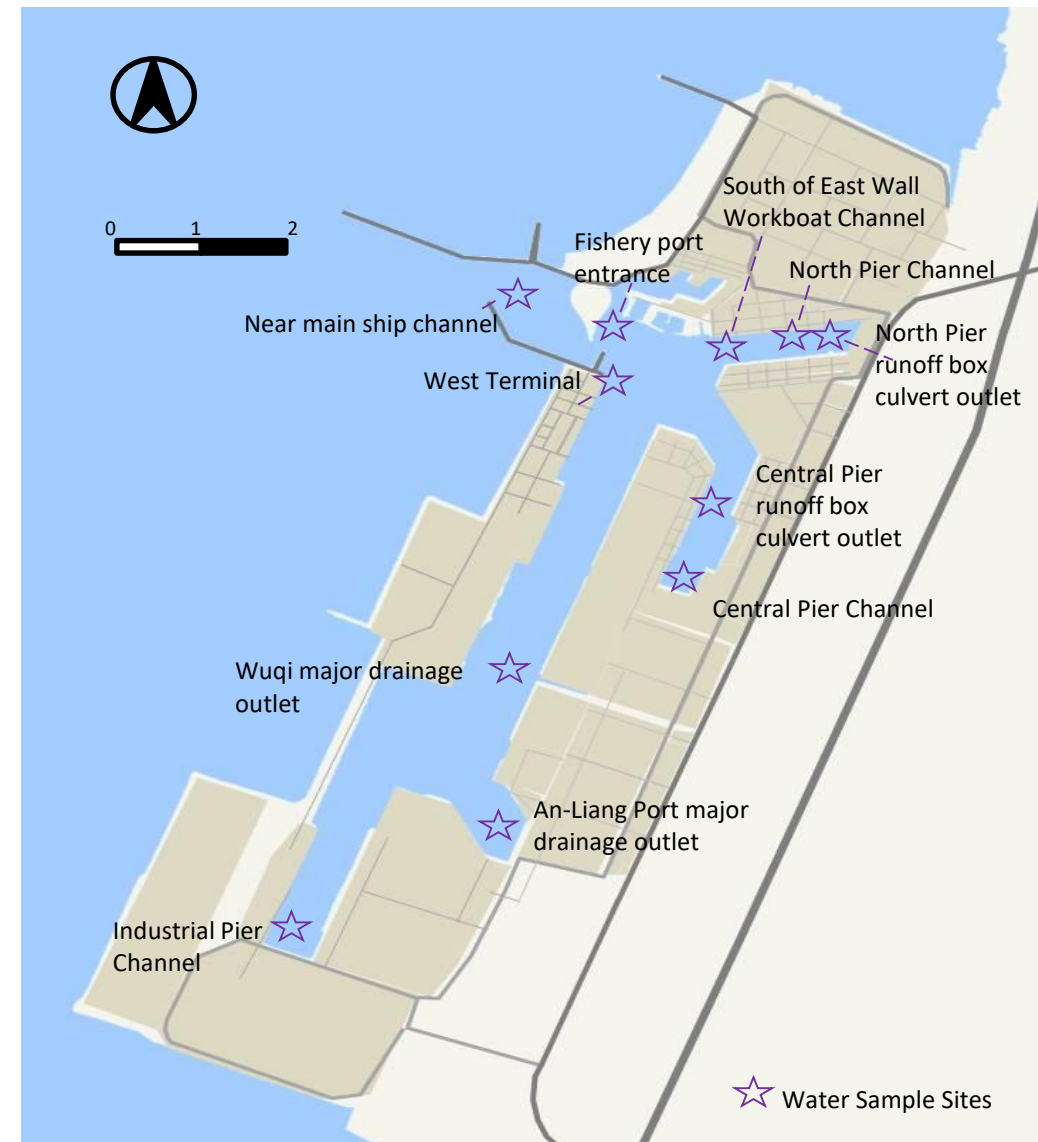
Water Quality Improvement Strategies

Reduce pollution influx from rivers

In order to reduce upstream pollution impact to port water quality, Taichung Branch of TIPC collaborates with the EPB to monitor and control upstream reservoir. To prevent garbage from entering water channel, all river channels and drainage outlet within the port's proximity are installed with trash racks.

The port will continue monitor river channels and ensure trash racks are functioning properly to prevent pollution from upstream.

Port of Taichung Water Quality Sampling Sites

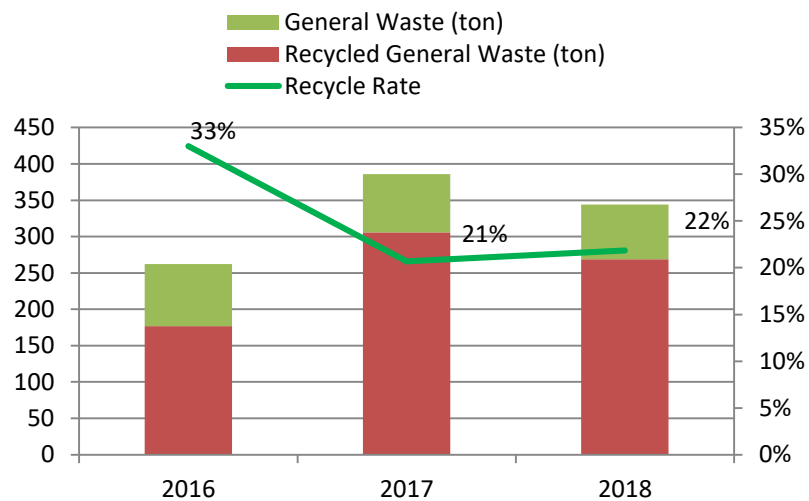


☆ Water Sample Sites



Reduce Port Waste

The Port of Taichung, TIPC, is promoting waste reduction and recycling plans and harnessing harbor dredged sediment for land reclamation. Recycling and waste reduction plans have been implemented in accordance with the Four-in-One Recycling Program promoted by the EPA since 1997. Additionally, the EPA initiated the Mandatory Garbage Sorting requirement in 2005, requiring waste to be separated into recyclable, kitchen refuse, and general garbage, which are individually designated to corresponding cleaning units for recycling or cleaning operations.



To prevent willful discharge of vessel sewage in the harbor, the Port of Taichung, TIPC, has reinforced controls on waste management and oily bilge water treatment. Currently, all oily bilge water has been treated and cleaned by commissioned operators with appropriate accreditation (2017 and 2018) at the Port of Taichung.

Port of Taichung Oily bilge Water Collected

Year	Number of ships	Oily bilge Water (tone)	Collection Rate
2017	46	744.59	100%
2018	31	374.55	100%

Energy Saving

Using energy-saving devices & technology

Gradually adopting high efficiency lightings, lighting is one of the main sources of port electricity consumption. Since the port is large, there are hundreds of street lights. Street light energy saving is an important environmental issue at Port of Taichung. As of the end of November 2018, there are in total 3,044 high pressure sodium gas lamp and 479 LED lamps installed.

Optimizing power supply system. Upgrade and replace high energy consumption appliances.

In 2018, the Port replaced its propeller central cooling system to maglev. In addition, all box cooling systems were replaced with frequency conversion system. Assuming 9 hours a day, 22 days each month, the original energy spending for light was 60,201.9 kWh. The new energy spending is now 38,144.9 kWh, saving 36%.

Green Materials

- Steel: Steel is not only a strong material that can be used sparingly, but also a material that can be recycled and reused.
- Concrete: Slag from water-quenched blast furnaces was used to substitute a portion of the cement to reduce carbon emission and pollution.

Light and power output	High pressure sodium gas lamp			LED	
	70 W	400 W	1000 W	160 W	Double lamps 160W*2
Roadside	301	2,333	0	464	15
Wharfs	0	125	285	0	0
Total	301	2,458	285	464	15



Green Construction Methods

- Embankment foundation protection: Soft construction methods, such as the application of sand bags, were used for in situ landfills instead of the traditional outsourcing of materials.
- Old revetment and seawall materials were recycled and reused. The use of local materials reduced outsourcing and transportation costs, as well as pollution derived from such operations.
- Filling materials for new piers and revetments: These materials were primarily obtained from the neighboring waters of the construction site to reduce the demand for dredging and utilize surplus earthwork.
- The waste earthwork produced from dredging navigable waterways in the port area, as well as the grates and concrete paving removed from the bottom section of Beiboqu, were crushed and applied to the seaside embankment protection and beach-nourishment construction operations.



Reinforce Hazardous Goods Management

The Taichung commercial harbor handles, stores, and transports hazardous as well as petrochemical bulk goods, and provides centralized management at the West Terminal. The Port of Taichung, TIPC, and relevant authorities perform nonscheduled inspections on petrochemical storage tanks and transport pipelines, supervise relevant safety operations involving hazardous goods, and perform emergency drills in response to chemical or oil spills.

Statistics on Hazardous Goods Management

Item/year	2015	2016	2017	2018
Inspection	50	51	50	50
Drill	1	1	1	1
Joint Supervision	4	4	4	4



Ecology survey

Conduct two marine ecology survey each year. In 2017, the dominant plankton species are Spinosa in June and Chaetoceros in October. As for animal plankton, the dominant species is Copepods, accounting for 63.24% and 79.51% of the population in June and October. In June, 3 species of Annelida, 1 species of Echiurida, 5 species of Crustacea, 7 species of Mollusca, 1 species of Echinodermata and 4 fish species were found. In sum, there were 5 main categories and 21 species of benthic organisms in total.



Charadrius alexandrinus



White Peacock



Thalamita crenata



Trachinotus baillonii



Environmental Performance Indicators

Ten Significant environmental issues of the Taichung Port	Index item	Calculation method	Index target	Calculation		
				2017	2018	
Air Quality	Qualification rate of air quality indices: total suspended particles (TSP), suspended particulate matter (PM ₁₀ and PM _{2.5}), SO ₂ , NO ₂ , CO, and O ₃	<ul style="list-style-type: none"> Rate of air quality measurements meeting the Air Quality Standards (measured at harbor test stations) 	<ul style="list-style-type: none"> Air quality measurements meeting the Air Quality Standards 	<ul style="list-style-type: none"> All minimum standards pass rate were 100% besides PM_{2.5} PM_{2.5} daily average pass rate: 88.31% 	<ul style="list-style-type: none"> All minimum standards pass rate were 100% besides TSP, PM₁₀, PM_{2.5} and O₃ TSP 24-h qualification rate: 93.65% PM₁₀ daily average pass rate: 95.24% PM_{2.5} daily average pass rate: 85.71% O₃ hourly average pass rate: 95.24%, 8-h average pass rate: 96.88% 	
	Amount of greenhouse gas	<ul style="list-style-type: none"> Greenhouse gas inventory results 	<ul style="list-style-type: none"> Greenhouse gas reduction decrease year by year 	<ul style="list-style-type: none"> Amount of greenhouse gas :458,000 ton 	<ul style="list-style-type: none"> Amount of greenhouse gas :436,000 ton 	
Dust	Number of prevention stevedoring and stacking devices	<ul style="list-style-type: none"> Number of prevention stevedoring and stacking devices in port 	<ul style="list-style-type: none"> Review number and worth use of prevention devices every 2 years 	<ul style="list-style-type: none"> 4 stevedoring machines with closed devices Execution of environmentally friendly loading and unloading operations, coal, copper, sand and gravel cargo. 	<ul style="list-style-type: none"> 6 stevedoring machines with closed devices Cement clinker and hearthstone need to be operated by closed discharger. 	
	Inspection of loading and unloading operators	<ul style="list-style-type: none"> Cases sent to MPB Cases penalized by MPB 	<ul style="list-style-type: none"> None of Cases sent to MPB 	<ul style="list-style-type: none"> Cases sent to MPB:22 Cases penalized by MPB:8 	<ul style="list-style-type: none"> Cases sent to MPB:13(2019:27) Cases penalized by MPB:7(2019:14) 	
	Road dust cleaning	<ul style="list-style-type: none"> Number of sweeps: 20 times / month Reduce PM₁₀: 89 metric tons per year 	<ul style="list-style-type: none"> Number of sweeps: 20 times / month Reduce PM₁₀: 89 metric tons per year 	<ul style="list-style-type: none"> Number of sweeps: 20 times / month Reduce PM₁₀: 89 metric tons per year 	<ul style="list-style-type: none"> Planning road dust cleaning operations 	<ul style="list-style-type: none"> Number of sweeps: 20 times / month Reduce PM₁₀: 89 metric tons per year (Cleaning road length 226 km)
	Beach sand drifting sand remediation	<ul style="list-style-type: none"> Lever of Beach sand drifting sand remediation 	<ul style="list-style-type: none"> Lever of Beach sand remediation: EL.+6M more 	<ul style="list-style-type: none"> Lever of Beach sand remediation: EL.+6M more 	<ul style="list-style-type: none"> Lever of Beach sand remediation: EL.+6.5M more 	<ul style="list-style-type: none"> Lever of Beach sand remediation: EL.+6M more
Hazardous Cargo Management	Number of harbor inspections, cargo spillage emergency response drills, and jointly supervised harbor safety drills	<ul style="list-style-type: none"> Number of harbor inspections, cargo spillage emergency response drills Number of jointly supervised harbor safety drills 	<ul style="list-style-type: none"> 50 harbor inspections At least one cargo spillage emergency response drill per year At least 4 jointly supervised harbor safety drills per year 	<ul style="list-style-type: none"> 50 harbor inspections hazardous Cargo One hazardous cargo spillage emergency response drill 4 jointly supervised harbor safety drills 	<ul style="list-style-type: none"> 50 harbor inspections hazardous Cargo One oil spillage emergency response drill 4 jointly supervised harbor safety drills 	
Ship exhaust gas emissions	The ratio of service vessels using shore power	<ul style="list-style-type: none"> Number of service vessels using shore power ÷ total number of service vessels × 100% 	<ul style="list-style-type: none"> All service vessels using shore power 	<ul style="list-style-type: none"> 19 ÷ 19 × 100% = 100% Self-operating tug boat: 3, outsourcing vessel: 8, TIPC Marine Corp tug boat: 4 and Shuttle Boat: 4, number of vessels using shore power: 19, shore power usage 254,435 	<ul style="list-style-type: none"> 22 ÷ 22 × 100% = 100% Self-operating tug boat: 4, outsourcing vessel: 8, TIPC Marine Corp tug boat: 4 and Shuttle Boat: 4, number of vessels using shore power: 22, maintenance harbor vessel: 2, shore power usage 298,243. Planning to fully install shore power supply facilities and use low-sulfur fuel in the terminal in 2019, which is expected to reduce 194 tons of CO₂ 	
	Vessel Speed Reduction	<ul style="list-style-type: none"> Reduce speed to under 12 knots 	<ul style="list-style-type: none"> Ratio of vessel speed reduction 44.1% 	<ul style="list-style-type: none"> Ratio of vessel speed reduction 44.1% 	<ul style="list-style-type: none"> Ratio of vessel speed reduction 48.46% Reduce carbon emissions by 18,120.43 metric tons 	
	Subsidy plan to remote vessel ship reduction	<ul style="list-style-type: none"> Cpntainer ship reduce speed within 20 nautical miles within port limits to 12 knots. 	<ul style="list-style-type: none"> Implemented in 2018 	<ul style="list-style-type: none"> Implemented in 2018 	<ul style="list-style-type: none"> Number of rewards: 595 ships bonus amount: 2,380,000 NT dallors It is estimated that 399 tons of NOx can be reduced by 2020; 229 tons of SO₂. 	
	Subsidy plan to promote low sulfur fuel transition policy	<ul style="list-style-type: none"> To promote early adoption of low sulfur fuel transition policy 	<ul style="list-style-type: none"> Implemented in 2018 	<ul style="list-style-type: none"> Implemented in 2018 	<ul style="list-style-type: none"> Number of rewards: 111 ships qualified bonus amount: 1,925,000 NT dallors In 2019, inbound ships are required to use low-sulfur fuels, which can reduce 1,525 tons of SO₂ per year; 73.85 tons of NOx/year. 	
	Consumption of low-sufer fuel among harbor crafts	<ul style="list-style-type: none"> Number of harbor crafts using low-sufer fuel (marine diesel oil or super diesel) ÷ Total number of harbor crafts × 100% Consumption of low-sufer fuel among harbor crafts 	<ul style="list-style-type: none"> The ratio of using low-sufer fuel or biodiesel reaches 100% among harbor crafts Consumption of low-sufer fuel among harbor crafts 	<ul style="list-style-type: none"> Among the 4 harbor crafts, 4 use low-sufer fuel. 4 ÷ 4 × 100% = 100% Low-sufer fuel for work vessels: Consumption of marine gas oil: 1,076 KL 	<ul style="list-style-type: none"> Among the 4 harbor crafts & 2 Maintenance harbor vessel, 6 use low-sufer fuel. 6 ÷ 6 × 100% = 100% Low-sufer fuel for work vessels: Consumption of marine gas oil: 1,332 KL 	

04/

State of Environment



Environmental Performance Indicators

Ten Significant environmental issues of the Taichung Port	Index item	Calculation method	Index target	Calculation	
				2017	2018
Port and harbor waste	Port area operator waste disposal rate	In-plant waste entrusted cleaning	Proper cleanup rate of 100%	<ul style="list-style-type: none"> Clearance number of wastes in the port area: 75 Number of visits: 2 times / year Proper cleanup rate : 100% 	<ul style="list-style-type: none"> Clearance number of wastes in the port area: 100 Number of visits: 2 times / year Proper cleanup rate : 100%
	Promote waste reduction and implement resource recycling	<ul style="list-style-type: none"> Waste removal amount Waste resource recovery rate The disposal rate of the vessel oil and sewage by qualified service providers 	<ul style="list-style-type: none"> Vessel waste recycling rate: 20% The disposal rate of the vessel oil and sewage by qualified service providers:100% 	<ul style="list-style-type: none"> General waste removed from the harbor land area; 305.7ton General waste recycling rate in the harbor land area: 20.7% $46 \div 46 \times 100\% = 100$ Performed vessels:46,the amount of cleaning ship oily waste water is 744.59 tonnes 	<ul style="list-style-type: none"> General waste removed from the harbor land area; 269.5ton General waste recycling rate in the harbor land area: 21.9% $31 \div 31 \times 100\% = 100$ Performed vessels:31,the amount of cleaning ship oily waste water is 374.55 tonnes
Ship waste					
Soil pollution	Progress of soil pollution control work	Number of completed progress of soil pollution control site \div number of total items on the progress list $\times 100\%$	Progress of soil pollution control work	Progress of soil pollution control site meet annual progress	Progress of soil pollution control site meet annual progress
Vehicle exhaust gas emissions	Promotion of a comprehensive use of the Automatic gate control System among shipping lines	The ratio of incoming and outgoing roadways installed with an automatic gate control system	Built gates of incoming & outgoing roadway are automated.	The ratio of incoming& outgoing roadways installed with an automatic gate control system: $18 \div 18 \times 100\% = 100\%$	The ratio of incoming& outgoing roadways installed with an automatic gate control system: $18 \div 18 \times 100\% = 100\%$
	Diesel vehicle self-management	<ul style="list-style-type: none"> Number of Self-management of standard vehicle passes Proportion of fourth and fifth diesel vehicles 	<ul style="list-style-type: none"> Number of Self-management of standard vehicle passes Ratio of fourth and fifth diesel vehicles:40% 	<ul style="list-style-type: none"> No. of self-issued passes for self-regulated diesel vehicles: 473 (launched since Sep 2017) Ratio of vehicle meeting the self-regulation standard (1,240,485/2,696,707) *100%=46% 	<ul style="list-style-type: none"> No. of self-issued passes for self-regulated diesel vehicles: 2,371 Ratio of vehicle meeting the self-regulation standard (1,425,026/2,531,130)*100%=56.3% Cooperate with the promotion of vehicle emission management, it is expected to reduce 7.07 tons of NOx in 2020.
	Diesel truck inspections	Number of Diesel truck inspections	Number of Diesel truck inspections:36/year	Number of Diesel truck inspections:36/year (Cooperate with the Environmental Protection Agency)	Number of Diesel truck inspections:36/year (Cooperate with the Environmental Protection Agency)
Relationship with Local Communities	Number of activities and participants	Calculate the actual number of occurrence	Number of activities and events	108 activities held	93 activities held
Port land area development	Maintain harbor green space and green belt areas	Maintain harbor green spaces and green belt areas	Continue maintaining 120 ha of harbor green space	Green belt area maintained: 394 ha 166 ha conservation forest; 66 ha north of low- development area; 30 ha 2nd phase north side silt improvement area; 29.9 ha of green space surrounding harbor buildings; 78 ha of harbor green space (mowed); 5.44 ha of landscaped green space at South Central Pier; 10.6 ha in selected West Terminal locations; 7.8 ha industrial zone (II).	Green belt area maintained: 390 ha 166 ha conservation forest; 66 ha north of low- development area; 30 ha 2nd phase north side silt improvement area; 20 ha of green space surrounding harbor buildings; 100 ha of harbor green space & plant maintenance (mowed); 7.8 ha industrial zone (II)
	Hydrophilic space	New hydrophilic space	Add 18 hectares of hydrophilic space	Mitsui outlet construction	Add 18 hectares of hydrophilic space
	Landscape maintenance rate for harbor green areas (number of plants planted)	Number of newly planted plants	Annual planted plants	Arbor: 50 Shrub: 2,550 Absorb 810 metric tons of carbon dioxide per year	Arbor: 920 Shrub: 13,010 Absorb 4,731 metric tons of carbon dioxide per year

*Emergency
Response*

05/



05/ Emergency Response



Port of Taichung Emergency Response

The Port of Taichung, TIPC, and relevant authorities perform nonscheduled inspections on petrochemical storage tanks and transport pipelines, supervise relevant safety operations involving hazardous goods, and perform emergency drills in response to chemical or oil spills. The Port of Taichung, TIPC, performed 50 inspections in 2017 and 50 inspections in 2018 on hazardous goods, conducted four jointly supervised drills in 2017 and in 2018 to the safe handling of hazardous goods. During this period, three accidents occurred at the harbor involving hazardous goods. In addition to periodic inspections and emergency response drills, the Port of Taichung, TIPC, monitors and encourages business operators at the West Terminal to establish regional response organizations

Port of Taichung Accident Handling Process from 2017 to 2018

Event	Date	Handling Process
Acid Gas Leakage of China American Petrochemical Co. (CAPCO)	May 5, 2017	Suspected reactor failure in CAPCO caused an abnormal discharge of copious acid gas and caused local residents to have adverse reactions. Although acetic acid is a nontoxic chemical substance, TIPC has demanded that CAPCO install an acetic acid detector to prevent similar events. The existing emergency report system for acidity at the Taichung factory alerts only the Taipei head office and the Environmental Protection Bureau of Taichung; CAPCO has been advised to program the system to alert additional authorities such as the Central Maritime Affairs Center at the Maritime and Port Bureau of the Ministry of Transportation and Communications and the Port of Taichung.
Leakage of nitric acid container from the ship Dong Fang Fu	September 15, 2017	After being struck by a typhoon, a leakage of nitric acid containers was observed on the ship Dong Fang Fu. On September 16, the ship docked at wharf No. 34 of the Port of Taichung, and the company immediately established a command post to contact coordinating officers of each first-response units, established the blockade line, and ordered the cargo owner to board the ship with adequate protective clothing to examine the leakage. The damaged barrels and the nitric acid in leaking containers No. 1 to 4 were removed, and the nitric acid in containers No. 5 and 6 was also removed before the emergency response team was dismissed.
Harbor basin pollution due to CPC Corporation oil pipe rupture and oil discharge through the box culvert	October 19, 2018	<ul style="list-style-type: none"> The monitoring center reported suspected pollution in the north turning basin and west wharf area, and this was then confirmed to be oil discharge from the box culvert between wharfs No. 2 and 3. The CPC Corporation was advised to dispatch support personnel and materials. On October 21, the leakage's cause was confirmed to be a CPC oil pipe rupture. Therefore, the CPC Corporation was ordered to stop the leakage and to handle all clean-up tasks. The main tasks for this case were oil pollutant cleaning, cleaning contaminated ships, and cleaning contaminated wharfs and revetment facilities.

Port Environmental Inspection

Port of Taichung continues to carry out inspections on petrochemical storage tanks and transport pipelines, supervise relevant safety operations involving hazardous goods, and perform emergency drills in response to chemical or oil spills.

Port of Taichung Conducted Drills in 2017-2018

Year	Drill title	Content	Time
2017	2017 National Critical Infrastructure Protection drill	Simulate natural disaster, information safety net breaching, and sabotage instances response drill	Jul 28 th
2017	2017 Port of Taichung Container Terminal hazardous cargo spillage disaster prevention and rescue drill	Simulate nitric acid spillage, emergency report, response, and recovery	Dec 29 th
2018	2018 Port of Taichung port security drill	Port safety, security, and disaster prevention and rescue drill	Jul 19 th



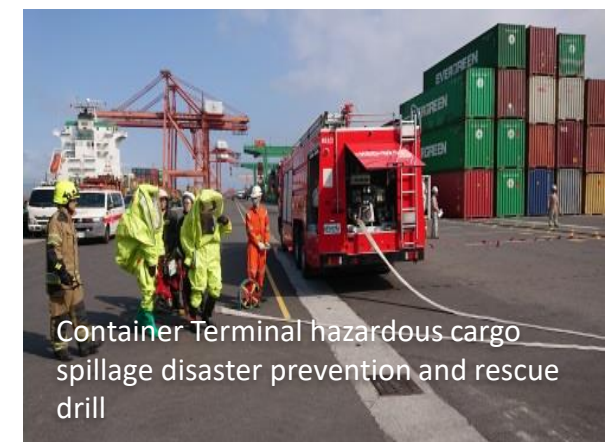
Helicopter air support



National Critical Infrastructure Protection drill



Sea and land water spray rescue

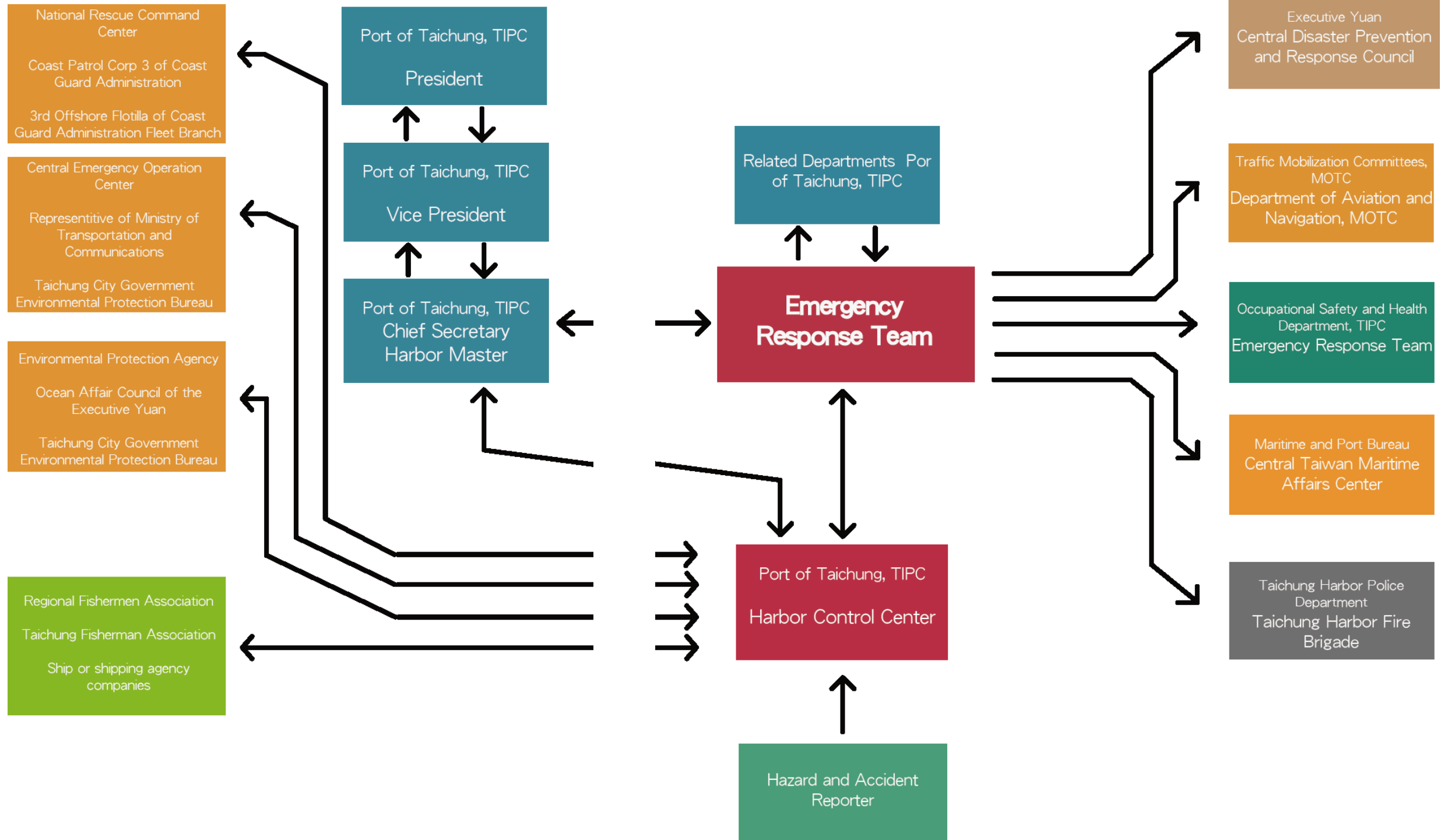


Container Terminal hazardous cargo spillage disaster prevention and rescue drill

05/ Emergency Response



Port of Taichung Emergency Response



*Involvement
and
Collaboration*

06/



06/

Involvement & Collaboration



Dust emission reduction mechanism for handling emission-prone cargoes.

Concern/Motivation

In the Port of Taichung, emission-prone cargoes have always been handled with conventional grabs and funnels; the dust emission during the handling process easily causes particulate pollution, and the transportation using vehicles also contaminates the roads. Therefore, a centralized management policy for bulk and general cargoes was implemented on January 1, 2017.

The pollution control for handling operations was implemented for coal, copper, and sand, three cargo types prone to emission; transporters of these are asked to adopt a handling method that adheres to comply with environmental regulations. The pollution control shall be extended to other cargoes that also produce emissions (such as cement clinker, slag, silica sand, and soda ash) from January 1, 2019 onward.

Solution

The company has established the Directions of Environmental Management of the Port of Taichung (promulgated in April 2017 and amended on April 3, 2019) to regulate the storing, handling, and transporting of emission-prone cargoes. Attachments of new or exchanged contracts for each company in the port area were included to serve as a reference for management.

To ensure that tenants would have the capacity to comply, Taichung Branch of TIPC had held 5 information meetings on enclosed cargo handling operation since July 18th 2017. In addition, Taichung Branch had held 13 meetings to review "cargo handling improvement plans" submitted by tenants. Currently, there are 8 environmental friendly cargo handling equipment in total.

To facilitate the compliance of the directions, the company conducted a meeting on the handling of emission-prone cargoes with all stevedoring companies and cargo owners. The stevedoring companies were asked to propose improvement plans and schedules for handling methods, which were reviewed by the company and the Maritime and Port Bureau of the Ministry of Transportation and Communication. Inspections were then conducted based on these proposed plans, and CCTVs were employed to reinforce the monitoring of cargo handling.

On October 31, 2018, the Taichung branch established the "Taichung Port fugitive cargo designated terminal mooring scheme". From January 1st, 2019, the fugitive cargo will be concentrated at No. 28, 29 and 44, while the West Wharf will be concentrated at No. 105 and the southern section of 106.

Implementation/Timeline

- 2018.1.1 The handling operations for coal, copper, and sand were required to be in compliance with relevant environmental protection laws
- 2019.1.1 Other emission-prone cargoes were required
- 2019.6.30 Cement clinker and slag must be handled by a sealed unloader. Other emission-prone cargoes should be handled using modified stevedoring machines and operation methods proposed in each company's improvement plans for handling emission-prone cargoes.

Effect/Benefit

According to statistical data, 5.754 million tons and 5.262 million tons of coal were imported via the Port of Taichung in 2017 and 2018, respectively; with the adoption of modified handling methods, the emissions was reduced by 397.1 tons and 363.1 tons, respectively.

Investment Amount

six unloaders have been purchased by the companies in the port area (the cost per machine is approximately NT\$40 million)



Stakeholders

Taichung Branch of TIPC ; Port staff ;
Local people

Participating Units

Maritime and Port Bureau (Ministry of Transportation and Communications) ;
Taichung Branch of TIPC ; Taichung Port Warehouse Co., Ltd. ; Delong Warehouse Co., Ltd. ; Jianxin International Co., Ltd.

* Coal Control Efficiency Unit : tons/year

Item	2017	2018
Loading amount	5,754,949	5,262,010
No loading control emissions	446.0	407.8
Have loading control emissions	48.9	44.7
Adoption of modified handling methods	397.1	363.1

*Times of penalization

Items	2017	2018	2019 Jan-Aug
Cases sent to MPB	22	13	27
Cases penalized by MPB	8	7	14



Environmental Issue

Dust

Port: Port of Taichung
Contact Person: LIN,ZHAO-CHONG
Unit: Taichung Branch of TIPC Stevedoring and Warehousing Business Department
Business Operations Section
Position: Deputy Manager
Phone Number: +886 4 2664 2210
Fax Number: +886 4 2664 2298
E-mail : tel5961@twport.com.tw

06/

Involvement & Collaboration



Taichung Port promotes green energy industry

Concern/Motivation

The Executive Yuan implemented the Green Technology Industry Innovation Program, and the development of green energy became a new driver for economic development. Specifically, on the basis of Taiwan's need for green energy, large-scale investments worldwide are introduced, thus increasing high-quality job opportunities and promoting developmental leaps in Taiwanese green energy technology and industry.

Solution

To meet the need for offshore wind power industrial development, the Port of Taichung shall designate an appropriate location for building a wind power wharf for the needs of resident companies. Considering the immediacy of international commercial ports in Taiwan, the offshore wind power wharf construction at the Port of Taichung has been included in various short-, mid-, and long-term development plans according to the 2017–2021 International Commercial Port Future Development and Construction Plans.

Because of the promotion of Taichung City Government I as a low-carbon city and Taiwan's renewable energy capacity inventory-checking policy, the company has adopted several measures. According to Article 22 of Taichung City Autonomous Regulations on Low-Carbon City Development, the company shall disclose users with a monthly average power consumption of 800 kW or more in a public announcement in 3 periods. These users must then complete the installation of green or energy-saving equipment such as solar panels and wind power generator equipment of at least 10% of the agreed capacity within 3 years after the public announcement.

Implementation/Timeline

Terminal Seat Bearing Capacity Improvement

Item	Date of award	Performance period
Taichung Port No 106 wharves New Construction Project	2017 Dec 5	660 day
Taichung Port No 36 wharves New Construction Project	2018 Jun 19	660 day
Taichung Port No 5A wharves Reconstruction Project & No 5B wharves New Construction Project, shallow water channel construction project	2017 Jun 1	960 day

Set up solar photovoltaic facilities

Item	Evaluation of setup capacity (KW)	Capacity has been set (KW)	Achieving rate
Port of Taichung, TIPC	587.09	54.28	9.25%
Taichung Port Area Operator	16,394.68	9,892.01	60.34%
Processing Export Zone Management Office - Taichung Port Park Operator	5,154.58	1,474.98	28.61%
Total	22,136.35	11,421.27	51.60%

Environmental Issue

Energy consumption, air quality

Investment Amount

Construction and rebuilding of offshore wind power terminals 103,498,940 EUR

Set up solar photovoltaic facilities 16,420,431 EUR

Effect/Benefit

Item	Set capacity (KW)	Power generation (degrees)	Carbon reduction benefit estimation(ton/yr)
Port of Taichung, TIPC	54.28	59,436.6	32.93
Taichung Port Area Operator	9,892.01	10,831,751	6000.79
Processing Export Zone Management Office - Taichung Port Park Operator	1,474.98	1,615,103	894.77
Total	11,421.27	12,506,290.6	6,928.49

Participating Units

Maritime and Port Bureau Central Taiwan Maritime Affairs Center ,Offshore wind power industry ,Taichung Branch of TIPC

Stakeholders

Offshore wind power industry, Port staff, General public



Port: Port of Taichung
Contact Person: HSU, ZHE-WEI
Unit: Taichung Branch of TIPC Port Business Department FTZ Logistics Section
Position: Manager
Phone Number: +886 4 26642170
Fax Number: +886 4 26642199
E-mail : wei316@twport.com.tw

Port: Port of Taichung
Contact Person: HUANG, WEI-CHENG
Unit: Taichung Branch of TIPC Management and Engineering Department Construction Section I
Position: Manager
Phone Number: +886 4 26642550
Fax Number: +886 4 26560829
E-mail : Dandes@twport.com.tw

Port: Port of Taichung
Contact Person: WANG, FAN-CHIN
Unit: Taichung Branch of TIPC Port Business Department Contracts Management Section
Position: Supervisor
Phone Number: +886 4 26642150
Fax Number: +886 4 26642199
E-mail : fangeen@twport.com.tw

06/

Involvement & Collaboration

Involvement and Collaboration

The Taichung Branch of TIPC 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, etc.

Organizations

協會



Association of Pacific Ports (APP)

The APP hosts conferences involving industry, government, and educational institutions on a regular basis for the benefit of port management bureaus, port management committees, and other relevant parties. It serves to provide ports in the Pacific region with a platform for exchanging professional skills, management knowledge, and relevant practical experience. The Port of Taichung, TIPC participates in conference on an occasional basis every year and exchanges operation experience with members from other countries so as to gain a better understanding of modern port operations and current development trends at Pacific ports.



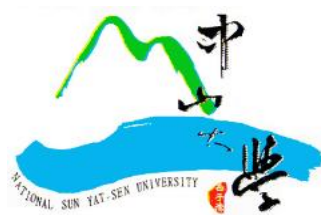
The International Association of Ports and Harbors

The International Association of Ports and Harbors is currently the most influential port and harbor organization in the world, and is a non-governmental organization that provides consulting to various primary UN organizations (ECOSOC, IMO, UNCTAD, UNEP, ILO, WCO, etc.). The Port of Taichung, TIPC participates in the World Ports Conference, which is held once every two years, so as to gain a better understanding of global port development trends.

Academia



National Taiwan Ocean University



National Sun Yat-Sen University



National Cheng Kung 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, 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.

Governmental Agency



Forestry Bureau, Council of Agriculture

The Forestry Bureau implemented a forest renewal project between 2003 and 2006, and a preliminary coastline forest ecology recovery and afforestation project in 2012. The afforestation area in the Low Density Development Area at the Port of Taichung is 8.1 hectare, and a total of 40,000 Casuarina Trees have been planted. The afforestation area in Special Zone for Industry II is 4.17 hectare, and a total of 20,000 Casuarina Trees have been planted.



Environment Protection Bureau

The Port of Taichung, TIPC and the Environmental Protection Bureau of Taichung City Government have cooperated on audits and drills in the port area on the regular basis and assist the Environmental Protection Bureau of the Executive Yuan in hosting relevant meetings such as the "meeting for discussion of atmospheric dust suppression in central river regions," "public hearing for proposal of air pollution prevention in Taichung City," "public hearing for greenhouse gas emission management and reduction in Taichung city," "drill for atmospheric dust prevention by rivers," "seminar for monitoring, investigation, reporting and control of soil sediments" and "meeting for discussion of regular pollution source control in the Taichung port area."



Central Maritime Affairs Center, Maritime and Port Bureau

The Port of Taichung, TIPC cooperates with the Central Maritime Affairs Center to perform regular audits and drills. The Port of Taichung, TIPC cooperates with Taichung Harbor Fire Brigade to train personnel in extinguishing fires in offices.



Taichung Harbor Fire Brigade

The Port of Taichung, TIPC cooperates with Taichung Harbor Fire Brigade to train fire extinguishing in office places.



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 Taichung, TIPC has worked with the Institute of Transportation on such projects such as "Port Ecological Landscape Planning, Design and Research" and "Energy Conservation and CO2 Emission Reduction at Taiwan's Ports," etc.



Environmental Protection Administration

The Taichung Branch of TIPC participates in major discussion meeting held by the EPA. For example, the "Port Area Air Pollution Reduction Discussion Meeting," "Environmental Assessment Act Promotion Campaign," and "Promotion Campaign for Port Transportation Pollution Control Measures." The Taichung Port has amended the "Terms and Conditions for the Application of TIPC International Commercial Port Access Pass" and only issue pass less than 3 months to trucks without a self-management seals.

Civic Agency



Industrial Technology Research Institute

To comply with the energy saving policy promoted by the central government, Port of Taichung entrusted energy management professionals to conduct energy researches and will require future public project contractors to meet national standards.

Training

07/



07/ Training

Employee Education

In compliance with its environmental policies, the Taichung Branch of TIPC provides suitable environmental education and training programs to raise environmental awareness, and improve the competitiveness of the Port of Taichung.

In 2017 and 2018, the Taichung Branch of TIPC organized more than 4,500 man-hours of environmental training. Topics of the training covers ecological preservation, disaster responses, greenhouse gases accounting, air and noise pollution monitoring, marine pollution control, and other related issues.

2015-2016 Environmental Education Hours

Types		2017 (man-hr)	2018 (man-hr)
Category by Field	Social Issues	217.5	29.5
	Climate Change	0.0	3.0
	Disaster Prevention	306.0	2.0
	Natural Preservation	0.0	100.5
	Public Nuisance	896.0	0.0
	Resource Management	913.0	2,644.5
	Cultural Preservation	96.0	2.5
	Community Outreach	0.0	672.0
Category by Course Type	Course	762.5	2,134.0
	Speech	1,202.0	17.5
	Web Learning	0.0	438.0
	Experience Sharing	3.0	0.0
	Site Visit	96.0	672.0
	Video	152.0	0.0
	Hands-on Activity	5.0	3.0
	Event	0.0	4.0



2017 Port Area Workplace Safety and Health Awareness Week Events



2018 TOSHMS and ISO 45001 System Introduction Initiation Conference



AED+CPR Hands-On Training



*Communication
and
Publication*

08/

Communication and Publication

Promotion activities, seminars, workshops, publication, web-sites, and exhibitions have been organized to align Taichung Port with contractors and potential partners. Therefore, publishing the port's relevant information is helpful to the public, port companies, academic institutions, and subsidiary units.

Websites



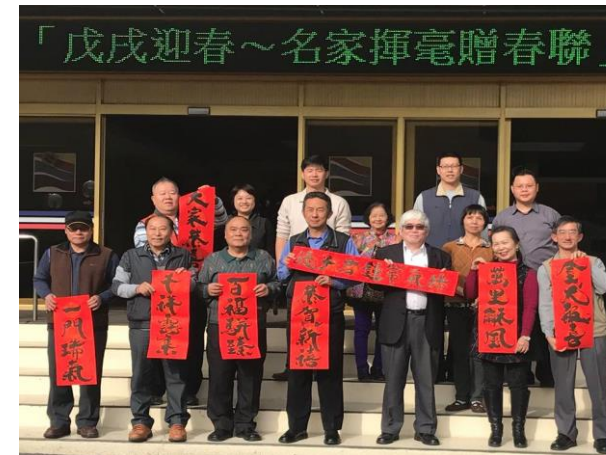
Front Page of Taichung Port Website



Chinese and English web pages for TIPC Green Policy

To present the positive outcomes of creating green ports in Taiwan to international society, TIPC established a website, which features Chinese and English versions of content, to demonstrate its green policies and create an exchange and communication platform with foreign countries.

Collaborating with the local governments



On-Site spring couplet writing and presentation



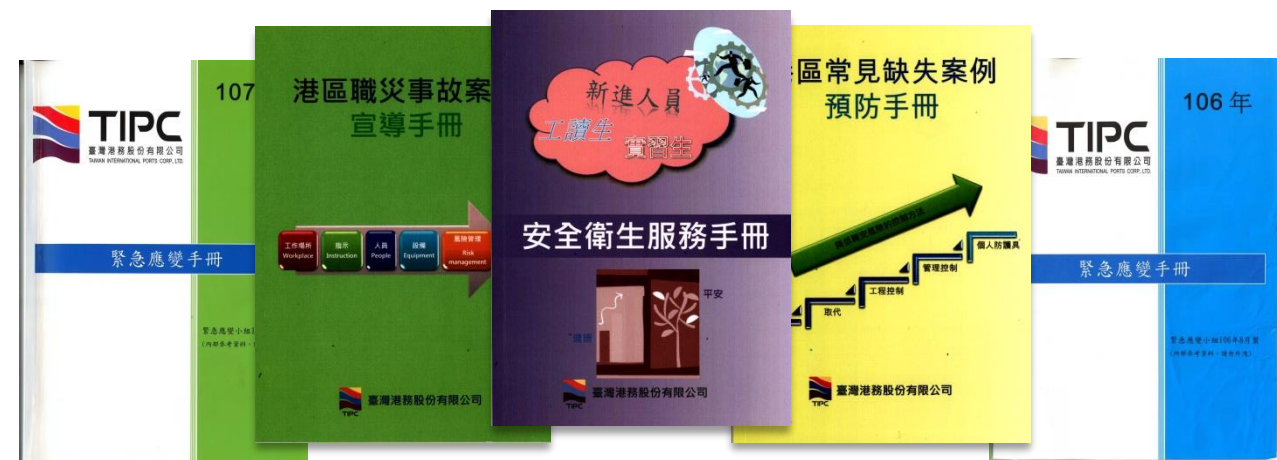
One-day volunteering in Taichung City Love Home



Charity events in elderly care homes



Premature babies return home (in collaboration with the hospital)



Port of Taichung disaster prevention related publications in 2017-2018

Communication and Publication

Community Visits



Wu-Qi Elementary School visit to the Port of Taichung



Wu-Nan Elementary School visit



Nanxun High School visit

Community Outreach



Tetrapod painting in the Port of Taichung



Visit of Dun-Mu navy fleet



Marine education activities



One-Day volunteering in the bakery

Promotion Campaigns



Promoting ideas of business honesty and ethics among companies in the port area.



Promoting cruise tourism industry development in central Taiwan.

*Green
Accounting*

09/



Environmental Investment and Cost

The investments made by the Port of Taichung, TIPC pertaining to the environmental issues can be primarily divided into employees, environmental maintenance and management, environmental monitoring, publications, and emergency response and communication. The objectives are to improve employee's awareness of the environment, maintain and improve the quality of the port environment, enhance the emergency response capability, and elevate the public's knowledge of the port.

Environmental Investments at the Port of Taichung

- Employees: Personnel expenses for those involved in environmental operations education, employee education.
- Environmental maintenance and management: Port area landscaping, removing wastes, dredging port berths.
- Environmental monitoring: aspects such as air, noise, water quality, sediment and environmental inspections
- Emergency response: Costs for accident management and for purchasing pollution removal materials
- Communication and publications: Costs for maintaining websites, holding promotional activities, etc.

The total cost expended by the Port of Taichung, TIPC for the environmental issues in 2017 and 2018 (Unit: thousand EUR)

Items	2017	2018
Employees	322	420
Environmental Maintenance and Management	1,130	1,092
Environmental Monitoring	128	132
Emergency Response	8	23
Communication and Publication	60	50
Total	1,648	1,716

Environmental Assets

Port of Taichung has implemented a series of harbor development projects for Taichung Port to develop into a value-added logistics hub in central Taiwan, as well as a base for port industry development and an eco-friendly green harbor. Some of them involve environmental issues, such as construction projects that are to new architecture's transition toward green buildings, increased public exposure to harbors, pier reconstruction with shore power equipment systems, and replacement of old equipment to increase work effectiveness and decrease pollutant emission. In 2017 and 2018, the respective amounts of fixed-asset investment toward environmental issues made by Port of Taichung, TIPC were approximately €26,680 thousand and € 30,714 thousand.



Fixed assets invested in environmental issues in 2017 and 2018 (Unit: thousand EUR)

Items	2017	2018
Land Improvements	22,753	26,835
Houses and Buildings	1,439	1,560
Machinery and Equipment	1,834	212
Transportation and Equipment	646	2,060
Other Equipment	8	47
Total	26,680	30,714



Improvement Recommendations

10/

Since operations began in 1976, the Port of Taichung has never ceased investing in the infrastructure of the port in response to domestic economic growth and the evolving shipping market. In 40 years, the port has grown. In future, the Port of Taichung will work to continue its growth on the global ocean shipping stage and remain attentive to the natural environment on the basis of its advantages.

TIPC became a government-owned business in 2012. The company has been promoting green port policy and endeavoring to achieve the objective of energy transition and the vision of a nuclear-free homeland; in particular, green energy will become the engine driving economic development. Favorable geographical conditions and national green energy needs have prompted the Port of Taichung to introduce large-scale investments from domestic and foreign businesses, to increase high-quality job opportunities, to promote the development of green energy technology nationwide, and to make Taiwan a critical stronghold of the green energy industry in Asia. In addition to complying with government policy, TIPC will endeavor to create a suitable environment for the development of green energy and to establish a high-quality offshore wind power industrial park and operation base to achieve energy transition and, ultimately, a nuclear-free homeland.