Port of Taichung
Environmental Report

The environmental report presents Taichung Port's achievements in environmental protection from 2015 to 2016 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.

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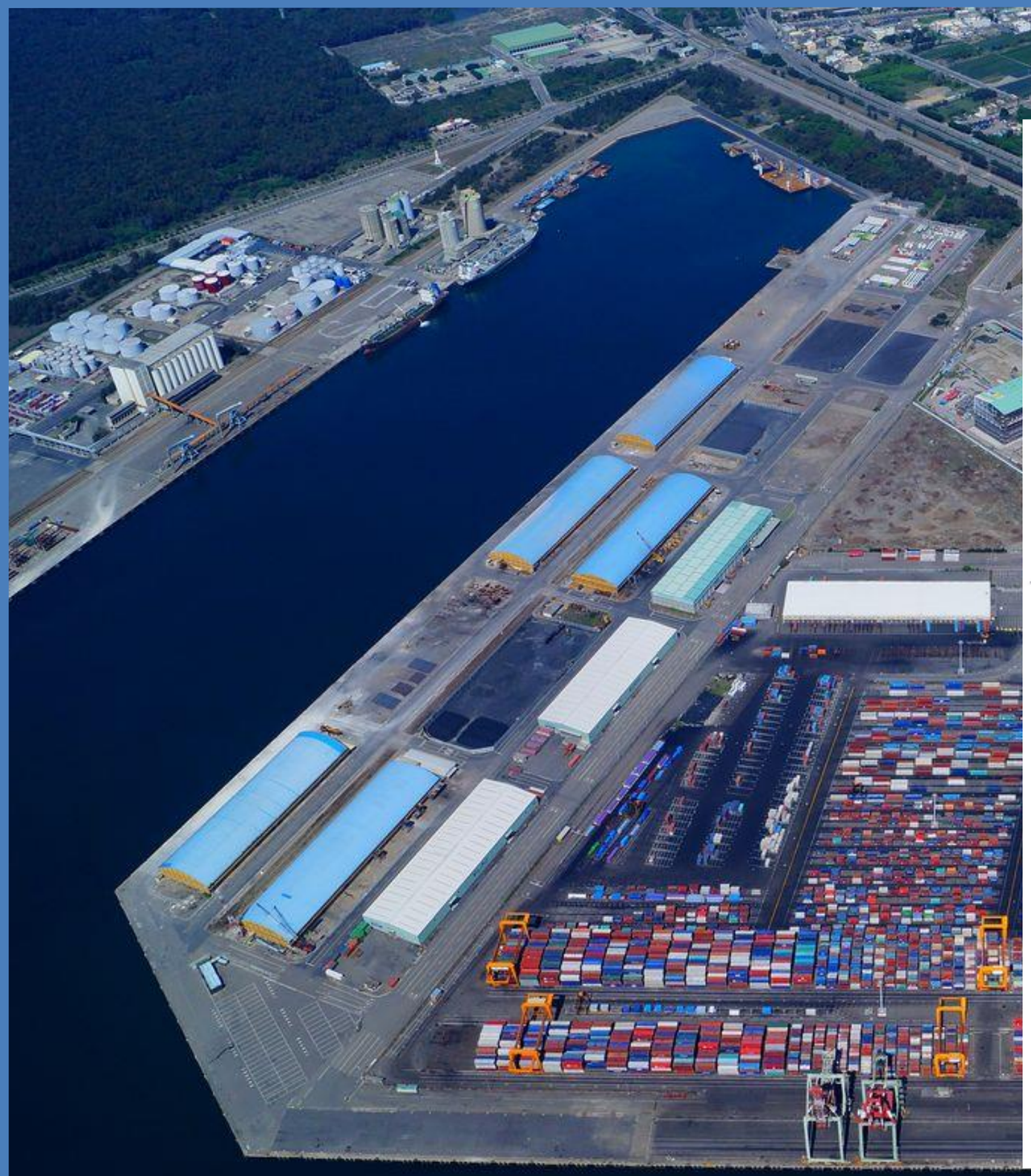

Taiwan International Ports Corporation Environmental Policy

"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.

Men Feng Wu

Men-Feng Wu
Chairman of TIPC
Date: 2016 / 11 / 2

Tien Kuei Kuo

Tien-Kuei Kuo
President of TIPC
Date: 2016 / 11 / 1

Environmental Policy of the Port of Taichung

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**
  Promote the deceleration of vessel, fuel change-over and the establishment of shore power and automated gates.
- **Mitigate soil pollution in the port**
  Continue to monitor and control polluted sites in the port.
- **Promote waste reduction in the port**
  Promote waste reduction and resource recycling.
- **Avoid upstream pollution from entering the port**
  Work with local government to mitigate upstream pollution and to prevent pollution sedimentation.
- **Reduce the chance of fugitive dust emission**
  Encourage enclosed stevedore operations and carry out vehicle control measures
- **Develop a friendly land environment in the port**
  Develop a low-carbon, low-pollution and beautified green port, and carry out plans for landscaping and forestation in the port.
- **Prevent vessels from discharging sewage**
  Regulate the disposal of garbage, waste oil and sewage management of vessels: assist with ballast water control.
- **Reinforce the management of hazardous cargos in the port**
  Realize the management of hazardous areas; enhance the emergency response mechanism.
- **Improve port water area development**
  Develop accessible waterfront, restructure cargoes handled in Zhongboqu, and promote tourism.
- **Abate industrial air pollution in the port**
  Implement autonomous management plan reduce greenhouse gas and other air pollutants from industries in the port.

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.

chung. jing feng

President of Taichung Branch of TIPC

Date 2017. 9. 12

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Message from TIPC

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Message from the Chairman of Taiwan International Ports Corporation ,Ltd

The Taiwan International Ports Corporation, Ltd. (TIPC) is committed to advancing port infrastructure, improving facility and service, optimizing land use and preventing pollution. In recent years, we have been networking with global ports and active in international certification schemes of port environment management. The environmental performance of ports in Taiwan is thus recognized by the world. With our global presence, we are well positioned to achieve our goal as building Ecoport and Green Port.

Sustainable development has been the foundation on which the TIPC has been built. It is our strong belief that long-term operation and success are not possible without social, economic and environmental prosperity. We are dedicated to carrying out our mission of creating the best investment environment for the port business as well as the livable life for the neighboring communities.

At the TIPC, we will continue the collaboration and communication with shipping companies, port business, neighboring communities and local governments. Together with public authorities and citizens, we will seek ways to build ideal international green ports for all

Men Feng Wu

Meng-Feng Wu
Chairman
Taiwan International Ports Corporation, Ltd.

Message from the President of Taiwan International Ports Corporation ,Ltd

Since the establishment of Taiwan International Ports Corporation in 2012, we have devoted ourselves to develop highly effective ports with friendly and safe working environments. In a world facing ever more severe environmental issues, we, as a global leader in port operations, are determined to uphold our environmental policies as the highest guiding principle to assess and manage port environments, promote energy conservation and carbon reductions, and optimize port environmental quality.

Starting in 2013, we have been assessing our port environmental management systems through the European EcoPort certification program and anticipate that our seven major commercial ports all obtain certification in 2017. Concrete pollution prevention strategies comprise hardware renewal, operational improvements, and port area resource management. Hardware renewal entails the replacement of outdated equipment such as trucks, marine vessels, and operational equipment. Operational improvements include vessel speed reduction in the port area, enclosed bulk cargo operations, and vehicle control protocols. As for resource management, we promote rainwater harvesting, utility savings, and reusing dredged soil for backfilling.

In response to global trends towards reducing carbon emissions as well as the Greenhouse Gas Reduction and Management Act recently enacted by the government, we conducted a greenhouse gas inventory with third party verification in 2016. In addition, we are taking advantage of the port environment to increase our competitiveness by installing solar panels and investing in offshore wind farms.

While committed to provide excellent port services, we also strive to protect the environment and maintain good living quality near the ports. We believe the development of green ports will bring soft power and competitiveness of the TIPC into full play and make the communities around us prosper. We are all partners in this endeavor, and our combined efforts to promote environmental protection and sustainable development will propel Taiwan to forge ahead to a better future!

Tien Kuei Kuo

Tien Kuei Kuo
President
Taiwan International Ports Corporation, Ltd.

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

Port of Taichung, TIPC is one of the international commercial ports in Taiwan, and annual container and cargo throughput have grown significantly since the completion of the port. The port was already handling millions of tons of cargo annually by 2000. But because of the port's rapid growth, the types and quantities of pollution have increased over the years. In order to protect the environment while developing economy, the Port of Taichung, TIPC has adopted a prospective development model that complies with the needs of sustainability, modern economics, and environmental protection.

The Port of Taichung, TIPC is currently involved in development and construction of a quality green port, which will transform Taichung Port into a green port that is environmental-friendly and low-polluting, as well as a port that recycles resources. In 1996, a professional organization implemented the project "investigation, monitoring and analysis of the Taichung Port environment" in order to gain a better understanding of the environmental quality and pollutant characteristics at Taichung Port, and ultimately build an environmental database and seek ways to prevent pollution.

In the future, the Port of Taichung, TIPC will be assessed by the European Sea Ports Organization (ESPO) with the goal of acquiring EcoPorts Certification and becoming one of the EcoPorts in the Pan Pacific Area. This will not only enhance the global competitiveness and image of Taichung Port, but also further Taichung Port's sustainable development.

chung ying feng

Ying-Feng Chung
President of Port of Taichung
Taiwan International Ports Corporations, Ltd.

Port Profile

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Port Profile

Port Geographic Information

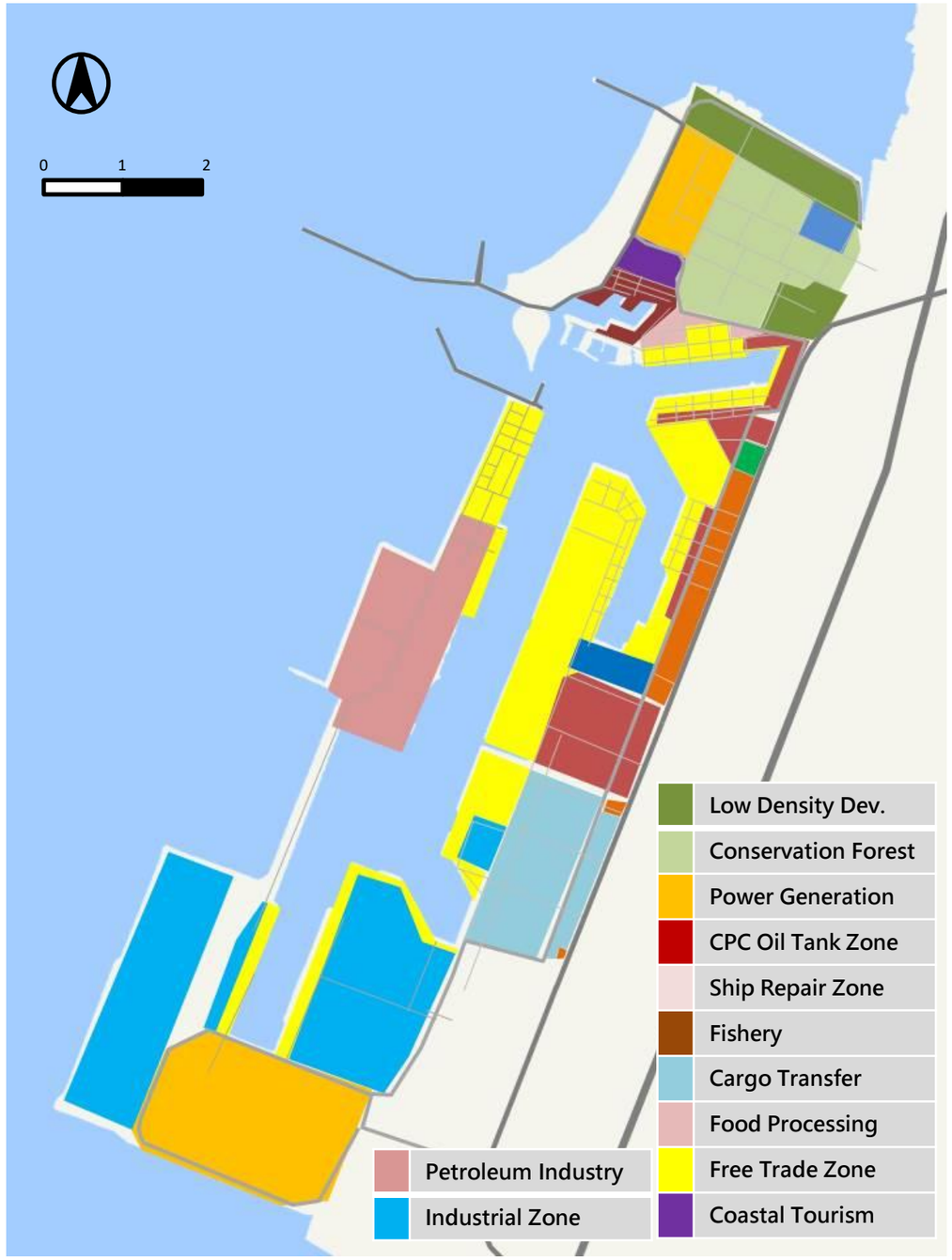
The Port of Taichung is located on the west coast of Taiwan. Its north begins from the south of Dajia River and south to the north of Dadu River and boarders Lingang Road on its east side, stretching 12.5 km from north to south and 2.5 to 4.5 km from west to east. The total area us about 3,861 ha. (about 2,903 ha. land and 958 ha. water). It has one entrance from the sea.

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



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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

Main Cargoes

The primary import cargo at Port of Taichung for 2015 and 2016 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

Port of Taichung Business Statistics from 2015-2016

Business Item		2015	2016	Comparison between 2015 and 2016	
				Actual Number	%
Incoming and outgoing ships (ton)	Total number of ships	15,587	16,193	606	3.89
	Total tonnage	255,255,538	272,622,011	17,366,473	6.80
Cargo Throughput (metric ton)	Imported cargo	61,331,483	61,968,632	637,149	1.04
	Exported cargo	7,439,623	8,369,960	930,337	12.51
	Domestic cargo	4,862,391	5,120,778	258,387	5.31
	Total	73,633,497	75,459,370	1,825,873	2.48
Cruise Passengers	Number of Travelers	134,441	47,165	-87,276	-64.92

Environmental Management

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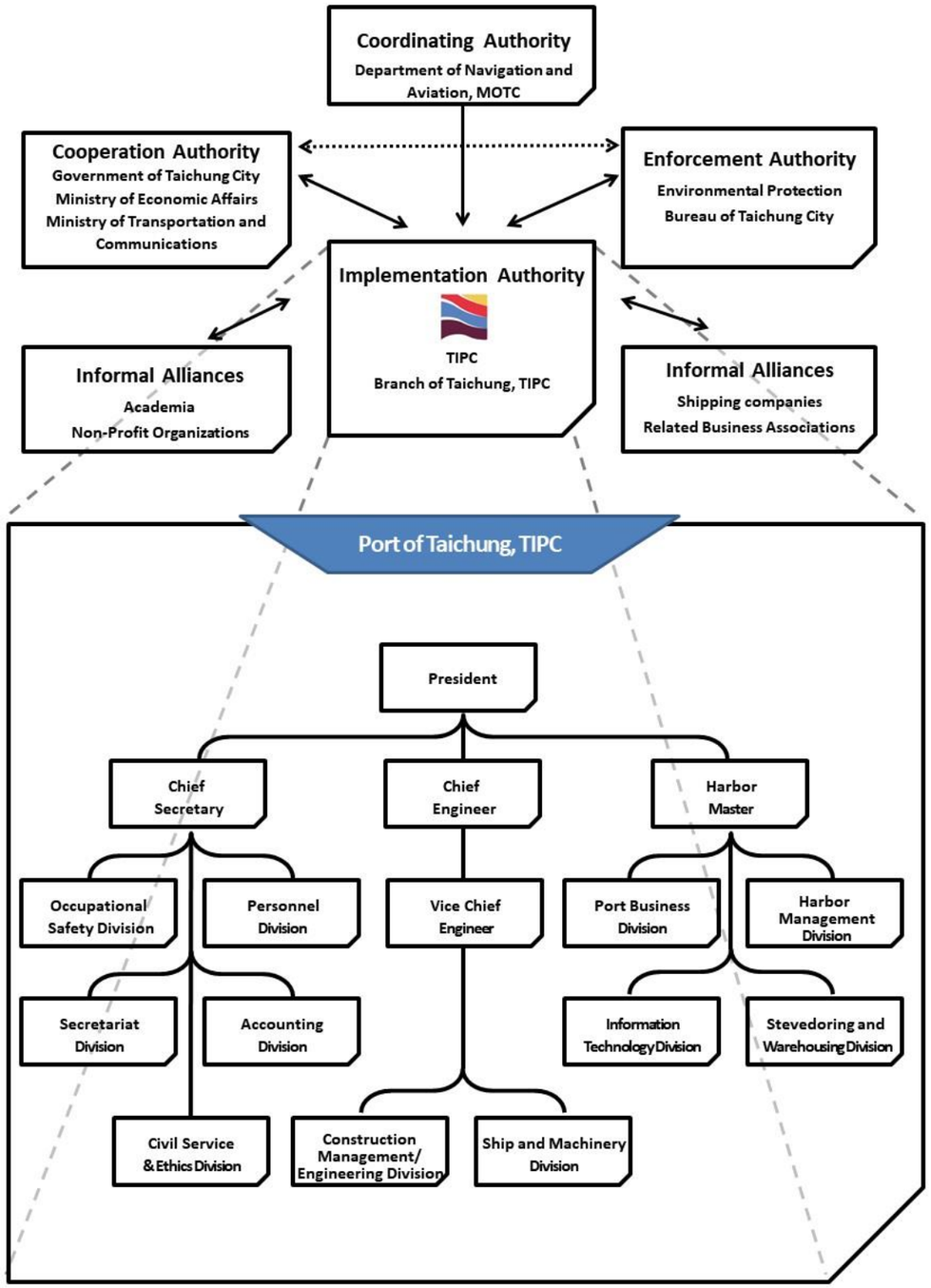
Organization Structure

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.

Divisions	Functions of the divisions at Taichung Port
Port Business Division	Attraction of local investments, implementation of port functions, and creation of benefit
Harbor Management Division	Port safety and port affairs management
Stevedoring & Warehousing Business Division	Tourist services and private store operation
Information Technology Division	Development and maintenance of IT systems and equipment
Construction Management / Engineering Division	Port planning, design, construction and supervision
Ship & Machinery Division	Maintenance and management of electrical equipment, ship machinery and tools
Occupational Safety Division	Port environmental protection, pollution prevention and management of occupational health and safety
Personnel Division	Human resource management
Civil Service Ethics Division	Enforcement of ethics and investigation
Accounting Division	Budget review and management of income and expenditures
Secretariat	General affairs management

Authorization of environmental management units



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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	2010/12/08		
	Act for the Establishment and Management of Free Trade Zones	2012/12/28		
Ministry of the Interior	Fire Service Act	2011/12/21	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	Environmental Protection Administration	Environmental Protection Bureau of Taichung City
	Air Pollution Control Act	2012/12/19		
	Water Pollution Control Act	2016/12/07		
	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 Chemical Substances Control Act	2013/12/11		
	Soil and Groundwater Pollution Remediation Act	2010/02/03		
	Public Nuisance Dispute Mediation Act	2009/06/17		
	Taichung City Self-governance Articles of Bituminous Coal Control and Petroleum Coke Prohibition in Public and Private Places	2016/01/26	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	2016/04/13	Ministry of Interior	Taichung City Government

State of the Environment

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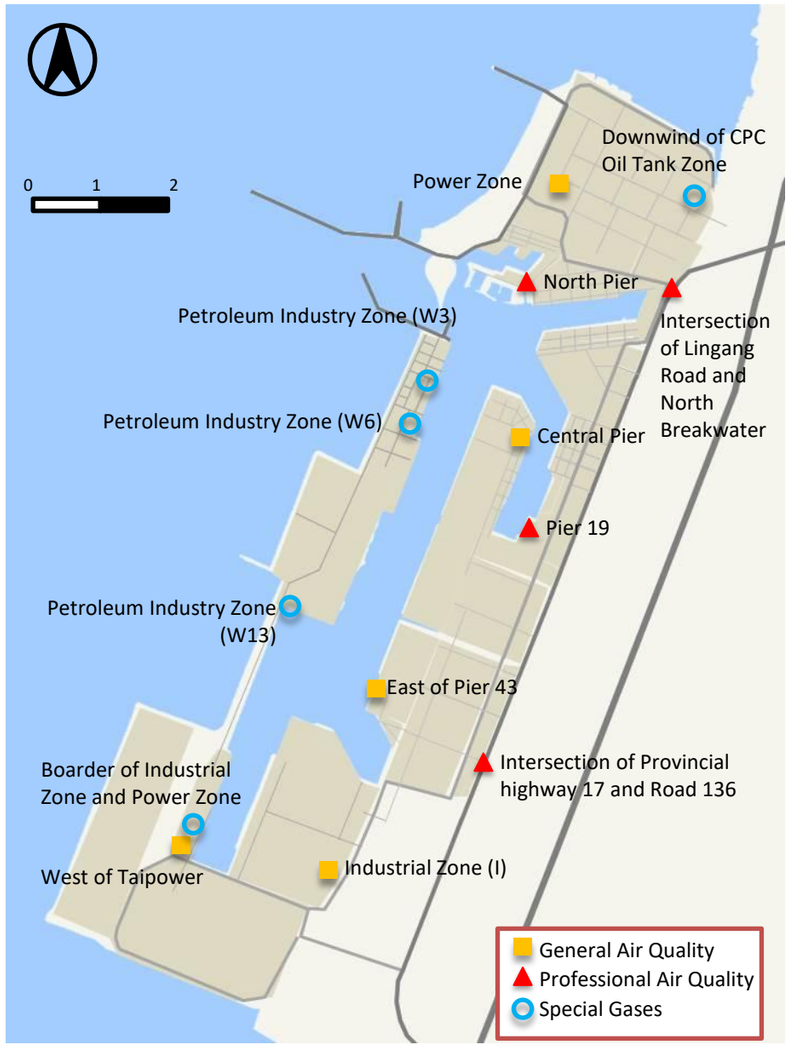
04/ State of Environment

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.



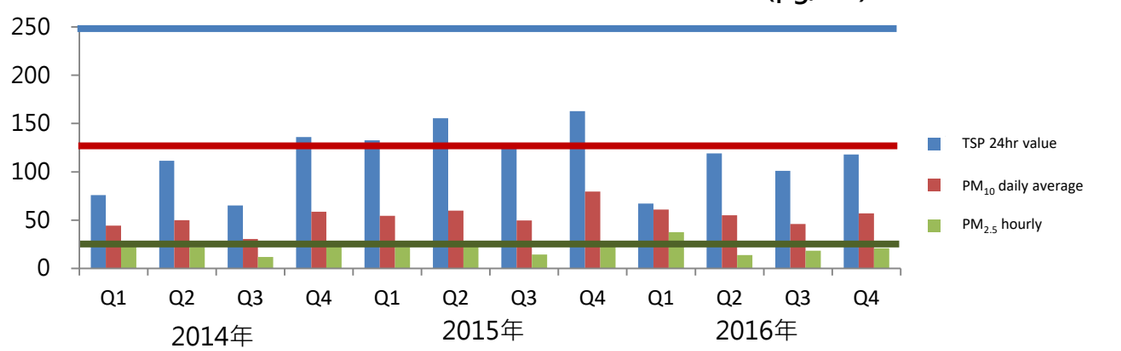
After implementing the aforementioned measures, the Port of Taichung, TIPC, achieved major air quality standards, demonstrating a substantial improvement in air quality. However, $PM_{2.5}$ standards are yet to meet the specified requirements. This shortfall is due to the general increase in background 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.

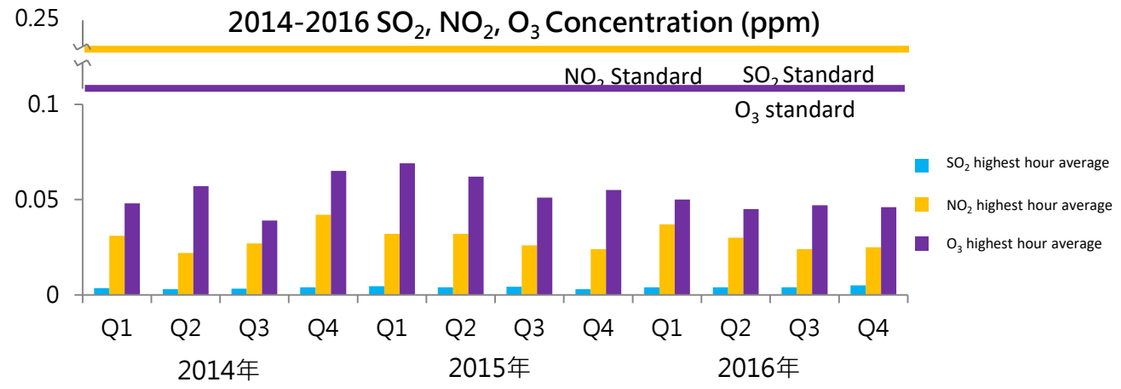
Port of Taichung Air Quality Monitoring Plan

Type	Frequency	Monitoring Items
General	Seasonal	Particulate Matter, SO_2, NOx, CO, O_3, Wind Speed, Wind Direction, Temperature, Humidity
Professional	Monthly	
Special Gases	6 Month	Acetic Acid, Ammonia, Total Hydrocarbons

2014-2016 Particulate Matter Concentration (μg/m³)



2014-2016 SO_2, NO_2, O_3 Concentration (ppm)



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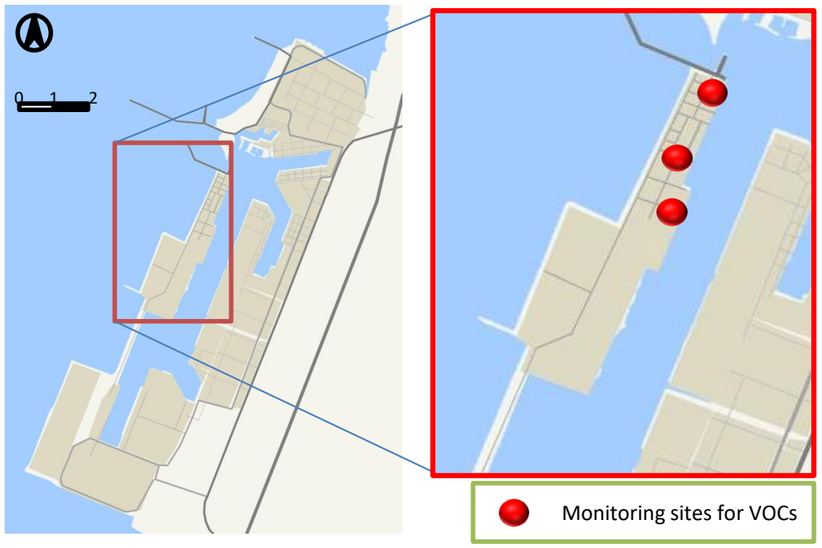
State of Environment

According to the data sampled by the Port in 2015 and 2016, 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.

2015-2016 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 than10 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 2015 and 2016 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)	TVOC (ppb)	CO (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	2015	350	19	0.3	0.02	N.D.	316	48	39	23
	2016	514	75	<0.1	0.02	<0.01	501	64	9	3
1F Arrival Office	2015	358	16	0.2	0.02	<0.02	725	70	45	26
	2016	403	78	<0.1	0.01	0.01	113	92	5	2
2F Arrival Entrance	2015	333	2	0.2	0.02	0.03	741	274	37	21
	2016	543	1	<0.1	0.02	<0.01	148	381	**90**	3
2F Departure Waiting Room	2015	314	2	0.4	0.02	N.D.	337	135	33	17
	2016	471	0	<0.1	0.02	<0.01	579	71	4	1
Legal Standards		1000	560	9.0	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.

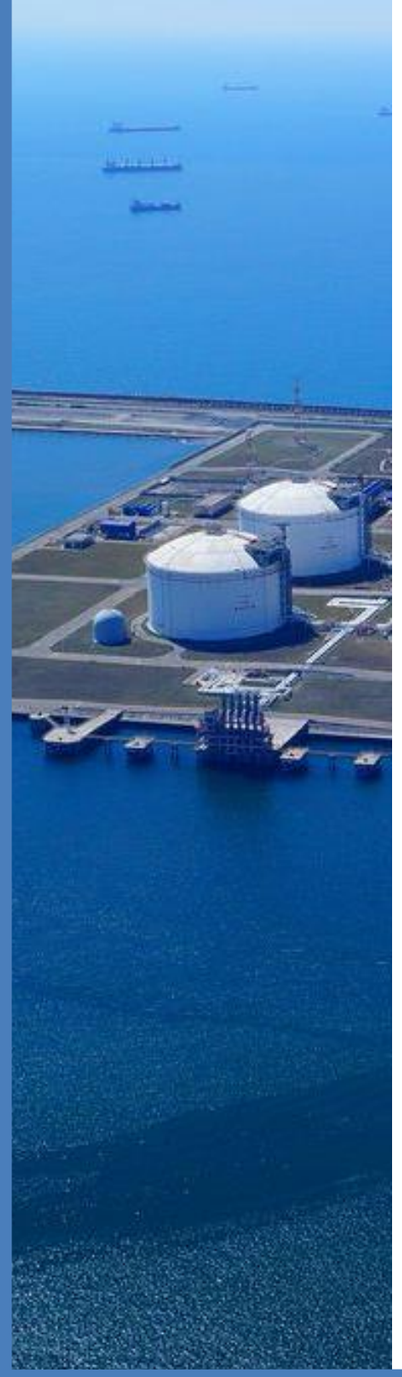
2014-2016 Port of Taichung Greenhouse Gases Inventory

Items		2014 (baseline)	2015	2016
Point	Section A	49,545,260	48,132,974	47,793,862
	Section B-1	228,930	259,828	272,099
	Section B-2	250,165	273,959	274,471
	Subtotal	50,024,355	48,666,761	48,340,432
Mobile	Section A	682	682	53
	Section B-1	498	498	627
	Section B-2	300,393	300,758	293,963
	Subtotal	301,573	301,938	294,643

Resource Consumptions and GHG emissions at Taichung Branch of TIPC

Items	Emission Coefficient ($kgCO_2e$ per unit)		2015		2016	
			Consumption	Emissions (ton)	Consumption	Emissions (ton)
Water (m^3)	2015	2016	27,616	4.2	23,602	3.6
	0.152	0.154				
Power (kWh)	2015	2016	6,018,927	3,178	6,314,542	3,340
	0.528	0.529				
Gas (L)	2.36(per liter)		45,936	108	37,044	87
	2016 EPA					
Paper (bag)	2.8(per bag)		1,281	3.6	1,147	3.2
	Paper Star A4					
Total				3,294		3,434

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.

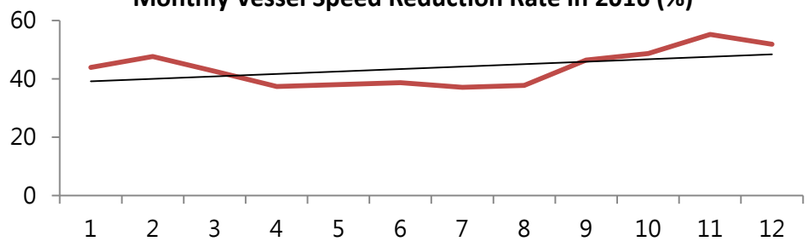
Readjusting Port Business Zones

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. 44 and 45, concentrating coal handling piers to pier no. 104 and 105, transferring copper soil handling pier to pier no. 43, and adding sustainable structures in the newly developed areas.

Environmental Friendly Vessels

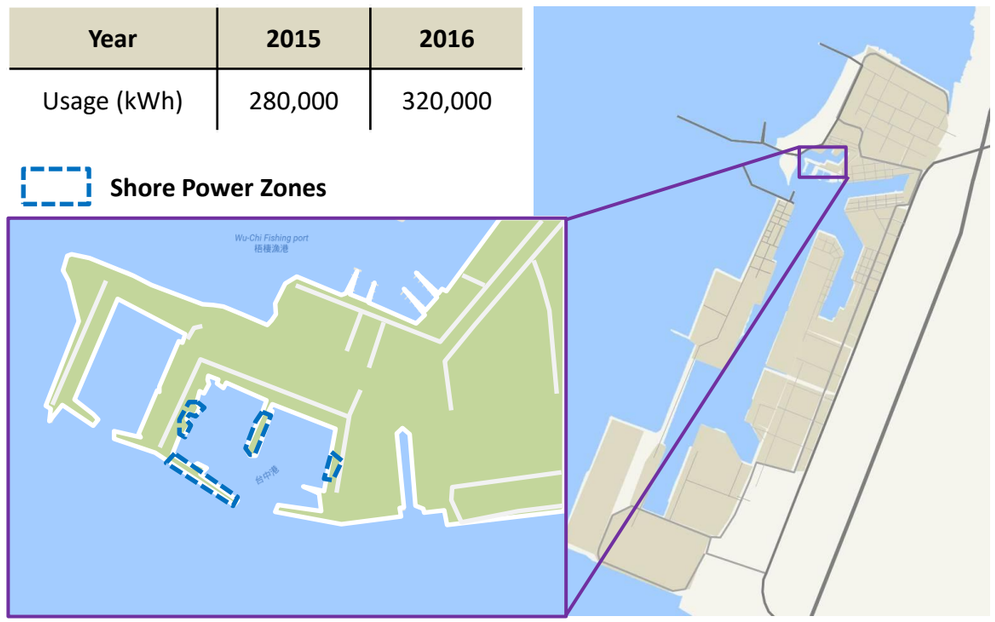
The Port of Taichung, TIPC built a speed-restriction check system in 2015 and has been put to use in 2016. Limiting vessel speeds substantially reduces the carbon emissions from fuel combustion engines; therefore, this policy has been actively promoted to shipping companies in the past 2 years. Since Sept. 12, 2013, hourly speed restrictions reminder has been sent to inbound vessels. In addition, such reminders have also been raised daily (working days) in berth meetings through 2015 (248 times) and 2016 (243 times). The vessel speed reduction achievement rate has increased gradually since implementation. All service vessels are using low-emission fuels. Additionally, shore power equipment is available to prevent vessels from generating unnecessary emissions. Accordingly, all service vessels used this service since 2013.

Monthly Vessel Speed Reduction Rate in 2016 (%)



Map of Shore Power Systems in Port of Taichung and Shore Power Usages

Year	2015	2016
Usage (kWh)	280,000	320,000



Service Vessel Using Shore Power

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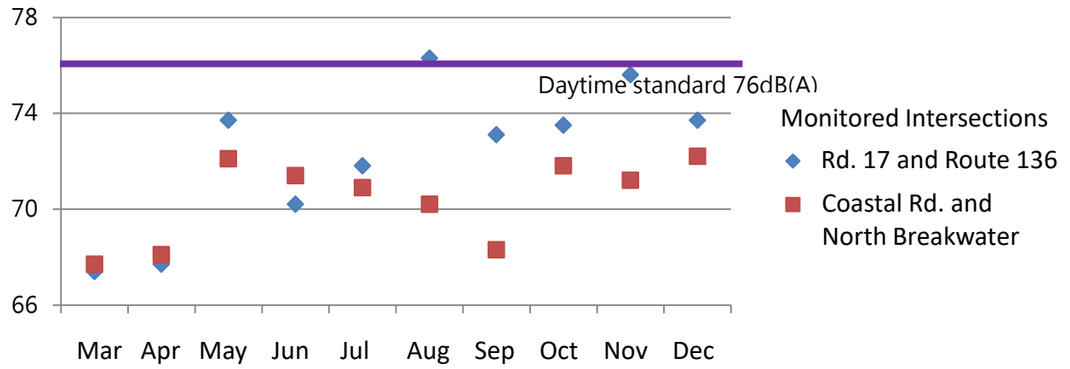
Port Noise

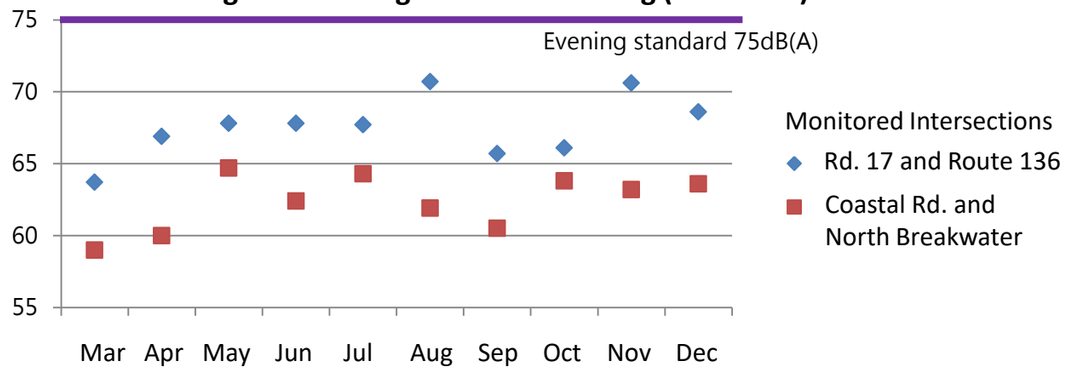
To ensure port environmental quality, two sites were chosen to monitor noise level in proximity to the port. These sites were all major intersections neat the port area. The noise level required for these sections is the Class D Road Noise Level Standard. According to the noise monitoring reports in 2016, most results show that the noise level complies with the class D road noise standard beside one particular day.

Port of Taichung Noise Level Monitoring Sites

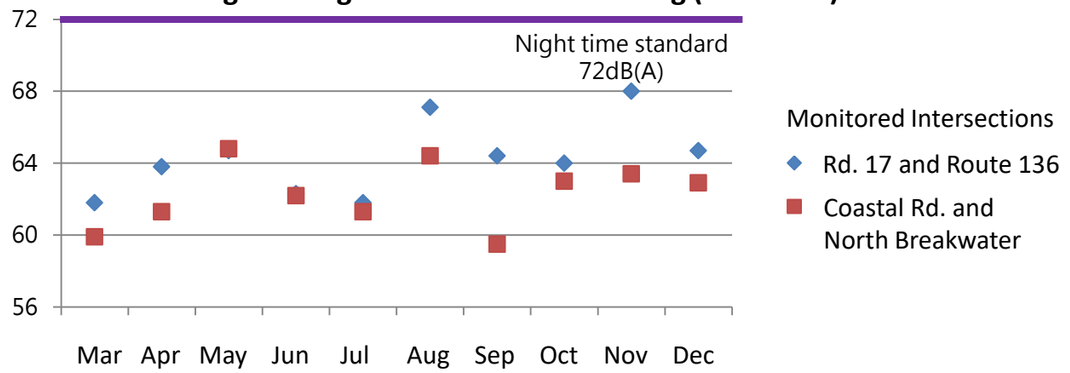
2016 Taichung Port Daytime Noise Monitoring (Unit: dBA)



2016 Taichung Port Evening Noise Monitoring (Unit: dBA)



2016 Taichung Port Night time Noise Monitoring (Unit: dBA)



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.

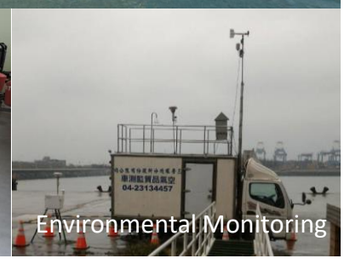
Port of Taichung 2015 and 2016 water quality

Items	Standard	Results	Pass rate(%)
pH	7.5~8.5	7.9~8.2	100
DO(mg/L)	≧5.0	3.0~7.5	70
BOD_5(mg/L)	≦3.0	<1.0~4.7	98
Mineral oil(mg/L)	<2.0	<0.5	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

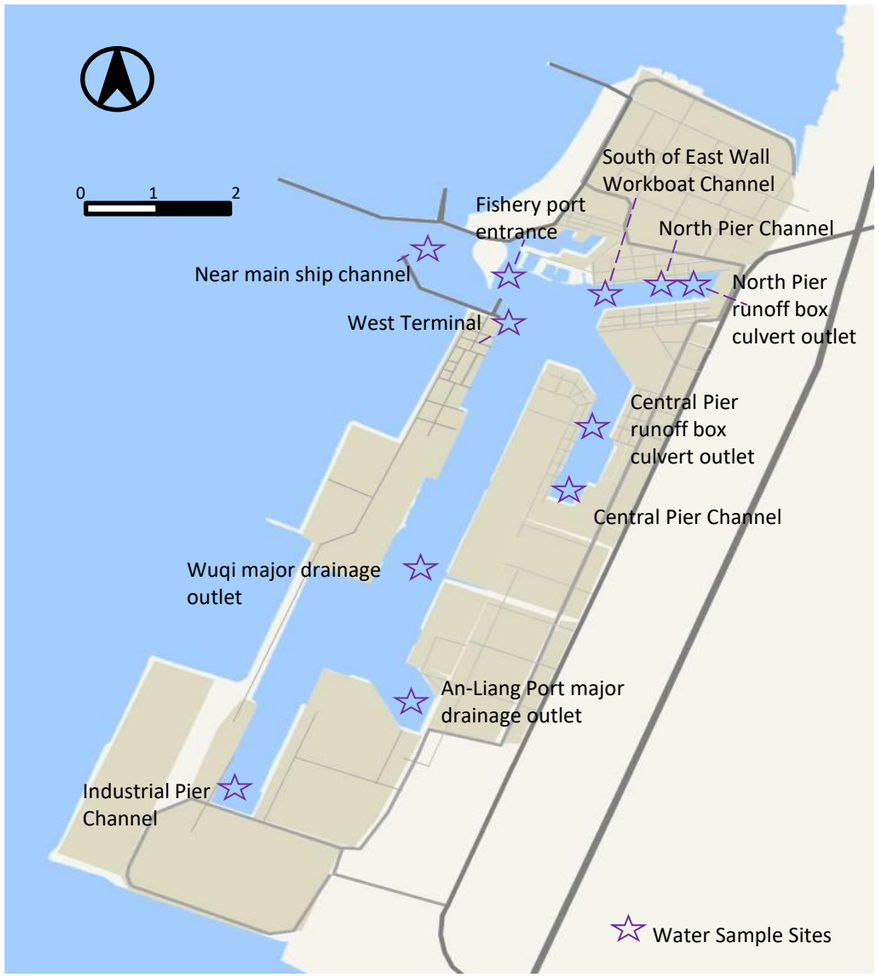
Water Quality Improvement Strategies

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

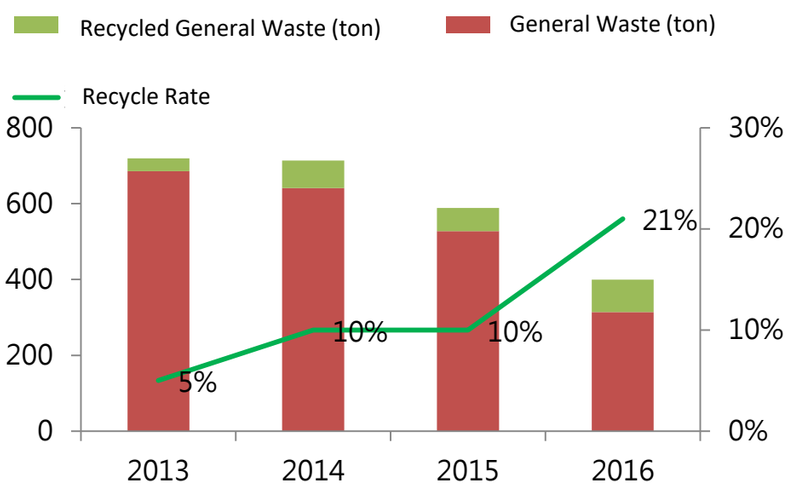


04/ State of Environment

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.

Port of Taichung Waste Recycle Statistics



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 (2015 and 2016) at the Port of Taichung.

Port of Taichung Oily bilge Water Collected

Year	Number of ships	Oily bilge Water (tone)	Collection Rate
2015	16	290.29	100%
2016	32	614.23	100%

Resource Consumption

The Port of Taichung is very attentive to its water and energy consumption. Reminders of resource conservation are constantly announced. Any abnormal activities will be reported to the maintenance units to minimize the waste of resource. Average resource consumption seem to decrease over year 2014 to 2016.

Water Usage (10 thousand m^3)

2014-2016 Electricity (10 thousand kWh)

2014-2016 Gas Usage (kiloliter)

2014-2016 Paper Usage (bag)

Wind Energy at Port of Taichung

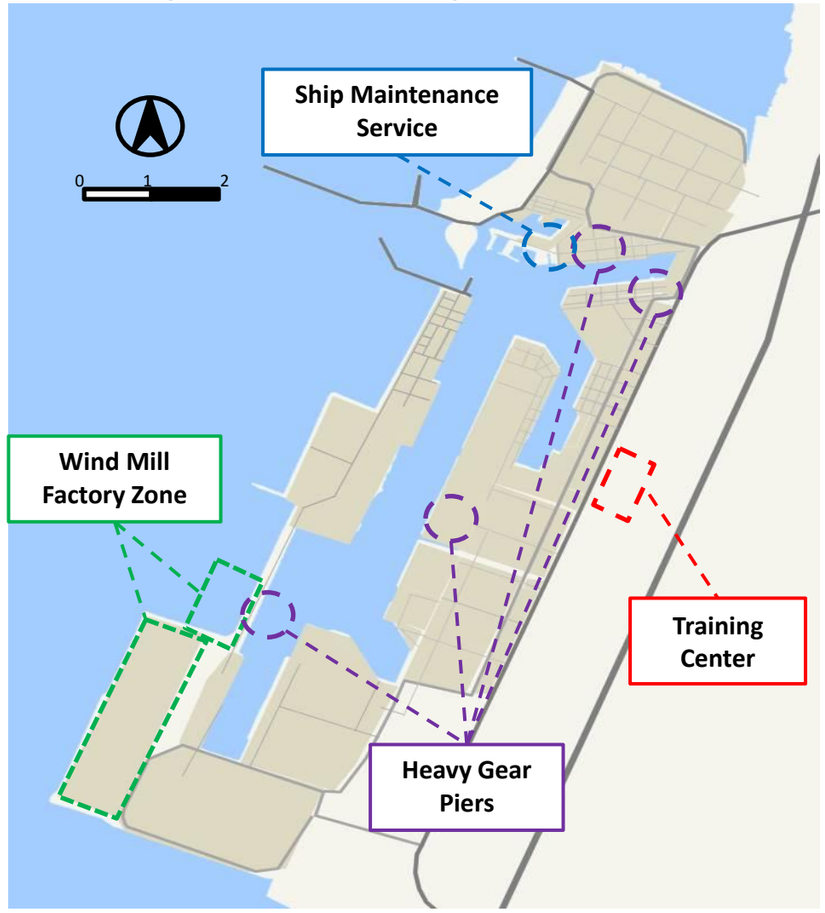
To promote green port development, TIPC plans to invest in green energy through installing solar panels and providing port services to off-shore wind farms.

The current focus of TIPC green energy develop is on the off-shore wind farm. Based on the national plan, there will be 36 wind farms with 15.2 GW capacity.

Port of Taichung Off-shore Wind Energy Related Construction

Item	Description	Note
Pier 5A, 5B	• 400 m in length • 11 m in depth • Bearing capacity 50 ton/m^2 • Backline 12.8 ha	5A: finish by 2018 5B: finish by 2019
Pier 38, 39	• #38 330 m in length • #39 330 m in length • 16 m in depth	#38: 330m x 450m #39: 357m x 188m
Pier 106	• Heavy gear pier 100 m • General pier 230 m • 16 m in depth	Finish heavy gear section by 2018 and general section by 2019
Industrial Zone Roads	• 2.6 km N-S road • 700m E-W road • 30m in width	Finish N-S road by 2018 and E-W section by 2019

Goal	Function		Location
Production Chain	Wind Mill Factory Zone		Industrial Zone (II), South Backfill Zone
	Heavy gear pier	Short term	Pier #2
		Mid term	Pier #5A, #5B, 4C backline
		Backup	Pier #38, #39
Ship Maintenance Service Zone	Service boat, wind mill pieces transport, workboat repair		Ship Repair Zone
Training Center	Technician training		Technician Training Zone



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.

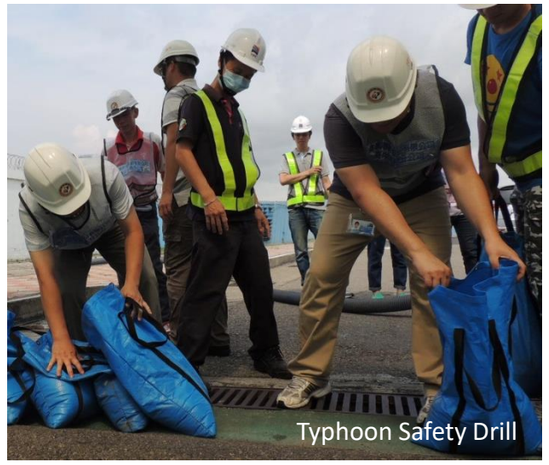
Statistics on Hazardous Goods Management

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

Port of Taichung Container Terminal


Control Center


Fire drill


Typhoon Safety Drill


Flood drill

Fuel Hose Deployment

Environmental Performance Indicators

Significant Environmental Issues	Index Item	Calculation Method	Index Target	Calculation Description 2015	Calculation Description 2016
Air Quality	Rate of service vessels using shore power	Service vessels using shore power ÷ total number of service vessels × 100%	Shore power for all docking service vessels	18÷18×100%=100% Number of service vessels: 18; number of shore-powered vessels: 18	18÷18×100%=100% Number of service vessels: 18; number of shore-powered vessels: 18
	Vessel speed reduction (VSR) policy	Number of inbound vessel speed reduction guidance activities held	At least 200 times per year	Letter to address VSR:1 Berth meetings that addressed VSR: 248	Letter to address VSR:1 Berth meetings that addressed VSR: 243
	Air quality pass rate(TSP、PM_{10}、$PM_{2.5}$、SO_2、NO_2、CO、O_3)	Ratio of the measurements in the air quality monitoring station of the port that meet the "Air Quality Standards	•Minimum standard for 24-h TSP, daily average PM_{10}, SO_2, hourly average NO_2, and CO hourly & 8-h average: 100.00% •$PM_{2.5}$ and O_3hourly average and O_3 8-h average:93.75%	All minimum standards pass rate were 100% besides $PM_{2.5}$ and O_3 •PM2.5 hourly pass rate: 87.50% •O3 8-h pass rate: 96.88%	All minimum standards pass rate were 100% besides $PM_{2.5}$ •PM2.5 hourly pass rate: 70.00%
	Full implementation of automated gate control system for all transport operators	•Ratio of vehicle traffic lanes with automated gate controls •Number of trucks and drivers with approved access cards	•Number of harbor access lanes equipped with automated gate control: 9 •Personal identification (ID) cards issued: 700 per year	•7 entry and 7 exit lanes are equipped with AHAC: Ratio=77.8% •Number RFID issued: 3,733	•9 entry and 9 exit lanes are equipped with AHAC: Ratio=100% •Number RFID issued: 3,247
	Ratio of service vessels using low-emission fuels or biodiesel	Number of service vessels using low-emission fuels	100% of service vessels using low-emission fuel	100% • All 5 service vessels uses low-emission fuel	100%
Soil Pollution	Progress of soil pollution control work	Number of completed progress of soil pollution control site ÷ number of total items on the progress list×100%	Progress of soil pollution control work	•Achieve work progress	•Achieve work progress
Port and harbor waste	General waste removed and recycling rate	•General waste removed •General waste recycling rate	General harbor waste recycling rate: 20%	•General waste removed: 527.31 t •General waste recycling rate: 12%	•General waste removed: 313.92 t •General waste recycling rate: 27%
Pollution from river influx	Ratio of river channels or canals installed with trash racks at interception stations	Number of rivers channels or canals installed with trash racks ÷ total number of river channels or canals in the harbor area × 100%	100% of river channels or canals with trash racks installed	3÷3×100%=100%	3÷3×100%=100%
Dust emissions	Number of control facilities for handling and stacking	Number of harbor facilities for handling and stacking cargo	Adding at least one set of control facility every two year	•Jinan International Corp. construct 2 enclosed warehouses at Pier no. 43 which went online Dec 31st, 2015 .	•Jianxin International Corp. constructed an enclosed warehouse at Industry Development Zone (I) •Jinan International Corp. constructed 2 enclosed warehouses at Industry Development Zone (III)

Significant Environmental Issues	Index Item	Calculation Method	Index Target	Calculation Description	
				2015	2016
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: 383 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.	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; 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)
	Landscape maintenance rate for harbor green areas (number of plants planted)	Number of newly planted plants	Annual planted plants	Number of newly added plants / Arbor / Shrubs surrounding harbor buildings: 19 / 556 South Central Pier and selected West Terminal: - / 11,788 Woody plants maintenance work: 9 / - Total: 29 / 12,344	Number of newly added plants / Arbor / Shrubs surrounding harbor buildings: 200 / 1,300 South Central Pier and selected West Terminal: 50 / 1,500 Industrial Zone (III): - / 40,000 Total: 250 / 42,800
Vessel sewage discharge	Performance of commissioned qualified operators on cleaning oily bilge water	Number of cleanups conducted by relevant vessels ÷ number of vessels that collected oily bilge water × 100%	100% oily bilge water cleanup	16÷ 16×100%=100 •Cleanups conducted by relevant vessels (oily bilge water): 16 •Total oily bilge water collected: 290.29t (excluding that from service vessels)	32÷ 32×100%=100 •Cleanups conducted by relevant vessels (oily bilge water): 32 •Total oily bilge water collected: 614.23t (excluding that from service vessels)
Hazardous goods management	Number of hazardous goods inspections, relevant emergency response drills, and joint supervised safety drills	Number of hazardous goods inspections, relevant emergency response drills, and jointly supervised safety drills	•Hazardous good inspections per year: 50 •Response drill per year: 1 •Number of jointly •supervised drills per year: 2	•50 hazardous goods inspections •1 emergency response drill •4 jointly supervised safety drills	•51 hazardous goods inspections •1 emergency response drill •4 jointly supervised safety drills
Port water area development	Water front recreational space (water front reconstruction and pedestrian friendly spaces)	Area of water front recreational space	Maintain 18.96 ha of water front recreational space	Total water front recreational space: 18.96 ha Low density development area: 2.5 ha Pier no. 100and north break water fishing area: 0.9 ha Scenic pathway north of Huan Gang N. Rd.: 15 ha Passenger Terminal sight viewing platform: 0.3 ha Extension of Zhong Yi Rd.: 0.26 ha	
	Rezoning Port of Taichung	Area of recreational space	Recreation related development plans	"Port of Taichung Future Development Plan (2012-2016)" total 119.36 ha •Seaside recreation zone: 59.82 ha •Second port service zone: 59.54 ha	"International Commercial Port Future Development Plan (2017-2021)" total 191.98 ha Rename "seaside recreation zone" to "tourism and commercial related zone" •Tourism and commercial related zone: 137.53 ha •Second port service zone: 54.45 ha
	Maintain port ship channel	Planned dredging ÷ actual amount dredged × 100%	Dredging execution rate: 100%	Dredging execution rate: 100% •Planned dredging: 169,368 m3 •Actual amount dredged: 169,380m3 •Area dredged: channel near dock #1, 5, 6, 7, 10, 11, 14, 26, 29, 32, 35 and #4A~#5A	Dredging execution: 100% •Planned dredging: 53,200 m3 •Actual amount dredged: 53,200 m3 •Area dredged: channel near dock #96 and 97
Industrial to air	Point source air pollution report rate in the Port	Number of point source pollution reported÷ total number of point source that are required to report ×100%	Point source air pollution report rate 100%	63÷63×100%=100% •Number of point source pollution reported: 63 •Total number of point source that are required to report: 63	65÷65×100%=100% • Number of point source pollution reported: 65 • Total number of point source that are required to report: 65
	Volatile organic compound monitoring (Seasonal) pass rate (Alkanes, olefins, aromatic, aldehydes, ketones, alcohols, and others)	Monitored volatile organic compound pass rate using "Stationary Pollution Source Air Pollutant Emissions Standards" (1/50 of the allowed level)	Volatile organic compound pass rate 100%	•All achieved 100% pass rate	•All achieved 100% pass rate

Emergency Response

05/

05/ Emergency Response

Port Emergency Response and Drill

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 2015 and 51 inspections in 2016 on hazardous goods, conducted four jointly supervised drills in 2015 and in 2016 to the safe handling of hazardous goods. During this period, two 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 Number of Reported Incidents 2015-2016

Incident type/year	2015	2016
Pollution (some incidents were reported multiple times by different individuals)	348	176
Traffic accident	192	199
Shipping safety	120	104
Shipwreck	5	11
Disaster	12	39
Personnel Safety	55	33

Gate Control Drill

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 2015-2016

Year	Drill title	Content	Time
2015	Port of Taichung 2015 International Ship and Port Facility Security/ National Critical Infrastructure Facility Prevention and Protection Emergency Response	International Ship and Port Facility Security, Disaster Prevention, and Protection; National Critical Infrastructure Facility Prevention and Protection Emergency Response	Sep 17
2016	2016 World Water Day- Water Safety Drill	Port security, basic infrastructure protection, passenger rescue, cruise fire drill, marine oil pollution prevention	Jun 4


Helicopter air support


Rubber Boat Rescue


Ambulance onshore standby


Fire truck water hose deployment

05/ Emergency Response

Port of Taichung Emergency Response

National Rescue Command Center

Coast Patrol Corp 3 of Coast Guard Administration

Environment Protection Bureau of the Executive Yuan

Taichung City Government Environmental Protection Bureau

Environmental Protection Agency

Taichung City Government Environmental Protection Bureau

Regional Fishermen Association

Taichung Fisherman Association

Ship or shipping agency companies

Port of Taichung, TIPC

President

Port of Taichung, TIPC

Chief Secretary

Harbor Master

Related Departments Por of Taichung, TIPC

Emergency Response Team

Port of Taichung, TIPC

Harbor Control Center

Hazard and Accident Reporter

Executive Yuan

Central Disaster Prevention and Response Council

Traffic Mobilization Committees, MOTC

Department of Aviation and Navigation, MOTC

Occupational Safety Department, TIPC

Emergency Response Team

Maritime and Port Bureau

Central Taiwan Maritime Affairs Center

Taichung Harbor Police Department

Taichung Harbor Fire Brigade

Involvement and Collaboration

06/

Innovation

Port of Taichung Energy Saving Street Lighting System

Concern/Motivation

Lighting is one of the largest electricity usages of a port. The Port of Taichung has a high number of street lights due to its large area coverage, which makes energy saving lighting become one of the central issues of the port. However, because of HPSL's lighting mechanism, its overall lighting efficiency is about only 60%, because nearly 40% of the light emitted is wasted inside the light. In addition, HPSL requires a preheating time to reach its ideal lighting state, which is another form of energy waste.

Solution

This project replaces HPSL with LED lightings. Different from HPSL, LED is distributed and single directional lighting that provides direct and high efficient illumination. In addition, there is no preheating period for LED lights, which it reaches ideal lighting when turned on. Therefore, it is easier for automatic control and energy saving.

However, because LED's light rays are more concentrated, in order to achieve optimized port area lighting, this project changes the previous distance of light poles from 40-50 m apart to 30 meters apart.

Effect/Benefit

The original 400W high pressure sodium lamps at the South Harbor Road and North Breakwater Road will be replaced with 120W LED lamps. Original street lamp quantity: 104*2+18=226 lamps. After accounting for illumination and other relevant problems, the quantity after replacement: 16+153*2+3=325 lamps. Calculating for 12 hours of lighting per day and 30 days per month, the estimated reduction in annual electricity usage is 18,504*12=222,048 kWh, for an annual savings of NT$1 million in electricity costs. Additionally, according to the power emission conversion factor (a reduction of about 0.528 kg per kilowatt of CO2 emissions) announced by the Bureau of Energy, the replacement reduces CO2 emissions by 117,241 kg annually.

Environmental Issues

Energy consumption, air quality

Participating Units

Taichung Branch, Huanqiu Electrical and Mechanical Technology (design firm) and Jiayi Electrical and Mechanical Engineering (Construction firm)

Implementation/Timeline

The design and construction timeline began in February 2017 and ends in December 2017. The detailed design was completed in end of April; the construction is planned to take 4.5 months to complete, and testing and checking of the project are anticipated to finish by December.

Investment Amount

The design fee is about 1.35 million NTD, and the construction was contracted on July 26th 2017 for about 18.58 million NTD. Therefore, the total project cost is at about 20 million NTD.

Stakeholders

Tenants on Huangang South Road (e.g. fire power plant workers), personnels around North Breakwater, Taipower Company, and Taichung Branch of TIPC

Port: Port of Taichung
Contact Person: Wang, Ren-Ze
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06/

Involvement & Collaboration

Port of Taichung Runoff Water Collection Facility

Concern/Motivation

Dock No. 44, 45 and 105 are piers capable of handling gravel and coals. Grit chambers are set up at the drainage outlet to catch sand to reduce pollution and prevent gravel scattered across dock and road surfaces being discharged into the harbor together with runoff.

Solution

In accordance with the Port of Taichung's Future Development and Construction Plan (Year 2012 to 2016), the port plans to build a runoff water recycling facility as part of its new port construction. Port surface runoff will flow into and collect in the grit chamber to prevent wastewater from cleaning operations or dust proofing spray water from flowing directly into the waters of the harbor.

The layout of the pier was planned according to the needs of its various sections. 3U-type ditches were deployed by the roadsides behind the Warehouse Area to collect road surface runoff and maintain a segregated green belt.

Twenty-centimeter wide drains were deployed at each unit on the pier to send apron drain water landward so as to prevent it from flowing into the water. 4U-type ditches were deployed at the port side of the Warehouse Area to collect converging drain water from the Warehouse Area, apron, and 3U-type ditches and divert it to two separate 1.4 meter x 1.4 meter box culverts for discharge into the port.

Areas	Collection Area (m^2)	Grit chamber sludge number and size				Grit Chamber	
		Number	Length (m)	Width (m)	Depth (m)	Depth (m)	Size (m3)
Pier No. 44	8,200	SP01	3.5	18	2.5	1.6	93.8
	8,200	SP02	3.5	18	2.5	1.6	93.8
Pier No. 45	8,700	SP03	3.5	20	2.5	1.6	105
	8,700	SP04	3.5	20	2.5	1.6	105
Pier No. 105	25,900	1	2.8	17.2	3.85	1.8	86.7
	25,900	2	2.8	17.2	3.85	1.8	86.7

Effect/Benefit

Gravels are chunks of solid matter whose proportions measure 1.3~2.7 with grain size larger than 0.2 millimeters. A grit chamber relies on the gravel's own mass to achieve the goal of sediment separation from the runoff water. Taking Pier 105 runoff collection facility as an example: removal rate=37%

Implementation/Timeline

Items		Procedure	2012	2013	2014	2015	2016
(a)	Port of Taichung Pier 44 and 45 Construction Project	1.Planning	■	■			
		2.Construction		■	■	■	■
		3.Completion					■
(b)	Port of Taichung Pier 105 Construction Project	1.Planning	■	■			
		2.Construction		■	■	■	
		3.Completion				■	

Investment Amount

Pier Number	Usage	Length (m)	Width (m)	Depth (m)	Investment (thousand NTD)
44	General Bulk Cargo	230	30	-12	1,286,400
45	General Bulk Cargo	230	30	-12	
105	Large Bulk Cargo	330	35	-16	780,809

Stakeholders

Taichung Branch of TIPC, port tenants, local communities

Environmental Issue

Water quality

Participating Units

Taichung Branch of TIPC, Yutai Engineering Consultants (architectural design firm), Taiwan Shixi Engineering Consultants (architectural design firm), Honghua Company (construction firm), Xiexin Construction Company (construction firm)

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06/

Involvement & Collaboration

Port of Taichung Landscape Greenification

Concern/Motives

In order to beautify and give shape to a multi-layered, lively port district environment and increase port district recreational and tourism leisure activities, the branch office developed a plan in 2015 to conduct a floral landscaping operation at the front of the visitor center square. Planting was completed in September 2016. The office continued to implement port district landscape greenification operations in 2017 to create the new focal points in the port district and endow the Special District of the Port of Taichung with more than a single color.

Solution

(a) Planning and Maintenance of the Port of Taichung Central 2nd Road Flower plantation:

The flower plantation is located in the most picturesque spot for visitors to the port and tourists coming up or down the coast to view the flowers. The location itself is one of the highlights of the port district environment. The area of the plantation measures 3,955 square meters, and is densely planted with 94,875 plants including Ixora, Orange Daylilies, and Blue Daze, while Britton's Wild Petunia is used to fashion a surrounding belt. The profusion of flowers creates a luxuriant effect.

(b) The Flowering Port of Taichung Event:

To celebrate the 2017 Sailing Festival, the branch office held the Flowering Port of Taichung planting event on June 30, 2017. The branch office coordinated with Taichung Port District businesses and retired company employees to dispatch hundreds of people to select suitable sites and plant over 3,000 flower seedlings, including French Marigolds, Angelonia, Globe Amaranth, Common Zinnia, and other colorful flowers.

(c) Landscaping and Beautification of the Green Area Surrounding the Port of Taichung Harbor Union Building:

A portion of the materials provided by the branch office were used with repurposed items such as fenders of various sizes, bollards, anchor chains, crane boom holders, pipe racks, channel markers, and trailer chassis, after redesign or direct transport to the green field next to Zhongheng 1st Road for landscaping.

(d) Landscaping and Beautification of the Port of Taichung Industrial Zone (II):

According to the minutes of the 206th meeting of the Environmental Protection Administration's Environmental Impact Assessment Review Committee and the environmental impact statement of the former Taichung Harbor Bureau's Port of Taichung South Fill Zone (I) Seawall and Channel Dredging Plan, the planting of over forty thousand plants at the seaside was primarily carried out to counter strong monsoon induced particulate matter in the Industrial Zone from being blown downwind and resulting in severe silting.

Port of Taichung Landscape Greenification (Cont.)

Effect/Benefit

(a) (a) The orange daylily blooms in May and June. The blossoming period for the daylilies at the port drew 1,262 visitors thanks to active marketing efforts by the Port of Taichung's Facebook Fan Page. Two Sea of Flowers short videos received 760 views and 2,307 shares. Additionally, media organizations such as the China Daily News, ETNEWS Travel (1,524 views), and ETNEWS Life gave highly positive reviews of the event, which successfully attracted visitors to come and take photos at the port.

(b) The Flowering Port of Taichung planting event garnered 856 views and 2,892 shares thanks to the active marketing efforts of the Port of Taichung Facebook Fan Page. Additionally, media organizations such as the China Daily News and Epoch Times E-Paper also covered the event.

Environmental Issue

Greenification

Stakeholders

Port of Taichung transportation companies, tenants, communities

Participating Units

Taichung Branch of TIPC

Implementation/Timeline

	Areas/Procedures	Planning	Planting	Nurturing	Check
(a)	Planning and Maintenance of the Port of Taichung Central 2nd Road Flower plantation	2nd half of 2015 to end of 2016	2nd half of 2016	2nd half of 2016 to end of 2018	End of 2018
(b)	The Flowering Port of Taichung Event	2nd half of 2017	2nd half of 2017	2nd half of 2017	2nd half of 2017
(c)	Landscaping and Beautification of the Green Area Surrounding the Port of Taichung Harbor Union Building	2nd half of 2016 to 1st half of 2017	2nd half of 2017	2nd half of 2017 to end of 2018	2nd half of 2018
(d)	Landscaping and Beautification of the Port of Taichung Industrial Zone (II)	2nd half of 2015 to end of 2016	2nd half of 2016	2nd half of 2016 to end of 2017	2nd half of 2017

Investment Amount

Item	Project name	Budget (thousand NTD)
(a)	Planning and Maintenance of the Port of Taichung Central 2nd Road Flower plantation	7,198
(b)	The Flowering Port of Taichung Event	98
(c)	Landscaping and Beautification of the Green Area Surrounding the Port of Taichung Harbor Union Building	5,750
(d)	Landscaping and Beautification of the Port of Taichung Industrial Zone (II)	8,250
Total		21,296

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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.

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.

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.”

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.

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.

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

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Employee Education

In compliance with its environ-mental 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 2015 and 2016, the Taichung Branch of TIPC organized more than 3000 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		2015 (man-hr)	2016 (man-hr)
Category by Field	Social Issues	6	819.5
	Climate Change	0	237
	Disaster Prevention	203	180
	Natural Preservation	677	55.5
	Public Nuisance	42	1.5
	Resource Management	882	1,624
	Cultural Preservation	1	12.5
	Community Outreach	32	378
Category by Course Type	Course	80	881
	Speech	864	1,358
	Web Learning	14	0
	Experience Sharing	644	574
	Site Visit	0	72
	Video	170	207
	Hands-on Activity	32	216
	Event	28	0

Workplace stress management

Warehouse Fire Training

Carbon Accounting Training

Communication and Publication

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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.

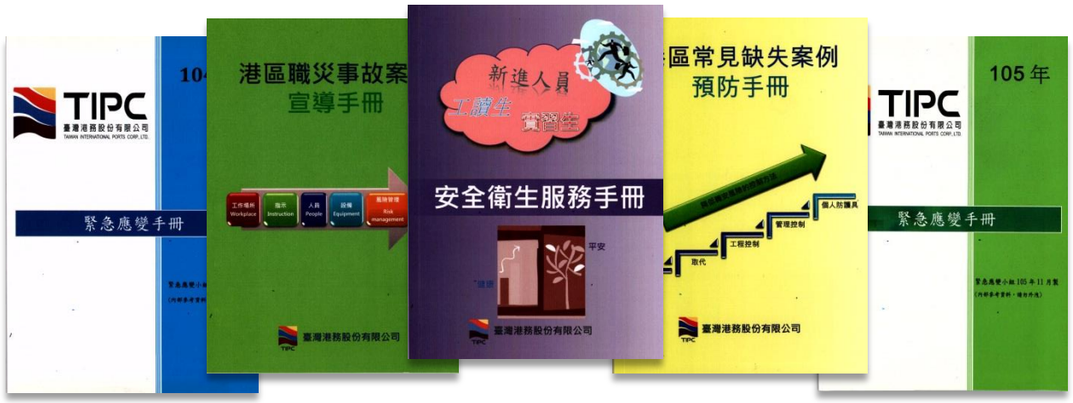
Collaborating with the local governments


EPA marine pollution evaluation

Taichung Port environmental action exhibition


Traditional religious events


Cruise visiting Port of Taichung



Port of Taichung disaster prevention related publications in 2015-2016

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Communication and Publication

Community Services

Port Cleanups

National Cleanup Week

Blood Drive

Port Tours

Port visits for elderly citizens

Hosting school trips

Community Outreach

Serving local communities

Old books give away

Promotion Campaigns

Port Business discussion meetings

Stamp exhibits

Green Accounting

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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, nose, 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 2015 and 2016 (Unit: thousand EUR)

Items	2015	2016
Employees	660	682
Environmental Maintenance and Management	2,438	1,353
Environmental Monitoring	282	280
Environmental Planning	297	146
Emergency Response	13	23
Communication and Publication	37	51
Total	3,727	2,534

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 2015 and 2016, the respective amounts of fixed-asset investment toward environmental issues made by Port of Taichung, TIPC were approximately €13,548 thousand and € 13,580 thousand.

Fixed assets invested in environmental issues in 2015（UNIT: Thousand EUR）

Items	2015	2016
Land Improvements	11,295	12,003
Houses and Buildings	277	355
Machinery and Equipment	162	63
Transportation and Equipment	1,739	1,098
Other Equipment	75	61
Total	13,548	13,580

Improvement Recommendations

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In order to meet the demands of domestic economic growth and changes in marine transportation, construction of infrastructure at Taichung Port has never stopped since the completion of Taichung Port in 1976. After 40 years of development, the port has grown to a considerable size. Our future work will be to make use of existing advantages to maintain Taichung Port’ s growth while protecting the environment.

In 2012, the port of Taichung, TIPC was transformed into a state enterprise organization. The company seeks to promote a green port policy, and evaluate its green port results from the angle of the four major aspects of “tourism,” “cargo operation,” “port environment,” and “city and community development” in order to effectively quantify port environmental quality. In the future, in addition to enhancing port logistics and creating even greater value, the Port of Taichung, TIPC will also continue to add more functions and actively attract more business to the port in order to enhance its operating performance, create a quality port environment by promoting sustainable eco-development, and build sound relationships with the local governments and companies, which will ultimately achieve a triple-win sit