Port of Hualien
Environmental Report

Environmental Report Work Team

Hualien Branch, TIPC., Ltd.:Vice Presiden Chen Rung Tsung, Harbor Master Shunyi Lee , Chief Engineer Ihsin Cheng , Director Syueping Song , Director Chuanhung Chung , Researcher Chingfu Lin , Director HsiuTzu Yu, Director Zihying Chang, Director Shihhong Li ,Manager Chiungyi Yen

Advised by Taiwan International Ports Corporation, Ltd.: Vice President of Business YingFeng Chung, Senior Director Weichien Chang , Manager Tsunghsun Tsai, Technician Changjing Feng

Chief Editor : Ihsin Cheng
Executive Editor： Syueping Song
Layout Design：N.Y. Lee
Examine & Revise：Huihsiung Su,Chingping Tsai,ChunYu Lo,KunLin Chiang,ChingSheng Cheng, Kuohsien Chang , Chenghung Chi,YaChien Yang

Publishers: Taiwan International Ports Corporation, Ltd.
Address: No.10, Penglai Rd., Gushan Dist., Kaohsiung City 804, Taiwan (R.O.C.)
Tel：+886-7-5219000

This environmental report presents Hualien Port's achievements in environmental protection from 2018 to 2019 as well as the environmental policy, commitments and action plans of the Hualien Branch, Taiwan International Ports Corporation, Ltd.

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

Occupational Safety and Health Division,
Hualien Branch of Taiwan International Ports Corporation, Ltd.
Website： http://hl.twport.com.tw/chinese/
Tel:+886-3-8325131#2521
E-mail： lsh@twport.com.tw
Facebook：https://www.facebook.com/hualientwport

Website

Facebook

CONTENTS

Port of Hualien, Taiwan International Ports Corporation

Environmental Policy

Port of Hualien , Taiwan International Ports Corporation (TIPC) is committed to protecting marine environment and achieving sustainable development under the environmental protection policies set by Minister of Transportation and Communications and Environmental Protection Administration. Based on the green ports development goals and projects established by TIPC, Port of Hualien has been devoted to issues such as port environmental protection, resource conservation, environmental education, ecological preservation, and pollution inspections. In order to [illegible] the environmental objectives and reach the environmental performance improvement, Port of Hualien has established the following environmental policies :

The office has committed to the continuous implementation of the following projects:

- Comply with related environmental laws and develop a green port.
- Adopt environmental friendly projects to abate emission and pollutants.
- Implement recycling and reuse policy to ensure resource sustainability.
- Establish audit and review system to ensure the continuous improvement.

The full understanding and mutual consent to this environmental policy have been reached by all the relevant parties, including employees, suppliers and tenants of Port of Hualien. This policy is open to the public on our website

Chen, Rung-Tsung

President of Port of Hualien Taiwan International Ports Corporation, Ltd.

Port of Hualien, Taiwan International Ports Corporation

Environmental Objectives

To implement the Port of Hualien environmental policy, the following environmental objectives and commitments are set based on the ten major environmental issues from the port.

- Improve Air Quality—Conduct regular air monitoring, environmental inspection to trace sources of pollutions.
- Abate Port Fugitive Dust Emissions—Cut down dust emissions by increasing spraying at port operation area and keeping cargo handling vehicles clean.
- Reduce Waste -Promote waste reduction in the port area, properly dispose of waste , and the recycling and reuse of resources .
- Reduce Noise Impact-Planting green belt as buffers and construct underground connecting roads to reduce noise pollution nearby the port.
- Reduce Ship Emissions-Require all duty vessels to adopt premium diesel, shore power and execute the Vessel Speed Reduction Surveillance System
- Enforce Bulk Cargo Management-Reinforce the inspection of cargo spillage to avoid pollution from uploading and unloading processes.
- Transportation Vehicles Control-Install RFID automatic-gates and vehicle regulations in the port area.
- Climate Change Mitigation Measures- Regular inventory of greenhouse gases and the construction of solar photovoltaic renewable energy.
- Reclaim and Preserve Water Resources- Dredge the drainage system of port area and execute the long-term ambient quality monitoring plan.
- Enhance Interactions with Local Communities- To construct open spaces in the port area , and provide opportunities for community participation.

The President, Port of Hualien, TIPC is responsible for the implementation, maintenance and effectiveness of the environmental issues, and also for reviews the environmental issues on an annual basis and adjusts the action plans based on the condition of the Port, so as to live up to the promises and improvements to achieve the environmental objectives.

Chen, Rung-Tsung

President of Port of Hualien Taiwan International Ports Corporation, Ltd.

Massage from TIPC

01/

Message from the Vice President of Port of Hualien Taiwan International Ports Corporation, Ltd.

The Port of Hualien is located on the east coast of Taiwan, where the natural environment is pure and clean and the location is suitable for maritime tourism and recreational sector activities. The port was given the Best Tour Experience award by the well-known British cruise industry magazine, Cruise Insight. The Port of Hualien is positioned as “the only international commercial port in Eastern Taiwan” and “a port that functions also as a tourist and recreational site” in its development. In addition to devoting itself to improving the quality and quantity of exports and imports in Hualien and Taitung, the Port of Hualien will actively develop itself into a tourist and recreational port, providing a waterside space accessible to the public. To keep up with the times, the Hualien Branch of TIPC has actively included environmentally friendly considerations in port construction to create a high-quality port environment and drive regional economic prosperity and development. Employing the geographical and environmental properties in the area, the port has been continuously improving its water bank facilities to provide adequate water supply for port operation and ship loading and unloading dust-suppression. In addition to improving the environmental protection of bulk cargoes, Hualien Port has continued to promote the following initiatives: install dust screens at the bottom of bulk carriers' (wood chips) tanks to reduce dust generated from cargo handling; increase dust mesh height at sand and gravel pile site area.; and plant trees such as Fu Mu and Araucaria along the two sides of connecting road in the port area. All of the above demonstrates Port of Hualien’s progressive approaches to improve its environment. In the future, port operation safety will be improved through the promotion of various port facility construction projects, and a vision of friendly service between carriers, operators and cities will be provided.

To fulfill its corporate responsibilities, the Hualien Branch of TIPC provides 4.6 ha of port land for the establishment of scenic rest areas and bicycle paths that connects Chihsingtan and Liyu Lake. In addition, it actively promotes green landscaping operations around the port and was conferred Silver Award for Hualien County Government’s Garden City Program in 2019 and 2020 , which showed Hualien Port’s efforts in local tourism development and sustainability development.

To fully implement its green port policy, the Hualien Branch of TIPC has been participating in the EcoPorts certification program to ensure the validity of its pollution prevention and resource conservation strategies. Additionally, Port of Hualien has combined its efforts with port-related agencies, including ocean carriers, operators, port bureaus, and local governments to abate environmental pollution, improve local living quality and achieve port sustainability.

Chen, Rung-Tsung

Port Profile

02/

History and Development

In early 20th-century of Taiwan, before the development of road and rail network, both trade and transportation were accomplished by sea. Due to the lack of suitable natural harbors on the eastern coast of Taiwan, steamships might lay their anchors at any point between estuary of the Hualien and Meilun Rivers, where Amis laborers would load the cargo onto barges and ferry it upstream. To expedite the shipment process, Japan's Imperial Diet passed a motion in 1930 to construct the Port of Hualien. Construction officially began in October of 1931, with three wharves completed by 1939. These wharves served for the export of sugar to Japan and the transport of goods locally around the island.

Once Taiwan's period of Japanese colonial rule had come to an end, the Taiwanese govern-ment was free to open the Port of Hualien to international trade, which it did on September 1, 1963 in a bid to facilitate economic and industrial development in the region. Over the years, Hualien Harbor has undergone four separate expansion projects to relieve congestion from steadily increasing cargo ship traffic, with the final project completed in December of 1991. The port now boasts 25 wharves, each serving freighters carrying 30,000–100,000 tons – easily enough capacity to support Eastern Taiwan's still-burgeoning industrial economy.

Port Location and Port Area

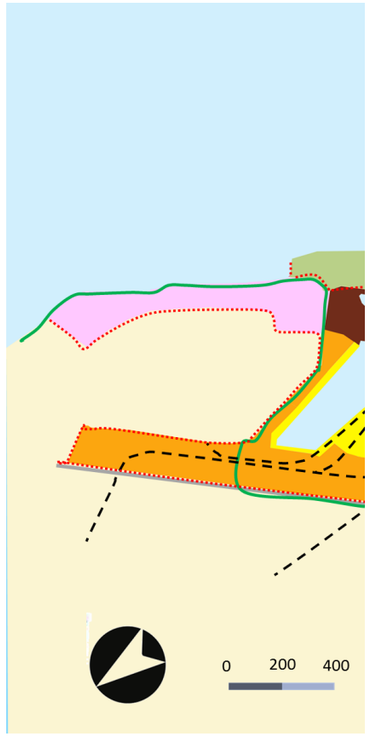
The Port of Hualien situates in northeastern Hualien, Taiwan (23°59'11"N, 121°37'35"E). Embedded by the Pacific Ocean to the east and Meiluen Mountain to the west, the Port of Hualien is the only international commercial port in Eastern Taiwan. The overall area of the port is 1,469ha (land area: 159 ha; waterside area: 1,310 ha)

Ships enter the inner harbor through a northward narrow waterway from the outer harbor. In the inner harbor zone, 16 wharves exist, where the water depth is 6.5–10.5 m and the wharf length is 2.5 km. The outer harbor contains 9 deep-water wharves, with 12–16.5 m deep and 2.3 km of wharf length.

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. In March 2012 the maritime system changed to a "separation of government and corporation" method. Previously publicly managed organization was transformed into state enterprise organizations, which combined port operation originally under Keelung Port Bureau, Taichung Harbor Bureau, Kaohsiung Harbor Bureau, and Hualien Harbor Bureau into a company managed system (Taiwan International Ports Corporation). This solved previous problem of commercial ports being limited by legal and system restrictions, which caused an inability to respond to market changes and decreased competitive strength.

After restructuring of the Hualien Port Bureau, stevedore operation business is now the responsibility of the Port of Hualien, TIPC. Maritime administration, operation items, and public authority within the harbor are handled by the East Taiwan Maritime Affairs Center of the Maritime and Port Bureau (MPB).



▲Master plan of Port of Hualien


Cruise night scene


Installation art


Installation art

Port of Hualien
Environmental Report
2020

02/ Port Profile

Commercial Activities

Currently, the Port of Hualien consists of 25 wharves, among which some have multiple functions, and others were mainly built for stevedoring bulk cargo and wood. The major commer-cial activities in the port include the transportation of aggregates (sand and gravel), ship building and repair. The incoming and outgoing cargos for stevedoring primarily include dry bulk, petroleum, general cargo, and ores. The commercial activities in the port include tourism, recreation, and the storage and transportation of cement, ores (sand), and stone.

The Hualien Branch of the Taiwan International Ports Corporation (TIPC) has also been actively stimulating tourism by leasing out underutilized facilities for recreational use. Opening such unused wharves to alternate commercial uses enables the tourism industry to capitalize on offshore recreational opportunities, such as conducting sightseeing tours of Hualien's skyline from a cruise ship at night.

Main Cargoes

In 2018, the major incoming cargo in the Port of Hualien from other countries included mineral products (58.5%) and wood, bamboo and rattan products (41.4%). In 2019, the major incoming cargo remained the same, including mineral products (55.8%) and wood, bamboo and rattan products (44.2%)

*Main Commercial Activities and Cargo Handling of Port of Hualien

Commercial Activities	Cargo Handling
Aggregates (sand, gravel)	Dry bulk
Ship repair	Petroleum(Refined products)
Tourism, recreation	Ores(Coal, gypsum)
	Pyrites minerals(Cement)

*Inbound Main Cargo of Port of Hualien

Cargo type	2018	2019	Difference	%
Mineral Products	1,267,348	986,673	-280,675	-22.15%
Bamboo , rattan and wood products	898,120	781,694	-116,426	-12.96%
Non-metallic mineral products	338	513	175	51.78%
Base Metals and Articles of Base Metal	1,723	42	-1,681	-97.56%
Products of the Chemical or Allied Industries	634	303	-331	-52.21%

Unit:tons

Cruises

In recent years, the international cruise market has seen marked growth in the Asia-Pacific region. In keeping with this trend, the Port of Hualien not only serves the regularly scheduled Lina cruiseliner (traveling the so-called "Blue Highway" between Su'ao and Hualien), but also receives large international cruise ships. The number of international travelers passing through the Port of Hualien surpassed 27,000 in 2018, and again in 2019.

Port of Hualien
Environmental Report
2020

02/ Port Profile

*2018-2019 Business of Port of Hualien

Business item		2018	2019	Comparison between 2018 and 2019	
				Actual number	%
Incoming & outgoing Ships	Total number of ships(vessel)	2,338	2,675	337	14.41%
	Total tonnage(tonnes)	18,428,088	18,898,682	470,594	2.55%
Cargo throughput	Imported cargo(tonnes)	2,168,226	1,769,444	-398,782	-18.39%
	Exported cargo(tonnes)	931,782	1,027,960	96,178	10.32%
	Domestic cargo(tonnes)	5,640,949	6,036,315	395,366	7.01%
	Total (tonnes)	8,740,957	8,833,719	92,762	1.06%
Number of travelers	Number of domestic line travelers (number of people)	31,089	16,575	-14,514	-46.69%
	Number of international line travelers (number of people)	10,242	10,676	434	4.24%
	Total number of travelers (number of people)	41,331	27,251	-14,080	-34.07%

資料來源：花蓮港務分公司

Environmental Management

03/

Organizational Structure

The Hualien Branch of TIPC consists of 6 divisions, including Port Business Division, Harbor Management Division, Construction Management/ Equipment Division, Information Technology Office, Occupational Safety and Health Division, Personnel Division, Civil Service Ethics Division, Accounting Division, Secretariat Division. In the Hualien Branch of TIPC, the division responsible for the operation and management of the environment is the Occupational Safety and Health Division that consists of the Safety and hygiene Section, Environmental Safety Section.
The Safety and Hygiene Management Section is in charge of management of occupational safety and hygiene; the Environment Safety Section deals with pollution control, environmental law, EIA, ambient monitoring, emergency response ,environmental education, plant conservation, waste treatment and recycling.
The Hualien Branch of TIPC is in charge of managing the environment of the Port of Hualien.

However, environmental aspects involve the division of responsibilities among different agencies. In addition to the Hualien Branch of TIPC, agencies responsible for environmental aspects include the East Maritime Affairs Center of Maritime and Port Bureau (MPB), Environmental Protection Bureau of Hualien County Government, Environmental Protection Administration, Ocean Affairs Council,Coast Guard Administration, Maritime Patrol Directorate General, 6th offshore Flotilla, Coast Patrol Group 12, Eastern Branch, Coast Guard Administration, Ocean Affairs Council, Hualien Harbor Police Division of National Police Agency, Hualien Harbor Fire Brigade of National Fire Agency, East Control of Centers for Disease Control.

Based on the Commercial Port Act, the MPB and the Hualien Branch of TIPC are responsible of Hualien Port's environmental management, which the Hualien Branch of TIPC is in charge of port operation related issues and the MPB is in charge of port authority related issues.


Interview with EPB

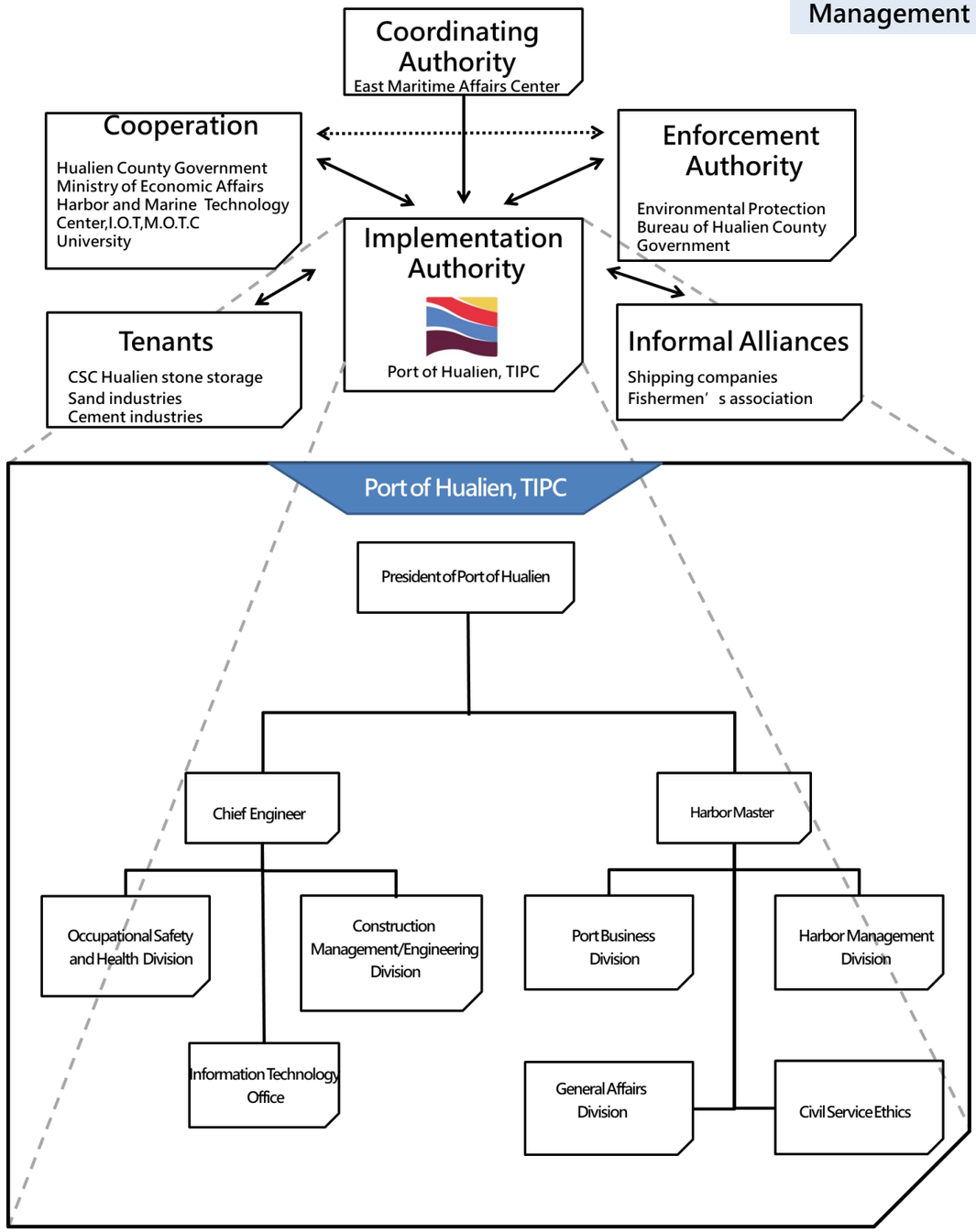

Kickoff meeting for eco port application

*Functions of the Divisions of the Hualien Branch of TIPC

Division	Description
Port Business Department	Port development, stevedoring, promotion of private investments and operations in the port, passenger clearance services
Harbor Management Department	Management of port security , navigation safety and berth scheduling
Information Technology Office	Integrating and maintaining information systems and devices.
Construction Management/Engineering Department	Port construction project management and repairs; maintenance and management of electrical and mechanical engineering equipment, ship machinery, and other machines.
Occupational Safety and Health Division	ort environmental protection, pollution control, and occupational safety management
General Affairs Department	Management of general affairs ,human resource management , auditing revenues and expenditures in the budget and final accounts, public relations for the Hualien Branch of TIPC
Civil Service Ethics	Prevention, inspection, and punishment related to civil service ethics

Port of Hualien
Environmental Report
2020

03/ Environmental Management



Environmental Regulations

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

The Hualien Branch of TIPC also regularly identifies and updates port environmental issues related to changes in domestic laws and regulations, participates in environmental protection public hearings, and shares pragmatic Port practices; currently applicable regulations are aggregated as follows:

Laws Title			Central Competent Authority	Local Law Enforcement Agencies
Sectors in the Ministry of transportation and communications	The Commercial Port Law	2011/12/28	Ministry of Transportation and Communications	East Maritime Affairs Center, Maritime and Port Bureau, MOTC
	The Law Of Ships	2010/12/08		
	Shipping Act	2014/01/22		
Sectors related to agricultural	Wildlife Conservation Act	2013/01/23	Council of Agriculture	Agriculture Bureau, Hualien City Government
Sectors in the Ministry of the Interior	Fire Services Act	2019/01/07	Ministry of the Interior	Hualien Harbor Fire Brigade
Sectors related to environmental protection	Marine Pollution Control Act	2014/06/04	Ocean Affairs Council	Environmental Protection Bureau, Hualien City Government
	Basic Environment Act	2002/12/11	Environmental Protection Administration	
	Air Pollution Control Act	2018/08/01		
	Toxic and Concerned Chemical Substances Control Act	2019/01/16		
	Indoor Air Quality	2011/11/23		
	Water Pollution Control Act	2018/06/13		
	Waste Disposal Act	2017/06/14		
	Soil and Groundwater Pollution Remediation Act	2010/02/03		
	Noise Control Act	2008/12/03		
	Environmental Impact Assessment Act	2003/01/08		
	Greenhouse Gas Reduction and Management Act	2015/07/01		
	Environmental Education Act	2017/11/29		
	Environmental Agents Control Act	2016/12/07		
	Public Nuisance Dispute Mediation Act	2009/06/17		Public Nuisance Disputes Mediation Committee, Hualien City Government
Intersectoral	Disaster Prevention and Protection Act	2019/05/22	Hualien City Government	

Port of Hualien
Environmental Report
2020

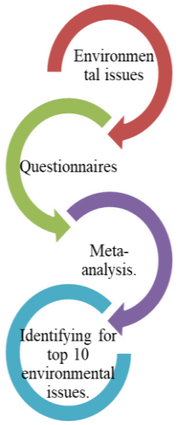
03/ Environmental Management

Stakeholder Analysis

The Hualien Branch of TIPC believes that good communications with stakeholder help identify key environmental issues and create value. Therefore, the Hualien Branch of TIPC uses a variety of methods to communicate with stakeholder ,including surveys and interviews Their needs and expectations are gathered and incorporated into operation and environmental management.

Sector	Focus on issues	Corresponding top 10 environmental issues in Hualien Port
Government agencies	Dust; Air quality; Water resources; Hazardous Cargo	■ Abate port fugitive dust emissions ■ Reduce Ship Emissions ■ Transportation Vehicles Control ■ Improve air quality ■ Reclaim and Preserve Water Resources ■ Enforce Bulk Cargo Management
Employee	Environmental quality of life near the port area; Port area environment; Resource use	■ Abate port fugitive dust emissions ■ Reduce Noise Impact ■ Maintain Water Quality within the Port Area ■ Enhance Interactions with Local Communities
Client	Air quality; Vehicle emissions ;Goods spill; Port area safety maintenance; waste ; Water quality;	■ Abate port fugitive dust emissions ■ Transportation Vehicles Control ■ Improve air quality ■ Reducing port waste ■ Enforce Bulk Cargo Management ■ Maintain Water Quality within the Port Area
Community	Air quality; Noise; Vehicle emissions; Environmental quality of life near the port area	■ Reduce Noise Impact ■ Transportation Vehicles Control ■ Improve air quality ■ Enhance Interactions with Local Communities

Stakeholder	Importance
Government	32%
Employee	22%
Client	27%
Community	19%



- Using the relevant environment issues in the Self Diagnosis Method to assemble a questionnaire
- Identifying stakeholder concerns. Investigating the level of concern of each stakeholder.
- Inspecting the impact level of environmental concerns within the port
- Filtering major issues by level of stakeholder concern and influence on operations of the Port of Hualien.
- Establishing environmental goals and improvement plans for top 10 environmental issues.

Continuous Improvement

04/

Environmental Monitoring

The most significant environmental issues affecting the Port of Hualien are air pollution, noise pollution, and sewage runoff, as well as waste management and resource conservation. Importantly, these challenges also create the need for a strong public relations strategy. To understand the environmental changes in the port and surrounding areas over the years, the Hualien Branch of TIPC launched the Hualien Harbor Environmental Quality Monitoring Integration Program in 2015. For the program, the Environmental Protection Administration (EPA) commissioned certain environmental testing organizations to gather data on important indicators in the area surrounding the port, including air quality, noise levels, water quality, sediment composition, and biodiversity.

Environmental monitoring is conducted to determine the effects of various pollution sources, providing crucial information for environmental management and pollution prevention and mitigation.
The harbor close to Hualien City presents potential noise generated by vehicular traffic. To monitor this traffic, the Hualien Branch of TIPC has set up around-the-clock surveillance cameras on the main road and along restricted areas, as well as noise monitoring stations at Sentry Posts No. 17 and 24. The Hualien Branch of TIPC has invited environmental professionals and researchers to review the project and provide suggestions. As part of its ongoing commitment to transparency, TIPC publishes its annual environmental monitoring report on its website.

***Hualien Port Environmental Monitoring Program**

	Monitoring item	Monitoring frequency
Air Quality	TSP(Total suspended particulates) ,PM_{10} , $PM_{2.5}$,SO_2 , CO , O_3 , No_x , NO , NO_2 , temperature , humidity , wind speed , wind direction , rainfall	Monthly , 24-hr duration
Noise	Environmental sound volume criteria (Daytime $L_{eq,}$, Evening L_{eq}, Nighttime L_{eq} , Full Range L_{eq}), Low frequency noise *Equivalent Energy Sound Level (L_{eq})：It refers to a specific period within the measured volume of the average energy	Monthly , 24-hr duration (weekday and weekend) Using 2 sets of 24-hr automated and continuous monitoring systems
Water Quality	<General item> Velocity of flow, Flow direction , Water temperature , pH ,DO,BOD,E-coli , NH_3-N,TP, cyanide, Phenols, Mineral oils ,SS , salinity, Nitrite , Nitrate , Detergents(Anionic surfactant interface) Etc. <Heavy meatal item> Cd , Pb ,Cr^{6+},As , Hg , Se , Cu , Zn , Mn , Ag..etc.	Quarterly
Sediment	<General item> Particle size analysis、Water Content、specific weight、Fixity solids ,Volatile solids、pH、TN、TP、Total lipid、Phenols, Total organic Etc. <Heavy meatal item> Cu , Cd , Pb , Cr , Zn , As , Hg , Se, Mn , Ag , Al etc.	Quarterly
Ecology	Concentrations of heavy metal in phytoplankton, zooplankton,, benthos（Cu , Pb , Cd , Zn ,Ni , Cr, Hg , As）	Quarterly


Air quality monitoring


Noise monitoring


Water quality/Sediment sampling

04/ Continuous Improvement

Improvement Strategy of Air Quality

A series of pollution control measures have been introduced to improve air quality in the Port. These measures include a campaign to reduce vessel speeds, a shore-side electric power supply system, the use of low-sulfur fuels, and an automatic gate control system. To prevent suspended particles emissions, the port now requires all operators to use dust control meshes, dust suppression sprinklers, car washing stations, water lanes, enclosed conveyors, and unloading facilities.

The Port offers its full cooperation with other government agencies at both the local and national level – such as Ministry of Transportation's Maritime Port Bureau or the Hualien County Environmental Protection Bureau (EPB) – especially with regard to pollution prevention and auditing measures. The Port also collaborates with the EPA in evaluating the efficacy of air and marine pollution control programs.

Vessel Speed Reduction

To reduce air pollution and greenhouse gas emissions from ships, the Port of Hualien has been actively promoting its Vessel Speed Reduction (VSR) Policy and established an automatic identification system (AIS) in 2015 to record the speed of inbound and outbound ships. With the AIS system, the Port of Hualien can receive real-time data to monitor the speed of ships that are approaching the port's 20nm radius and notify the ships for speed reduction through either text messages or port's broadcasting system. The Port of Hualien also makes use of the Port Affairs Meetings and Berth Allocation Meetings to promote the VSR Policy.

The Port of Hualien VSR Policy requires ships within 20nm radius to reduce speed to under 12knots. This policy began in September 2015, and the VSR achieved decreased from 67.9% in 2018 to 80.2% in 2019, thus demonstrating a growth of approximately 12.3%

* Results of vessel speed reduction program

Year	(A) Meet the deceleration conditions	(B) The average speed of all vessel	(C) Total vessels	(D)Reduction rate(%) (D=A/B)	(E) Carbon reduction(ton)
2018	779	1147	171	67.90%	2458.62
2019	1125	1402	171	80.20%	3413.29

Reduce Vehicle Emissions

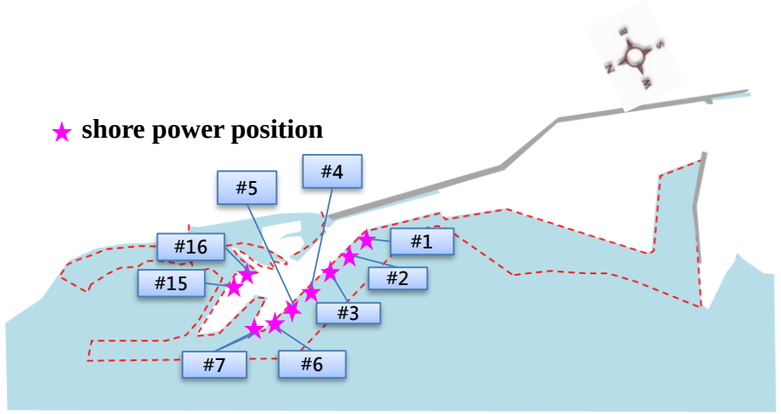
Vehicle air pollutants come from vehicle fuel combustion or evaporation. Approximately 380,000 vehicles enter and leave the Port of Hualien annually(2018-2019). Therefore, the port has installed an automatic gate control system at the inbound and outbound to save time and fuel. The system reduces the passing time of each vehicle by 70 sec (7,357 hours in total). Moreover, approximately NTD 1.18 million of fuel can be saved. Reduce about 115 tonnes of carbon dioxide emissions annual

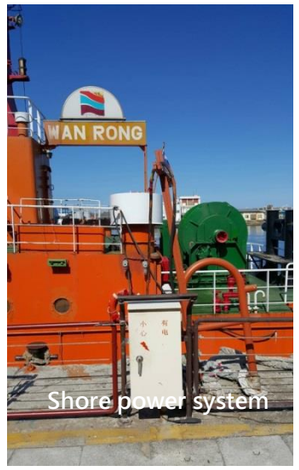
***Note: If the fuel consumed during idling is calculated at 6 L per hour and one liter of diesel costs NTD 19; for every vehicle passing the sentry post, 0.1167 liter of gasoline and 304.4g of carbon emissions are saved, which considerably decreases environmental pollution and port operators' idling time for accessing the port.**


Automatic gate control system

Low-sulfur Fuel and Shore Power

Low-sulfur fuel and shore power have been comprehensively implemented among harbor crafts in the Port of Hualien. All Wharves No. 1–4 ,15-16 are already equipped with shore power systems for harbor crafts. In addition, Wharves No. 5–7 have been installed with shore power systems along with the relocation of the Coast Guard Administration. Ships docking at the wharves can turn off their diesel engines to reduce carbon emissions. There are currently 6 seats in No. 1–4 Wharves of the shore power, 7 in the No. 5-7 , and 6 in the No. 15-16 , for a total of 18.





Reducing Leakage of Cargo Stevedoring

The Hualien Branch of TIPC takes a number of steps to ensure safety on port grounds and support its environmental management efforts, including: monitoring surveillance cameras placed throughout the Port; assigning personnel to conduct regular environmental inspections; and requiring and enforcing written agreements with tenants to observe all environmental laws and regulations.
To control dust emissions and reduce air pollution, grab operators shall not open the grabs highly.

Conveyor operators shall install a cover at the output opening. The output opening shall be within 1 meter above the upper edge of the truck beds. Dust covers should be firmly wrapped and fastened to the vehicle, with a margin of at least 15 cm extending down below the upper edge of the carton. In addition to the loading and unloading operations anti-blanking separator shall be installed to avoid the discharge of contaminated waters from entering the basin .


Vehicles covered with dust-control fabric


Environmental inspections

* Inspection and Jointly Supervised Safety Drills

Item	2018	2019
Number of harbor inspections	259	259
Number of joint safety supervision	12	12


Dust-control mesh

04/ Continuous Improvement

Dust Reduction

All the stevedoring operators in the Port of Hualien have installed concealed warehousing and conveyor systems. For example, Asia Cement Corporation has set up a concealed concealed ship lifts at Wharves No. 8, 10 and 18. China Steel Corporation has installed a concealed conveyor belt and concealed concealed ship lifts in the rear area of Wharf No. 11. At Wharves No. 17, 20, 21, and 22, sand industries have installed concealed ship lifts, which are effective in abating pollution from cargo handling operations.
To reduce dust generated by the sand and gravel storage site and traffic in the port, the Port of Hualien has installed mobile anti-dust sprinklers in the sand and gravel storage area, regularly sprinkling the site to continuously moisten the materials and requiring that cargo handled on site be moistened by automatic sprinkling and water screens. The sand and gravel storage site of the port is equipped with its own truck washing facilities.
Statistics show that approximately 2,030 and 2,500 thousand tonnes of sand and gravel in total were stacked at the site in 2018 and 2019, indicating a decrease of 108.7 tonnes of discharged particulate pollutants. In addition, the Hualien gravel site of China Steel Corporation handles approximately745 and 729 thousand tonnes of gavel in 2018 and 2019. A sprinkling system with a ground net is used to keep the ground surface moist, and approximately 35 tonnes of particulate pollutants.

*Dust Control Efficiency of Sand and Gravel

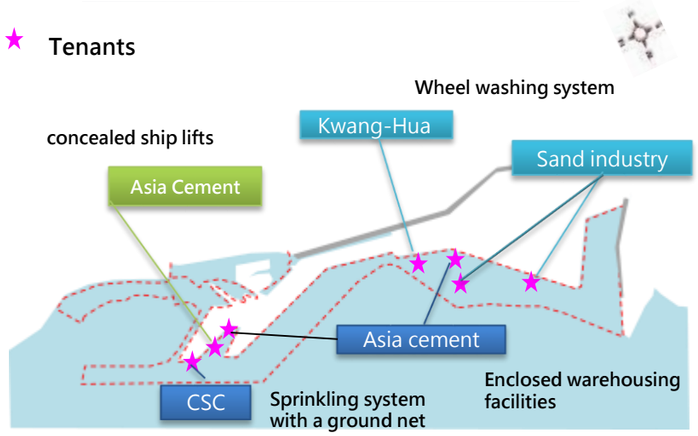
Unit : tonne/year

Type	Amount of sand	Amount of suspended particles emissions*	Amount of suspended particles controlled **
Sand industries	4,530,000	271.8	108.7
Hualien sand site of China Steel	1,474,000	88.4	35.4
Total	6,004,000	360.2	144.1

* Emission factor(0.06kg/tonne) :EPA gravel acquisition and processing industry suspended particles pollutants Prevention Technical Manual (P9)
** Dust-proof efficiency40% :Large exposed to suspended particles matter emission characteristics and technical feasibility study of control


Enclosed conveyor belt


Automatic watering system

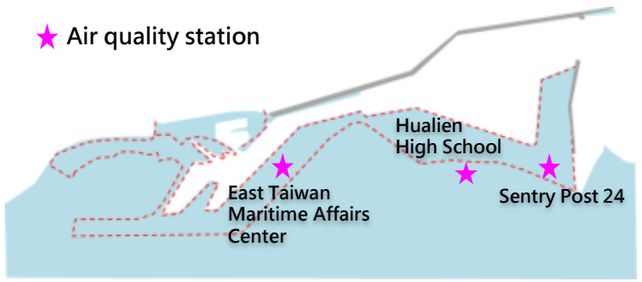



Car washing lane

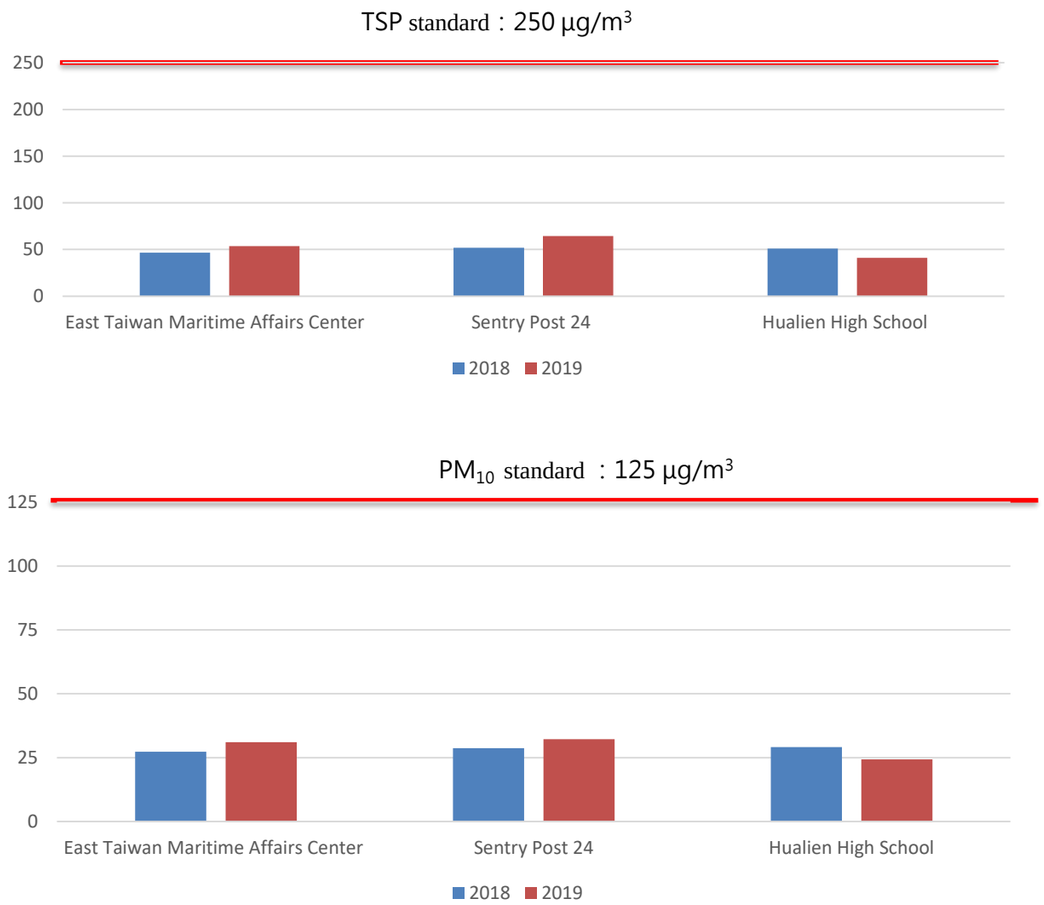
Air Quality Monitoring

The air pollution in the Port of Hualien mainly derives from vessel, as well as exhaust discharge and suspended particles from vehicles used by port operators. Longterm scientific environmental monitoring data should be established to examine and maintain local air quality. The Hualien Branch of TIPC monitors air quality to review the improvement of pollution reduction. From 2015, Hualien has been set up 3 monitoring station at Sentry Post 24, Hualien High School, and East Taiwan Maritime Affairs Center to monitor items of TSP、PM_{10}、$PM_{2.5}$、SO_2、NO_2、CO and O_3. It shows that all results are in compliance with air quality standards.

*Air quality monitoring station



*Air quality monitoring results



04/ Continuous Improvement

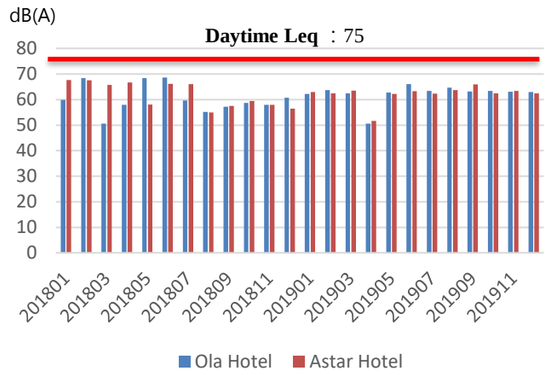
Noise Reduction Improvement Strategy

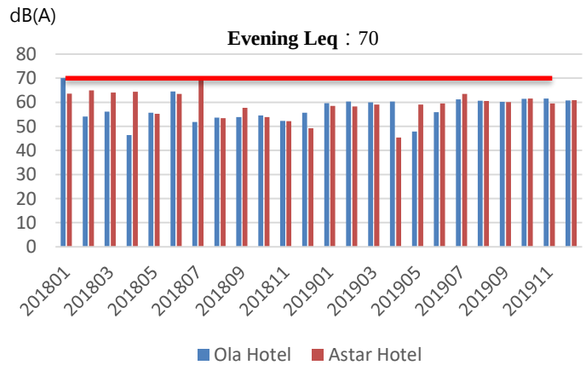
After the outer ring road along the northern coast was built, vehicles change their route to the underground road, thus reducing the air and noise pollution suffered by communities along the northern coast, ensuring the safety of people and vehicles, and quality of life of the community.
In addition, access roads to the Port of Hualien have been built to separate port traffic from the commuting routes of nearby residents. A green belt, railings, bicycle pathway, promenade, and jogging trail have been built upon the box-culvert road.
In addition to its extensive, ongoing environmental monitoring and management work, the Port is also deeply invested in the surrounding community. To mitigate the impact of the commercial and industrial activity it generates, the Port has constructed an 11-acre green belt between it and the neighboring residential community.
This green belt serves as a noise barrier and, more importantly, as a green buffer zone between the Port and the local residents.

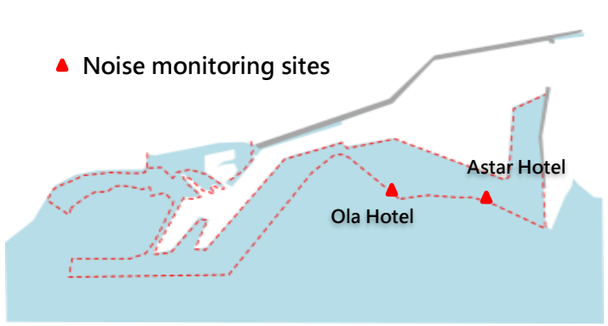

Outer ring road along the northern coast

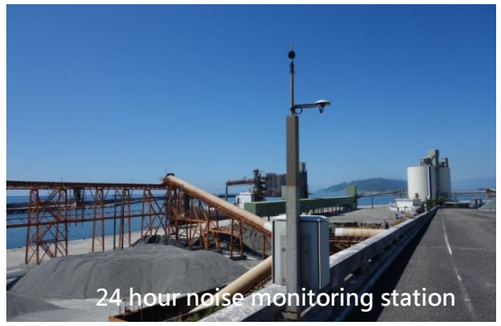
Noise Monitoring

The Port of Hualien is adjacent to Hualien City, consequently the noise generated by cargo transportation tends to affect the living quality of nearby residents. In addition, public grievances from neighboring residents about noise pollution have been frequent. The Port of Hualien is classified into the Regulated Area of Category D, and two monitoring stations have been established around the port. All results of the Port of Hualien in 2018 & 2019 met the noise control standards as well.








24 hour noise monitoring station

Water Quality Improvement Strategy

Water in the port may be contaminated by ship discharge or upstream municipal pollutants. The Hualien Branch of TIPC will continue to abide the Hualien EPB's wastewater policy and discharge its municipal wastewater to the public sewage system . In accordance with the EPA's Port Pollution Prevention and Reduction Measures, the Hualien Branch of TIPC has planned to build a runoff wastewater interception and treatment system to reduce runoff wastewater-induced pollution during rain gusts. In 2015, the Branch completed the runoff wastewater collection system at Wharf No. 25 in the outer harbor. The system can treat 500 CMD of water and reduce 90% of suspended solids. Another runoff collection system is scheduled to be built at Wharves No. 23 and 24 in 2016.

During oil unloading operations, ships in the Port of Hualien are required to place oil booms around them to effectively prevent oil leaks and pollution caused by operational accidents. The Port of Hualien has not experienced any vessel fuel leaks in the past 3 years, and the water in the port has been maintained clean.

The Hualien Branch of TIPC regularly organizes marine pollution emergency response drills every year, continuously promotes the commissioning of wastewater and sewage treatment, and improves the control over ship waste disposal and the treatment of waste oil and sewage . The management of all ship waste, waste oil in the port is commissioned to qualified service providers.

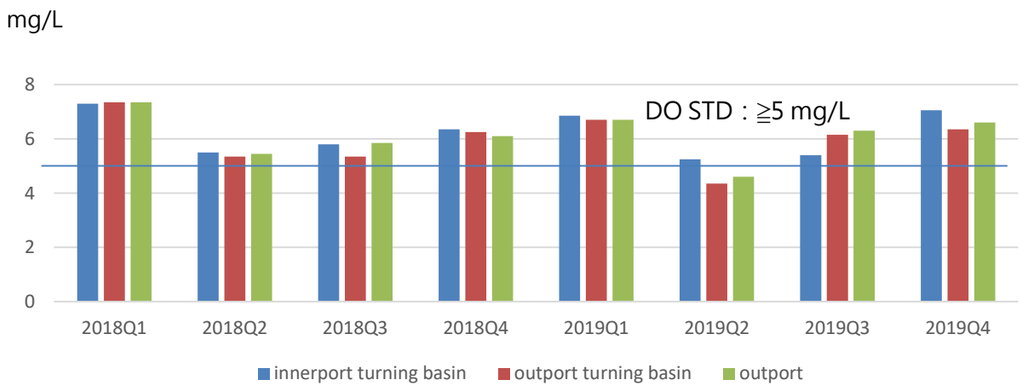
* Locations of water quality monitoring sites and runoff wastewater interception and treatment system

Water Quality Monitoring

The Hualien Branch of TIPC quarterly monitors effluents, marine water quality, and sediment. In accordance with the "Port Area Pollution Prevention and Reduction plan," monitoring reports are sent to the EPA every six months.

There are a total of 3 sampling sites in the harbor basin. In 2019, testing results revealed slightly high concentrations of dissolved oxygen, biochemical oxygen demand, and mineral oil. This was caused by the discharge of civil wastewater from the upstream Meilun region, which entered into the inner harbor through various stormwater sewer channels. Subsequent tests revealed that these concentrations had returned to normal.

* Water quality monitoring results



Port of Hualien
Environmental Report
2020

04/ Continuous Improvement

Climate Change Mitigation Measures

Taiwan has scarce water resources. The Hualien Branch of TIPC adjacent to the Meilun Mountain is favorable for collecting and filtering surface runoff because it is low-lying and has gravel at the surface layer and mudstone at the bottom layer. According to the concept of water resource banks, the Branch built 12 water storage facilities in the port to provide nondomestic water in replacement of tap water for flushing toilets in the administrative building, greening, containing dust at the sand and gravel storage site, and washing vehicles.

In 2018, Hualien Port salvaged approximately 4,000 m3 of concrete blocks after disasters and screened for concrete blocks that were viable for use in the creation of concrete breakwater foot-protection blocks.

Though this process, Hualien Port reduced processing costs of soil and stone resource processing and protected the port from ocean wave erosion. With the increase in environmental protection awareness and the rise in prevalence of adopting renewable energy, Hualien Port began installing solar panels on the rooftops of its buildings in 2018. This led to an increase in the port's income and reduction in its CO_2 emissions. In 2018 and 2019, the port reduced its CO_2 emissions by 24 and 645 tons, respectively.


protection blocks


Outbound vehicle cleaning

Reducing port waste

In the Port of Hualien, the amount of waste produced on land in 2018 was 108.1tonnes, with approximately 9.4 tonnes recycled(9%); the amount of waste produced in 2019 was 99.3 tonnes, among which 11.3 tonnes were recycled (11%).

We aim to increase the rate of recycling general waste on land from 3% to 5% In addition, the recycling rate has increased from 4.2% in 2017 to 9% in 2018, demonstrating a growth of approximately 4.8%.

* Solid waste disposal (2018-2019)

Item /Year	2018	2019
Total waste generation(ton)	105.5	96.1
General waste clearance volume(ton)	96.1	84.7
Recycle (ton)	9.4	11.3
Recycle Rate (%)	9	11

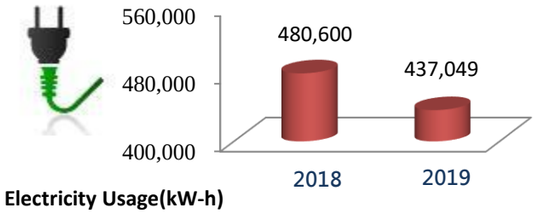
Reduction Garbage/ Port Waste

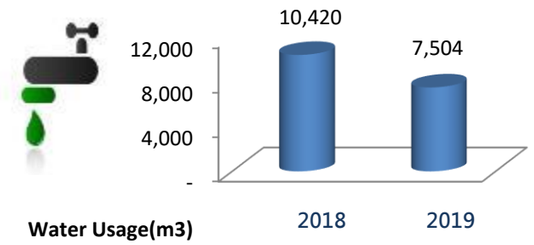
To conserve energy and reduce carbon emissions, the Hualien Branch of TIPC has launched the Four-Saving Project to monitor the energy, water, oil, and paper consumed by offices and operating areas, examine and improve the use of resources, and increase the ratio of conservation annually.

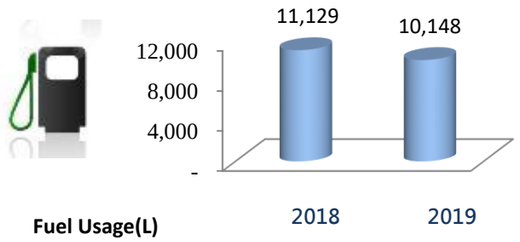
Compared with 2018, the year the project was launched, the total consumption in 2019 was reduced by 9.1%, which was equivalent to24,958.4kg of carbon emissions.

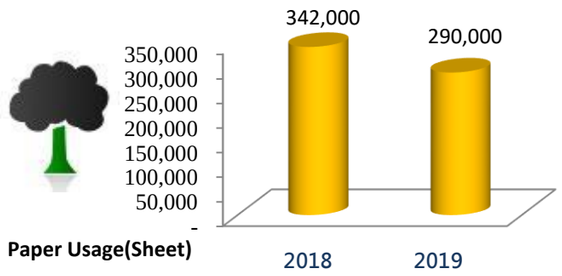
***Carbon Footprint of Resource Consumption at the Port of Hualien**

Item	Emission factor ($kgCO_{2e}$)		2018 The actual amount	2018 carbon emission (kg)	2019 The actual amount	2019 carbon emission (kg)	Saving carbon emissions	Savings ratio
Electricity consumption (kWh)	0.509	2019 National electricity emission factors	480,600	244,625.4	437,049	222,457.9	22,167.5	9.1%
Water consumption (m^3)	0.0633	2019 Taiwan Water Supply Co.	10,420	659.6	7,504	475.0	185	28%
Fuel consumption (Liter)	2.36	2017 EPA	11,129	26264.4	10,148	23949.3	2315.2	8.8%
Paper consumption (Sheet)	0.0056	Paper Star A4	342,000	1,915.20	290,000	1624	291.2	15.2%
Total				273,464.6		248,506.2	24,958.4	9.1%









04/ Continuous Improvement

Improving the Port’ s Relationship with Local Communities

Every year, the Port of Hualien Taiwan International Ports Corporation calls on its employees and related divisions in the harbor area to undertake a beach-cleaning activity and to collect beach trash in the harbor area. This activity helps participating units and employees understand the importance of protecting the marine environment. It is hoped that the beach-cleaning activity can help the Port of Hualien and related units collaboratively maintain their working environment and keep the harbor comfortable and beautiful. By building team and community cohesion in the Port of Hualien, a healthy, quality, and sustainable environment in the region can be developed.

To promote marine education and teach children how commercial ships enter and exit from the harbor and load and unload and how tourists enter and exit from the harbor.In 2018, the port hosted a port summer camp for parents and children, which had 160 attendees. Throughout 2018–2019, the port held 17 and 23 charity events in the winter and for minorities, respectively.


Elementary school and junior high school student visits

Winter gifts


Camp activity

Port Landscaping

The Port of Hualien is adjacent to the Meilun community. A 4.6-ha leisure park was established between the port and the community as a green belt to prevent dust, noise, and wind.

Mean while, the park also creates a positive image for the port for providing recreational space. This project is estimated to reduce 437 tonnes of carbon emission annually.

***Estimates of Carbon Abatement from Port Landscaping**

Planting area	Total tree planted	Shaded area per arbor tree	Ratio of arbor tree*	Carbon reduction**
46,000m^2	5,806 plants	0.1256m^2/plant	1.59%	437,460kg-CO_2e/yr

*Arbor area ratio:0.1256m^2/plant X 5806 plant/46000m^2 X 100% =1.59%
**Reducing the amount of carbon=600kg-CO_2/m^2 X 46000m^2X1.59%
Source : Arbor green space beautification calculated estimate of Architecture and Building Research Institute


Bicycle lane


Port green landscape

Port of Hualien
Environmental Report
2020

Environmental Performance Indicators of Hualien Port

Significant environmental issues of Hualien Port	Index item	Calculation method	Target value	Indicator presentation (calculation details) 2018	Indicator presentation (calculation details) 2019
Air Quality	Air quality pass rate (PM_{10}、$PM_{2.5}$、SO_2、NO_2)	The ratio of the measurements in the air quality monitoring station of the port that meet the "Air Quality Standards"	• PM_{10} of the daily mean measurem- ents satisfy the standard (<125μg / m3): 100% • $PM_{2.5}$ of the daily mean measurem- ents satisfy the standard (<35μg / m3): 60% • SO_2 of the daily mean measurem- ents satisfy the standard: 100% • NO_2 of the daily mean measurem- ents satisfy the standard: 100%	• PM_{10} of the daily mean measurem- ents satisfy the standard (<125μg / m3): 100% • $PM_{2.5}$ of the daily mean measurem- ents satisfy the standard (<35μg / m3): 60% • SO_2 of the daily mean measurem- ents satisfy the standard: 100% • NO_2 of the daily mean measurem- ents satisfy the standard: 100%	• PM_{10} of the daily mean measurem- ents satisfy the standard (<125μg / m3): 100% • $PM_{2.5}$ of the daily mean measurem- ents satisfy the standard (<35μg / m3): 60% • SO_2 of the daily mean measurem- ents satisfy the standard: 100% • NO_2 of the daily mean measurem- ents satisfy the standard: 100%
	Number of air pollution patrols	Frequency of land patrol	250 inspections per year	Number of port area inspections:259	Number of port area inspections:259
Dust	Number of prevention stevedoring and stacking devices	Number of prevention stevedoring and stacking devices in port	Review number and worth use of prevention devices every 2 years	• 4 stevedoring machines with prevention • 3 stevedoring machines with closed devices	• 4 stevedoring machines with prevention • 3 stevedoring machines with closed devices
	Water bank usage.	• Water usage at sand and gravel disposal plants. • Water usage for loading and unloading water spraying of woodchip carriers.	Conserve up to 100,000 tons of tap water.	• sand and gravel disposal plants: 123,410 tons • woodchip carriers:0 ton	• sand and gravel disposal plants: 131,130 tons • woodchip carriers:3,563 tons
Port and harbor waste	General waste removed and recycling rate in the harbor land area	Amount of recycled waste ÷ Waste generation×100%	5% general waste recycling rate in the harbor land area based on general waste removed	9.4÷108.1×100%=9%	11.3÷99.3×100%=11%
Noise	Quarterly ratio of noise levels satisfying related regulations	Daily ratio of noise levels (measured at the noise monitoring station in the port) that satisfy related regulations The port is classified into the Regulated Areas of Category D in general area Noise Control Criteria: Detailed regulations: 75 dB during the day (7 am–8 pm); 70 dB during the evening (8–11 pm); 65 dB during the night (11 pm to 7 am of the following day)	• Daytime equivalent energy sound levels: quarterly achievement rate of 100% • Evening Leq: quarterly achievement rate of 100% • Nighttime Leq: quarterly achievement rate of 100%	• Daytime Leq 100% • Evening Leq 100% • Nighttime Leq 100%	• Daytime Leq 100% • Evening Leq 100% • Nighttime Leq 100%
	Area of the buffering green space(the ecological pool and the bicycle path)	Area of the buffering green space	• Increasing and maintenance the area of buffering green space	Area of the buffering green space: 4.6 ha	Area of the buffering green space: 4.6 ha
	Total number of received petitions.	The number of received petitions.	Decrease the number of petitions	0	0

Port of Hualien
Environmental Report
2020

04/
Continuous Improvement

Environmental Performance Indicators of Hualien Port

Significant environmental issues of Hualien Port	Index item	Calculation method		Target value	Indicator presentation (calculation details)	Indicator presentation (calculation details)
					2018	2019
Ship exhaust gas emissions	The ratio of using low-sufer fuel or biodiesel and the consumption of low-sufer fuel among harbor crafts	• 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		The ratio of using low-sufer fuel or biodiesel reaches 100% among harbor crafts	• 3÷3×100%=100% • Percentage of harbor crafts that use low-pollution fue:. 100% • The total amount of low-pollution fuel used.: 216.73 KL	On January 1, 2019, the port implemented measures for controlling the sulfur content in fuel used by ships that navigate international routes.
	• Percentage of harbor crafts using shower power. • Shore power usage	• Number of service vessels using shore power ÷ total number of service vessels × 100% • Shore power usage (kWh)		All service vessels using shore power	• 3÷3×100%=100% • Number of service vessels: 3; number of service vessels using shore power: 3 • 67,092(kWh)	• 3÷3×100%=100% • Number of service vessels: 3; number of service vessels using shore power: 3 • 70,941(kWh)
	Ships deceleration target completion rate	The automatic identification system for ship deceleration is applied to determine the deceleration of ships within 20 sea miles from the port		The achieved speed reduction rate:50%	67.9%	80.2%
Cargo spillage	• Inspections of hazardous cargo. • Number of cargo spill emergency response drills performed	• The number of inspections • Number of cargo spill emergency response drills performed		• Six inspections/year • At least one cargo spillage emergency response drill per year	• Number of inspections of hazardous cargo/the port performed: 7 • One cargo spillage emergency response drill	• Number of inspections of hazardous cargo/the port performed: 6 • One cargo spillage emergency response drill
	Percentage of oil tanker ships using containment booms.	Percentage of oil tanker ships using containment booms (number of ships using oil containment booms ÷ number of ships that entered the port within a given period × 100% = percentage of oil tankers using oil containment booms).		Deployment oil booms of ship Bunkering is 100%	• Deployment oil booms of ship Bunkering is 100% • (259÷259)×100%=100%	• Deployment oil booms of ship Bunkering is 100% • (341÷341)×100%=100%
Vehicle exhaust gas emissions	Permit certification grading (short-term or long-term).	Long-term permit ÷ total number of permits.		The percentage of long-term permit application has increased .	• 188÷330×100%=56.9% • Number of trips: 398,139, reducing approximately 7,271.9 kg of CO2.	• 226÷356×100%=63.5% • Number of trips: 358,621, reducing approximatel6,550.2 kg of CO2.
Climate change	Number of foot-protection blocks used.	Number of foot-protection blocks manufactured.		Using concrete blocks salvaged after disasters to manufacture foot-protection blocks.	• During the preparatory stage, 4,000 m3 of concrete blocks were removed.	• 160
	Amount of solar power generated.	• Power generated • Level of carbon reduction • Capacity		• Amount of solar power generated. • Level of carbon reduction	• 45,121(kWh) • 24,050kgCO2 • 499.72 kWp	• 1,154,737(kWh) • 615,475kgCO2 • 999.44 kWp
Water Quality	Marine water quality pass rate (pH, DO, BOD_5, cyanide, phenols, mineral oils)	The ratio of port water quality measurements (obtained at the water quality monitoring station in the port) satisfying the Marine Environment Classification and Quality Criteria		Marine water quality: 100% of the quarterly pH, DO, BOD_5, cyanide, phenols, mineral and oils measurements satisfy the criteria.	Marine water quality criteria for Category B pH 100% DO 100% BOD_5 100% Cyanide 100% Phenols 100% mineral oils 100%	Marine water quality criteria for Category B pH 100% DO 100% BOD_5 100% Cyanide 100% Phenols 100% mineral oils 100%
Relationship with Local Communities	Number of activities and participants	Calculate the actual number of occurrence		Number of activities and events	Held 17 charitable activities.	Held 23 charitable activities.

Emergency Response

05/

Port Emergency Notification and Drills

Because of Hualien port's geographical position, its land and sea areas are exposed to various disasters such as earthquake, wind storms, floods, tsunami, general shipwrecks, marine oil pollution, air pollution, leaks of toxic and nontoxic materials, severe traffic events and industrial safety accidents, etc. We have stipulated 21 notification and response procedures to mitigate the impact, ensuring the emergency events can be informed and response in the fastest time. Meanwhile, we cooperate with harbor police and harbor fire brigade for periodical drills to practice and improve emergency operation skills.

As far as the port pollution and disaster events are concerned, general public, ship owners or port business units can liaise with Hualien Branch of TIPC via our communication channels or mail box. Every year,

Hualien Branch of TIPC works with EPA of Hualien County Government for non-prewarning drill of pollution and chemicals and other hazardous substances spill response . This drill includes preventing the spill from reaching shore, removing spilled oil from the water and clean-up residual oil from sea surface, event investigation and pollution claim, etc.

In all cases, the Hualien Branch of TIPC tries to cooperate and work closely with all parties involved in an incident and ensure the cross-department emergency response center can be set up promptly and run smoothly. In case the event arises, prompt notifications , and appropriate emergency measures are taken to mitigate the impact on the environment and minimize loss.


A class protective clothing


Oil boom on the dock


Vacuum skimmers

Oil pollution incident clean-up work

On August 27, 2019, the monitoring center found that oil pollution was discharged from the Port Basin. Upon receiving the notification, the Occupational Safety and Health Division immediately activated the response mechanism and notified the relevant operators. After the inspection, the Occupational Safety and Health Division immediately ordered the contractor to stop work and evacuate the relevant pipelines.

The CPC has also provided emergency oil containment cables and mobilized more than 10 people (including contractors) to carry out sea surface and drainage ditch clearing operations. Clean up the oil by using the absorbent cotton sheet together with the containment rope.


Oil on water surface


Clean-up


Water surface after clean-up

05/ Emergency Response

*Number of Accidents in Hualien Port

Accidents\Year	2018	2019
Ship collision, sinking, capsizing, fires, oil pollution, and leaks of other chemicals.	0	0
Ship mechanical failure, operational failure, tilting, and stranding	0	0
Major warehouse and storage tank fires or explosions	0	0
Minor pollution, fires, and chemical leaks in the port	0	0
Man overboard, industrial safety accidents, flotsam, and others	0	0

*Records of Joint Drills (2018–2019) by the Hualien Branch of TIPC

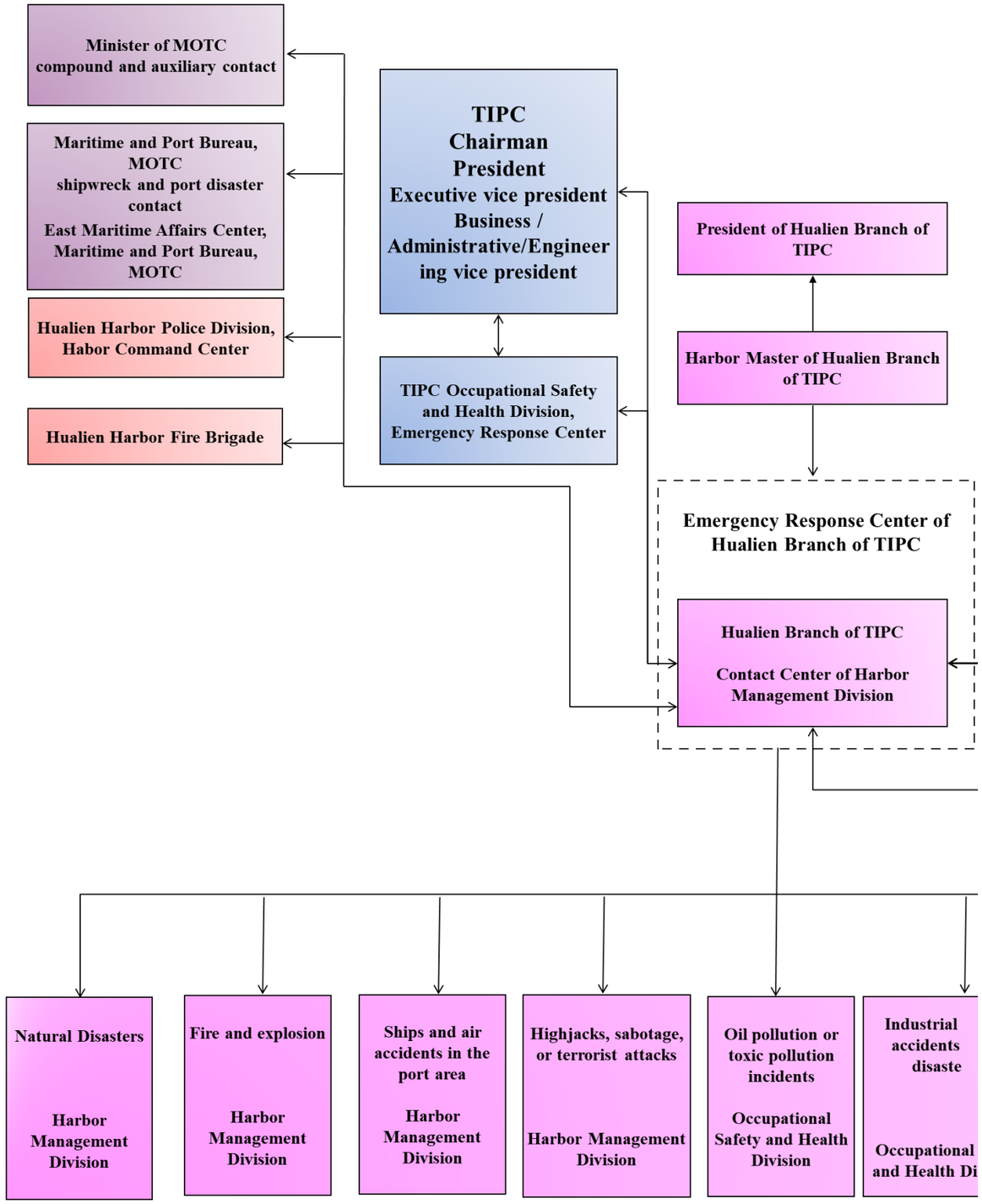
Year	Name of drill	content	date
2018	2018 Hualien Oil Depot Area Response Drill	In the simulated scenario of this drill, an earthquake with a magnitude of 6.0 hypothetically occurred in Hualien's outer sea . A pretended substantial tear hypothetically caused the 6-inch oil loading hose to rupture and oil to spills and outbreaks of fire. The emergency response protocol for oil pollution was therefore implemented.	July 17, 2018
2018	Emergency response to marine oil pollution-EPB	An earthquake in Hualien damaged the hose fittings on a CPC tank ship, which caused fuel oil spills. The emergency response to oil pollution was quickly initiated because part of the fuel had flowed into the sea.	October 17, 2018
2019	The Chingyung Project–police drill–the Harbor Police Department	During the drill, a passenger in the queue spread unidentified liquids to other passengers for unknown reasons. Such incident was managed using relevant CIQS emergency response.	April 15, 2019

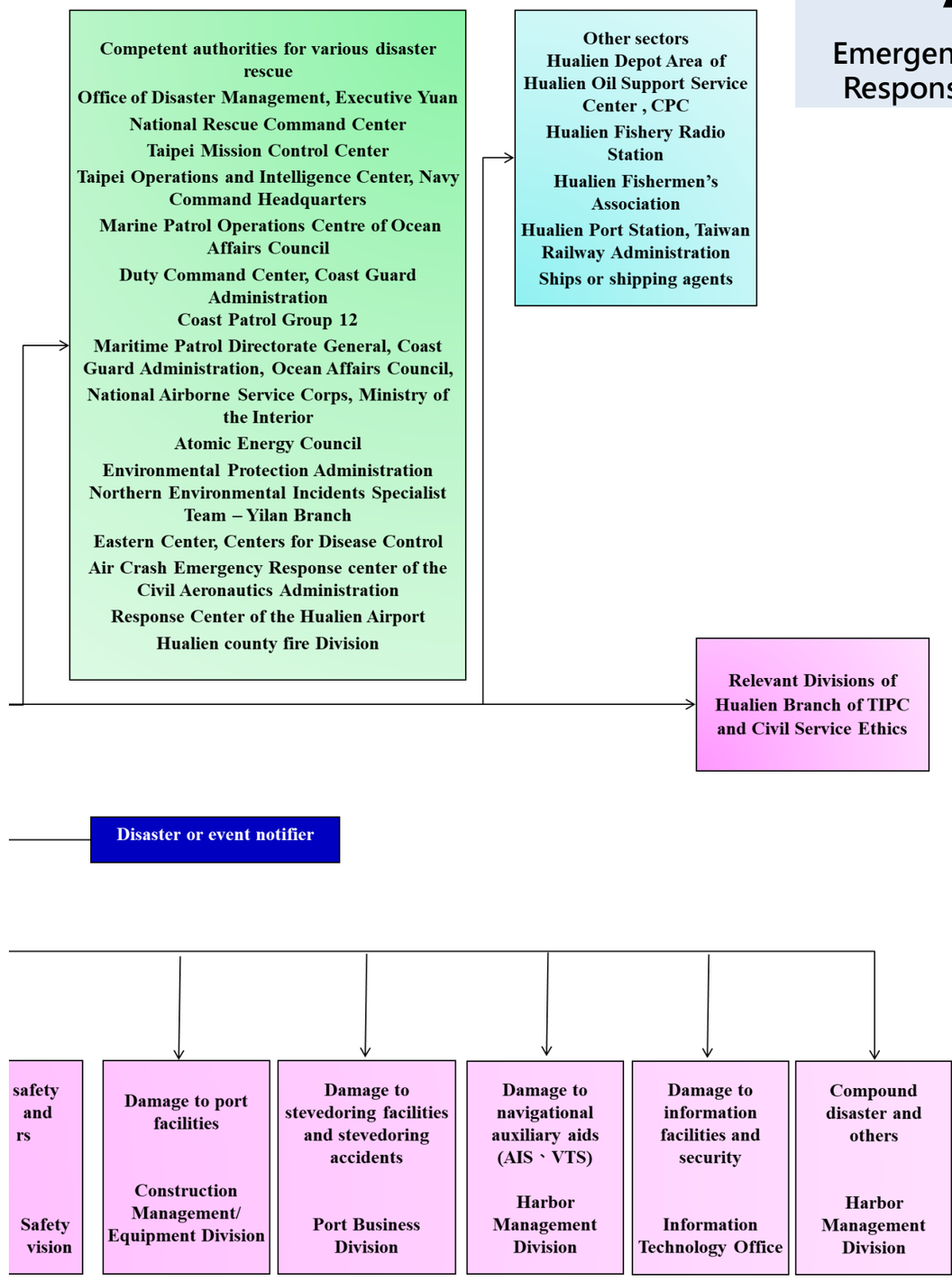

Marine Salvage Drill at the Port of Hualien


Emergency response to Marine oil pollution

Port of Hualien
Environmental Report
2020

05/ Emergency Response





Innovation & Cooperation

06/

The best practices proposed by the Hualien Branch of TIPC indicate the organization's ability to manage port environment. Hualien Port's best practice examples includes (1)Stage IV of the Smart Grid Integration and Application Project; (2) Port solar energy system

Best practice Ⅰ、Stage IV of the Smart Grid Integration and Application Project

Content

Since 2015, to expand on the application of the Hualien smart grid and to thoroughly meet the demands of port operation and management, Hualien Port has completed the construction of its illumination and monitoring systems, remote monitoring systems, and optical fiber systems throughout the port. Consequently, the port has simplified its patrolling operations and relevant reporting operations. Furthermore, Stage IV of the Smart Grid Integration and Application Project includes environmental and safety protection elements. This has led to the establishment of relevant automatic, systematic, and digitized systems for moderating the water source for water bank facilities, recording water usage, controlling water sprinkler systems on land bridges to suppress dust, and providing alarm functions for public restrooms and checkpoints.

Project Goal

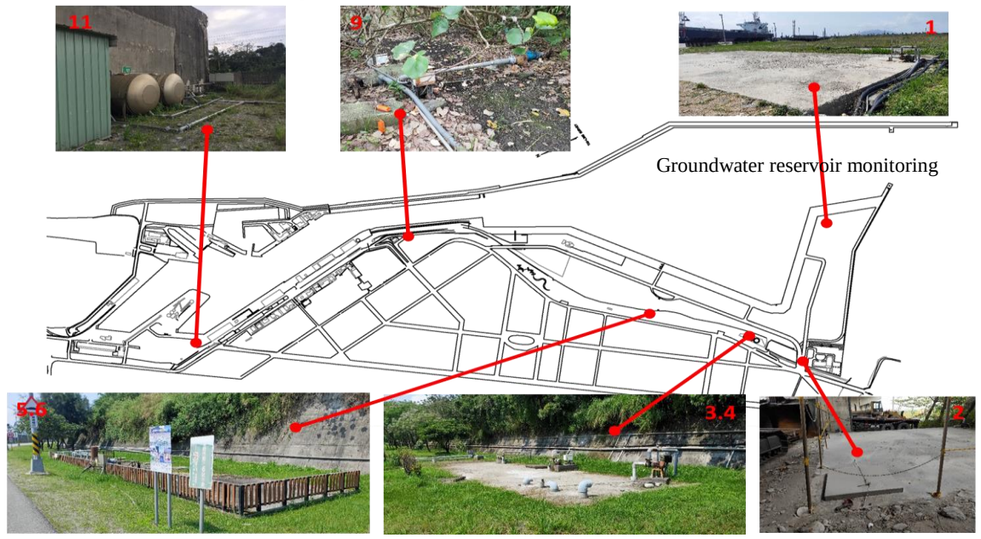
In Stage IV of the Smart Grid Integration and Application Project, Hualien Port reviewed its water bank facilities, pump motors, and pipes and control systems. Additionally, the port established ultrasonic meters for determining the water level, water level control systems, and a smart water meter monitoring system for the sand and gravel plant. These installment projects enable to port to flexibly adjust its illumination according to the current berth instructions for ships at the port, thereby reducing the human resources required for these tasks. The completion of these projects will enable the port to achieve its goal of smart technology application, visualization, and enhanced operation efficiency to meet practical demands. By integrating operational information from each of its facilities, Hualien Port has expanded its application of the smart power grid and has completed the execution of relevant infrastructure construction plans for expanding its hardware in the next 3 to 5 years. Accordingly, the port could enhance its foundation for sustainable development as a commercial port.

Implementation/Timeline

January 2020	Announcement of current tenders
March 2020	Plan design
June 2020	Plan design to be completed
July 2020	Award of bid and starting construction
November 2020	Completion
December 2020	Final acceptance of the completed project

Environmental Issues

Energy Consumption, Land Related Port Development, Rainwater treatment



06/
Innovation and Cooperation

Effect/Benefits

(a) Improve the management and operation efficiency of the port, establish a new monitoring portal for vessel movement, provide competent authorities and managers with rapid and convenient search functions for key port information, and enable port illumination managers to exercise real-time remote lighting control.
(b) Monitor the water level at the underground reservoir, including monitoring the surface water level and making adjustments to its usage.
(c) Enhance information integration and the monitoring capabilities of the Control and Monitoring Center and establish facility systems that actively send alerts.
(d) Smart electric meter and water meter: established to separately monitor electricity and water consumption and determine associated costs for each region of the port.
(e) Digitize the sprinkler systems installed at each road at the port. Use smart rain gauges to predict the number of hours of sunshine and rain each month. This would enable the conservation of approximately 7% of water consumed by the sprinkler system each month (based on the number of days with sunshine and rain) and is conducive to maintaining the underground water bank capacity in the drought season.

Participants

Hualien branch of TIPC

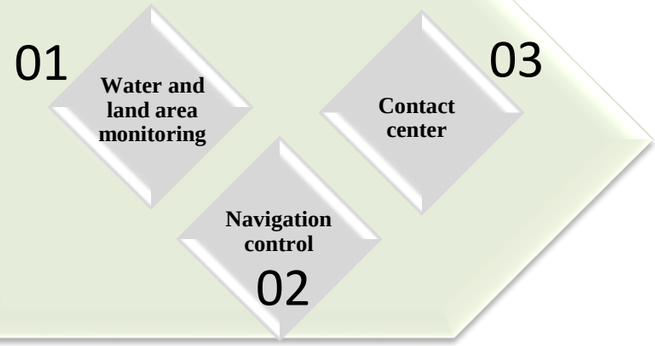
Investment Amount

Total investment amount : NT$1.2 million (about€34498) in planned design costs and NT$25 million (about€718711)in construction and contractor costs

Stakeholders

Hualien branch of TIPC, stevedoring companies, Operators associated with port businesses, Agencies responsible for port CIQS, the public.

The additional functions of the monitoring center at the Port of Hualien



Contact
Port of Hualien
Construction Management/ Equipment Division
Contact Person: Mr. Cheng,Ching-Sheng
Phone: 03-8325131 ext 2471
Fax: 03-8352813
E-mail: cscheng@twport.com.tw

Best practice II、Port solar energy system

Content

In consideration of the severe global energy crisis and the environmental impact of fossil energy, the Taiwanese government is actively developing alternative energies and aims to establish a nuclear-free homeland by 2025. In July 2016, the government initiated the Two-Year Solar PV Promotion Plan in an attempt to increase the proportion of renewable energy to 20% relative to the total energy used by 2025. Accordingly, we have endeavored to promote renewable energy projects and have invited energy-related operators to conduct on-site visits at the port. Currently, we have completed the execution of plans to install solar PV facilities on the rooftops of the inner harbor warehouse, administrative building, and assembly hall.

Solution

The plan to install solar power panels on the rooftops of warehouses #6 and #14 was first executed in 2018 and was completed in 2019. In 2018 and 2019, the panels generated 1,247,000 kW. In addition, the installment of solar panels on the rooftops of the assembly hall and administrative building was completed in the end of May 2020. We are currently planning to install solar power panels on the rooftops of the warehouses in the Waterfront Recreation Area.

Implementation/Timeline

2018 Nov.	The solar power system installed on the rooftop of warehouse #14
2019 Mar.	The solar power system installed on the rooftop of warehouse #6
2020 May	The solar power system installed on the rooftop of Auditorium and Administration Building
2020 Oct.	The solar power system installed on the rooftop of #1-4

Investment Amount

The total investment amount is about NT$ 100 million. (about€2874843)

Port of Hualien
Environmental Report
2020

Stakeholders

Hualien Branch of TIPC, Port industry

Environmental Issues

Energy Consumption, Land Related Port Development

Participating Units

Hualien Branch of TIPC, Taiwan Power Company, ECOVE Solar Energy Corporation,Yong Liang Ltd.

Effect/Benefits

The solar power system established by Hualien Port

Location	Status	Area (m2)	Capacity (kWp)	Annual generating capacity (kWh)	Estimated CO_2 reduction (ton).	Equivalent forestation efficiency (ha).	Current power generation (kWh).
Warehouse #14	Installed	3,235.17	499.72	547,193.40	320	23	831,384
Warehouse #6	Installed	4,498.80	499.72	523,632.06	305	22	677,649
Auditorium and office building	Installed	560.00	108.36	112,785 (estimate)	60	5	12,960
Warehouse #1-#4	Planned	9,049.68	1,284	1,406,980 (estimate)	750	55	0

Update：May, 2020

Contact
Port of Hualien
Port Business Division
Contact Person: Ms. Ling,Tzu-Hsiu
Phone: 03-8325131 ext 2416
Fax: 03-8310325
E-mail：melody2 @twport.com.tw

Port of Hualien
Environmental Report
2020

Involvement and Collaborating Organizations

The Hualien Branch of TIPC has been very active in collaborating with the private sector, public sector and academia in Taiwan and abroad on issues related to the environment. In addition to understanding environmental development trends in the international arena, the Port of Hualien also works to achieve the goal of becoming a sustainable green port through technological cooperation, joint inspection, lecture and practice.

Association

The International Association of Ports and Harbors (IAPH)

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

Association of Taiwan Port

The industrial, official, and academic knowledge platforms in Taiwan are integrated for domestic marine industries to coordinate internally and collaborate externally to implement affiliate marketing, call for investment, seek membership of international organizations, host crucial conferences, and facilitate cross-strait cooperation.

The Taiwan Marble Association

The Taiwan Marble Association regularly assign representatives to participate in the association congress.

Cooperation

China Steel Corporation (CSC)

An automatic material transporting device has been installed at Wharf No.11 in the Port of Hualien. In addition, the Hualien Branch of TIPC provided land for the CSC to invest in improving related transportation equipment, changing the means of gravel transportation in Hualien from highways to railways.

Taiwan International Ports Corporation Marine Corporation, Ltd

Signing of cooperation Agreement Tugboat, ship repair shop maintenance business

Asia Cement Corporation

An automatic material transporting device has been installed in Wharf No. 10 & 18 in the Port of Hualien.

Academic institution

National Taiwan Ocean University

National Taiwan Ocean University and the TIPC signed a MOU for studying marine meteorology and sediments of drift sand from the ocean, working together to further the international ports, academic development, international competitiveness, and shipping quality of Taiwan.

National Cheng Kung University

National Cheng Kung University and the TIPC signed a memorandum of cooperation for personnel training and development of the Port. Working together to further the international ports and competitiveness.

National Sun Yat-sen University

NSYU signs a memorandum of cooperation with the TIPC to cooperate in terms of personnel training, student internships, and the management of seminars and lectures.

Public sector

Environmental Protection Bureau of Hualien County

The Hualien Branch of TIPC cooperates with the Environmental Protection Bureau of Hualien County to conduct unscheduled joint inspections and marine pollution prevention drills in the port.

East Maritime Affairs Center of MPB, MOTC

The East Maritime Affairs Center of the MPB under the MOTC is in charge of the affairs related to port security, disaster relief, and pollution control in the Port of Hualien, as well as the implementation of laws and regulations, gathering of evidence, and penalty consideration

Hualien City Office

The Hualien Branch of TIPC and the Hualien City Office jointly organize EcoPorts promotion activities.

Training

07/

Training

The Hualien Branch of TIPC provides its staff with suitable environmental education training programs according to Environmental Education Act. These programs not only develop trainee's environ-mental awareness and environmental protection knowledge, but also improve the Branch's competitiveness. The Branch has organized seven and five environmental education courses for its employees in 2018 and 2019, respectively. The total participants are 405.The curriculum consisted of video watching, practicing, experiential learning, outdoor learning, lectures, and other activities. The contents included disaster prevention and relief, nature conservation, environmental and resource management, and environmental education for schools and society.

There are oil containment devices such as oil booms, oil skimmers, and oil sorbents are prepared and installed according to the major marine oil pollution emergency response plan devised by the Branch. The Hualien Branch of TIPC annually maintains and checks equipment and devices required in emergency responses to ensure their normal functioning. The training and on-site practice for operating oil pollution response equipment are offered.

Mountain clean-up activities

Clean environment

Oil boom of usage training

Marine pollution equipment exercises regularly

07/ Training

Internally, the Port of Hualien holds environmental meetings on a regular basis to improve the quality of its services and its success in mitigating pollution. The focus of the meetings changes each year according to the needs of the different industries that comprise the Port's traffic – including the sand-and-gravel industry, cargo shipping, and construction. At these meetings, the Port of Hualien uses constructive dialogue to clarify environmental regulation and resolve issues of non-compliance, creating win-win outcomes.
To further facilitate on-site environmental compliance inspections, the Hualien Branch of TIPC attends training sessions held by various agencies, including the EPA, the EPB, the Environmental Professional Training Institute, the Ministry of Transportation's Harbor and Marine Technology Center, the National Sun Yat-sen University, and TIPC Headquarters. Currently, the Occupation and Safety Division holds several professional licenses, including a Visual Assessment of Smoke License, a Dedicated Air Pollution Control Specialist Class A License, a Dedicated Wastewater and Sewage Treatment Specialists Class A License, and more.

Health lecture

Safety and health education and training in port area

2019 Labor environmental education

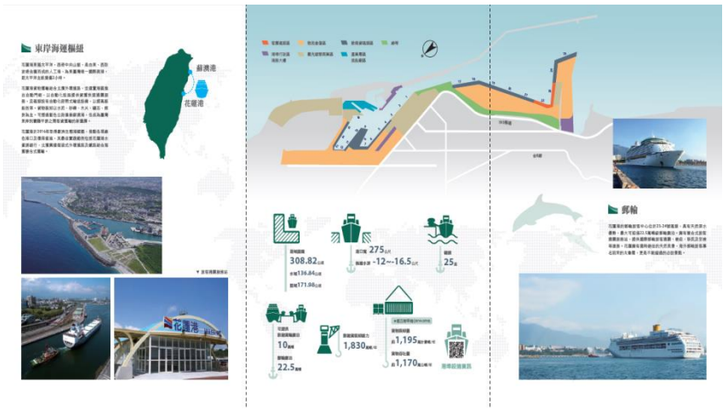
Environmental education and training for New staff

Communication & Publication

08/

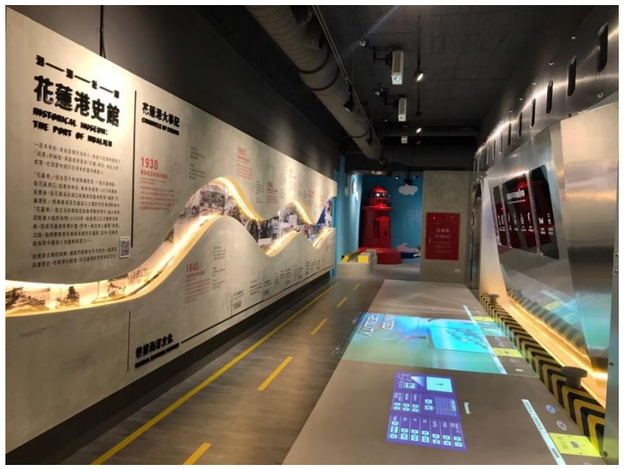
Publication

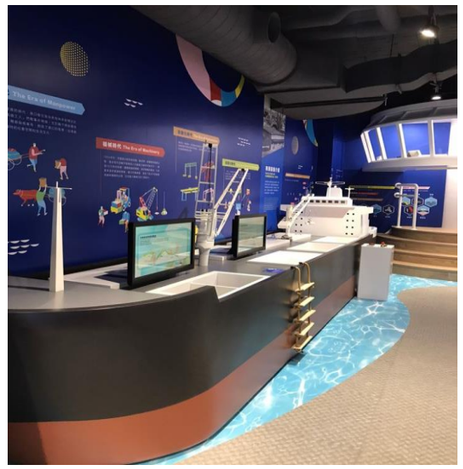
The poster of the 90th Port of Hualien Anniversary Events



Hualien Harbor Brochure

Exhibit Space





「History of Hualien」, Introduce the past development and future prospects of the Port of Hualien, as well as major events in the past years, to improve visitors' understanding of and connection with the port.

08/ Communication & Publication

Internet Web

Green port action plan of TIPC Web (http://www.twport.com.tw/GP/)

TIPC presented outcome of Green port in the international arena. Set up " Green port policy of TIPC Web " to communicate with other countries.

The Hualien Branch of TIPC World Wide Web - (http://hl.twport.com.tw/chinese/)

The Hualien Branch of TIPC World Wide Web on which global public opinion with a contact-mail, provide the general public to express views and opinions of online .

Publications about service measures

Videos for marketing the port (https://www.youtube.com/watch?v=9jH0yjS0G3I&feature=player_embedded)

The public can watch the port marketing video "Ports in Taiwan" to experience the features of each port through real scenes.

Facebook fan page (https://www.facebook.com/hualientwport)

Each units of the port occasionally release news about public calls for investment, cruise schedules, and promotion activities for the public to know the business of the Hualien Branch of TIPC.

Public Welfare / Neighborhood Activities

Blood donation activity

In line with its spirit of social responsibility, the Hualien Branch of TIPC occasionally even invites employees of cooperation departments to participate in blood drives as part of a broader effort to promote blood donation among the public at large.

The Coming of Winter Solstice, The Arrival of Good Tidings

To welcome Christmas, a meaningful holiday, the Hualien Branch of TIPC held The Coming of Winter Solstice, The Arrival of Good Tidings event in 2019. The members of the Mennonite New Dawn Home hospitably opened the event by singing carols; they brought joy, gratitude, and peace to every corner of the event.

The Port of Hualien Summer Camp

Recently, the Hualien Branch of TIPC has promoted marine education. During every summer vacation, it organizes summer camps and accepts applications from teachers and students from elementary schools, junior high schools, universities, and colleges in Taiwan to observe port operations, expecting that more business and port professionals will engage in port affairs in the future.

Elementary school and junior high school student visits

To promote marine education, the Hualien Branch of TIPC guides teachers and students from elementary and junior high schools in Hualien to visit the signal station, the monitoring center, tugboat operations, and harbor police enforcement, enabling the public to understand more about our ocean and further protect marine ecology.

Port of Hualien
Environmental Report
2020

Meeting /Visit Activities

The Train Festival

Hualien Branch of TIPC cooperated with the 132th Railway Festival held by the Taiwan Railways Administration and warmly welcomed visitors of all ages to admire the CT273 steam train at the Hualien Harbor Waterfront Recreation Area. ◦

Vintage car driving tour around Taiwan

Hualien Branch of TIPC warmly welcomed the visit of the president of the Taiwan Antique Car Association and its antique car fleet to the Hualien Harbor Waterfront Recreation Area, which give people the opportunity to appreciate the antique cars. In addition, a food truck bazaar provided an additional space for admiring the sea and the antique cars.

Planting trees to “Light up the Port of Hualian”

The Port of Hualien cooperated with the Hualien environmental education ambassadors and local residents to jointly construct a Hualien Port garden, providing the public with a new recreational and scenic spot from which to appreciate the beauty of the port.

History of Hualien

The Port History Museum has the mission of establishing a green port and advocating marine education, enabling the public to joyfully embrace and deeply recognize Taiwan’s precious marine culture.

Green Accounting

09/

Environmental Investments and Cost

The cost that have been invested by the Hualien Branch of TIPC in the environmental aspects are mainly divided into the categories of staff, environmental maintenance and management, environmental monitoring, and emergency responses and communication. The purpose of these investments is to improve the environmental awareness among staff, environmental maintenance, environmental quality, emergency response abilities, and public understanding of the port.

Cost invested by the investments of the Hualien Branch of TIPC in the Environmental aspects in 2018-2019 is 13,479,000 NTD (approx. 391,191 Euro) & 14,562,000 NTD (approx. 422,622 Euro).

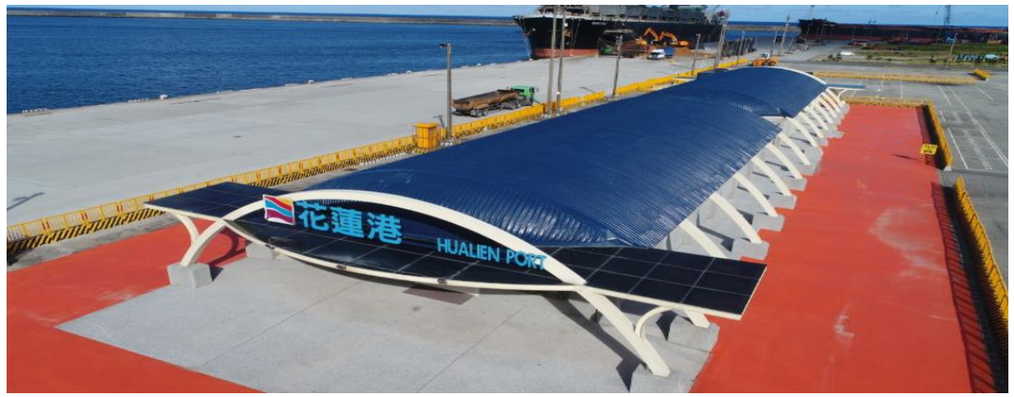
The cost in each category are as follows

- ✓ **Staff: Cost for environment-related staff and training.**
- ✓ **Environmental maintenance and management: Port greening and beautification, waste disposal, and dredging.**
- ✓ **Environmental monitoring: Environmental monitoring and inspection of air, noise, water quality, sediments, and dredging.**
- ✓ **Emergency response: Charges for handling accidents, materials for pollution in the port, and charges for testing dangerous goods.**
- ✓ **Communication and publications: Website maintenance, promotional activities, and environmental publications.**

***Total Expenditures on Environmental Issues Made by the Port of Hualien, TIPC in 2018-2019**

(Unit: Thousand in NTD)

Cost items	2018	2019
Staff(environment training)	6,466	7,082
Environmental maintenance and management	4,300	4,293
Environmental monitoring	2,303	2,557
Emergency response	250	250
Communication and publications	160	380
Total	13,479	14,562



Environmental Assets

The Hualien Branch of TIPC has launched a series of port development projects to improve the efficient use of property by the Port of Hualien, promote local economic prosperity, and develop the port into an eco-friendly green port capable of energy conservation and carbon reduction. Several projects concern environmental aspects. For example, the infrastructure of the terminal in the Port of Hualien has been built to increase public access to the port. Moreover, a monitoring system has been established at the security check point and harbor power, lighting, and water supply equipment has been installed, and updated to increase operational effectiveness and reduce possible pollution caused by construction projects.Cost invested by the investments of the Hualien Branch of TIPC in the Environmental aspects in 2018-2019 is 86,026 thousand NTD & 108,994 thousand NTD, which is approximately €2,555,734 and €3,238,087, respectively.

***Environmentally-related Fixed Asset Expenditures in 2018**

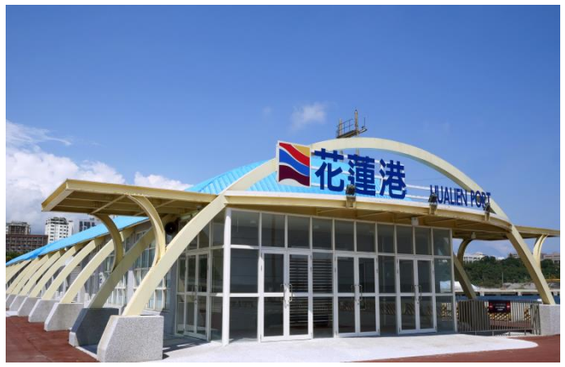
(Unit: Thousand in NTD)

Items	Land Improvements	Houses and Buildings	Machinery and Equipment	Transportation Equipment	Other Equipment	Total
General Construction and Equipment Purchase Project	65,000	18,000	2,000	690	336	86,026
Total	65,000	18,000	2,000	690	336	86,026

*** Environmentally-related Fixed Asset Expenditures in 2019**

(Unit: Thousand in NTD)

Items	Land Improvements	Houses and Buildings	Machinery and Equipment	Transportation Equipment	Other Equipment	Total
General Construction and Equipment Purchase Project	107,000	0	474	1,020	500	108,994
Total	107,000	0	474	1,020	500	108,994



Cruise terminal

Water recreation Merchants

09/

Green Accounting

Improvement Recommendations

10/

To protect marine environment and facilitate sustainable development, the Hualien Branch of TIPC is committed to protecting port environment, conserving resources and the ecology, and continuously implementing on-site inspection to ensure favorable air quality in the port. These actions are taken according to the environmental protection policies of the Environmental Protection Administration and the Ministry of Transportation and Communications, as well as the TIPC's goal and implementation plan of promoting green ports in Taiwan.

The Hualien Branch of TIPC will actively develop the cruise economy and tourism, obtain the EcoPorts certification issued by the European Sea Ports Organization, and become both a green and a tourist port to achieve both the goals of economic development and environmental protection.