

Port of Anping Environmental Report

▶ 2017



Port of Anping Environmental Report

Environmental Report Work Team

Kaohsiung Branch, TIPC., Ltd.: President ShaoLiang Chen, Harbor Master RungTsung Chen,
Junior Technician YiWen Chen
Anping Port Branch Office, Port of Kaohsiung, TIPC, Ltd.: Senior Director ChanJung Chang,
Manager YuanFeng Lin, Senior Clerk ChiaRuei Chou

Advised by Taiwan International Port Corporation, Ltd. Senior Director WeiChien Chang,
Supervisor ShuHui Tsai

Chief Editor: RungTsung Chen
Executive Editor: ChanJung Chang
Layout Design: ChiaRuei Chou
Examine & Revise: YuanFeng Lin, ChiaRuei Chou, YiWen Chen
Publishers: Taiwan International Ports Corporation, Ltd.
Address: No.25, Xingang Rd., South Dist., Tainan City 702, Taiwan (R.O.C.)
Tel : +886-6-2614404

This environmental report presents Anping Port's achievements in environmental protection from 2015 to 2016 as well as the environmental policy, commitments and action plans of the Anping Port Branch Office, Port of Kaohsiung, Taiwan International Ports Corporation, Ltd.

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

Anping Port Branch Office, Port of Kaohsiung, TIPC.
No.25, Xingang Rd., South Dist., Tainan City 702

E-mail: khh-4100@twport.com.tw
Website: <http://kh.twport.com.tw/chinese/>





CONTENTS

TIPC Environmental Policy / 01

Port of Kaohsiung Environmental Policy/ 02

Anping Port Branch Office Environmental Objectives/03

Message from TIPC / 04

Port Profile / 09

Environmental Management / 15

State of the Environment / 21

Emergency response / 41

Innovation and Cooperation/ 47

Training / 55

Communication and Publication / 59

Green Accounting / 63

Improvement Recommendations / 67



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
Chairman of TIPC

Date: 2016/11/2

Tien-Kuei Kuo
President of TIPC

Date: 2016/11/1

Port of Kaohsiung, Taiwan International Ports Corporation Environmental Policy

The Kaohsiung Branch of the Taiwan International Ports Corporation (TIPC) understands its role as a port management entity responsible for maintaining and improving the port environment. Additionally, we ought to consider environmental protection as a part of sustainable management. Therefore, we are committed to reducing environmental impacts resulting from port operations, as well as to providing an environmentally friendly, sustainable, and progressive port of high quality. To ensure that the port environmental performance is consistent with its environmental policy, the following principles will be implemented:

- Fully apply the environmental management system; promote sustainable development of the green port
- Follow environmental laws and regulations; endeavor to fulfill corporate social responsibility initiatives
- Provide appropriate environmental education and training; enhance the environmental awareness and skills of our employees
- Continue environmental monitoring and pollution control; reduce energy consumption, carbon emissions, and environmental load
- Disclose environmental information regularly; establish a bridge of communication between the inner and outer port
- Encourage adjacent communities to participate in creating a friendly environment in the port city

The environmental policy will be effectively conveyed to employees, shipping companies, lessees (or contractors), and residents of adjacent communities. The policy is available on the official website of the Kaohsiung Branch of the TIPC.

Chen Shao Liang

President of Port of Kaohsiung, TIPC

Date: 2017. 7. 20

Environmental Objectives

To achieve our commitments in environmental policy, the following environmental objectives are set according to the ten major environmental impacts from the port:

- **Improve Port Water Quality:**
Plan a waste water runoff treatment system for the port area and monitor the long-term water quality of the port area
- **Improve Air Quality:**
Monitor air quality in the port area; perform environmental inspections of the port area and environmentally friendly strategies to implement on ships
- **Prevent Dust in the Port Area:**
Enforce stricter port area operational measures for effective dust control
- **Reduce Port-generated Waste:**
Avoid unnecessary resource waste through the appropriate disposal of waste and implement the recycling and reuse of resources
- **Reduce Marine Sediment Pollution:**
Periodically dredge the waterways to reduce sediment pollution in port water areas
- **Reduction of Noise within the Port Area:**
Monitor noise in the port area and increase control over operational and transportation noise
- **Strengthen Hazardous Cargo Management:**
Improve the management of dangerous goods and strengthen port safety
- **Improve the Management of Vessel Sewage Discharge:**
Effectively control and manage the flow of waste oil and sewage discharged by ships
- **Appropriate Disposal of Dredged sediment:**
Effectively use recycled sediment as materials for land filling
- **Abate Ship Emissions :**
Promote vessel speed reductions and a shore power system and reduce exhaust emissions from ships

The President of the Kaohsiung Branch of TIPC is responsible for implementing, upholding, and communicating the environmental policy, and for reviewing the environmental policy annually to meet commitments, make continuous improvements, and achieve environmental objectives.

Chen Shao Liang

President of Port of Kaohsiung, TIPC

Date: 2017. 7. 20

Message from TIPC

01/

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.

Meng-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

President
Taiwan International Ports Corporation, Ltd

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

The gradually growing awareness at major ports around the globe that port development and environmental protection are inseparable has created a trend of port development that focuses on environmental sustainability. Advanced countries have focused on combining the concepts of green operations and sustainability with port management. With port development aims of achieving low pollution, low energy consumption, environmental restoration, and combined benefits for the surrounding communities while sustaining economic benefits, focuses have been placed on designing suitable port plans, production operations, and protective measures of the surrounding environment.

As one of Taiwan's seven major international ports, Anping Port plays a crucial role in the development of the shipping industry. Since its conversion to a government-owned entity in 2012, the Anping Port Branch Office of the Port of Kaohsiung, Taiwan International Ports Corporation has continued to promote the development of the trade and commercial port tourism industries and pursue increased economic benefits from the port and harbor, to uphold its responsibility as a port management unit to maintain and improve the port environment. The Office is committed to including environmental protection as an integral part of sustainable port management, minimizing the impact of port operations on the environment, and progressing towards our goal of becoming a green port. In 2016, Anping Port earned recognition as an international EcoPort. Anping Port will continue to promote green port oriented measures to achieve a balance between the ecosystem, port-city development, and port operating interests.

Chen Shao Liang

President of Port of Kaohsiung
Taiwan International Ports Corporation, Ltd

Port Profile

02/

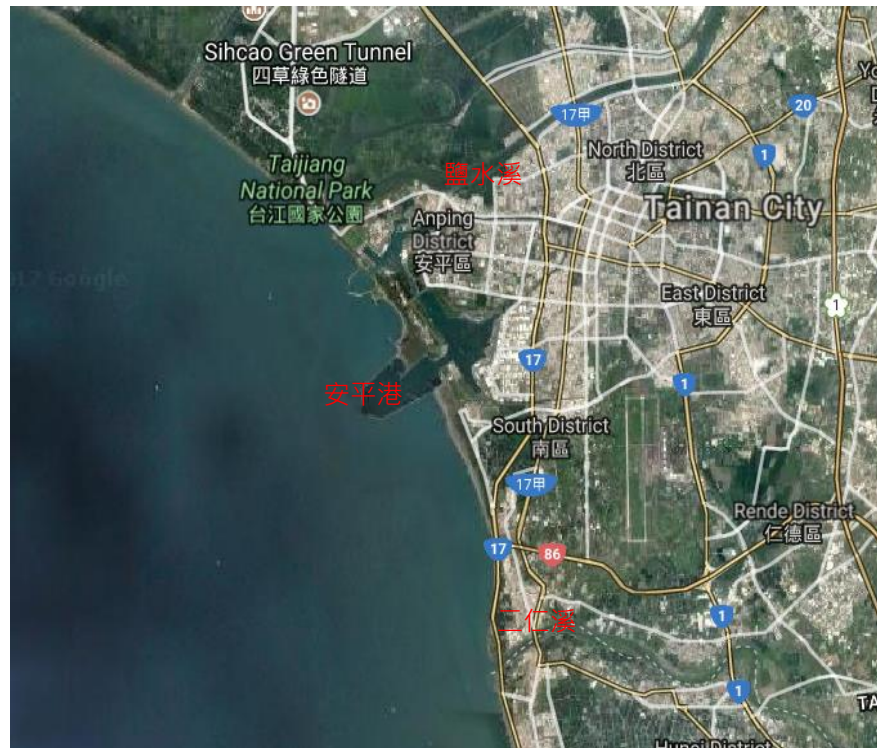


2.1 Port Location and Port Area

The Port of Anping is located on the southwest coast of Taiwan (22°59' north latitude and 120°09' East longitude). The total area of the port district is about 18.21 square kilometers. Its land area is 2.11 square kilometers, interior water area is 2.77 square kilometers and the water area outside the port is 13.33 square kilometers. The port is 180 meters wide, its main channel depth is 12 meters, and the mean tidal range is 0.57 meters.

Anping Port is located in Tainan on the southwest coast of Taiwan between the Erren and Yanshui Rivers, about 40 kilometers north of the Port of Kaohsiung and 140 kilometers south of Taichung

Port. During the Qing dynasty, Anping Port was the gateway to Tainan Prefecture, then Taiwan's main urban center, and as such was the largest port in Taiwan at the time. However, longshore drift resulted in the silting in of the port and led to its decline. In 1997, the Ministry of Transportation and Communications designated Anping Port as an auxiliary port to the Port of Kaohsiung in an effort to promote local economic development. Anping Port functions as an international commercial port, and international merchant ships can operate here.

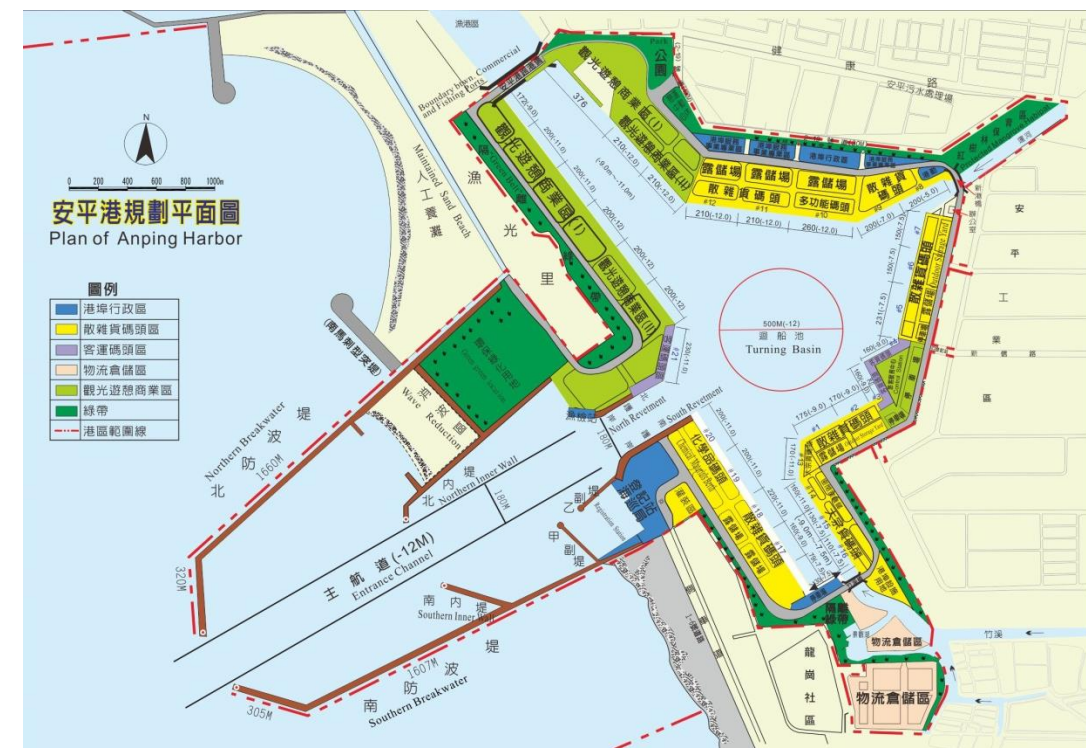


Geographical Map of Anping Port

2.2 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 Kaohsiung is now the responsibility of the Kaohsiung Branch of TIPC. The Southern Taiwan Service Center of Maritime and Port Bureau (MPB), Ministry of Transportation and Communications (MOTC) will be in charge of navigation and management of issues related to public authority.



MASTER PLAN OF PORT OF ANPING

2.3 Commercial Activities 2.4 Main Cargoes

Anping Port offers 17 docks, 2 of which are designated as chemical product dockage for Chi Mei Corporation (CMC). The total length of the docks is 3,196 meters. Their types include breakbulk and sundry goods docks, passenger and goods docks, chemical products, bulk cargo docks, and port service docks.

The main inbound cargos in 2015 were chemical or related industrial products(81.72%) and mineral products(17.32%). Outbound cargos were mainly chemical or related industrial products (100%).In 2016 were chemical or related industrial products(64.83%) and mineral products(17.42%).Outbound cargos were mainly chemical or related industrial products (97.41%) and animal or vegetable fats and oils and their byproducts(2.59%).

Main Cargoes of Port of Anping

| | |
|-----------------------|-----------|
| Pyrites minerals | Dry bulk |
| Aluminium, Cement | Chemicals |
| Liquid bulk (non-oil) | Ores |
| Liquid chemicals | Coal |
| Other | |
| Vehicle, Fish, Fruit | |

Source: Anping Port Branch Office

2.5 Port Business

2015-2016 Anping Port business statistics

| Item | | 2015 | 2016 | Difference | % |
|---------------------------------|--------------------------------------|-----------|-----------|------------|--------|
| Incoming and Outgoing Ships | Vessels | 733 | 988 | 255 | 34.79% |
| | Gross ton | 5,437,040 | 6,789,331 | 1,352,291 | 24.87% |
| Volume of Cargo Handled | Dry bulk and groceries (Revenue ton) | 170,495 | 309,653 | 139,158 | 81.62% |
| | Pipeline cargo (Revenue ton) | 992,654 | 1,116,884 | 124,230 | 12.51% |
| | Total (Revenue ton) | 1,163,149 | 1,426,537 | 263,388 | 22.64% |
| Volume of Imports & Exports | Imports (ton) | 496,709 | 698,714 | 202,005 | 40.67% |
| | Exports (ton) | 121,519 | 114,304 | -7,215 | -5.94% |
| | Domestic(ton) | 478,407 | 624,878 | 146,471 | 30.62% |
| | Total(ton) | 1,096,635 | 1,437,896 | 341,261 | 31.12% |
| Incoming and Outgoing Passenger | Domestic line (number) | 0 | 3,054 | 3,054 | - |
| | International line (number) | 0 | 0 | 0 | 0.00% |
| | Total(number) | 0 | 3,054 | 3,054 | - |

Source: Annual Statistical Report, TIPC, 2015-2016

*Environmental
Management*

03/



3.2.1 Relevant International Regulations

Anping Port Branch Office follows relevant international specifications, such as International Convention for the Prevention of Pollution From Ships (MARPOL73/78),

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.

3.2.2 Relevant Environmental Laws and Regulations in Taiwan

The Anping Port Branch Office collaborates with local authorities to manage the environment in the

Port in compliance with relevant environmental laws and regulations in Taiwan.

| Competent Authorities | 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 | South Maritime affairs center- Anping MPD |
| | The Law Of Ships | 2010/12/08 | | |
| | Act for the Establishment and Management of Free Trade Zones | 2012/12/28 | | |
| Sectors in the Ministry of the Interior | Fire Services Act | 2011/12/21 | Ministry of the Interior | Fire Bureau, Tainan City Government |
| Sectors related to agricultural | Wildlife Conservation Act | 2013/01/23 | Council of Agriculture | Agriculture Bureau, Tainan City Government |
| Sectors related to environmental protection | Marine Pollution Control Act | 2014/06/04 | Environmental Protection Administration | Environment Protection Bureau of Tainan City ,Government |
| | 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 Act | 2011/11/23 | | |
| | Toxic Chemical Substances Control Act | 2013/12/11 | | |
| | Soil and Groundwater Pollution Remediation Act | 2010/02/03 | | |
| | Greenhouse Gas Reduction and Management Act | 2015/07/01 | | |
| | Tainan City Self-Government Ordinance for Environmental Cleaning | 2012/09/13 | | |
| Tainan City Self-Government Ordinance for a Low-Carbon City | 2017/04/17 | | | |
| | Public Nuisance Dispute Mediation Ac | 2009/06/17 | | Public Nuisance Disputes Mediation Committee, Tainan City Government |
| Intersectoral | Disaster Prevention and Protection Act | 2016/04/13 | Ministry of the Interior | Tainan City Government |



*State of the
Environment*

04/



Enhance Port Water Quality

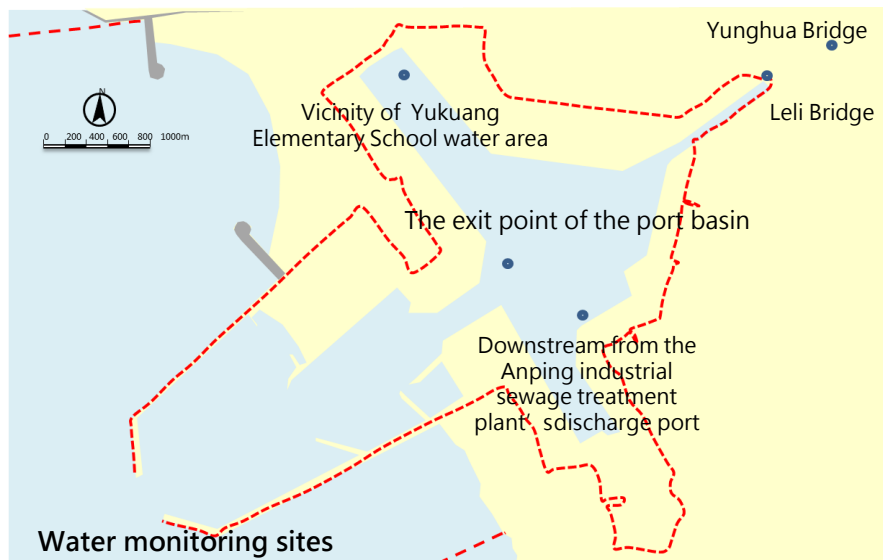
The Anping Port Branch Office has committed to facilitating the establishment of rainwater treatment facilities. The port completed construction on the port district wastewater end-stage processing facility in 2005. Its wastewater processing capacity was certified by the Tainan City Government's EPB as having a daily maximum processing capacity of 80 m³. It can

effectively process domestic wastewater in the port district and prevent pollution from incidental wastewater discharge. Anping Port is currently working towards its goal of separating surface rainwater runoff and wastewater runoff into two different systems. It hopes to effectively reduce the generation of runoff wastewater pollution in the wharf area through the construction of a dedicated drainage system.

Water Quality Monitoring

The Anping Port area currently provides 5 water quality monitoring stations, at Yukuang Elementary School, Leli Bridge, Yunghua Bridge, the exit point of the port basin, and downstream from the Anping industrial sewage treatment plant's discharge port. Inspection items include water temperature, pH, dissolved oxygen, and E. coli. Sea water quality is monitored

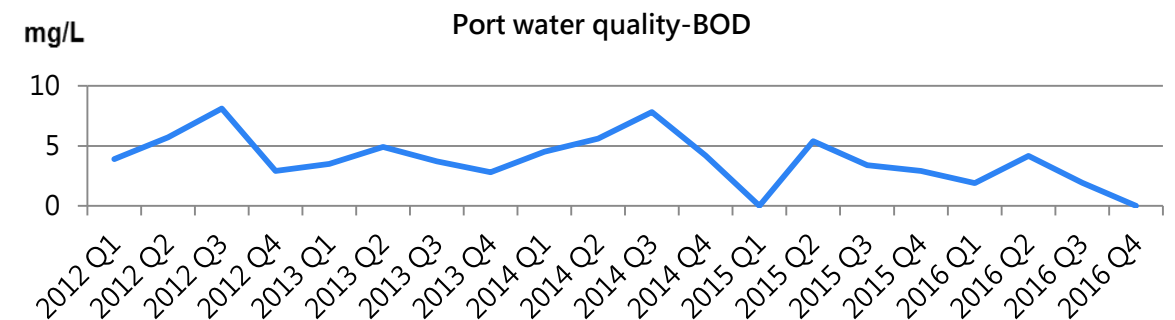
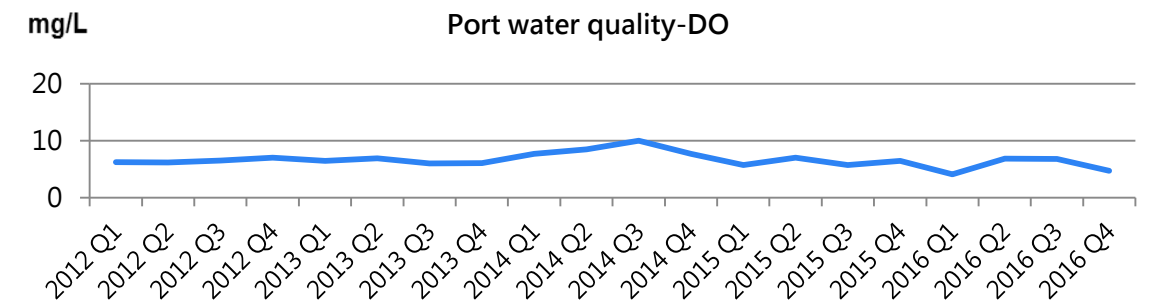
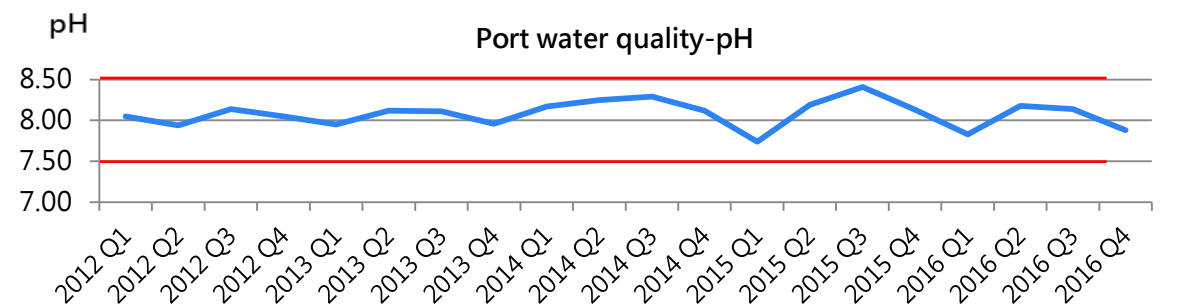
seasonally, and the data indicate that all water quality indicators in the port area meet regulatory standards. Follow-up planning for Anping commercial port area wastewater: Domestic waste from the passenger service center and office buildings is piped to the wastewater treatment station at each terminal for treatment and discharged when it meets discharge standards.



>> Records of 2015, 2016 Anping Port Water Quality

| Indicators | Standards | Measurements | Pass rate(%) |
|-------------------------|-----------|--------------|--------------|
| pH | 7.5~8.5 | 7.9~8.3 | 100 |
| DO(mg/L) | ≥2.0 | 4.1~6.7 | 100 |
| BOD ₅ (mg/L) | ≤6.0 | ≤4.1 | 100 |

Note : Environmental quality standards for class III marine water bodies are referenced when examining the port's water quality



Improve the Management of Vessel Sewage Discharge

Vessel waste oil and wastewater cleanup businesses must apply and present the relevant documentation before they can conduct vessel waste oil and wastewater collection within the port.

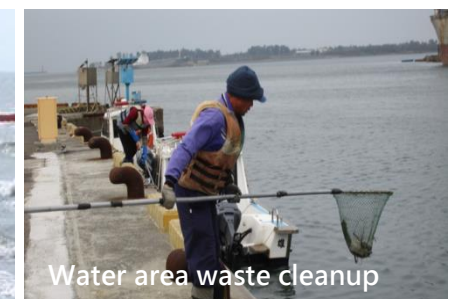
Certified businesses must report the amount processed each month. Statistics show that 50.4 tons of vessel waste oil and wastewater was cleaned up in Anping Port in 2015, and 21.01 tons in 2016.



Pipes for reuse water



Water quality sampling



Water area waste cleanup

Air Quality

Major sources of air pollution in Anping Port Branch Office are emissions from the burning of marine fuel oils onboard ships within the port area, port operators' vehicle and loading equipment exhaust emissions, including NO_x , SO_2 and $\text{PM}_{2.5}$ and so on.

Anping Port Industrial District and the Ssu Kun Shen Checkpoint have a total of 8 entry and exit lanes, four of which are automatic gates. Vehicles passed through the gates 143,384 times in 2015 and 178,300 times in 2016.



Air Quality Monitoring

The Anping Port area currently has 4 fixed-site air quality monitoring sites, including the visitor center, Hsinkang bridge, Yitsai Elementary School, Yukuang Branch School, and Lungkang Community.



The idling and waiting time for vehicles entering and exiting the gates has been reduced and the port has increased the efficiency of its entry and exit process, aiding in the reduction of carbon emissions.

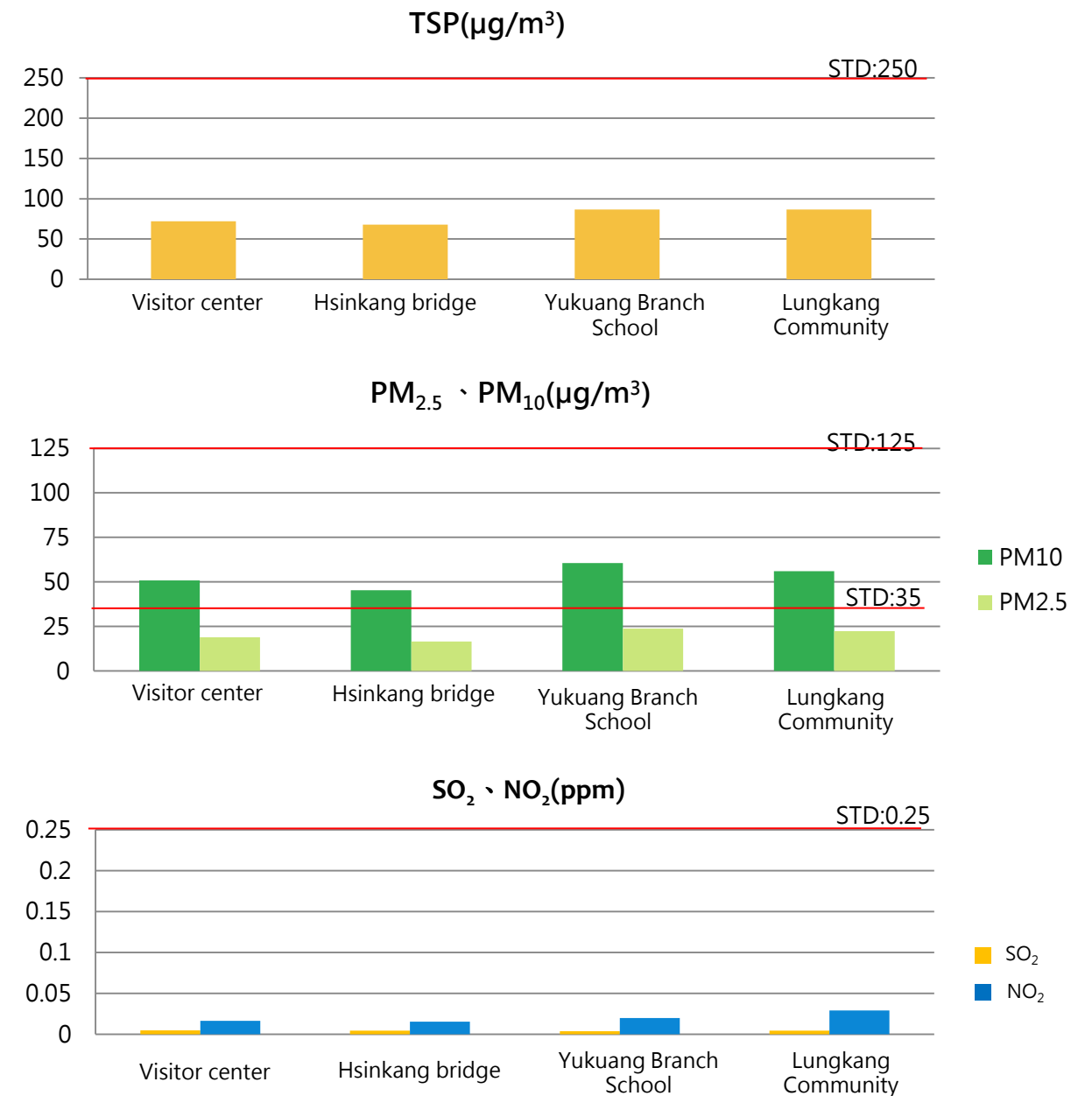
Anping Port joined the Tainan City Government EPB in establishing a clean air zone on January 1st, 2016. After a long period of advocacy and inspections, 237 out of 343 registered vehicles had already obtained the inspection-free label. The rate of vehicles obtaining the label is 69.1%.



Monitoring for Total Suspended Particles (TSP), PM_{10} , $\text{PM}_{2.5}$, SO_2 and ozone is performed once per season. All data resulting from air quality monitoring in 2016 met air quality standards.

Results

| Pollutant (Unit) | TSP ($\mu\text{g} / \text{m}^3$) | PM_{10} ($\mu\text{g} / \text{m}^3$) | $\text{PM}_{2.5}$ ($\mu\text{g} / \text{m}^3$) | SO_2 (ppm) | NO_2 (ppm) |
|------------------|------------------------------------|---|--|---------------------|---------------------|
| Averaging Time | 24 hours | 24 hours | 24 hours | 1hour | 1hour |
| Standards | 250 | 125 | 35 | 0.25 | 0.25 |



Shore-side Power Supply



Shore power system

The port area is currently equipped with 7 electrical facilities that are used by ferries, tugboats, and private yachts.

Dust Pollution Reduction

Dust in the Port of Anping is mainly derived from stevedoring operations at bulk and general cargo terminals as well as from wind erosion and vehicle-based road emission.

In terms of dust reduction, the Anping cement loading dock and coal unloading facility have adopted enclosed warehouses, not only increasing the efficiency of ship unloading operations but also fully reducing the dispersion of particulate matter pollutants during the unloading process.

The dock is equipped with 4 vehicle washing stations. Bodies and tires of transport vehicles must be sprayed and cleaned of fugitive particulate matter before permission to exit can be granted.

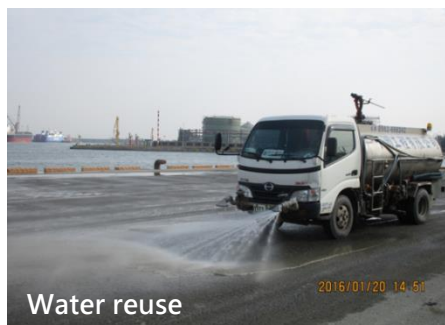
The Tainan City Government Water Resources Recycling Center has a reclaimed water intake port installed at Anping's commercial port for irrigating trees within the port area or cleaning ground surfaces and suppressing airborne dust caused by port operations. The total capacity of the reclaimed water used at Anping Port was approximately 7,606 tons in 2015 and 4,748 tons in 2016.



Reuse water intake location



#31wheel washes



Water reuse

Fully-automatic coal unloading enclosed warehouse

The enclosed warehouse at Dock No. 29 and No.30 has effectively reduced dust generated during coal stevedoring. From 2015 to 2016, a total of 67,347 tons of coal had been unloaded from these docks. The maximum capacity of the

enclosed warehouse is approximately 800 tons per hour. This is more efficient than traditional grapple operations, which has a coal unloading capacity of 600 tons per hour.



#29,30Enclosed warehouse



Automatic coal unloader

Mobile Pollution Source Control

Vehicles traveling on land in the Port of Anping are another source of air pollution. The Anping Port Branch Office and the Tainan City Government's EPB have collaborated to promote air quality purification advocacy and inspections since January 1, 2016 and Anping Port has officially been designated an air quality purification area; the port has also required Chi Mei Corporation's outsourced chemical tankers and EGC Cement Corporation's transport vehicles within the port area to carry out self-management.

Between January 1 and December 15, 2016, 17 advocacy and inspection tasks were performed at the Ssu Kun Shen Checkpoint and the main entrance on Xinxing Road. Inspections of 249 vehicles were completed; only 2 vehicles failed inspection. These inspections ensured that vehicle emissions in the Anping Port clean zone are below the vehicles' factory regulatory standards, thereby minimizing vehicle exhaust pollution in the clean zone.



Billboard of the clean air zone



Vessel Speed Reduction

To reduce pollution caused by shipping, Anping Port completed the setup of the AIS ship deceleration verification system in 2015 to control the records of ship speeds for ships entering and exiting the port. In port affairs discussion forums, ocean carriers, shipping agencies, and the relevant port operators are advised to reduce ship speeds to 12 knots within 20 nautical miles of port entry or exit to cooperate in implementing air pollution control measures. In 2016 the port, achieving approximately a 72% deceleration rate. The total speed reduction was equivalent to an estimated reduction of 1,153 tons of carbon dioxide emissions per year.



The AIS for ship deceleration

Resource Consumption

Waste generation and treatment

Regarding onshore waste in the Anping Port area, the port district set up recycling bins for vessels to recycle and prevent garbage from being scattered on the wharf and falling into the dock basin. In 2015, the onshore area of Anping Port generated 88.3 tons of garbage and recycled 12.6 tons, for a recycling rate of 14.3%. In 2016, it generated 92.3 tons

of garbage and recycled 11.7 tons, for a recycling rate of 12.7%, still above the target recycling rate of 10%. The future goal is to increase the general garbage recycling rate to 15% to reduce the amount of garbage and increase the amount of recycled materials.

>> Collection amount of ship oily wastewater

| Year | Vessel | Oily wastewater (ton) |
|------|--------|-----------------------|
| 2015 | 1 | 50.40 |
| 2016 | 1 | 21.01 |



>> Waste recycle & disposal amount at the Port of Anping

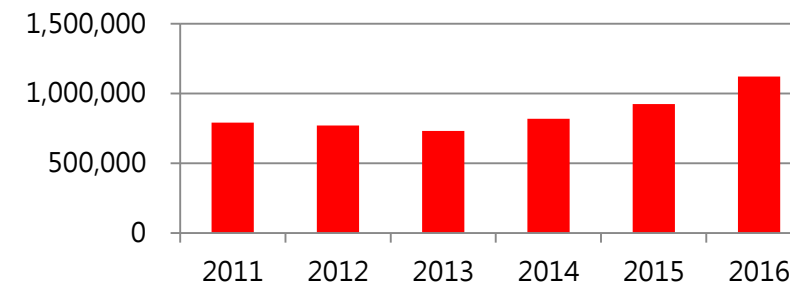
| Item | 2015 | 2016 |
|-----------------------------|------|------|
| Total waste generation(ton) | 88.3 | 92.3 |
| Recycle (ton) | 12.6 | 11.7 |
| Recycle Rate (%) | 14.3 | 12.7 |



The Four-Saving Project

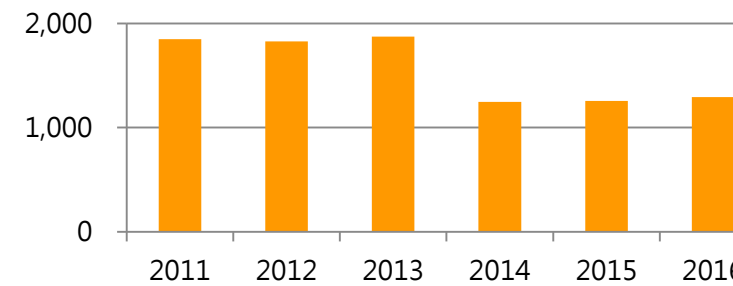
The Port of Anping applies the Four-Saving Project with the goals of annual power, fuel, water and paper consumption reduction to decrease resource consumption and waste production of the port .

Electricity Usage(kwh)



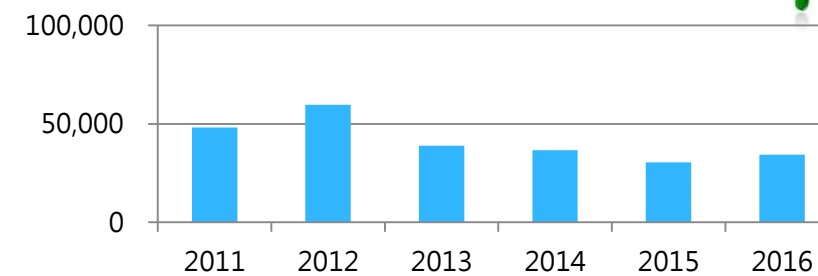
The electricity usage increases with the electricity demand.

Fuel Usage(L)



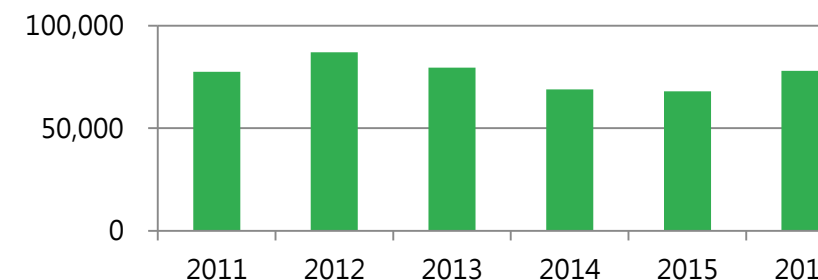
To reduce fuel consumption, old two-stroke motorcycles and scooters within the port area are viewed as replacement targets. Replacing these aging motor vehicles can not only save on fuel consumption, it also reduces vehicle emissions, thus reducing air pollution.

Water Usage(m³)



The port's reduced water consumption can primarily be attributed to increasing public awareness of the need for water conservation. Additionally, the port coordinates with Tainan City's nearby Anping water resource recycling center in waste water treatment and recycling operations. By using reclaimed water for plant irrigation and vehicle washing stations, Anping Port saves an average of 5% on its tap water usage per year.

Paper Usage(Sheet)



Recent increases in the frequency of meetings means that paper use saw a slight increase in 2015 due to advancements in administrative operations.. However, usage declined again in 2016 thanks to the implementation of a carbon inventory.



Noise

The Port of Anping is adjacent to urban areas and next to the industrial district. Consequently, the industrial activities and cargo transport in and nearby the port,

as well as the noise caused by port construction, tend to affect nearby residents' quality of life. Noise pollution is a public environmental concern as well.

Improvement Strategy

Anping Port constructed a sixty meter wide green belt and thirty meter wide Harbor road, with a total length of 1,500 meters. The road forms a nearly ninety meter wide buffer zone separating the port from the neighboring community. The Anping Port Branch Office has formulated a transportation route for large vehicles that takes them from the harbor road in the port

through the Ssu Kun Shen Checkpoint to the community outer ring road, and thence towards the West Coast Expressway. The route reduces crossover between port district and resident traffic, maintains pedestrian and vehicle safety, and greatly reduces port district noise impacts on the neighboring community.

Noise Monitoring

The Anping Port commercial port area observes noise control standards for type 4 control areas next to roads measuring at least 8 m. The port laid out 4 noise monitoring points, at Hsinkang bridge, the Anping industrial area control

station, and Lungkang Community to monitor nearby sensitive receptor zones, port traffic arteries, and loading areas. Environmental quality monitoring results in 2015 and 2016 show that 100% compliance with the port's noise control standards was achieved.

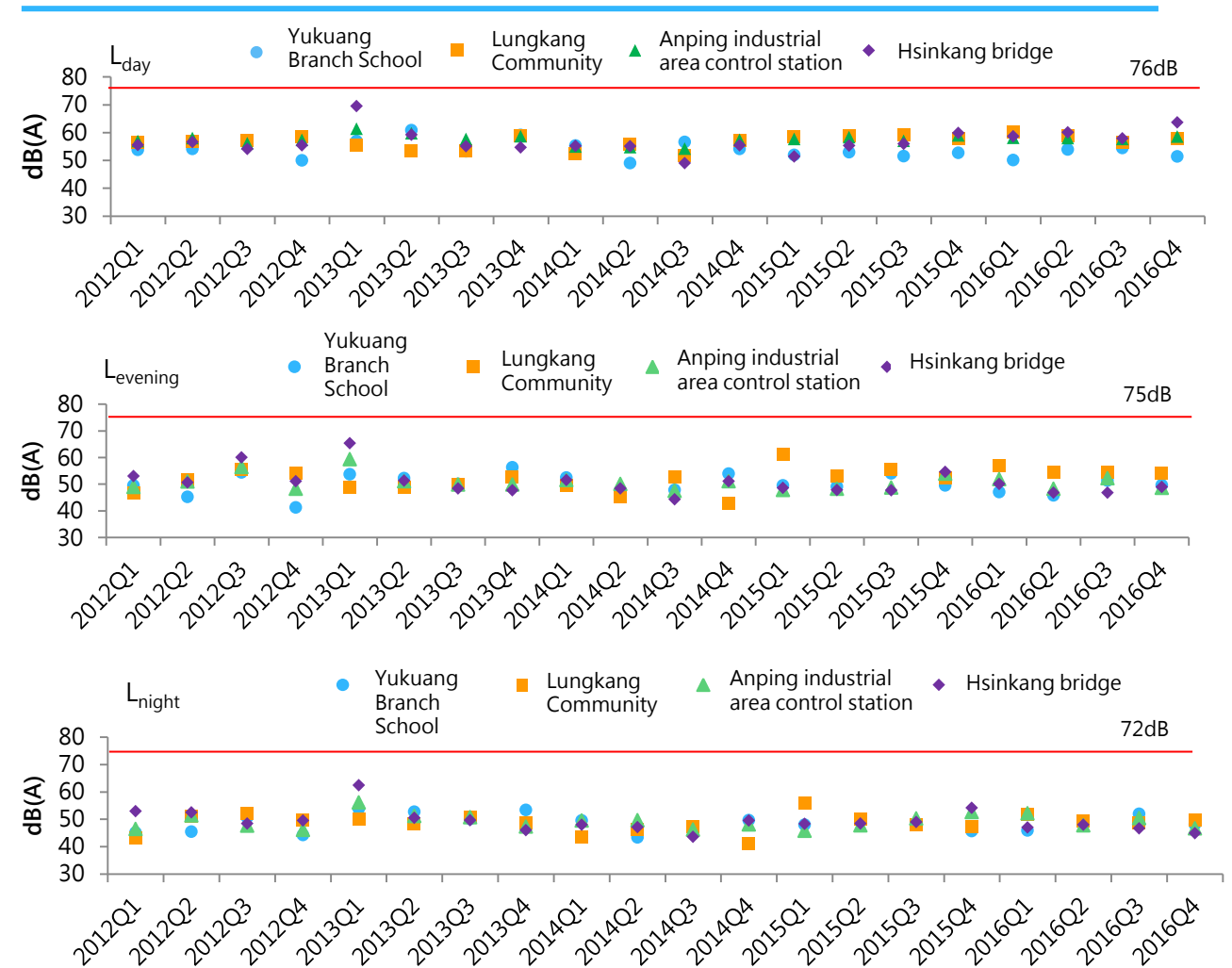
| Time period | Day Level | Evening Level | Night Level |
|--|-----------|---------------|-------------|
| Road Category D Noise Control Criteria : dB(A) | 75 | 70 | 65 |
| Next to roads that are wider than 8 m | 76 | 75 | 72 |



Noise monitoring



Green buffer



Strengthen Hazardous Cargo Management

Chemical storage and transportation businesses within Anping Port could potentially be the source of a large number of environmental hazards. Leakages would pose grave dangers, both to the ecosystem and to neighboring residents. Therefore, Anping Port conducts routine monthly inspections, biannual port district safety joint oversight operations, and quarterly port facility security drills (ISPS) in accordance with commercial port law, the regulations for port services at commercial ports, the Toxic Chemical Substances

Control Act, the Occupational Safety and Health Act, regulations for vessels carrying dangerous goods, and the International Maritime Dangerous Goods Code. All port authority units at Anping Port District are self-managed and have corresponding emergency response plans. Government agencies and private businesses conducted a joint national toxic chemical spill disaster response drill at Anping Port in 2016 to strengthen their emergency response capabilities in the event of an accident.

In accordance to current regulations, the Anping Port Branch Office stipulates a set of operating procedures for a variety of dangerous cargo. Anping Port conducts at least 48 inspections of loading processes each year to ensure and maintain proper handling of dangerous cargo in the port area. Additionally, the Anping Port Branch Office communicates with each unit from time to time to increase the

response capabilities of relevant units in the event of cargo leak emergencies. Moreover, at least 4 port area emergency drills are planned per year. In 2015, 4 ISPS drills and 1 ocean pollution drill (for a total of 5 drills) were carried out. In 2016, 4 ISPS drills, 1 ocean pollution drill, and 1 toxic disaster drill (for a total of 6 drills) were carried out.

>>Inspections and Drills Conducted in 2015-2016

| Year | 2015 | 2016 |
|--------------------------|------|------|
| Inspections | 20 | 28 |
| Drills | 5 | 6 |
| Cross Agency Inspections | 2 | 2 |

The petrochemical and chemical storage and transportation industries within Anping Port are businesses with potential for considerably high-risk environmental hazards. In the event of emergencies, spills or leakages could endanger the ecosystem and neighboring residents. Therefore, the implementation of cargo

management and reinforcement of port safety is viewed as a major environmental issue at Anping Port. For their part, all business operations must have corresponding emergency response plans and periodically organize disaster drills, while also cooperating in joint port drills to strengthen emergency response capabilities in case of accidents.



Cargo Vehicle Inspection



Safety Check



Inspection of vessel pollution control certification (including air, water, and waste oil)



Drills(ISPS)



Greenhouse Gas Emissions

Carbon Emissions from Ships

The Taiwan air pollution emission [TEDS 8.1] line source manual calculation formula was adopted to estimate carbon emissions by ocean-going vessels:

Note:
 Fuel consumption amount (L) = Cargo throughput (L) × Energy density (L/tonne kilometer) × Harbor travel distance (km) × 1000 (kg/metric ton)

A ship entering the harbor may switch to marine diesel oil, the properties of which are similar to those of regular diesel fuel. Therefore, the 2015 diesel fuel carbon emission factor in the EPA carbon factor database is used as a reference for the emission factor.

$$\text{Ocean-going ship carbon emissions (KgCO}_{2e}\text{)} = \text{Fuel consumption amount (L)} \times \text{Emission factor (KgCO}_{2e}\text{/L)} \times \text{Control factor}$$

>> 2015-2016 Ocean-Going Ship Carbon Emissions in Anping Port

| Year | Total Cargo Throughput (tonne) | Energy Density (L/tonne-km) | Harbor Travel Distance (km) | Fuel Consumption (L) | Emissions Factor (kgCO _{2e} /L) | Carbon Emissions (tonne) |
|------|--------------------------------|-----------------------------|-----------------------------|----------------------|--|--------------------------|
| 2015 | 1,096,635 | 0.003 | 12 | 39,478,860 | 2.65 | 104,619 |
| 2016 | 1,437,896 | 0.003 | 12 | 51,764,256 | 2.65 | 137,175 |

>> Carbon Emissions from Resource Consumption

| Resource | 2015 | | 2016 | |
|-------------|-----------------------------|--------------------------|-----------------------------|--------------------------|
| | Amount of Resource Consumed | Carbon Emissions (tonne) | Amount of Resource Consumed | Carbon Emissions (tonne) |
| Electricity | 925,668 | 490 | 1,120,947 | 593 |
| Water | 30,426 | 4.7 | 34,331 | 5.3 |
| Paper | 68,000 | 0.38 | 78,000 | 0.44 |
| Fuel | 1,255.72 | 2.96 | 1,293.93 | 3.05 |
| Total | | 498 | - | 602 |

Pollution Reduction in Marine Sediments

The Anping Branch Office conducts sediment monitoring operations in the port district each quarter. Results show that heavy metal concentrations in sediments at the port's monitoring stations are clearly higher than those at monitoring stations outside the port. Sediment monitoring in the area outside of the port has generally resulted in lower values in recent years and accords with sediment quality standards. Regarding excessive heavy metal concentrations in sediments in the

Anping Port District, the Anping Branch Office conducts periodic dredging of port district channels. It also requests the Tainan City Government's EPB and Water Resources Bureau to conduct sectional monitoring and dredging of rivers in accordance with the River and Ocean Pollution Prevention and Control Unit Meeting Platform and the specifications of the Sediment Quality Indicator's Classification, Management, and Usage Restrictions.

Appropriate Disposal of Dredged Sediment

To pursue greater efficiency in the utilization of resources, Anping Port maintains a balance between dredging and reclamation in the port area by recycling the sediments excavated in channel dredging operations to use as backfill in construction work at the Port of Kaohsiung. To ensure navigational safety of ships in the port channel, channel dredging operations are periodically carried out every year. In 2013 and 2014, Anping Port decided on pseudo-solidification of a portion of the sediments dredged from the nearby channel. Other portions of the sediments

were moved to the breakwater next to Anping Port's northern seawall for beach maintenance. The amount of soils dredged in Anping Port in 2016 came to 1,098,400 tons. To meet its resource utilization efficiency target, Anping Port recycled sediments from channel dredging and shipped them to the Port of Kaohsiung for site expansion and filling. The 100% backfilling rate accords with the disposal principles of the London Marine Dumping Convention.



#30 dredging



Marina dredging

Environmental Performance Indicators of Anping Port

| Significant environmental issues | Index item | Calculation method | Target value | Indicator presentation (calculation details) | |
|----------------------------------|--|---|--|--|--|
| | | | | 2015 | 2016 |
| Water Quality | Marine water quality pass rate (pH, DO, BOD5, TP, 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, cyanide, metal oils, and BOD ₅ measurements satisfy the criteria | Marine water quality criteria for Category C pH 100% DO 100% BOD5 100% Cyanide 100% Phenols 100% (1+1)÷2×100%=100% | Marine water quality criteria for Category C pH 100% DO 100% BOD5 100% Cyanide 100% Phenols 75% (1+1)÷2×100%=100% |
| | Ratio of the regulated businesses or wastewater (sewage) treatment permits in the port obtained approval for their water pollution prevention plans. | Number of regulated businesses or wastewater (sewage) treatment permits in the port that have obtained approval for their water pollution prevention plans ÷ Total number of businesses producing wastewater (sewage) in the port that should be regulated × 100% | All the regulated businesses or wastewater (sewage) treatment permits (100%) in the port have obtained approval for their water pollution prevention plans. | Total number of businesses in the port that produce wastewater (sewage): 2 Number of regulated businesses in the port that have obtained approval for their water pollution prevention plans: 1 Number of businesses in the port that are not regulated by the Water Pollution Control Act to commission wastewater (sewage) treatment contractors or do not discharge wastewater: 1 | Total number of businesses in the port that produce wastewater (sewage): 2 Number of regulated businesses in the port that have obtained approval for their water pollution prevention plans: 1 Number of businesses in the port that are not regulated by the Water Pollution Control Act to commission wastewater (sewage) treatment contractors or do not discharge wastewater: 1 |
| 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" | <ul style="list-style-type: none"> PM₁₀ of the daily mean measurements satisfy the standard (<125µg / m3): 100% PM_{2.5} of the daily mean measurements satisfy the standard (<35µg / m3): 60% SO₂ of the daily mean measurements satisfy the standard (<0.1 ppm): 100% NO₂ of the hour average measurements satisfy the standard (<0.25 ppm): 100% | <ul style="list-style-type: none"> PM₁₀ of the daily mean measurements satisfy the standard: 100% PM_{2.5} of the daily mean measurements satisfy the standard: 88% SO₂ of the daily mean measurements satisfy the standard: 100% NO₂ of the hour average measurements satisfy the standard: 100% | <ul style="list-style-type: none"> PM₁₀ of the daily mean measurements satisfy the standard: 100% PM_{2.5} of the daily mean measurements satisfy the standard: 100% SO₂ of the daily mean measurements satisfy the standard: 100% NO₂ of the hour average measurements satisfy the standard: 100% |
| | Promotion of a comprehensive use of the Automatic Gate Sentry Post Control System among shipping lines | <ul style="list-style-type: none"> The ratio of incoming and outgoing roadways installed with an automatic gate sentry post control system | <ul style="list-style-type: none"> Ratio of gates with automatic sensory: 50% | The ratio of incoming roadways installed with an automatic gate sentry post control system: 2÷4×100%=50% The ratio of outgoing roadways installed with an automatic gate sentry post control system: 2÷4×100%=50% | The ratio of incoming roadways installed with an automatic gate sentry post control system: 2÷4×100%=50% The ratio of outgoing roadways installed with an automatic gate sentry post control system: 2÷4×100%=50% |

Environmental Performance Indicators of Anping Port

| Significant environmental issues | Index item | Calculation method | Target value | Indicator presentation (calculation details) | |
|----------------------------------|--|---|--|---|---|
| | | | | 2015 | 2016 |
| Dust | Number of pollution prevention device for cargo handling ,indoor cargo handling ,dust collecting | <ul style="list-style-type: none"> Number of dust prevention devices implemented annually | Increase/update or maintain the number of dust prevention devices | The ratio of outgoing roadways installed with an automatic gate sentry post control system: $2 \div 4 \times 100\% = 50\%$ | The ratio of outgoing roadways installed with an automatic gate sentry post control system: $2 \div 4 \times 100\% = 50\%$ |
| Garbage/port waste | Port recycling rate | Amount of recycled waste \div Waste generation $\times 100\%$ | <ul style="list-style-type: none"> Port recycling rate reaches 10% | <ul style="list-style-type: none"> Waste generation: 88.3 tons Amount of recycled waste: 12.6 tons Recycling rate: 14.3% | <ul style="list-style-type: none"> Waste generation: 92.3 tons Amount of recycled waste: 11.7 tons Recycling rate: 12.7% |
| Marine sediment quality | Sediment monitoring | Quarterly means and maximums of port sediment monitoring measurements | Upper limits of heavy metal content in domestic sediments (mg/kg per unit): <ul style="list-style-type: none"> Arsenic 33 Mercury 0.87 Copper 157 Lead 161 Chromium 233 Zinc 384 Cadmium 2.49 | <ul style="list-style-type: none"> Arsenic: mean = 7.07 Mercury: mean = 0.40 Copper: mean = 37.99 Lead: mean = 25.87 Zinc: mean = 213.65 Cadmium: mean = 0.47 | <ul style="list-style-type: none"> Arsenic: mean = 7.30 Mercury: mean = 0.55 Copper: mean = 54.68 Lead: mean = 22.24 Zinc: mean = 156.43 Cadmium: mean ND |
| Noise | Quarterly ratio of noise levels satisfying related regulations | Road Category D Noise Control Criteria: Detailed regulations: 76 dB during the day (7 am–7 pm); 75 dB during the evening (7–11 pm); 72 dB during the night (11 pm to 7 am of the following day) | <ul style="list-style-type: none"> Daytime equivalent energy sound levels: quarterly achievement rate of 100% Evening Leq: quarterly achievement rate of 100% Nighttime Leq: quarterly achievement rate of 100% | <ul style="list-style-type: none"> Daytime Leq 100% Evening Leq 100% Nighttime Leq 100% | <ul style="list-style-type: none"> Daytime Leq 100% Evening Leq 100% Nighttime Leq 100% |
| Hazardous Cargo Handling/Storage | Number of inspection, drills, and cross-agency inspection each year | Number of inspection, drills, and cross-agency inspection each year | <ul style="list-style-type: none"> Number of inspections:20 Number of drills:4 Number of cross agency inspections:2 | <ul style="list-style-type: none"> Number of inspections:20 Number of drills:4 Number of cross-agency inspections:2 | <ul style="list-style-type: none"> Number of inspections:28 Number of drills:4 Number of cross-agency inspections:2 |

Environmental Performance Indicators of Anping Port

| Significant environmental issues | Index item | Calculation method | Target value | Indicator presentation (calculation details) | |
|----------------------------------|---|---|---|---|---|
| | | | | 2015 | 2016 |
| Ship discharge (sewage) | <ul style="list-style-type: none"> Waste oil and wastewater collection volume Waste oil and wastewater collection rate | Amount of collected waste oil and wastewater recorded in the port district oil record book or established appropriate waste oil, wastewater, or other pollutant collection facility (Production Amount ÷ Collected Volume × 100% = Collection Rate) | <ul style="list-style-type: none"> Waste oil and wastewater collection rate 100% | <ul style="list-style-type: none"> Waste oil and wastewater production volume: 50.4 tons Waste oil and wastewater collection volume: 50.4 tons Waste oil and wastewater collection rate: 50.4 ÷ 50.4 × 100% = 100% | <ul style="list-style-type: none"> Waste oil and wastewater production volume: 21.01 tons Waste oil and wastewater collection volume: 21.01 tons Waste oil and wastewater collection rate: 21.01 ÷ 21.01 × 100% = 100% |
| | <ul style="list-style-type: none"> Amount of sediment dredged Amount of sediment disposed Amount of sediment reclaimed | <ul style="list-style-type: none"> Amount of sediment dredged :ton Amount of sediment disposed: ton Amount of sediment reclaimed: ton Reclaim rate: amount reclaimed ÷ amount dredged × 100% | <ul style="list-style-type: none"> Annual reclaim rate: 100% | <ul style="list-style-type: none"> Amount of sediment dredged: 0 ton Amount of sediment disposed: 0 ton Amount of sediment reclaimed: 0 ton Reclaim rate: 0% | <ul style="list-style-type: none"> Amount of sediment dredged: 1098400 ton Amount of sediment disposed: 0 ton Amount of sediment reclaimed: 1098400 ton Reclaim rate: 100% |
| | The ratio of using low-sufer fuel and the consumption of low-sufer fuel among harbor crafts | <ul style="list-style-type: none"> Number of harbor crafts using low-sufer fuel (marine diesel oil or marine gas oil) ÷ Total number of harbor crafts × 100% Consumption of low-sufer fuel among harbor crafts | <ul style="list-style-type: none"> The ratio of using low-sufer fuel reaches 100% among harbor crafts | <ul style="list-style-type: none"> 1 ÷ 1 × 100% = 100% Among the 1 harbor craft, 1 use low-sufer fuel | <ul style="list-style-type: none"> 1 ÷ 1 × 100% = 100% Among the 1 harbor craft, 1 use low-sufer fuel |
| Ship exhaust gas emissions | The ratio of using shore power among harbor crafts | Number of harbor crafts using shore power ÷ Total number of harbor crafts × 100% | <ul style="list-style-type: none"> The ratio of using shore power reaches 100% among harbor crafts | <ul style="list-style-type: none"> 1 ÷ 1 × 100% = 100% All the harbor craft use shore power during berthing operations | <ul style="list-style-type: none"> 1 ÷ 1 × 100% = 100% All the harbor craft use shore power during berthing operations |
| | 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 | <ul style="list-style-type: none"> The achieved speed reduction rate was 40% in 2016 and 45% in 2017. (The target value set by Taiwan ports) | <ul style="list-style-type: none"> A total of 178 vessels entered and exited the port from September to December in 2015. The achieved speed reduction rate was approximately 57%. | <ul style="list-style-type: none"> Vessels entered and exited the port 1,214 times in 2016. The achieved speed reduction rate was approximately 67%. |

*Emergency
Response*

05/

務股份有限公司高雄港務分公司安平港營運處
變演練暨國際船舶與港口設施保全(ISPS)演習



5 Emergency Response

In order to maintain port safety, the Anping Port Branch Office conducts daily land and marine environment inspection. When any suspicious behavior was identified, the inspection personnel will immediately notify for correction or inform competent legal authorities for legal enforcement. In 2015 and 2016 there have been no occurrences of fishing boat induced navigational safety incidents, small-scale oil spills within the port district, waste and fire alarms, ship collisions, fires, explosions, oil spills, chemical spillage, occupational safety incidents (with personnel casualties), or other accidents or incidents.

For port pollution and disaster, Anping Port Branch Office, Tainan City Environmental Protection Department, and South Maritime Affairs Center-Anping MPD. A grievance channel has been put into place for reporting or contact by members of the public, ship companies, or other relevant organizations. Regarding catastrophic events such as vessel or fire explosions, the Port triggers emergency response procedure to cope with disastrous incidence.

>> Environmental Inspection and Punishment in Port of Anping

| Item\Year | 2015 | 2016 |
|--|------|------|
| Number of patrols (water area and land area) | 48 | 49 |
| Notification (water area and land area) | 1 | 0 |
| Exhaust emission | 0 | 0 |
| Environment and hygiene inspection in ship making plants | - | - |
| Oil fence (vessels) | 1 | 0 |
| Joint inspection | 2 | 2 |
| Admonishment for improvement | 0 | 0 |
| Admonishing ticket | 0 | 0 |
| Penalty (Maritime and Port Bureau) | 1 | 0 |

Source : Anping Port Branch Office



ISPS drill



ISPS drill

>> 2015-2016 Anping Port Drill Records

| Year | Name of the Drill | Content | Dates |
|------|---|--|--------------------------------------|
| 2015 | Tainan City Environmental Pollution Incident Joint Emergency Response Drills. | Emergency response drill for open sea pollution incidents | May 22 |
| | International Ship and Port Facility Security Drills. | Security drill for port personnel | Mar 27 Jun 24 Sep 24 Dec 24 |
| 2016 | National Hazardous Chemicals Emergency Response Drills. | Through pollution incident emergency response and disaster rescue drills, all organizations undergoing drills develop familiarity with the notification process, emergency response procedures and methods, and how to utilize joint prevention system contingency capabilities to minimize environmental disasters and harm to personnel. | Nov23 |
| | Tainan City Environmental Pollution Incident Joint Emergency Response Drills. | Emergency response drill for open sea pollution incidents | Apr28 |
| | Facility Security: International Ship and Port Facility Security Drills | Security drill for port personnel | Mar 18 Jun 30 Sep 29 Dec 21 |

>> Accidental Incidents in Anping Port

| Accident type/Year | 2015 | 2016 |
|---|------|------|
| Ship collision, fire, explosion, fuel spill, chemical spill | 0 | 0 |
| Ship breakdown, tilt (no affecting safety) | 0 | 0 |
| Safety and health accident (cause injuries or deaths) | 0 | 0 |
| Major warehouse, storage tank explosion | 0 | 0 |
| Port minor pollution, fire, chemical spillage | 0 | 0 |
| others | 0 | 0 |

Source : Anping Port Branch Office



Fuel spill drill

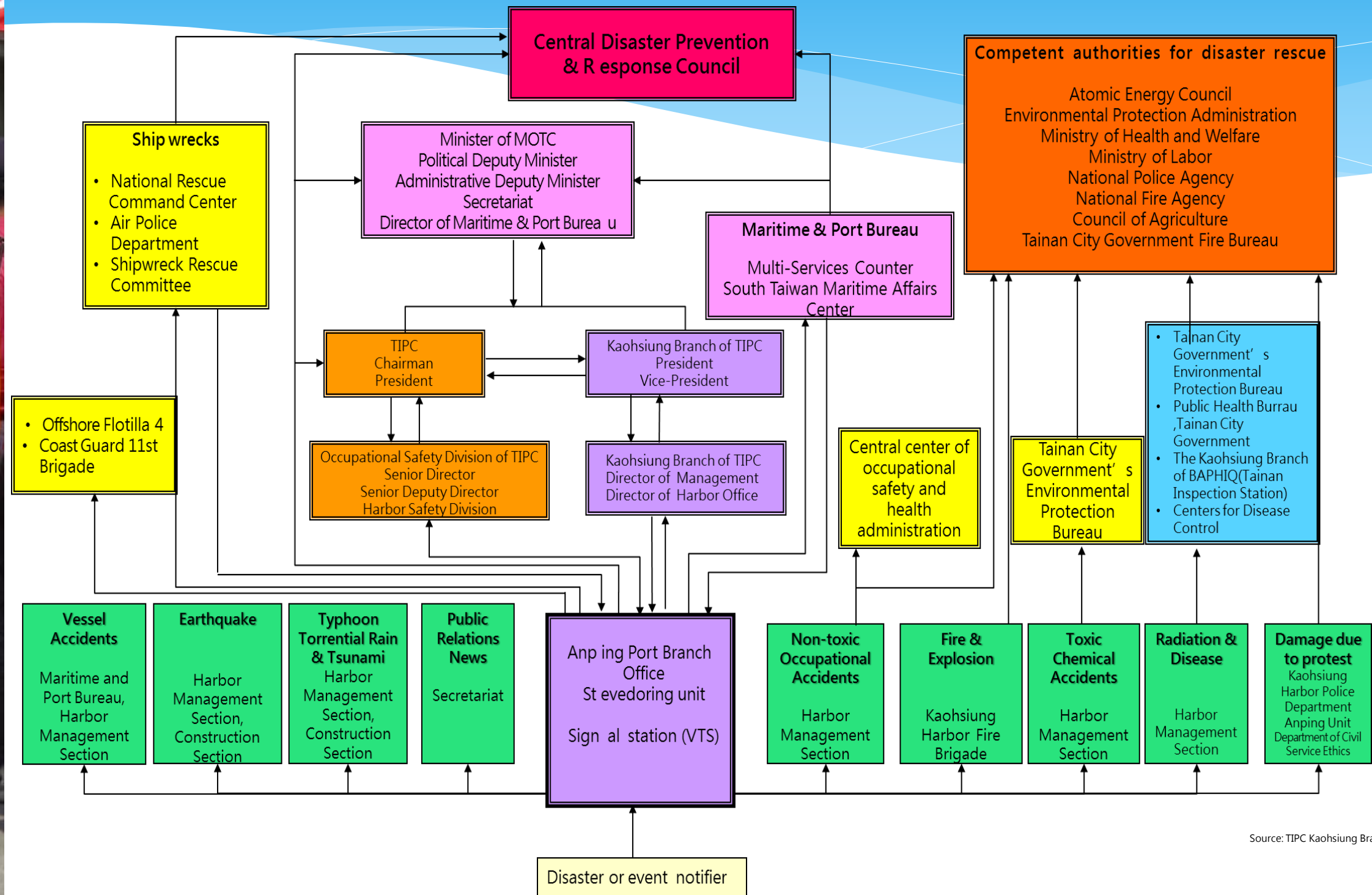


Fuel spill drill

05/

Emergency Response

Flow Chart for Disaster and Accident Notification in Port of Anping



Source: TIPC Kaohsiung Branch

Involvement and Cooperation

06/

Port of Anping has established best practices for issues concerning the port environment, which include (1) Mangrove Conservation and Restoration ; (2) Enclosed handling facilities for bulk cargo. In addition, the proposed example of best practices can be incorporated into the database of the ECO Sustainable Logistic Chain as a reference for other EcoPorts.

6.1.1 Mangrove Conservation and Restoration

Environmental issue : Soil,Water Quality, Relationship with local community



Straight plantation of *Rhizophora stylosa* (stilted mangrove) seedlings in transitional zone

Content

Strategies : Exemplifying,Enabling

Attention/Motives

To prevent development at Anping Port from damaging the original mangrove habitat and in the interests of environmental protection, ecological conservation, and

sustainable development, TIPC developed a site to restore the mangrove forest and implemented a plan for ecological transplantation.

Solutions

According to the mangrove operational management plan in the environmental assessment report, the survival rate for mature mangrove transplantation is low and the required expense is enormous. In accordance with the recommendations of experts

and scholars, we opted to use seedlings instead, finding restoration efforts in favorable locations within the port district to avoid issues with oil pollution and algal blooms, and employed PVC piping to enable plantation in deep water areas.

Implementation/Timeline

- 1998-2002 Phase1 and 2 restoration and monitoring plans
- 2002-2004 Phase3 restoration and monitoring plans

Investment amount(NTD)

| Year | Item | Cost |
|------|---|-----------------------|
| 1994 | Construction of stainless steel perimeter fence | 3.97million dollars |
| 1994 | Transplantation and dredging expenditures | 20.19 million dollars |
| 1995 | Construction of open fencing | 2.1 million dollars |
| 1998 | Initial restoration expenditure | 4.38 million dollars |
| 2015 | Environmental maintenance expenditures | 92 thousand dollars |
| 2016 | Environmental maintenance expenditures | 105 thousand dollars |

Effect/Benefits

- Mangroves have important environmental protection functions. They act as windbreaks, protect embankments from erosion, and remove pollutants.
- Mangroves provide conservation, educational, and economic benefits.

- The port was invited by CIRAD (French Agricultural Research Centre for International Development) to publish the initial results in the journal Bois et Forets des Tropiques (BFT) in 2002.

Participating Units

National Pingtung University of Science and Technology; National Chung Hsing University; Anping Port Branch Office, Port of Kaohsiung, Taiwan International Ports Corporation; Environmental Protection Bureau, Tainan City Government.

Stakeholders

Anping Port Branch Office, Port of Kaohsiung, Taiwan International Ports Corporation; Environmental Protection Bureau, Tainan City Government; neighboring residents of Anping Port; visitors to Anping Port.



>> Rehabilitation site



Lumnitzera flower



Rhizophora stylosa flowers

Source : Tainan City Mangrove Protection Association Website

Port of Anping
 Contact Person: Chou,Chia-Ruei
 Harbor Management Section, Anping Port Branch Office, Port of Kaohsiung, Taiwan International Ports Corporation
 Phone : 06-2925756
 Fax : 06-2653064
 E-mail : T02663@twport.com.tw

6.1.2 Enclosed handling facilities for bulk cargo

Environmental issue : Air Quality,Dust



Strategies : Exemplifying, Enabling

Content

Attention/Motives

Docks number 28 to 31 (presently numbers 13 to 16) are bulk cargo stevedoring operations docks. Stevedore cargo handling frequently generates particulate matter pollution from coal and gravel operations and bulk cement

clinkers. Without the implementation of relevant air pollution prevention measures, this would lead to the dispersal of particulate matter air pollutants and affect the air quality of the port district and nearby residential areas.

Solutions

In order to reduce the dispersal of particulate matter pollutants caused by port district stevedoring operations; meet the need for dedicated rear dock bulk cargo operations in docks number 29, 30, and 31 (presently numbers 13 to 15); increase efficiency in the unloading facility; provide

secure cargo storage; and increase operational capacity, Logistics Co., LTD installed an enclosed coal unloading system, dust proof nets, and water curtains in accordance with regulations to lower particulate matter pollution to minimum levels.

Implementation/Timeline

Planning started in December, 2011

Fully operational after completion in November, 2015

Investment amount(NTD)

| | |
|---|--------------------|
| Civil engineering facility | 64,057,637 dollars |
| Electromechanical machinery and equipment | 26,251,591 dollars |

Effect/Benefits

- Environmental benefits: The enclosed unloading facilities at docks number 29 to 31 were constructed and installed in accordance with regulatory specifications, allowing for effective reductions in particulate matter air pollution during the stevedoring process and helping improve air quality in the Tainan area.

- The adoption of RC processing at the work site has resulted in a marked decrease in incidents of soil contamination.

Participating Units

Anping Port Branch Office, Port of Kaohsiung, Taiwan International Ports Corporation ; Rich Logistics CO.,LTD.

Stakeholders

Shipping industry, transport operators, stevedore, Tenants

>>Comparison table of traditional grapple and enclosed unloading system operating formats

| Stevedoring facility specifications | Description of traditional grapple operations | Description of enclosed unloading system |
|-------------------------------------|--|---|
| Unloading capacity (ton/hr) | About 600 tons/hr (4 derricks * 150 tons/derrick-hr) | Speed of ship unloader: 800 tons/hr(unloading = warehousing, not affected by number of vehicles; Speed of conveyer: 1200 to 1400 tons/hr) |
| Offloading capacity(ton/hr) | About 600 tons/hr (4 derricks * 150 tons/derrick-hr) | About 900 tons/hr (3 lines * 300 tons/per line-hour) |



Enclosed warehouse design, aerial view

Port of Anping
 Contact Person: Chou, Chia-Ruei
 Harbor Management Section, Anping Port Branch Office, Port of Kaohsiung, Taiwan International Ports Corporation
 Phone : 06-2925756
 Fax : 06-2653064
 E-mail : T02663@twport.com.tw

Port of Anping
 RICH LOGISTICS CO.,LTD
 Contact Person: Mr.Lin, Chiu-Fu
 Phone: 06-2631558
 Fax: 06-2631929
 E-mail : lcf5959@gmail.com

06/

Involvement and Collaboration

6.2 Involvement and Collaboration

The Anping Port Branch Office 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 Kaohsiung also works to achieve the goal of becoming a sustainable green port through technological cooperation, joint venture, joint investigation and seminars.

Participation organizations

Public sector



Environmental Protection Bureau of Tainan City Government

The Tainan City Government EPB held its 2015 Tainan City Environmental Pollution Incident Response Drill, 2016 National Hazardous Chemicals Emergency Response Drill, and 2017 Tainan City Environmental Pollution Incident Response and Rescue Integrated Drill at the northern seawall beach of Anping Commercial Port to improve its environmental pollution emergency response capabilities. The Tainan City Government declared Anping Commercial Port a Clean Air Zone in 2016 and required all vehicles entering and exiting the port to obtain a self-regulatory label.



Southern Taiwan Service Center of MPB, MOTC

The South Taiwan 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 Anping, as well as the implementation of laws and regulations, gathering of evidence, and penalty consideration. The Anping Port Branch Office cooperates with the South Taiwan Maritime Affairs Center to conduct land-water inspection in the port.



Bureau of Economic Development, Tainan City Government.

In order to revitalize investment in Anping Port, the Tainan City Bureau of Economic Development and TIPC strengthened port construction, opened new shipping routes, and improved port infrastructure through a smart logistics strategy. The completion and opening of Terminal 10, a multipurpose port terminal, in 2016 was beneficial to cargo stevedoring operations. It integrated Tainan City's agricultural and industrial zones and developed a combined sales/production business model.



Tourism Bureau of Tainan City Government

The Tainan City Tourism Bureau held its soft opening of Anping One at the Anping Port District in 2017. Tourists can now enjoy harbor views and experience the beauty of Anping by joining one of its yacht tours. To promote these sightseeing cruises, new routes were opened for investment in 2016. One operator's application has already been approved, and service will be opened in three stages.



Tainan City Government

The Tainan Ancient Capital International Marathon was organized by the Tainan City Government and is famous for the concentration of historical sites along the route. For the 2017 run, the city government invited Taiwan International Ports Corporation to collaborate in planning the route. The result was that in addition to the historical sites and scenic areas that were part of the 2016 run, the usually restricted Anping Port was also opened to runners for the first time, allowing them to enjoy the beautiful seascape. In order to promote the development of tourism in Anping's Commercial Port, the Taiwan International Ports Corporation organized the Anping Port Yacht Harbor Area and Large-Scale Shopping Mall Planning Forum with the Tainan City Government in 2016.

Academic Institution



Cheng Shiu University

The implementation of the 2015 Environmental Monitoring Plan, a subsection of Anping Port's overall plan, includes biannual analysis of harbor area terrain features and cross sectional water depth analysis, annual marine status observations, water quality, substrate, noise vibration, and marine life monitoring.

Association



Taiwan Fishing Right Organization

The Taiwan Fishing Rights Organization organized the 2nd Tainan City Mayor's Cup National Invitational Fishing Tournament and Ocean Fishing Resources Conservation Fish Fry Release Event at the south seawall of Anping Commercial Port in the hope that by participating in seaside recreational activities, the public will learn to treasure marine resources, develop appropriate attitudes toward marine fishing, and not litter or pollute the ocean.



National Cheng Kung University

The 2014 International Creative Industries Day Exhibition was organized by National Cheng Kung University's Institute of Creative Industries Design. After visiting Anping, foreign students at National Cheng Kung University proposed the idea of reinventing the space using public art as a medium to promote Anping Port as a sightseeing destination. The port commissioned National Cheng Kung University to conduct land and harbor groundwater quality and sediment/soil testing in 2015. The school also participated in the Anping Port Yacht Harbor Area and Large-Scale Shopping Mall Planning Forum in August, 2015.

Training

07/



7. Training

In compliance with its environmental policies, the Anping Port Branch Office provides suitable environmental education and training programs to improve staff's environmental awareness, enhance their environmental protection knowledge and improve the competitiveness of the Port of Anping.

In 2015 and 2016, the Anping Port Branch Office organized environmental education courses for internal staff members. The courses included: pollution prevention, natural disaster, environmental impact assessment and ecological education.



Environmental education courses (Video)

Course title: Emerging Infectious Diseases (Introduction to and Prevention of Ebola and Novel Influenza A Virus Infections).



Environmental education curriculum (Class)

Education and Advocacy for the Eradication of Dengue Fever Breeding Sources.



2016 Labor environmental education

Course title: Cultural heritage preservation & environmental education



2015 Yukuang island seawall cleanup Event



2016 Labor environmental education



Kick-off meeting

2016 Greenhouse gases inventory education training



2016 Summer internship with scholarship



*Communication
and
Publication*

08/

08/

Communication & Publication

8. Communication & Publication

Promotion activities, seminars, publication, and websites, have been organized to align Anping 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.

Publication



Port of Anping Introduction Booklet



TIPC Environmental Monitoring Report

Website



Chinese and English web pages for TIPC Green Policy



"Contact us" on the Anping Port Branch Office, Port of Kaohsiung, website



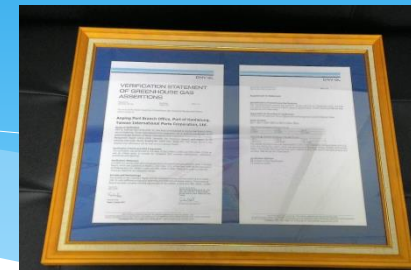
Anping Port Branch Office FB Pages

To present the achievements of TIPC in promoting green ports, Chinese and English web pages have been set up on our website. These web pages can also enhance communication between Taiwan and other countries.

Anping Port Branch Office, the general public and consumers can provide us with their feedback through the e-mail information on "contact us".

Port district event information is shared to create a closer bond between Anping Port and the public.

Seminars/Conference



Declaration of greenhouse gases inventory

Through self-regulation, Anping Port passed the Greenhouse Gas Inventory Verification, increased its energy efficiency and reduced environmental pollution.



Travel Light Shuttle Bus No. 17 Links up Anping Port and Hsingta Port

Tainan's City Transportation Bureau established Shuttle Bus No. 17 as a convenient holiday link between Anping Port in Tainan and Hsingta Port in Kaohsiung, allowing tourists to experience in-depth tours of historical spots at Anping Port and enjoy delicious seafood at Hsingta Port all in the same day.



Capital City 16-Year-Old Coming-of-Age Experience

The canoe route travels through the section of Anping Port that is in the ocean current impact zone. Rising and falling of waves test the willpower and balance of participants and provide a chance for the teens to challenge themselves and build endurance.



The Anping Port Yacht Harbor Area and Large-Scale Shopping Mall Planning Forum.

It was organized in conjunction with the Tainan City Government in hopes of formulating the best and most feasible development project. Representatives from industry, the government, and the academic sphere were invited to brainstorm and come up with creative ideas.



Germany's MV Logos Hope (known as the world's largest floating bookstore)

The ship berthed at Anping Port in September, 2014 and opened its onboard book fair to the public for 4 days. The estimated total number of visits was 88,440 and the highest number of visits on a single day was 28,931, breaking the world record of 24,000 visits on a single day during the MV Doulos' visit to Sri Lanka.



The TV program Taiwan Fishing, shot at Anping Port.

Activities



The Navy's Friendship Fleet Visits Anping Port

The Navy's Friendship Fleet Training Detachment berthed at Anping Port and showcased its newest and largest Panshih fuel and ammunition supply ship, one La Fayette class ship, and two new missile boats.



The 11th Tainan Ancient Capital International Marathon

More than 8000 domestic and foreign participants entered Anping Port for the Tainan Ancient Capital International Marathon. About 85 kilometers of the run took place in the port district. The route ran across Anping Commercial Port's Chuhsi, Hsinking and Yukuang bridges. These three bridges link up the entire port district and one can enjoy the changing scenery and views of the port district from the bridges.



New employees visit Anping Port District

*Green
Accounting*

09/



9.1 Environmental costs

Regarding the environmental issues, the Anping Port Branch Office has spent funds on their employees, environmental maintenance, management, environmental monitoring, publications, emergency response and communication, with the aim of enhancing employees' environmental awareness and

environmental maintenance, to improve environmental quality and ability of emergency response, and to increase the public understanding of the port. The Summation of Costs invested by the Investments of the Anping Port Branch Office in the Environmental Aspects is €378,961 in 2015 and €423,146 in 2016.

Environmental investments in the Anping Port

- Staff: Costs for environment-related staff and training.
- Environmental maintenance and management: Port greening and beautification, waste disposal, and dredging.
- Environmental Monitoring: Monitoring the air, noise, water, sediment, dredging as well as environmental patrol
- 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.

>> Costs related to Environmental Issues, Anping Port Branch Office in 2015 (Unit: €)

| Item of Expense | | 2015 |
|--|---|----------------|
| Staff | Cost of environment-related personnel | 105,106 |
| | Training costs | 0 |
| | Subtotal | 105,106 |
| Environmental maintenance and management | Outsourced spending for port garbage disposal | 163,537 |
| | Port greening (plantation and maintenance) and beautification | 2,138 |
| | Consultant fees of the construction and management operations | 29,191 |
| | Subtotal | 194,866 |
| Environmental Monitoring | Test request fee | 75,932 |
| Emergency Respose | Port disaster drill expenses | 294 |
| Communication and Publication | Welfare expenditure (for networking with neighboring communities) | 2,762 |
| Total | | 378,961 |

>> Costs related to Environmental Issues, Anping Port Branch Office in 2016 (Unit: €)

| Item of Expense | | 2016 |
|--|---|----------------|
| Staff | Cost of environment-related personnel | 78,755 |
| | Training costs | 418 |
| | Subtotal | 79,173 |
| Environmental Maintenance & Management | Outsourced spending for port garbage disposal | 248,317 |
| | Port greening (plantation and maintenance) and beautification | 5,867 |
| | Consultant fees of the construction and management operations | 2,624 |
| Subtotal | | 256,808 |
| Environmental Monitoring | Test request fee | 83,003 |
| Emergency Response | Port disaster drill expenses | 294 |
| Communication & Publication | Welfare expenditure (for networking with neighboring communities) | 3,867 |
| Total | | 423,146 |

9.2 Environmental Assets

The Anping Port Branch Office has launched a series of port development projects to improve the efficient use of property by the Port of Anping, promote local economic prosperity, and develop the port into an eco-friendly green port. Several projects concern environmental aspects. For example, the infrastructure of the recreational area in the Port of Anping has been built to increase public access to the port, an AIS

for inspecting vessel speed reduction has been built that updated to increase operational effectiveness and reduce possible pollution caused by construction projects. Cost invested by the investments of the Anping Port Branch Office in the Environmental aspects in 2015-2016 is €783,345 & €442,425.

>> Assets invested by the Anping Port Branch Office in the environmental aspects in 2015 – 2016 (General building and equipment plan) Unit: Euro

| Item | 2015 | 2016 |
|---------------------------|----------------|----------------|
| Improvement on land | 9,201 | 274,777 |
| Buildings | 120,955 | 40,181 |
| Machinery and equipment | 131,636 | 42,131 |
| Transportation Facilities | 72,283 | 58,853 |
| Miscellaneous equipmen | 449,270 | 26,482 |
| Total | 783,345 | 442,425 |

Improvement Recommendations

10/

北觀光

南自貿

Anping Port became an international commercial port in 1997 and positioned itself as an international bulk cargo importing and exporting port with tourism and recreational functions. The port successfully reinvented itself, supplementing its gravel unloading operations with the dual goals of developing free trade to the south and tourism from northern regions. Free trade operations were established in conjunction with a free trade harbor, a maritime courier zone, an agricultural products distribution center, and the provision of cargo operating services to effectively increase free trade zone efficiency. Tourism from northern regions was encouraged by combining port tourism with local urban culture and the promotion of the yacht harbor area, Yukuang Island, Crescent Moon Bay, and other recreational industry businesses to shape a seaport environment where visitors can enjoy leisure activities.

As an international port operator, Anping Port fully understands the importance of operating an ecofriendly port. The port has initiated many port district environmental protection projects since the early days of its inception, including a mangrove restoration project, enclosed cargo handling operations, the construction of an onshore power facility, and the formulation of air quality zones. Since its certification as an International Eco Port, besides exchanging information on the latest green port construction measures and best management practices with other green ports around the world, Anping Port plans to implement the eco port philosophy in future port district land developing planning. For example, the North Tourism Zone development project will adopt a low density, low carbon development philosophy, including the construction of a low carbon waterfront eco island, to promote the establishment of a green, sustainable, advanced top quality port destination.



臺灣港務股份有限公司

高雄港務分公司

PORT OF KAHSUNG TAIWAN INTERNATIONAL PORTS CORPORATION, LTD