

# Taiwan's Eco-resilient Future

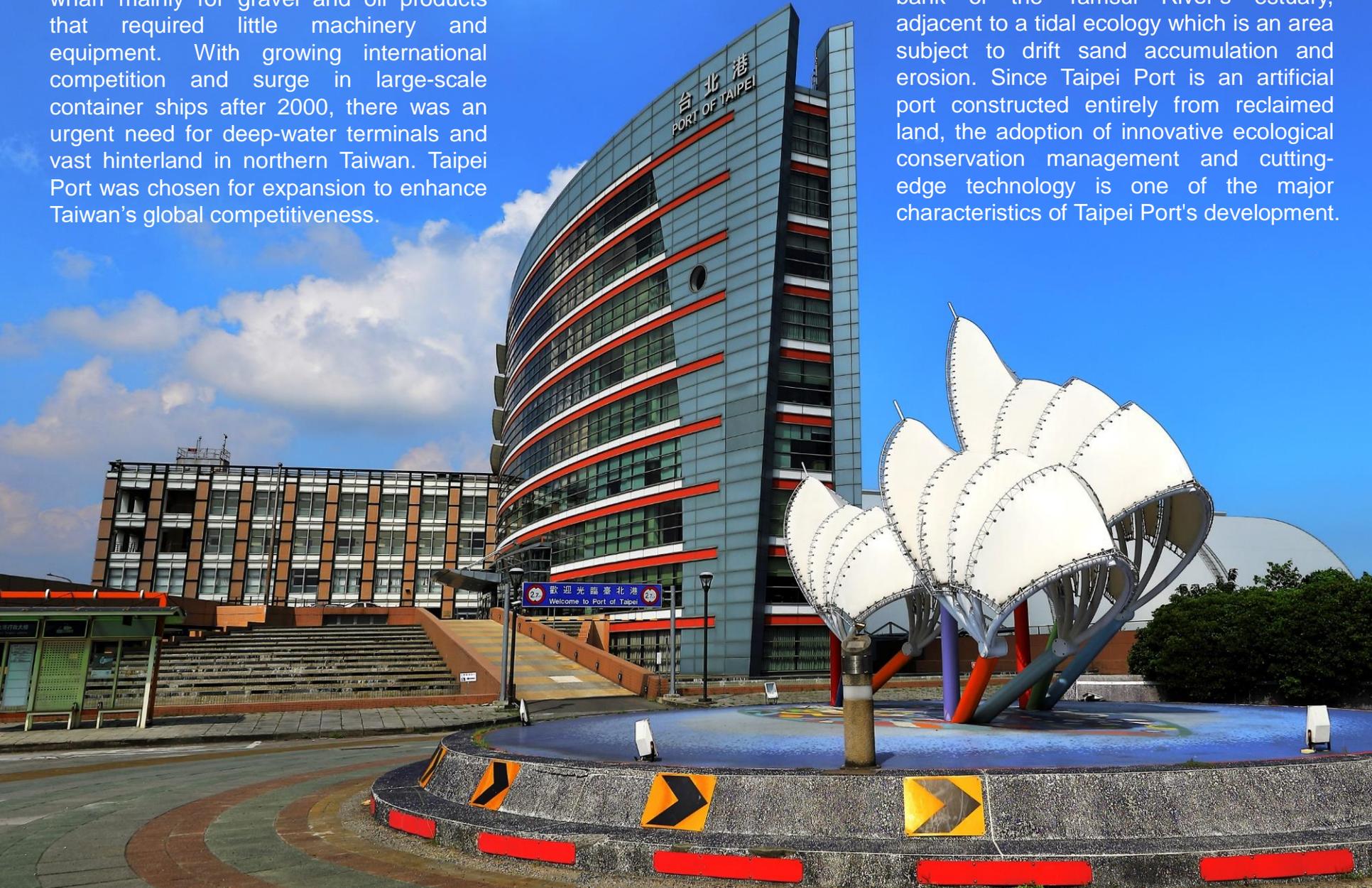
An aerial photograph of the Port of Taipei Environmental Sustainability Action building. The building is a prominent, curved structure with a facade of green-tinted glass and horizontal red and white bands. It is situated in an urban area with other buildings, roads, and a circular fountain in the foreground. The text "PORT OF TAIPEI" is visible on the building's facade.

Port of Taipei Environmental  
Sustainability Action

## About the Port

Taipei Port was originally a small-scale wharf mainly for gravel and oil products that required little machinery and equipment. With growing international competition and surge in large-scale container ships after 2000, there was an urgent need for deep-water terminals and vast hinterland in northern Taiwan. Taipei Port was chosen for expansion to enhance Taiwan's global competitiveness.

Taipei Port is located on the southwest bank of the Tamsui River's estuary, adjacent to a tidal ecology which is an area subject to drift sand accumulation and erosion. Since Taipei Port is an artificial port constructed entirely from reclaimed land, the adoption of innovative ecological conservation management and cutting-edge technology is one of the major characteristics of Taipei Port's development.





## Vision

With the increasing awareness of global environmental protection, major ports worldwide have been combining the concepts of port operation with sustainable development and climate change. The Taiwan International Ports Corporation, Ltd (TIPC) is actively promoting various environmental protection measures, formulating countermeasures for climate change, and transforming the Port of Taipei into a green port while pursuing the expansion of its operations.

The TIPC firmly believes that port development should be a win-win scenario for economic development and environmental protection. Thus, in addition to carrying out the green port project, the TIPC also will actively build more friendly spaces by the waterside for residents and will shape the Port of Taipei into an international quality port.

# Environmental Policy and Objectives



## Port of Keelung, Taiwan International Ports Corporation Environmental Policy (Including Keelung Port, Taipei Port, Suao Port)

In charge of port operation and developments, Port of Keelung, Taiwan International Ports Corporation (hereinafter referred to as Port of Keelung) recognizes its obligations towards protecting the environment as its corporate social responsibility. Aiming at being an eco-friendly and sustainable port with continuous advancement, we consider environmental protection as a part of port operation and work proactively to prevent the pollution of the environmental impacts.

In order to minimize the potential and actual environmental impacts from port operations, Port of Keelung has identified the scope of its environment protection. With autonomous management, periodic inspection and evaluation, we will keep continuously improving our environment performance.

We commit to:

- Regularly evaluate port environmental impacts and any pollution generated from port operation.
- Set environmental objectives to continuously lower environment impacts.
- Comply with all relevant environmental regulations and aim at pollution prevention.
- Provide environmental education to build environmental awareness in all staff to completely implement our environment policy.

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

*Kao Chwan-kai*  
President of Port of Keelung, TIPC

Date : 200.10.14



No. 1, Chung-Cheng Road, Keelung 20202, Taiwan, R.O.C.  
Tel: +886-2-24206100 Website: <http://kl.twport.com.tw>



## Environmental Objectives for Taipei Port

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

- **Improve Air Quality of Port**  
Maintain air quality through utilizing continuous environmental monitoring system, reducing vessel pollution, and implementing port environment inspection.
- **Decrease Fugitive Dust**  
Use airtight operation and cargo handling equipment management to control fugitive dust.
- **Reduce Ship Exhaust**  
Promote vessels deceleration, usage of low sulfur fuel oil, and the usage of onshore power supply by official vessels to reduce exhaust pollution.
- **Strengthen Hazardous Cargo Management**  
Ensure hazardous cargo management by increasing cargo inspection frequencies to strengthen port security.
- **Reduce Port Vehicle Exhaust Emissions**  
Increase sensory gates installations to control vehicle access and the situation of vehicle pollution.
- **Manage Vessel Sewage Discharge**  
Entrust qualified traders to deal with vessel sewage discharge and waste oil problem to prevent the discharge vessel sewage and waste oil from polluting the ocean.
- **Improve cargo handling management**  
Improve cargo handling management, prevent overloading or leakage, and strengthen the fundamental plans of emergency response.
- **Reduce Vessel-generated Waste**  
Propaganda waste reduction of vessel and practice resources recycling/ reusing properly with record of vessel waste.
- **Land Use Optimization**  
Adjust port land usage and enhance completeness use of land usage.
- **Enhance Port Water Quality**  
Install sewage treatment system and long-term monitoring of water quality to maintain water quality.

The president of Keelung Branch is responsible for the implementation, maintenance, and effectiveness of the environmental objectives are reviewed on a biennial basis, and action plans are adjusted according to the condition of the Port of Keelung to ensure that promises are upheld, improvements are made, and environmental objectives are achieved.

*Kao Chwan-kai*  
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# Land Reclamation Project

Through land reclamation, Port of Taipei was able to accommodate surplus earth from construction projects in the Taipei Metropolis, creating land for development and resolving landfill issues at the same time.

- Solving the problem of surplus earthwork deposit for construction projects in Taipei Metropolis (high cost saving).
- Mitigating the impacts of monsoons and salt damage on port operations and relevant facilities.
- Increasing national land assets and green areas.



Taipei Port list of recent land reclamation projects

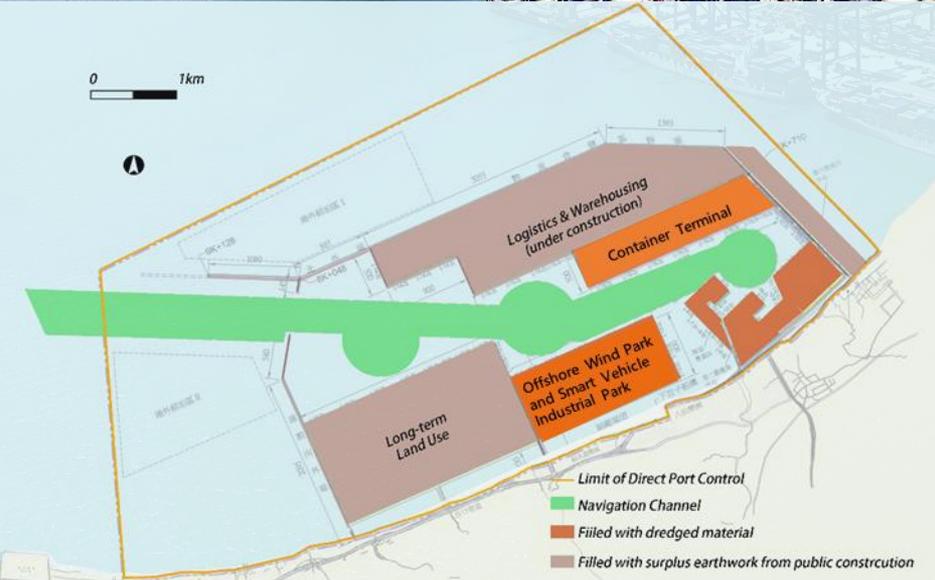
Site	Content	Status	
East Dockland	Bulk/General Cargo Terminal No.1, 2, and 3	The spoil disposal channel dredging which covers 159 hectares started its operations in 1997	
	Container Terminal		
North Dockland	Logistics & Warehousing Phase I	Complete in 2016 (about 48.3 hectares of land)	
	Logistics & Warehousing Phase II	Commenced in 2012 (total of 123.2 hectares of land). About 45 hectares have been reclaimed in 2020	
	Logistics & Warehousing Phase III	124.4 hectares	Complete reclamation by 2027
	Logistics & Warehousing Phase IV	42.1 hectares	
South Dockland	South Outer Bank Rear Wharf	About 128 hectares reclaimed by 2020 (146 hectares in total)	

# Sediment management

To maximize the effectiveness of resource utilization, the port has sought to maintain the balance between land dredging and filling by recycling the bottom mud removed from ship channel and reusing it for filling in-port land areas. Bottom mud was used for reclamation in the south dockland, which is mainly used for the development of green industries now.



Port of Taipei Dredge and Fill



## Ecological Buffer Zone

The Taipei Port ecological buffer zone is consisted of 200-m-wide windbreak forest and 50-m-wide tide zone.

## Ecological Artificial Tide Pool

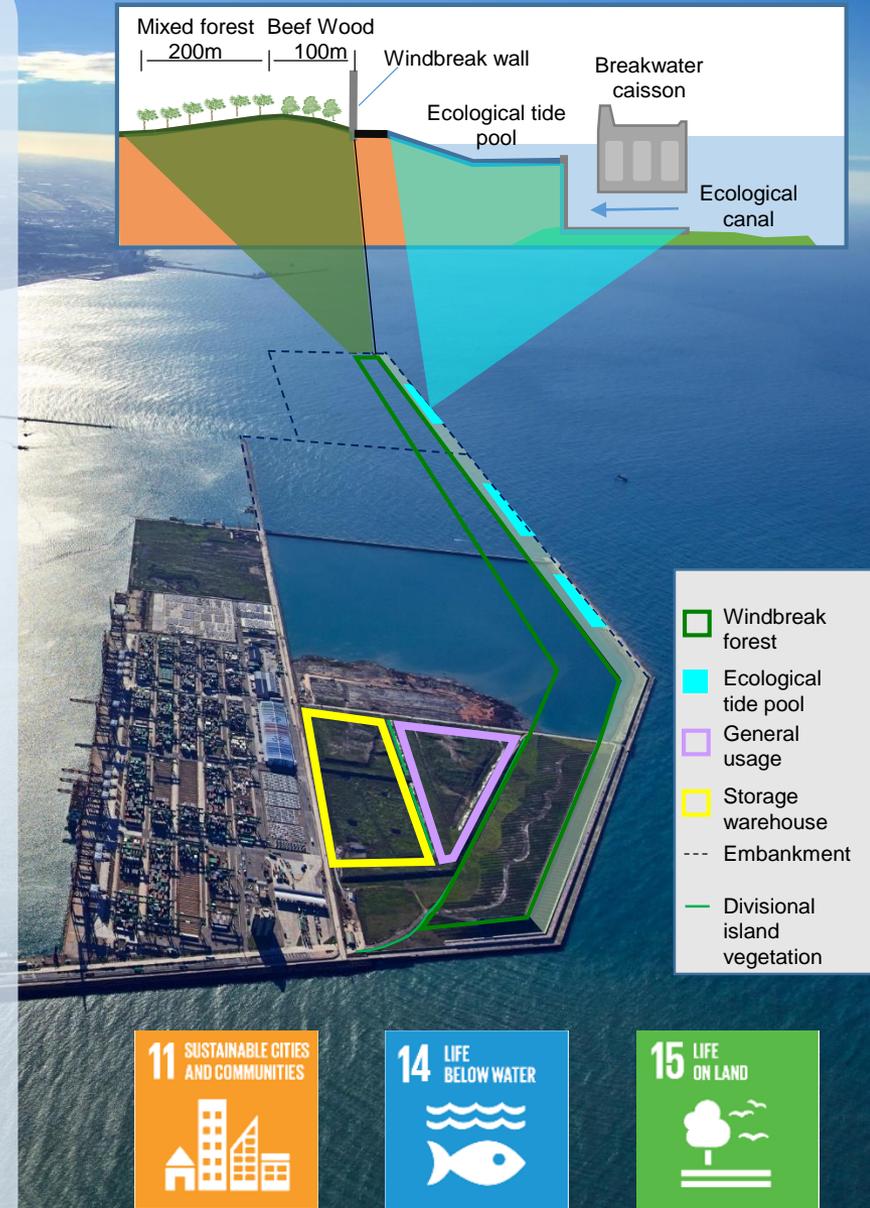
Taipei Port adopts the 3<sup>rd</sup> generation breakwaters that infused the concept of a tide pool ecology and ecological foundation blocks. The curved appearance and porous design creates visual structural beauty that blends with the surrounding environment and a prosperous habitat for cluster creatures.

Ecological foot-protection blocks are foundations with grooves added on the top. The grooves, filled with water, transform the port interface into tidal habitats for organisms to settle and cave. Meanwhile it also serve as water drainage system and wave absorptive structure. In addition, 30% of the cement concrete is replaced by quenched blast furnace slag, abating 58,000 tons of CO<sub>2</sub> emission.

## Windbreak Forest

- The forest arrangement for logistics and warehousing areas
  - ✓ Occupy 43 ha of the reclaimed land
  - ✓ 64,000 arbors (absorbing around 34,000 tons of CO<sub>2</sub>)

Location	Future plant and tree types	
<b>First line (completed)</b>	Beef wood ( <i>Casuarina equisetifolia</i> )	
<b>Second line –mixed (Expected tree species)</b>	Conifer trees	Alexandrian laurel, Laburnum, Taiwan Nato Tree, <i>Thespesia populnea</i> , <i>Terminalia catappa</i>
	Small trees and shrubs	<i>Scaevola taccada</i> , <i>Heliotropium foertherianum</i> , <i>Volkameria inermis</i> , <i>Sophora flavescens</i> , <i>Schefflera arboricola</i> , <i>Rhaphiolepis umbellate</i> , <i>Diospyros ferrea</i> , <i>Myoporum bontioides</i>



# Coastal protection

According to current monitoring results of coastal landforms, the energy from the wave impacts on the coastal areas will be reduced after offshore submerged breakwaters are set for protecting the southern coast of the Port of Taipei from erosion, which is expected to have a positive effect on the overall protection of the coasts.

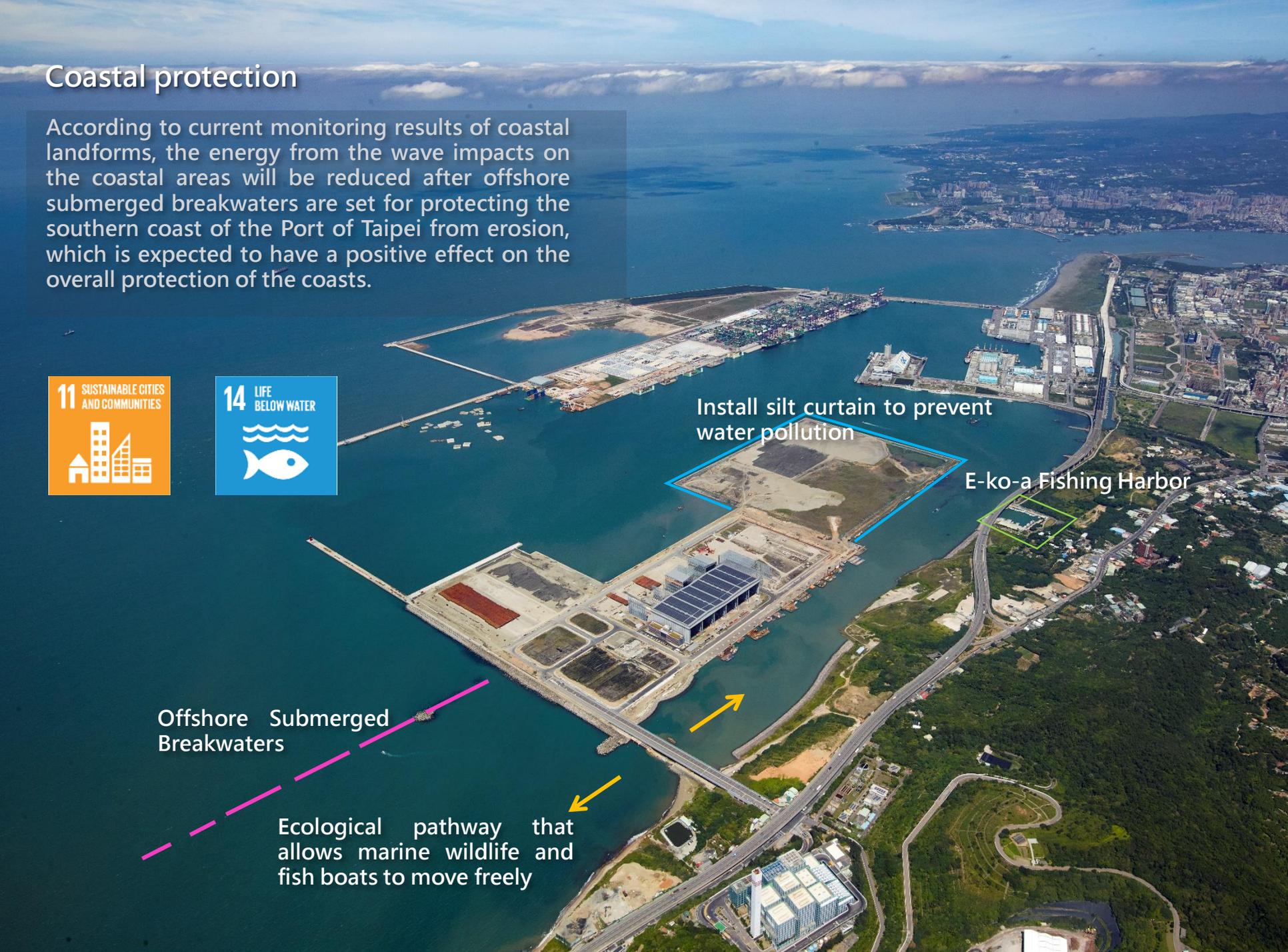


Install silt curtain to prevent water pollution

E-ko-a Fishing Harbor

Offshore Submerged Breakwaters

Ecological pathway that allows marine wildlife and fish boats to move freely

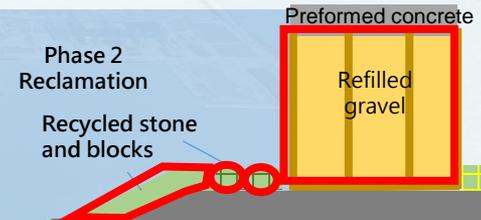


## Reusing Dikes for Embankment Construction

The construction materials from constructed fencing at the Port of Taipei for all phases are recycled to reduce environmental resource consumption, including 42 caissons, over 4,700 miscellaneous leftover blocks, and around 70,000 cubic meters of building stones for reuse in subsequent construction, which can effectively rein in spending, saving about NT\$560 million.

Material	Unit	Quantity	Cost (1000 NTD)
Stone	m <sup>3</sup>	75,973	49,609
Preformed blocks	Piece	4,736	135,345
Caisson	Block	42	382,186
Total			567,140

### Recycling Scope Diagram



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



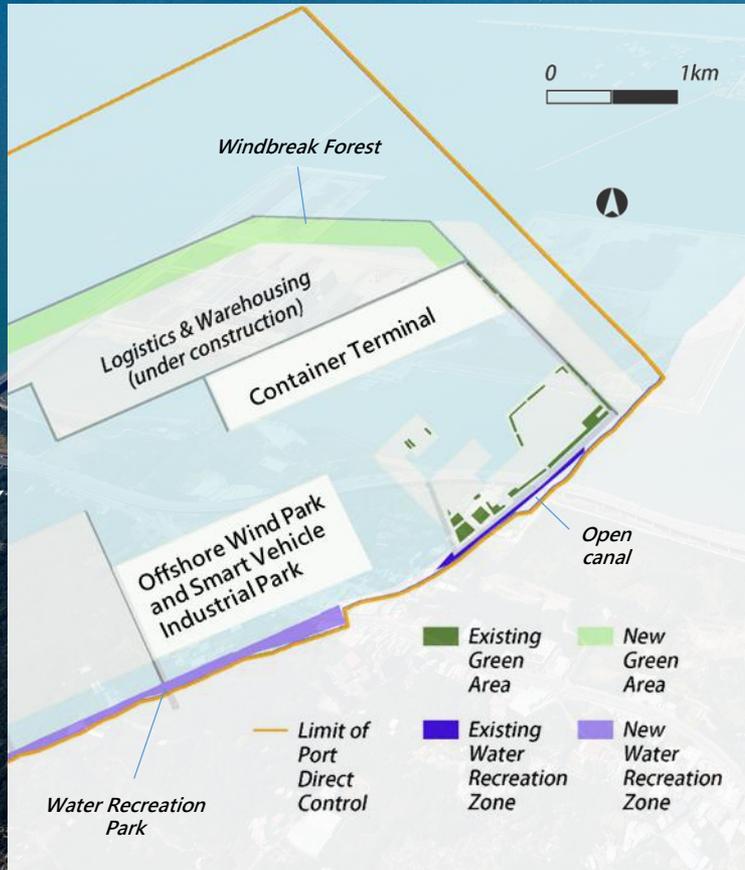
# Recreational Space

To make improvements according to the Executive Yuan's examination results of Taipei Port's overall development and to follow the National Development Plan, the port shall set its long-term goals as multidirectional and conducive to creating highly beneficial and low-polluting port service environments and increasing regional prosperity and quality of life. Therefore, in addition to enlarging port areas and enhancing operational effectiveness, the port has focused on developing plantation and green areas, as well as water recreation zones.

3 GOOD HEALTH AND WELL-BEING



15 LIFE ON LAND



# Land Use Planning

In consideration of the safety of the port area, the construction schedule is in alignment with the progress of relocation of petrochemical companies to provide better living environments for residents.



➤ Phase 4 reclamation work is scheduled to finish by 2027. The petrochemical site will relocate in accordance with the project schedule.



Temporary petrochemical storage

Phase 1

Phase 2

Phase 3

Phase 4

New petrochemical storage site

➤ Phase 1 reclamation work was completed in Mar 2020

➤ Phase 2 reclamation work is scheduled to finish by 2028

## Taipei Port Automated Container System

Thanks to the wireless sensor technology ZigBee, the Port of Taipei has become a smart industrial model park for the Ministry of Economic Affairs. With ZigBee wireless communication and sensor technology, the procedure of loading and unloading from container trucks inside and outside the port can be streamlined and the efficiency will improve.

The Port of Taipei has introduced the wireless sensor technology ZigBee to container terminal for improving the efficiency of automated loading and unloading. It is estimated that the introduction of the technology has increased overall efficiency by at least 20%.

## Automatic gateway



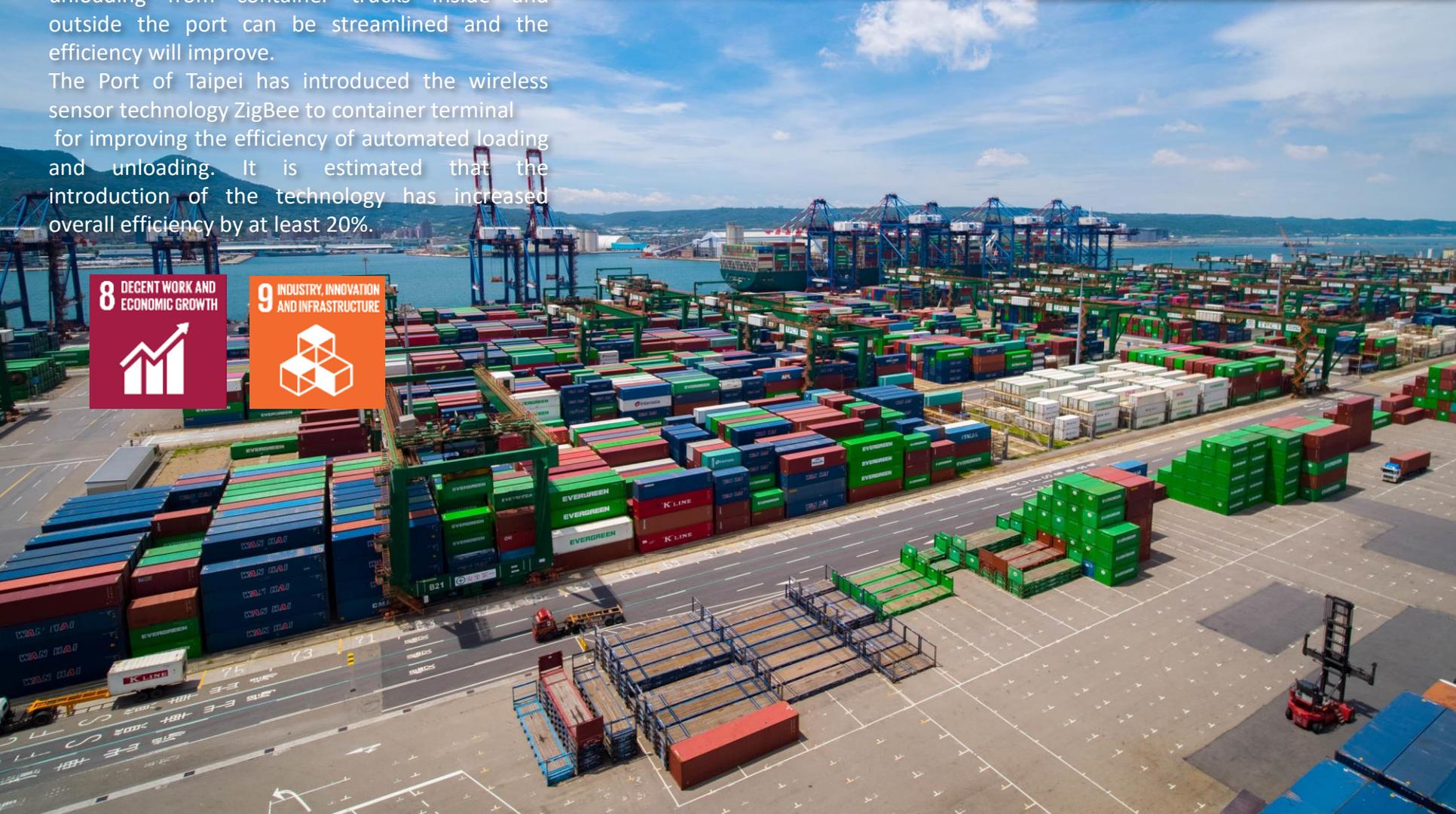
## Automatic container terminal



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



## QR code and Cloud Control System

The Bulk & General Cargo Terminal 2 of the Port of Taipei covers 42,000 pings (138,852 square meters). The plants inside manage 9 large facilities from the central control room and work closely with the operation control center to closely monitor and control all vehicle transportation. The Terminal also introduced a GPS smart dispatch system for the large sand gravel warehouse, which comprises the warehousing areas and shipping stations for sand and gravel. Moreover, it jointly developed a QR code cloud system for picking up materials, thereby elevating the overall operational efficiency and creating the first smart operation control solution.



Cloud plate recognition

Cloud weighing



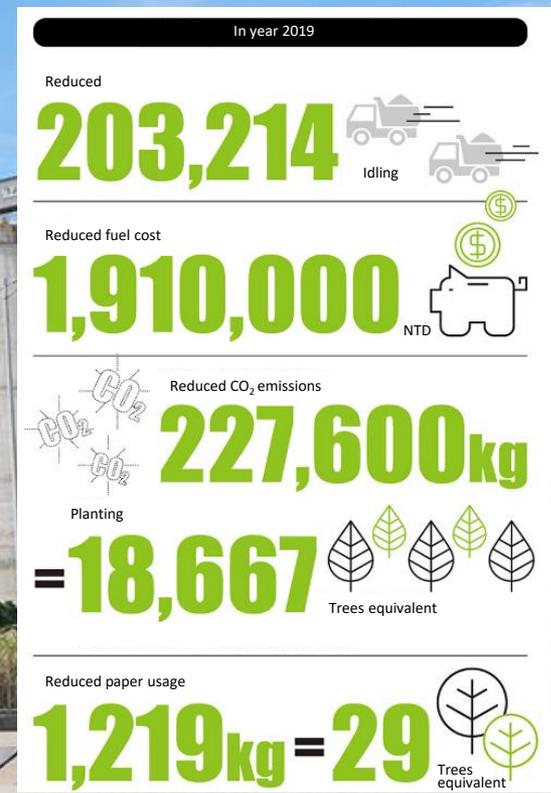
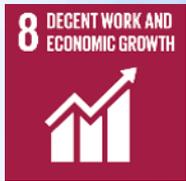
Cloud cargo issuance

Cloud monitoring



Cloud dispatch

Cloud picking



# Port of Taipei Environmental Sustainability Action

Project name	Content
The second phase of land reclamation(1998)	Utilize the dredging of the port area and the remaining earth from the public works to fill the new land in the port.
Sewage Discharge in Public Sewage Systems(2003)	Taipei Port is the first commercial port that was able to comprehensively process its own sewage and wastewater.
Raising the north outer dike of the Port of Taipei(2006)	In response to rising sea levels due to climate change, the height of the dike will be increased by 1.5 m.
Chia Pei Enclosed Warehouse(2009)	Reduce fugitive dust emission from coal, sand, and gravel handling.
24-Hour Automated and Continuous Environment Surveillance System(2011)	Allows public examination of port environmental qualities.
Taipei Port Container Terminal Corp. – Automated container handling system(2013)	Ensure effective handling, prevent environmental risk, and abate pollution.
Taipei Port Terminal Company Ltd.- General/Bulk Cargo Terminal No.2 QR code and Cloud Control System(2020)	Replace human contact via cloud control and increase dispatch efficiency.
Solar Power System at East No.1-1 and 2 Warehouse(2020)	Utilize spare space in Taipei Port for renewable energy development.
Water Recycling Center at South Wharf(2021)	Treated water will be reused for street washing and watering to save water consumption.

The Port of Taipei continued to obtain European eco-port certification in 2016, 2018, and 2020. Through roll planning its environmental policies, the port have actualized actions such as implementing energy saving facilities, environmental monitoring, environmental management plans to protect marine ecosystems and ensure neighborhood living quality.

