

CHAPTER 9

GREEN DEVELOPMENT





Climate change poses grave challenges to business operations. The Company continues to work closely with stakeholders to respond to and mitigate the impact of climate change. We uphold our commitment to properly manage natural resources, minimise the impact of our operations on the environment, and speed up the development of “Green Ports” to achieve sustainable development.

The Company’s focus areas in Green Development:

Energy saving and emission reduction	• Introduce technologies to save energy and reduce emissions and to increase energy efficiency • Broaden the use of clean energy • Reduce overall energy consumption, carbon emissions and air pollutant
Proper management of resources	• Optimise water resources and sewage management • Enhance waste management
Response to climate change	• Identify climate-related risks and opportunities • Improve our terminals’ ability to cope with climate change
Raising environmental awareness	• Enhance our staff’s environmental awareness • Cooperate with business partners in the value chain

PERFORMANCE HIGHLIGHTS IN 2021

During the year, the Company set targets for four environmental performance for its Subsidiaries, so as to monitor and manage our environmental performance more systematically and drive continuous improvement.

Environmental performance	Target	Performance of the Subsidiaries in 2021 ⁶
Reduction in greenhouse gas emissions	To reduce the greenhouse gas (Scope 1 and Scope 2) emission intensity of our Subsidiaries by 20% in 2030, setting 2020 as the base year, and to achieve carbon neutrality no later than 2060.	Greenhouse gas emission intensity ⁷ : 9.24 kg of CO ₂ equivalent per TEU, representing a decrease of 1.2% year-on-year (2020: 9.36 kg of CO ₂ equivalent per TEU)
Improvement in energy use efficiency	To reduce the energy consumption intensity of our Subsidiaries by 15% in 2030, setting 2020 as the base year.	Energy consumption intensity ⁷ : 0.0866 GJ per TEU, representing a decrease of 1.9% year-on-year (2020: 0.0883 GJ per TEU)
Improvement in water efficiency	To enhance the management of water resources and improve water efficiency.	Water consumption intensity ⁷ : 0.04 m ³ per TEU, representing a decrease of 6.3% year-on-year (2020: 0.05 m ³ per TEU)

6 Among the existing 15 Subsidiaries of the Company, Chancay Terminal in Peru is still under construction and the acquisition of Tianjin Container Terminal was completed in December 2021. Their environmental performance was not included in the performance of the Subsidiaries for 2021.

7 The environmental performance data shown in the table are rounded off, while the corresponding percentage changes are derived from unrounded figures.

Environmental performance	Target	Performance of the Subsidiaries in 2021 ⁶
Reduction in waste	Hazardous waste: To maintain 100% hazard-free disposal of waste.	100% of hazardous waste was handled by recycling companies or material suppliers with professional qualifications
	Non-hazardous waste: To reduce domestic waste by terminals and, in the long term, achieve the goal of zero domestic waste sent to the landfill.	<i>No quantitative target is set</i>

The Company continued to enhance its climate change risk assessment, identifying and prioritising risks related to climate change in the port industry. In May 2021, the Company launched a green finance framework, which has successfully passed the verification by the Hong Kong Quality Assurance Agency, demonstrating our commitment in driving green development. This framework, covering COSCO SHIPPING Ports and its Subsidiaries, serves as a guideline in funding eligible green projects by way of green bonds or loans and regulates the use of proceeds.

MANAGEMENT APPROACH

The Company strictly complies with all national and local environmental laws and regulations⁸ and ensures compliant operations by the Company and its terminal companies. During the year, there were no non-compliance incidents of the Group. Before commencing all large-scale projects, we engage consultants to conduct environmental assessments to ensure that local environmental requirements are met.

To improve the performance of terminal companies in environmental management, the Company has revised and improved the Management Guidelines on Energy Saving and Emission Reduction, and has formulated the Management Guidelines on Ecological and Environmental Protection, the Supervision and Inspection Management Measures on Ecological and Environmental Protection and the Contingency Plan for Emergency Environmental Incidents as the guiding principles for its Subsidiaries in China, and requires them to develop environmental policies and governance approach based on their own operational practices. In addition, in accordance with the requirements of the management guidelines mentioned above, the Company regularly sorts out and investigates environmental pollution sources and ecological risks of its Subsidiaries, and requires them to file relevant reports such as work summary report on the investigation of environmental pollution related-risks or information related to energy saving and emission reduction.

We continue to improve management regulations, monitor and analyse the environmental performance of terminals and regularly review environmental risks. At the same time, we encourage our terminals to apply for international environmental protection recognitions and certifications to reflect our environmental management capabilities.

⁸ Including, but not limited to, the Environmental Protection Law of the People's Republic of China, the Marine Environmental Protection Law of the People's Republic of China, the Law of the People's Republic of China on Prevention and Control of Environmental Pollution by Solid Waste, the Law of the People's Republic of China on Prevention and Control of Water Pollution, the Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution, the Energy Conservation Law of the People's Republic of China, the Interim Measures for the Supervision and Administration of Energy Conservation and Emission Reduction at Central Enterprises, etc.

Environmental certifications obtained by terminal companies

Xiamen Ocean Gate Terminal	ISO 14001 Environmental Management System Certification ISO 50001 Energy Management System Certification APSN Green Port
Guangzhou South China Oceangate Terminal	ISO 14001 Environmental Management System Certification
CSP Spain Related Companies	ISO 14001 Environmental Management System Certification ISO 14064 Greenhouse Gas Accounting and Verification Certification (CSP Valencia Terminal) ISO 50001 Energy Management System Certification EU Eco-Management and Audit Scheme (EMAS)
CSP Abu Dhabi Terminal	ISO 14001 Environmental Management System Certification
Kumport Terminal	ISO 14001 Environmental Management System Certification ISO 14064 Greenhouse Gas Accounting and Verification Certification Green Port Certificate Zero Waste Certificate

ENERGY SAVING AND EMISSIONS REDUCTION

The Company is committed to promoting energy saving and emissions reduction to support China in achieving the “dual carbon” national goals, respond to the initial strategy on reducing greenhouse gas emissions of the International Maritime Organization (IMO), and meet shipping companies’ need to cut emissions. We have established a Steering Team for Energy Saving and Emission Reduction and an Energy Saving and Emission Reduction Management Office to monitor the emission reduction-related policies, performance and targets of the Company and its domestic Subsidiaries, and established relevant appraisal and award mechanisms.

To reduce greenhouse gas emissions and improve energy use efficiency, the Company has set the following targets for the Subsidiaries:

Reduction in greenhouse gas emissions	To reduce the greenhouse gas (Scope 1 and Scope 2) emission intensity of our Subsidiaries by 20% in 2030, setting 2020 as the base year, and to achieve carbon neutrality no later than 2060.
Improvement in energy use efficiency	To reduce the energy consumption intensity of our Subsidiaries by 15% in 2030, setting 2020 as the base year.

In order to achieve or even exceed the above targets as soon as possible, we are committed to driving the development of terminal automation and smart ports, using more advanced and energy-efficient equipment, and continuing to facilitate technological upgrade and explore the use of technology. During the year, our terminal companies continued to proactively facilitate energy saving and emission reduction through the following four initiatives:

INITIATIVE 1: INSTALLING SHORE POWER SYSTEMS

The use of shore power system at terminals allows vessels to use electricity without running their engine generators when they are at berth, thus reducing fuel oil consumption, reducing air pollutants such as carbon emission, sulphides and nitrogen oxide, and also reducing noise, thereby creating a comfortable working environment at the terminals. Currently, all of our Subsidiaries in China have already installed shore power systems.

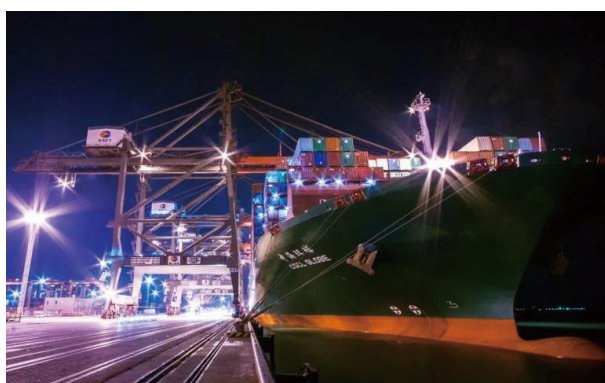
Case Study: Shore power systems at Xiamen Ocean Gate Terminal

Xiamen Ocean Gate Terminal has been actively investing in the construction and implementation of green projects such as shore power for vessels and intelligent production upgrades. It has already completed the construction and renovation of seven sets of shore power facilities, which can reduce carbon dioxide emissions by up to approximately 7,900 tonnes per year.



INITIATIVE 2: RETROFITTING ENVIRONMENTALLY-FRIENDLY LIGHTINGS FOR ENERGY-SAVING

In order to reduce energy consumption, our Subsidiaries continue to switch to using energy-efficient LED lighting systems to replace high-pressure sodium lamps with shorter lifespan and higher pollution. For instance, Guangzhou South China Oceangate Terminal replaced the 1,000 W sodium lamps of the quay crane by 400 W LED lamps; while the high-power lighting LED retrofits of Jinjiang Pacific Terminal and Xiamen Ocean Gate Terminal are expected to save more than 18,000 kWh and 2 million kWh of electricity per year, respectively.



INITIATIVE 3: ELECTRIFICATION OF INFRASTRUCTURE

We continue to promote diesel-to-electricity conversion with the objective to increase the proportion of electricity and hybrid energy use, and reduce the dependence on fossil fuels such as diesel and gasoline with higher carbon emissions. During the year, Jinjiang Pacific Terminal transformed four sets of traditional rubber tyre gantry (RTG) cranes into hybrid power, reducing the frequency of maintenance of engines and the consumption of lubricating oil. Meanwhile, CSP Zeebrugge Terminal acquired four hybrid container straddle carriers. Over the years, we have been facilitating diesel-to-electric conversion of equipment or the use of electric or battery-powered equipment covering gantry cranes, straddle carriers, articulated booms, reach stackers, empty container handlers and forklifts, among others, with the aim of reducing energy consumption and saving costs at the same time.



The Coverage of Electric RTG Cranes among the Subsidiaries in China by the end of 2021⁹:



12% Traditional RTG crane

88% Electric RTG crane (eRTG)

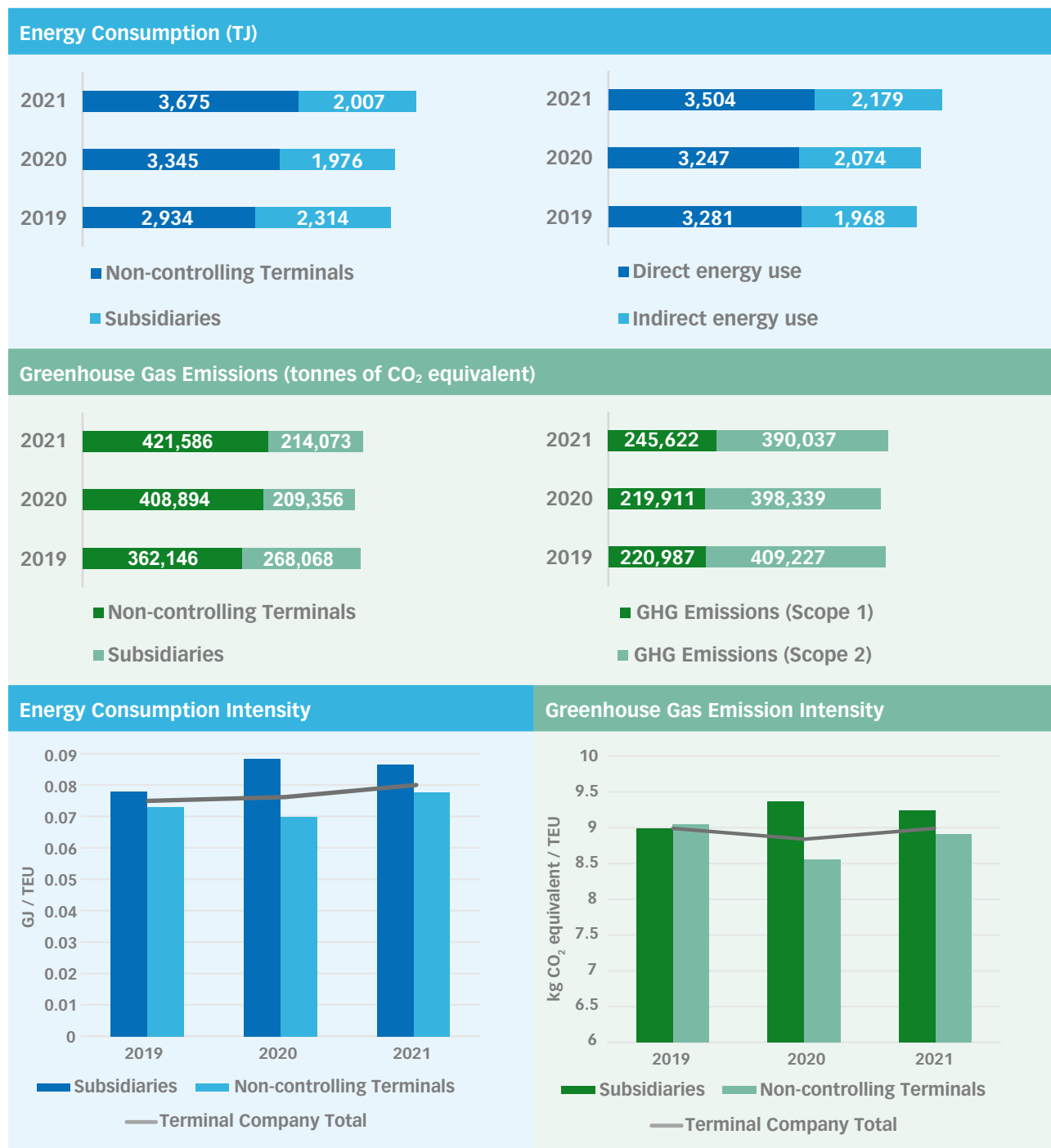
In 2021, the electrification of RTG reduced diesel consumption by around 890,000 litre, representing emissions of around **2,325 tonnes** of CO₂ equivalent.

INITIATIVE 4: CONTINUOUS PROMOTION OF THE APPLICATION OF NEW ENERGY

To improve air quality at the terminal and reduce carbon emissions, we continue to promote the use of liquefied natural gas or clean energy-powered vehicles and electric vehicles. CSP Spain Related Companies and Shanghai Pudong Terminal have initiated photovoltaic power generation projects and will install solar panels in the port area in the future. In addition, CSP Zeebrugge Terminal is conducting a feasibility study for wind power, with a view to promoting the use of renewable energy.

⁹ The statistics excludes CSP Wuhan Terminal.

PERFORMANCE SUMMARY OF ENERGY CONSUMPTION AND GHG EMISSIONS¹⁰



¹⁰ Excluding the energy consumption and GHG emissions of the Company. For details of our environmental performance, please refer to Chapter 12 – Appendices – Key Performance Indicators of this report.

PROPER MANAGEMENT OF RESOURCES

The Company follows international and industry best practices to ensure that natural resources are managed in a compliant manner, thus minimising the potential impact of business operations on the environment and natural resources.

WATER RESOURCES AND SEWAGE MANAGEMENT

Water used in terminal companies is sourced from municipal supplies. Production water consumption is mainly used for maintenance and repair of daily facilities and berth and yard cleaning, while domestic water consumption is used for office buildings and canteens. In an effort to effectively optimise the use and management of water resources, we set the following target for our Subsidiaries:

Improve water use efficiency	To enhance the management of water resources and improve water use efficiency.
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Our Subsidiaries actively carry out education campaigns to raise staff's awareness on water saving, and encourage them to save water on a daily basis, while implementing various water-saving measures based on specific circumstances, such as regular inspections of water supply networks, water saving equipment and system, and monitoring of water consumption levels to ensure prompt repairment of leak spots and avoid wastage.

In terms of sewage discharge management, we strictly follow the process specified in the Wastewater Quality Standards for Discharge to Municipal Sewers (CJ343-2010) to handle wastewater, so as to ensure the safe treatment of wastewater. The sewage treatment stations at terminals apply SBR activated sludge process to handle domestic and oily wastewater at ports. The oily wastewater generated from the oil-water separators will be passed to companies with professional qualifications for recycling purposes. The remaining sewage which passes the reclamation standard will be reused for irrigation and site cleaning. During the year, on top of the existing mobile mechanical sewage treatment station and domestic sewage treatment station, Guangzhou South China Oceangate Terminal implemented secondary treatment on the treated sewage, ensuring the water quality can meet the standard for domestic water, which can be reused for vehicle cleaning, toilet flushing and irrigating around the berths to achieve water saving.

WASTE MANAGEMENT

To optimise waste disposal and strengthen the protection of the ecological environment, the Company set the following targets for the Subsidiaries:

Hazardous waste	To maintain 100% hazard-free disposal of waste.
Non-hazardous waste	To reduce domestic waste by terminals and, in the long term, achieve the goal of zero domestic waste sent to the landfill.

We stick to the 3R principle of environmental protection, i.e. reduce, reuse and recycle, to reduce waste. The types of hazardous and non-hazardous waste generated from the terminals¹¹ during operations and respective treatment measures are as follows:

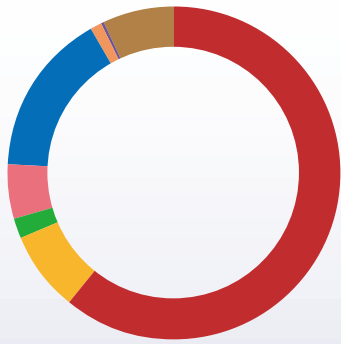
Types	Proportion of the overall waste of the Group*	Treatment measures
Hazardous waste		
Solid chemical waste (such as waste oil contaminated rag, waste wire rope, scrap metal, waste oil drum and waste oil sludge)	68.3%	Waste is collected and properly stored and handled by companies with professional qualifications or by material suppliers.
Liquid chemical waste (such as waste lead acid battery and waste oil)	7.9%	For waste oil, the terminals strengthen daily maintenance of machinery and equipment, and continue “diesel-to-electric” conversion to reduce waste oil generation.
Others	2.9%	
Non-hazardous waste		
Wooden pallets	4.1%	Companies with professional qualifications or material suppliers are engaged.
Others (such as municipal waste from ports)	16.7%	Waste is stored in collection zones before being transferred to designated locations by the environmental hygiene department for daily treatment in sealed containers.

* Add-ups may not be equal to 100% due to rounding.

11 For details regarding the materials used and the waste generated and recycled, please refer to Chapter 12 – Appendices – Key Performance Indicators of this report.

In 2021, the types of waste recycled by the Group are as follows:

Waste Recycled by Category in 2021



61.0%	Solid chemical waste
8.0%	Liquid chemical waste
1.9%	Other hazardous waste
5.3%	Wooden pallets
15.9%	Tyres
0.9%	Paper
0.2%	IT equipment
6.7%	Other non-hazardous waste

* Add-ups may not be equal to 100% due to rounding.

RESPONSE TO CLIMATE CHANGE

The Company operates terminals worldwide, including areas which are sensitive to climate change. We realise that the magnitude and velocity of climate change are intensifying, which adversely impact business operations and the places where we operate in. Therefore, we appointed an independent consultant to conduct climate risk and opportunity assessment in 2021 to actively enhance the governance of and transparency towards climate change. We focus on two areas in response to climate change:

Climate Change Mitigation	Climate Change Adaptation
Reduce greenhouse gas emissions (please refer to the section headed Energy Saving and Emissions Reduction in this chapter)	Enhance the governance of climate change (please refer to the section headed Measures to Respond to Climate Change in this chapter)

RISKS AND OPPORTUNITIES IN RELATION TO CLIMATE CHANGE

With reference to the recommendations from the Task Force on Climate-related Financial Disclosures (TCFD), we identified climate-related risks and opportunities on a preliminary basis, categorised the risks into physical risk and risks related to the transition towards a low carbon economy, and prioritised them according to their impacts on business operations. Extreme weather and climate events, carbon trading system and the IMO sustainable development strategies are identified as the most significant climate-related risks to our business.

Types of risks	Scope	Risk description
Physical Risk		
Risks arising from more frequent extreme weather or changes in climate patterns	Acute risks (such as extreme weather): typhoons, storms, droughts, floods, etc.	• Damage to ports and relevant facilities, vessels and goods, resulting in loss of assets • Extreme weather forces vessels to divert from their route, causing delays • Affect the capacity of waterways, thus requiring more dredging works • A decrease in volume of goods due to crop failure, eventually affecting terminal throughput
	Chronic risks: rising sea levels, continuous high temperatures, etc.	• Rising sea levels change wave and tidal patterns, affecting the schedules of shipping companies • Terminals need to be equipped with more refrigeration facilities due to rising temperatures to meet the demand from customers; staff may not be able to work long hours outdoors during hot season, hampering operational efficiency • The polar ice layer is melted to form a shorter distance and lower cost route at a particular period each year, affecting terminal throughput • Terminal infrastructure deteriorates faster due to rising temperature and ocean acidification, increasing maintenance costs
Transition risks		
Risk resulting from changes in policies, laws, technologies and market needs during the transition to low-carbon economy	Policies and legal risks	• Policies issued by the IMO • China's Emission Trading System (ETS) has enforced a carbon pricing mechanism • The national development strategy and guidelines for green shipping • EU Emissions Trading System • Industry framework on Poseidon Principles • Litigation claims in relation to climate-related risks
	Technology risks	• Increase in investments in renewable energy, and energy saving and emissions reduction technology
	Market risks	• Increasing demand for low carbon services and green ports from customers
	Reputation risks	• Customers' preference to partner with companies with better performance in sustainable development

While climate change has incurred risks, it has also brought potential business opportunities, which are analysed as follows:

Types of opportunities	Scope	Opportunity description
Resources efficiency	• Adopt more efficient means of transportation • Implement a more efficient process of production and distribution • Apply recycling technology • Buildings and facilities with higher efficiency are built • Reduce water discharge and water consumption	• Supply of liquefied natural gas to vessels • Compared with other modes of transportation such as air freight, road freight, rail freight, the amount of carbon dioxide emissions per kilometer-tonne of shipping is lower. It is expected that an increasing number of customers may change transportation methods and choose shipping in accordance with their own low-carbon strategies
Energy	• Sources of low-emission energy • Incentive from supportive policies • Rise of new technology • Participate in carbon trading market • Energy safety	• National/local subsidy policies (such as construction of green ports and shore power facilities, etc.) • Increase in transportation volume of green products (such as wind power equipment or electric vehicles)
Products and services	• Develop and/or expand low emission goods and services • Solutions to climate adaption and insurance risks • Research and development and innovation • Diversification of business activities • Change in consumers' preferences	• Global warming accelerates glacial meltdown and shortens the time for ice-freezing in the Arctic region, bringing development opportunities to the logistics and transportation business (including shipping services and ports) in the regions of open water
Market	• Entry to new markets • Motivation from authorities • Demands and initiatives from communities	
Adaptability	• Participate in renewable energy projects and adopt energy-saving measures • Alternatives/diversification of energy	

MEASURES TO RESPOND TO CLIMATE CHANGE

We analyse climate-related risks and opportunities, and develop strategies to mitigate and adapt to climate change, striving to minimise the threat of climate change to the business.

Typhoon Measures

During the year, several terminals experienced challenges from typhoons. Thanks to our regular drills on typhoon and flood response, our staff was able to effectively handle such emergencies and take contingency measures in a timely manner, thus ensuring their own safety and the orderly operations of the terminals.

We have standard procedures in place to deal with typhoons. Before the typhoon arrives, terminal workers will reinforce and secure on-site equipment, examine the leak-proof drainage measures and operation of rainwater pumping in key areas. After the typhoon arrives, relevant departments will keep track of the route of the typhoon. When the typhoon signal is withdrawn, the department of safety control will identify and investigate potential safety hazards, and other departments will facilitate the communication with shipping companies, pilot stations and control centres to resume terminal operations.

During the year, Quan Zhou Pacific Terminal established a wind-proof control system for quay cranes. The system will immediately suspend the operation of the quay crane when it detects a deviation between the operating speed and the actual speed of the quay crane, so as to ensure the safe and reliable operation of the quay crane under strong wind. This system was successfully awarded the first prize in the "Five Small" Innovation Competition for Millions of Workers organised by Fujian Federation of Trade Unions.

Case Study: Lianyungang New Oriental Terminal carried out drill against strong wind in spring

Lianyungang New Oriental Terminal organised a drill against strong wind on 26 March, simulating gusts of wind on site without prior notice and predetermined danger level. After receiving emergency reinforcement instruction, the personnel at each post reinforced the quay cranes and yard cranes immediately according to the contingency plan, and promptly checked whether the site met the requirements for stacking.

During the drill, all personnel took prompt actions, and mastered the windproof reinforcement process in a smooth and proficient way, which greatly improved the ability to respond to sudden severe weather.



Case Study: Guangzhou South China Oceangate Terminal and Guangzhou Nansha Stevedoring Terminal responded to Typhoon Kompasu

On 12 October, Typhoon Kompasu edged to the coastal area of Guangdong. Guangzhou South China Oceangate Terminal and Guangzhou Nansha Stevedoring Terminal immediately implemented anti-typhoon procedures, and issued a typhoon prevention notice to the shipping industry. The staff quickly used anchor chains to secure the quay cranes and the yard cranes, closed the gate at 9:00 pm, and suspended the service of outside vehicles. The night shift workers closely monitored the movement of Kompasu and the changes in wind and tidal water levels in the port area, so as to ensure that the terminals could resume normal operation in a safe and orderly manner as soon as possible after the typhoon weakened.



Measures to Prevent Heatstroke

The Group realises that climate change has led to an increase in the average temperature and heat waves have become increasingly frequent, which may affect the health of outdoor workers. To minimise safety accidents caused by high temperature, Nantong Tonghai Terminal has developed guidelines for working under high temperature. When the temperature goes up to 37°C for three consecutive days, the contingency steering group will adjust the rest break arrangement of outdoor workers, reduce outdoor working hours, increase manpower and adopt a more frequent rotation within shift. When the temperature is over 39°C, all outdoor operations will be suspended immediately.

Carbon Trading

Even before China launched the national carbon emissions trading system, Shanghai Pudong Terminal and Shanghai Mingdong Terminal were already included in the carbon trading scheme of Shanghai in accordance with the Interim Measures on Carbon Emissions Management of Shanghai Municipality starting from 2018. Since 2019, the two terminals have carried out carbon emission monitoring, reporting and settling, respectively. The Company and its terminals will continue to monitor the latest development of carbon trading, follow the technical specifications of carbon trading and related management in various regions, and cooperate with local governments in emissions reduction.

Innovative Goods

Investment in renewable energy is going up all around the world, resulting in more innovative goods. China has now become a major exporter of wind power equipment. A significant increase in orders for exporting wind power equipment is witnessed recently, allowing us to benefit from a green economy. We will continue to improve terminal facilities and procedures to support new cargo types in advance to ensure that the cargo can be safely delivered.

RAISING ENVIRONMENTAL AWARENESS

We continue to communicate with stakeholders to promote environmental protection awareness, implement various environmental protection initiatives in our daily operations with the aim of joining hands in building “green ports”.

The Company is committed to protecting the ecological environment of the places where it operates in, and reinforcing the principal responsibility of its Subsidiaries in China in terms of ecological and environmental protection. It also makes efforts to strengthen ecological and environmental protection education and training, and establish a sound and holistic ecological and environmental protection working mechanism covering supervision, accountability and performance appraisal to promote green and sustainable development. Based on the Statement of Responsibility for Operational Safety and Ecological and Environmental Protection of China COSCO SHIPPING Corporation Limited, we have set up a leading group on ecological and environmental protection and an ecological and environmental protection management office, which are responsible for assessing the current status of ecological and environmental protection and implementing performance appraisal among the Subsidiaries in China. They also conduct quarterly ecological and environmental protection inspections and special inspections so as to avoid material violations of laws and regulations.

In order to actively improve the ecological environment, Xiamen Ocean Gate Terminal conducts an annual survey on the ecology of the sea area near the terminal, monitors plankton and sediments, and conducts monthly inspections of sewage discharge outlets to ensure that daily operations of the terminal will not affect the ecological environment.

We shared articles such as Low-carbon Living Starts with Me, Happy Low-carbon Living from Green Consumption and Speeding up the Development of Low-carbon Production and Living on the Company's WeChat account to advocate the concept of low-carbon development, and promote the knowledge of ecological civilisation, green development and energy saving and emissions reduction. We also put up signs in office areas to encourage our staff to save water and turn off idle office equipment in order to eliminate unnecessary energy consumption.

