



SUSTAINABILITY AT
PSA SINGAPORE 2022

Propelled by Purpose

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About This Report

Sustainability is a Cornerstone of our Business Strategy

PSA Corporation Limited (PSA SG) is proud to present our 6th sustainability report.

This report has been prepared in accordance with the updated GRI Universal Standards in 2021, and is guided by the GRI Reporting Principles. For more information on specific standards applied and disclosures reported, please refer to the GRI Content Index on page 118. This report was published on 14 August 2023.

In this 6th edition, we continue to enhance our coverage and extend our scope to encompass additional aspects deemed material within PSA SG's sustainability framework.

This report encompasses PSA SG and its subsidiaries. Data and information presented in this report reflect PSA SG's performance in our financial year from 1 January to 31 December 2022, unless otherwise stated. We have gathered relevant data and information from our business unit representatives and incorporated them where available. To demonstrate our progress in our sustainability journey, any restated data or information from 2020 and 2021 will be clearly highlighted in the corresponding sections of the report. We have utilised standard units of measurements to ensure comparability of the data reported, and where necessary, their conversion factors have been provided.

The data presented in this report has undergone a comprehensive internal review. We will review the corporation of external assurance in the future.

**For feedback, you can reach us at
sg.psa.contact@globalpsa.com**



Regional CEO Southeast Asia's Message



I am pleased to present our sixth Sustainability @ PSA Singapore update. This annual report is a testament of our collective sustainability commitment and pledge to net zero, setting out the roadmap as we take firm actions to do our part to build a sustainable future.

As we look back on 2022, there are many things to be thankful for. We have emerged stronger as the global Covid-19 situation stabilised and the world adapted and transited to a new normal. As an essential business, PSA Singapore (PSA SG) has enhanced our international standing as we worked closely with our partners and stakeholders to keep cargo moving and global trade going. 2022 was also a milestone year for PSA SG with the opening of Tuas Port – the port of the future. This would not have been possible without the steadfast commitment and unwavering support from our management, unions, staff, customers, and partners.

The outlook is uncertain amid global trade slowing down, supply chain disruptions and rising geopolitical tensions, and we must brace ourselves for the bumpy road ahead. We will strive to do what is right, secure sustained strategic growth and do good for the community and the future generations.

Sustainability is at the Core of Everything we do

Sustainability is no longer an option. Companies can be green and profitable at the same time. In support of the heightened global commitment to net zero, the Singapore Government raised its climate ambition further in October 2022, pledging to achieve net zero emissions by 2050. To support this national target, PSA SG must persevere in our efforts to drive a sustainable value chain as we take pride in being a good steward of our environment and sustainable operations. We incorporate Environmental, Social and Governance considerations in all our business decision-making and management.

“

Sustainability is no longer an option. Companies can be green and profitable at the same time.

”

In the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 6 (AR6) Synthesis Report published in March 2023, it “underscores the urgency of taking

more ambitious action and shows that, if we act now, we can still secure a liveable sustainable future for all”.

The challenges ahead are not stopping PSA SG from accelerating our own drive for change. Propelled by purpose, we continue to build on our core business as the world’s largest container transshipment hub to drive trade growth and global connectivity for Singapore’s economy, as well as ramp up digitalisation to create a seamless global supply chain.

With PSA International’s successful acquisition of BDP International in April 2022, this enhances and extends our logistics ecosystem with solutions that focus on supply chain orchestration and cargo flow optimisation. This will provide our customers with more innovative and sustainable end-to-end supply chain solutions.

Decarbonisation Vision and Strategy

We remain committed to meet our long-term decarbonisation targets of reducing port greenhouse gas (GHG) emissions by 50% by 2030 against a 2019 baseline and achieve net zero emissions by 2050. PSA SG is progressing on a dual pathway roadmap to transit to low-carbon port operations through low carbon fuels and equipment electrification. This dovetails with our overall business expansion and sustainability strategies.

As part of our ongoing effort to green our horizontal transport, we will have eight units of electric prime movers and one unit of hydrogen fuel cell prime mover by end 2023.

We are also looking to green our electricity supply through renewable energy import from the region and lower carbon energy source.

In addition, we are also developing new capabilities in automation and the use of artificial intelligence of things (AIoT) to deliver intelligent insights, predictive analytics and augment our existing capabilities in engineering and operations.

Some of our ambitious decarbonisation plans are already introduced in Tuas Port, officially opened on 1 September 2022. Sustainably developed, Tuas Port is a focal point of the wider Tuas ecosystem and is a game-changer in Singapore’s port and supply chain operations. When fully operational in the 2040s, Tuas Port is expected to be the world’s largest fully automated container terminal in a single location powered by smart technology and green energy, with an annual handling capacity of 65 million Twenty-foot Equivalent Units (TEUs).

Everybody Makes a Difference

PSA SG’s goal is to make green thinking a key part of our company culture. The Greenfish Sustainability Mobile App (Greenfish App) was launched in June 2022 to leverage technology to engage all PSA SG colleagues in sustainability.

A suite of activities was rolled out via the Greenfish App. More PSA SG wide campaigns will be rolled out in 2023 to encourage colleagues to adopt sustainable habits.

Regional CEO Southeast Asia's Message (cont'd)

Human capital remains our biggest asset and cultivating talent is vital to our continued success. We work closely with the unions to upskill and reskill our colleagues to take on new and higher-value roles created by our digital transformation efforts. Smart technologies and intelligent data-driven operations management systems are deployed at an unprecedented scale to deliver service excellence. To ensure sustainable business growth, intelligent automation supported by a future-ready workforce and sustainable business practices are instrumental.

“

PSA SG's goal is to make green thinking a key part of our company culture.”

As part of our workforce transformation to meet business needs, PSA SG will train skilled professionals in cross-disciplinary roles, such as the Automated Equipment Specialists at Tuas Port. Apart from providing resources and opportunities for staff to upskill and reskill, we will also support them with technical knowledge transfers through collaborations with industry partners in areas such as energy management and Artificial Intelligence. To complement hard skills, we will look towards moulding people developers. Coaching and mentorship opportunities are curated to enhance talent development, in addition to the introduction of TalentTech 4.0

which enables staff to have the flexibility in project management outside their primary responsibilities. These are supporting tools which staff can tap on to expand their network and gain new experiences.

Recognition for our Efforts

PSA SG is honoured to be named “Best Container Terminal – Asia (over 4 million TEUs)” at the 2022 Asian Freight, Logistics and Supply Chain Awards. This marks the 32nd time PSA SG has won the award. We also won the “Container Terminal Operator of the Year” award for the 14th time at the Supply Chain Asia Awards 2022.

On the sustainability front, PSA SG was recognised with the “SGBC-BCA Business Leadership in Sustainability Award”. For our efforts in doing good for the community, PSA SG was awarded the “Champions of Good” award by the National Volunteer and Philanthropy Centre.

A big thank you for the dedication and hard work of our staff, and strong support from our unions, customers and stakeholders.

The Journey Ahead

2023 continues to be plagued with uncertainties and challenges. With a mindset that a glass is half full (and not half empty), we can reframe our mindsets to harness risks into opportunities. We have done this before and we must persist in doing so to sharpen our competitive edge, entrench ties and strategically position ourselves to capitalise on every situation. We will

continue to develop products, solutions and actions across the five themes of Port, Port+, Digitalisation, Sustainability and Talent.

The development of Tuas Port will continue as planned. It is the manifestation of our vision of a smart and green port, where automation, technology and design allow us to intensify land and resource usage to optimise our capacity. We are co-creating the Tuas ecosystem, curating supply chain capabilities and synergising logistics flow to better support identified key industries. Complemented by digital integration with the broader logistics ecosystem, the port and the upcoming Port+ Hub will be an integral part of the Tuas ecosystem, enabling enhanced container flows and connectivity.

We are on track with decarbonisation efforts in Scope 1 and 2 and will continue to focus our efforts in this area. We believe

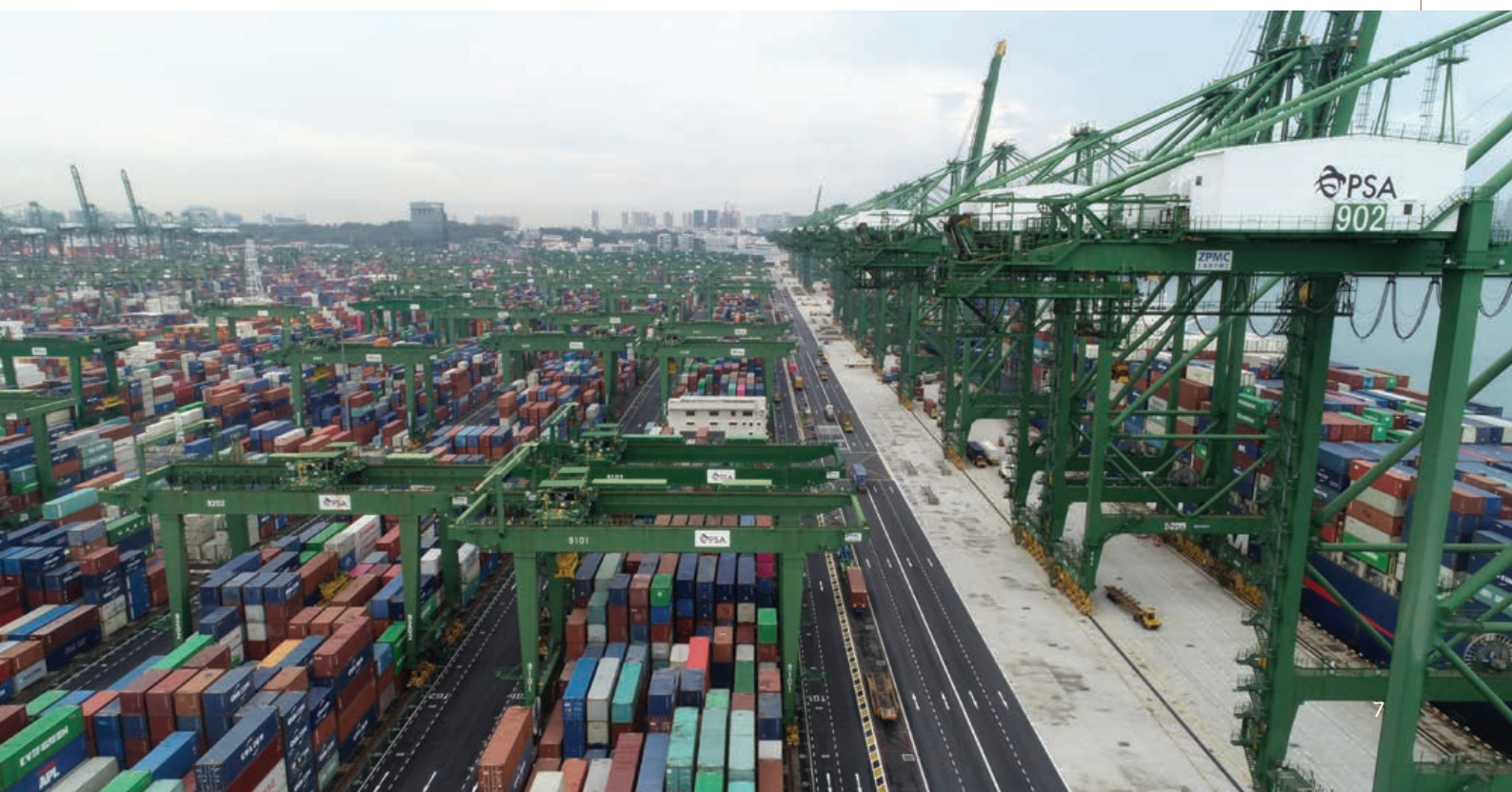
in our responsibility as a global supply chain orchestrator to assist our stakeholders and partners in advancing their sustainability goals.

Sustainability is a journey. Ensuring that PSA's operations and business continue to generate long-term sustainable value for all our stakeholders defines our purpose. We will continue to embed this in all that we do and keep in mind the impact of our business decisions on people, communities, and the environment. Together, we can make a difference.



Ong Kim Pong

Regional CEO, Southeast Asia
PSA International



About PSA Singapore



PSA SG is a fully owned subsidiary of PSA International (PSAI), a leading global port operator and trusted supply chain partner to cargo stakeholders. With flagship operations in Singapore and Antwerp, PSAI's global network encompasses 160 locations in 42 countries around the world. The group's extensive portfolio comprises over 60 deep-sea, rail, and inland terminals, as well as affiliated businesses in supply chain management, logistics, marine and digital services.

PSAI leverages the deep expertise and experience of our diverse and global team to establish meaningful collaborations with our customers and partners, providing world-class port services, developing innovative cargo solutions, and co-creating an Internet of Logistics. As the partner of choice in the global supply chain, PSA has earned the moniker "The World's Port of Call".

PSA SG operates the world's largest transshipment hub in Singapore with unrivalled connectivity, facilitating container movements across the world, 24/7 all year round. PSA SG handled 37 million TEUs in 2022.

Beyond port operations, PSA also offers PORT+ services, our unique differentiator in mid-mile logistics, to meet our customers' dynamic needs. This value adding service, supported by our bespoke PORT+ digital solutions, will provide shared visibility of the end-to-end supply chain. We aim to create more agile, resilient and sustainable supply chains with Port+ as a key differentiator to capture the entire value chain.

PSAI leverages the deep expertise and experience of our diverse and global team to establish meaningful collaborations with our customers and partners, providing world-class port services.

About PSA Singapore

Seizing Future Opportunities and Possibilities

The age of digital revolution and the rise of big data, aided by artificial intelligence, continues to drive rapid changes across organisations, opening incredible growth opportunities and possibilities. To meet future demands, PSA is focusing on four key areas:



We continue to **strengthen our core container business** and seek innovative ways to deepen our collaboration with like-minded partners and stakeholders to ensure that we continue to deliver service excellence. Concurrently, there will be continued emphasis on automation and other applications to uplift productivity and improve energy efficiency.



Provide **value-added services** and **bespoke solutions** through Port+, our unique differentiator in mid-mile logistics, facilitating global trade and cargo flow amidst ongoing supply chain disruptions. In line with Singapore's future economic plans, PSA will develop supply chain capabilities to optimise and meet the needs of different industries.



Enhance our growing data analytics and digitalisation capabilities to **provide greater intelligence and insights** that would yield robust decision-making and collaboration with our stakeholders. Harnessing big data for business growth, strategic planning, and decision-making offers PSA greater opportunities for competitive advantage as we create a more sustainable and resilient business.

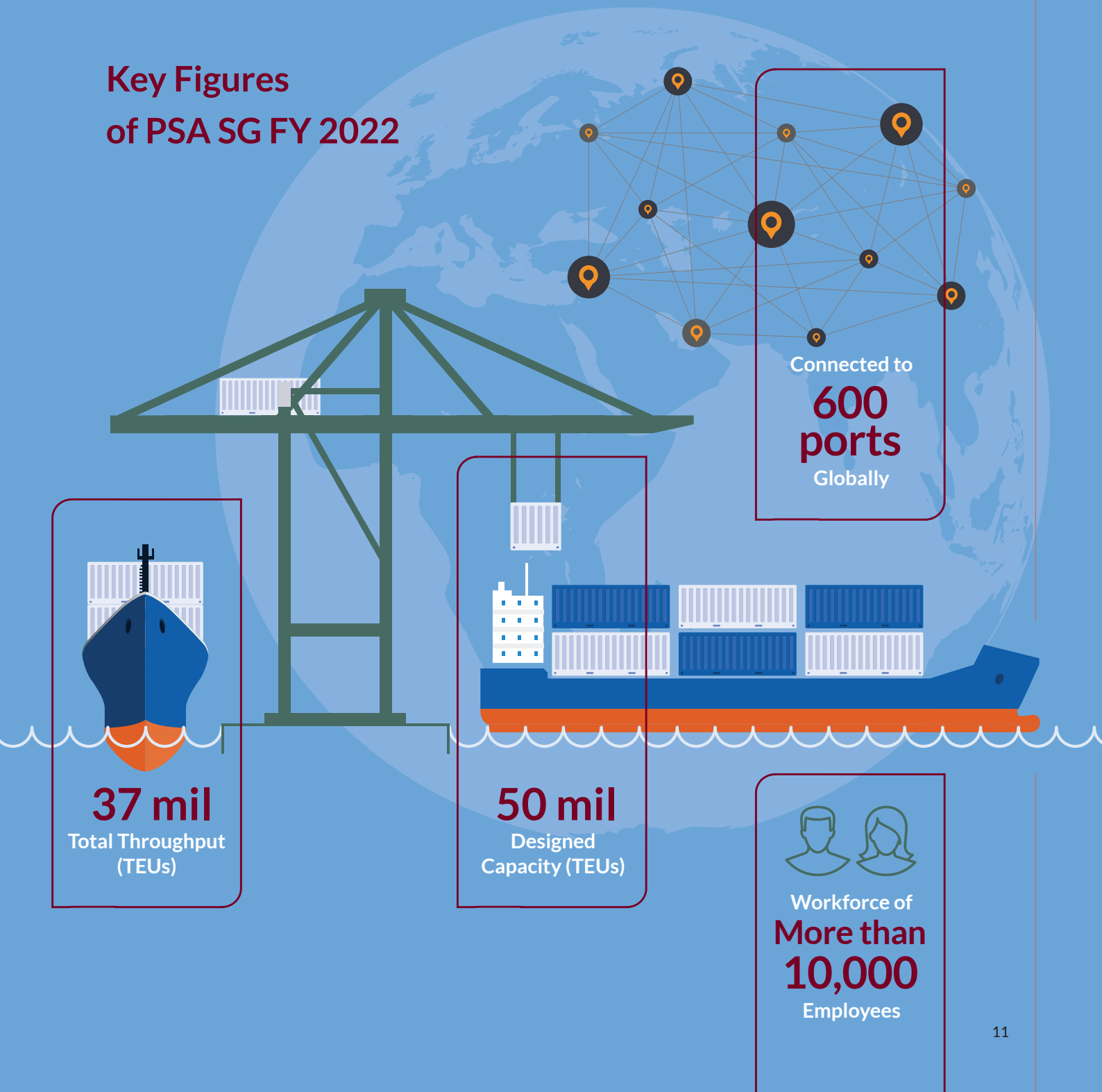


Environmental, Social and Governance (ESG) priorities underpin how we enable sustainable business. PSA's decarbonisation and sustainability efforts span across the above 3 areas and scope 1, 2 and 3 emissions. Beyond decarbonisation, the importance of green procurement and the development and adoption of regulations, standards and data, are also important in our roadmap.

Vision to Create Value

PSA SG aims to fortify its position in the market by preserving its port's value proposition as a dependable and resilient hub in the global supply chain. Apart from just handling port operations, we assist shippers and cargo owners in transporting their goods across the entire supply chain in a cost-efficient and sustainable manner. Leveraging on digital technology, PSA SG is determined to enhance its role as a facilitator of global trade and supply chain orchestrator, and achieve its vision to co-create the "Internet of Logistics".

Key Figures of PSA SG FY 2022



About PSA Singapore

Core Values

We are committed to staying true to our values in all actions and relationships, as we work alongside our various stakeholders.



1

Committed to Excellence

We set new standards by continuously improving results and innovating in every aspect of our business.



2

Focused on People

We win as a team by respecting, nurturing, and supporting one another.



3

Dedicated to Customers

We help our customers, external and internal, succeed by anticipating and meeting their needs.

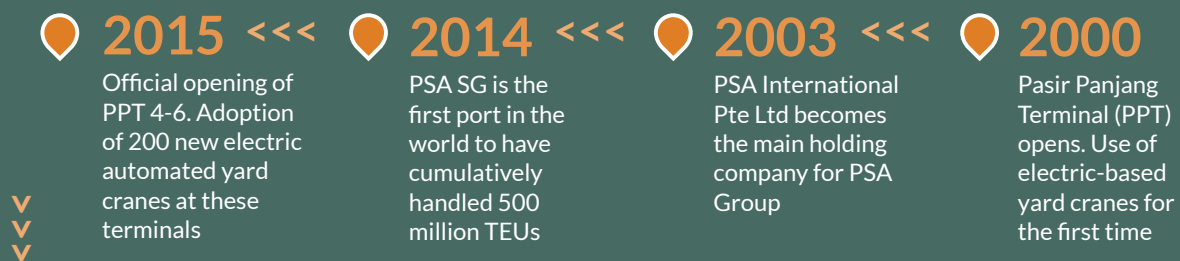
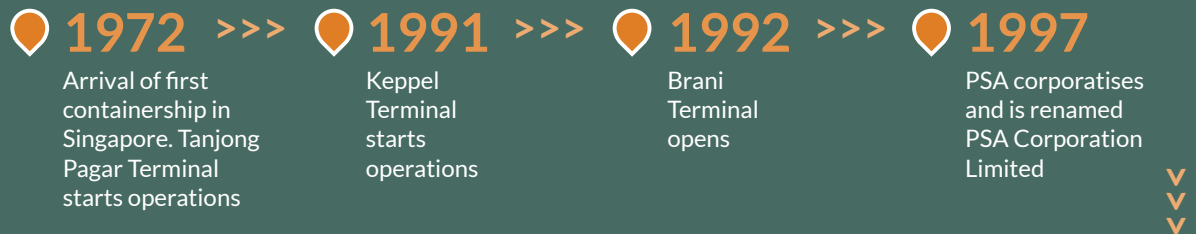


4

Integrated Globally

We build our strength globally by embracing diversity and optimising operations locally.

Key Developments and Sustainability Journey



Our Approach to Sustainability

PSA SG strives to establish a robust sustainability strategy that can be integrated into all aspects of our business operations. We uphold our responsibility towards global sustainability initiatives and have aligned our objectives with 6 United Nations Sustainable Development Goals (SDGs) to navigate towards creating a more sustainable future for the company, our partners and our customers.



Our Sustainability Strategy Framework

Our goals are aligned to PSA's Sustainability Strategy Framework that was formulated in 2020 and we are committed to translating the goals and visions established at the Group level into PSA SG.



Material Sustainability Topics — Environment

To identify and assess our most critical environmental, social, economic and governance topics that have the most impact and influence on our operations and stakeholders, we conducted an in-depth engagement with our stakeholders as part of our materiality assessment. This includes both our internal and external stakeholders, including our board members, employees from across our business units, unions, investors, customers, suppliers and regulatory authorities. Our material sustainability topics were also validated and approved by the senior management and the Sustainability and Technology Supervisory Committee (S&T SC).

By disclosing our goals, objectives, and accomplishments on these topics in our sustainability strategy and reporting, we aim to demonstrate our commitment towards driving sustainability across our business operations.

Climate Change Adaptation

Strengthening our resilience and management of the physical and transition impacts of climate risks on our infrastructure, operations, surrounding communities and ecosystems, as well as our readiness to leverage opportunities in a low-carbon economy.

Emissions and Energy

Reducing carbon emissions across our businesses and supporting the decarbonisation of the shipping and logistics industry. Reducing our energy consumption and intensity by harnessing energy-saving and efficiency technology, as well as increasing the use and generation of renewable energy.

Environmental Protection

Protecting our people through protecting the work environment they are in by ensuring that the air quality and boundary noise level are within healthy limits with good haze response management in place.

Green Port Culture

Cultivating a generative culture where our people are green-minded, green-skilled, and green-motivated. To make green thinking a key part of the company culture.

Waste Management and Recycling

Adopting more circular approaches to optimise resource use, minimise the waste generated in our operations and increase recycling.

Water Use and Pollution

Ensuring efficient use of water, water conservation efforts and responsible management of wastewater discharge.

Material Sustainability Topics — Social

Community Relations

Contributing meaningfully to the lives and wellbeing of the communities where we operate, and engaging community stakeholders to address the social and environmental impact of our operations.

Employee Diversity and Inclusion

Creating a workplace environment that respects and promotes diversity and inclusion.

Labour Relations and Worker Wellbeing

Maintaining strong relationships and engagement with labour unions, establishing best practice labour standards, including respecting human rights, having zero tolerance of modern slavery and ensuring worker wellbeing.

Occupational Health and Safety

Ensuring the highest standards of health and safety for workers across our operations.

People Development

Building a future-ready organisation by attracting and retaining an engaged workforce, providing learning and development opportunities, and cultivating a purpose-driven organisational culture that is aligned with our values and supports our people to do their best work.



Material Sustainability Topics – Governance

Cybersecurity and Data Privacy

Protecting our business systems and ensuring data privacy through adoption of robust cybersecurity measures.

Ethical Business Conduct

Upholding high standards of ethics and regulatory compliance, to go beyond minimum legal requirements, reflecting our long-term commitment to building a business that is successful, honest and responsible.

Innovation and Technology

Innovating and harnessing technology to drive digitalisation and create more efficient and sustainable operations.

Optimisation of Global Supply Chains

Driving sustainability improvements in shipping and logistics supply chains by working with suppliers, partners and customers on route optimisation and alternative transport options for better efficiency and safety.

Port Security

Ensuring safety and security of port operations, including ensuring responsible handling of dangerous goods, as well as working with relevant authorities and partners to put in place adequate controls to safeguard against terrorism and illicit trade.

Sustainable Port Development

Ensuring that the planning, design and development of port infrastructure and operations take into account and addresses the environmental impacts from land development and reclamation.

Sustainable Procurement

Minimising environmental impacts and creating positive social impacts through our procurement of goods and services, by integrating sustainability criteria in the selection, monitoring and evaluation of suppliers, including ethical behaviours, environmental protection and upholding human rights.




Collaborative Partnerships with Common Goals

We recognise that decoupling business and economic growth from carbon emissions requires the development, adoption, and localisation of green technology, both within and outside of the port.

We are committed to playing a proactive role in collaborating with stakeholders and industry partners to build and operationalise green technology capacity and standards. This includes actively engaging in research and development efforts, fostering innovation, and promoting the adoption of sustainable and green technologies within its operations and throughout the broader industry.

- 
1. **Agency for Science, Technology and Research (A*STAR)**
 2. **Economic Development Board (EDB)**
 3. **Energy Market Authority (EMA)**
 4. **National Climate Change Secretariat (NCCS)**
 5. **National Research Foundation (NRF)**

- Support from the Low-Carbon Energy Research Funding Initiative (LCER FI), a multi-agency initiative involving A*STAR, EDB, EMA, NCCS and NRF. It is co-driven by EDB and EMA, with A*STAR as the implementing agency on behalf of the Singapore Government.
- LCER FI is started by the Singapore Government to support research, development, and demonstration projects on low carbon energy technology solutions such as but not limited to hydrogen, carbon capture utilisation and storage, and industry adoption.
- The Singapore Government's investments in low-carbon energy solutions are part of the Singapore Energy Story and will support the country's ambitions under the Long-Term Low-Emissions Development Strategy and the Singapore Green Plan.

- 
1. Chiyoda Corporation (Chiyoda)
 2. City Energy
 3. Jurong Port
 4. Mitsubishi Corporation (Mitsubishi)
 5. Sembcorp Industries
 6. Singapore LNG Corporation Pte Ltd (SLNG)

- With support from NRF, MPA and LCER FI, PSA SG partners the 6 companies to pioneer ways in utilising hydrogen as a viable low-carbon green energy source in Singapore.
- The companies will work together to evaluate the technical and commercial feasibility of hydrogen as a low-carbon energy source. They will also identify and demonstrate the various potential use cases in which Chiyoda's SPERA Hydrogen™, Liquid Organic Hydrogen Carrier (LOHC) technology can be implemented to allow the safe transportation of hydrogen in chemical tankers at normal atmospheric temperature and pressure. The technology is based on Methylcyclohexane (MCH) as a hydrogen vector. MCH is a form of organic hydride and is currently the safest form of hydrogen vector to transport hydrogen over long distances.

Collaborative Partnerships with Common Goals

- 
1. Chiyoda Corporation
 2. City Energy
 3. Jurong Port
 4. Mitsubishi Corporation
 5. National Technological University of Singapore (NTU)
 6. Sembcorp Industries
 7. Singapore LNG (SLNG)

- PSA SG is one of the industry collaborators in Singapore and Japan supporting NTU to develop new technologies for the extraction of hydrogen from liquid organic hydrogen carriers to power Singapore's green energy future. The project aims to contribute to the design of a cost-effective hydrogen supply chain network for Singapore.
- Liquid organic hydrogen carriers are flexible media for the storage and transportation of renewable energy. The research project thus has the potential to allow for more efficient and economical transport of hydrogen, which can in turn contribute to the expansion of global hydrogen supply chains.
- The collaboration is made possible by a grant awarded under the LCER FI.

- 
1. Energy Market Authority (EMA)
 2. Envision Digital
 3. Durapower

- Testbed a port-based smart grid management system (SGMS) with battery energy storage system at Pasir Panjang Terminal to optimise and improve energy efficiency of port operations, market participation, enhance grid resilience and support grid stability.

Enterprise Singapore

- Funding for OptETruck, a PSA SG offering to the haulier community to enable asset pooling and optimise the matching of trucks to jobs.
- Funding under its Partnerships for Capability Transformation (PACT) Programme for ePMs and Hydrogen PMs for a year.

JTC Corporation (JTC)

- To create a more sustainable, efficient and resilient supply chain ecosystem for companies on Jurong Island with transportation of container-on-barge and positioning of empty containers to enable manufacturers on the island to utilise the empty containers to export their end products.



Collaborative Partnerships with Common Goals

Land Transport Authority (LTA)

- PSA SG is working with LTA and stakeholders to establish and proliferate an electric truck ecosystem.

Singapore Green Building Council (SGBC)

- PSA SG engages SGBC to tap on its advocacy on green building design, practices and technologies for our colleagues in the Planning and Design team to keep abreast on environmental sustainability matters in the building and construction industry. PSA SG also shares its experiences and best practices in sustainable built environment with the objective to drive environmental sustainability in the building and construction industry.

The Silk Alliance

Inaugural members of 'The Silk Alliance' are

A) shipowners:

1. **MSC Shipmanagement Ltd**
2. **Pacific International Lines**
3. **Wan Hai Lines**
4. **X-Press Feeders**
5. **Yang Ming Marine Transport Corp**

B) shipyards:

SEATRIM

C) bunker logistical supplier:

Singfar International

D) engine manufacturer:

Wärtsilä


E) ship manager

Wilhelmsen Ship Management

F) financial institutions

1. **Asian Development Bank**
2. **ING**

- PSA joins 'The Silk Alliance', a cross supply-chain maritime partnership dedicated to the development of a fleet-specific fuel transition strategy for the intra-Asia container trade, based on the Hub's First Movers Framework.
- This multinational coalition was initiated by Lloyd's Register Maritime Decarbonisation Hub, a joint initiative between Lloyd's Register Group and Lloyd's Register Foundation that brings together thought leaders and subject matter experts with the skills, knowledge and capabilities to help the maritime industry design, develop and commercialise the pathways to future fuels required for decarbonisation.
- With the inclusion of PSA SG, 'The Silk Alliance' is set to benefit from an even wider range of deep maritime expertise from 12 top industry leaders to foster industry collaboration in the establishment of a Green Corridor Cluster in Singapore and the wider Asia region.
- The partnership will work towards delivering learnings from focused studies and workshops to develop the strategy needed to transition intra-Asia shipping fleets to zero carbon fuels.



Collaborative Partnerships with Common Goals



Global Centre for Maritime Decarbonisation (GCMD)

- PSA SG participated in an ammonia bunkering safety study led by GCMD.

Hydrogen Fuel Cell Association of Singapore (HFCAS)

- Network and synergise with like-minded association members to influence, educate, and promote the use of hydrogen and fuel cells in the Singapore context to help Singapore decarbonise and move towards a greener energy mix for power generation, mobility, and industrial applications.

Extending Sustainability Development Beyond the Port

In line with UN SDG 17 “Partnership for the Goals”, PSA believes that collaboration between governments, the private sector and civil society is crucial to accomplish a successful sustainable development agenda.

We leverage our ability to influence the maritime industry and actively seek out like-minded partners to join us in our sustainability journey. By combining diverse perspectives, resources, and expertise, we can accomplish more together than we ever could have alone, driving greater change and reaching a wider audience.



Our Sustainability Governance

PSA SG's approach to sustainability is guided by the policies and procedures established at the Group level. The Board of directors have the overall responsibility for the direction of the company. They are directly involved in the management of sustainability at PSA and provide oversight of PSA SG's sustainability materiality assessments. At the Board's discretion, they can also require management to follow up on any potential areas of concern.



PSA SG supports the Group's Sustainability and Technology Supervisory Committee (S&T SC), responsible for charting the sustainability direction of the company. With oversight from the Board, the S&T SC provides a supervisory role in ensuring that sustainability and technology initiatives are in line with PSA's overall business and sustainability strategy, spending, and investments. PSA SG provides updates to the committee on the company's progress on sustainability and technology projects during the triannual meetings, or as frequently as required.



PSA SG's senior management is also represented in the Senior Management Council (SMC), who oversees the company's sustainability strategy, together with the Board.



PSA SG aligns with the Group's Climate Response Management System (CRMS), managed by the Group Climate Response Command (GCRC). The GCRC was established to coordinate and promote group-wide sustainability and climate response efforts, together with the Supply Chain Sustainability Solutions (SCSS) team. They are responsible for the development, implementation, and monitoring of our sustainability strategy, working in tandem with five cross-functional sub-committees of Climate RESponse Agents (CRESTs), in the areas of competence, communication, intelligence, technology and external projects. PSA SG is represented in CRESTs.

Our Sustainability Governance

Within PSA SG, Technology and Sustainability Solutions Division partners stakeholders internally, including Institutes of Higher Learning (IHLs), the wider Maritime community and industry experts to unlock new value pools through private public partnerships on technology and sustainability-related initiatives.

Through our established governance structure, PSA seeks to drive our sustainability vision and mission through our operations.



Environment



Climate Change Adaptation

Governance

As part of PSA Group, PSA SG's inputs, initiatives and targets are included in the Group's Climate Response Management System (CRMS). The CRMS provides to adapt to climate change and mitigate emerging climate-related physical and transition risks.

Our terminals are stress tested for extreme weather events in line with Singapore's approach. The approach adopts scenario analysis based on different pathways. In our scenario analysis, we had considered a range of different scenarios, including a very high GHG emissions scenario (based on IPCC's SSP5-8.5 scenario) to consider how extreme weather events may cause damage and disruptions to our terminal operations.

In line with this approach, we work closely with our national agencies, MPA and PUB to address terminal vulnerability and the adaptation actions needed, with a dedicated team consisting of risk and engineering trained colleagues working together to understand, assess and build awareness around changes in sea levels, precipitations, and their corresponding impacts.

The findings and recommendations are feedbacked into the CRMS which Group Climate Response Command (GCRC) has oversight. The GCRC is established at Group level with the responsibility to develop and execute sustainability strategies. Climate actions having top priority. At least quarterly, the GCRC reports to PSA's Senior Management Council (SMC), where PSA SG is represented by our Regional CEO, Southeast Asia.



Environment

Strategy, Metrics and Targets

PSA SG recognises that an effective climate change response strategy is not a binary option between addressing physical risks or transitions risks but rather to implement both approaches simultaneously.

We have adopted long-term decarbonisation targets of reducing our absolute emissions by 50% by 2030, 75% by 2040, and achieving net zero emissions by 2050. Given that we expect business volumes to grow through this period, the targets translate to an even higher quantum of emission intensity reductions needed.

Meeting 2030 decarbonisation goals for PSA SG entails **three main drivers**:

1. Reduce scope 1 emissions by adopting lower-carbon fuels such as LNG and converting diesel yard cranes to hybrid to reduce diesel consumption. By the end of 2023, PSA SG will adopt a further 50 units of LNG PMs to make for 210 units.
2. Electrification converts and significantly reduces scope 1 into scope 2 emissions. Equipment at Tuas Port will be fully electric. At Pasir Panjang Terminal, we will convert and replace more than 90% of our diesel yard cranes to electric or hybrid variants by 2030. We will also be progressively replacing ageing diesel prime movers with electric prime movers.
3. With electrification, our Scope 2 share of total emissions will continue to increase to about 60% of total Scopes 1 and 2 emissions by 2030. To further reduce total emissions to meet the 2030 decarbonisation milestone, PSA SG will tap into green electricity to abate our Scope 2 emissions.

To assess, manage and monitor the development of physical climate risks, PSAI has developed a Climate Risk Assessment and Adaptation (CRAA) Framework, including internal guidelines to ensure that these risks are considered into the design and construction of our Tuas Port vis-à-vis their expected operating lifespan. CRAA also covers adaptation measures for our existing terminals, i.e., Pasir Panjang Terminal.

Risk Management

As part of climate risk management, PSA Group has identified the material climate risks comprising of both physical and transition risks. Based on these, we have reviewed and adapted the most material risks that our operations in Singapore face.

Similar to the Group's approach, we have assessed the impact of climate change via two dimensions:

1. **Physical risks**, which comprises of both acute physical risks (due to extreme weather occurrences) as well as chronic physical risks (due to longer-term changes in the climate, such as increasing mean temperatures and changing rainfall patterns).
2. **Transition risks**, which are concerned with if and how we can adjust to pace of change necessitated because of regulatory, economic, and societal shifts towards a greener economy and more climate-friendly future, as obligated or expected by our stakeholders.

We recognise that climate change is a business risk multiplier and that it is vital for us to track and act on the climate risks which have the largest potential impact on our operations.

Environment

Physical Risks

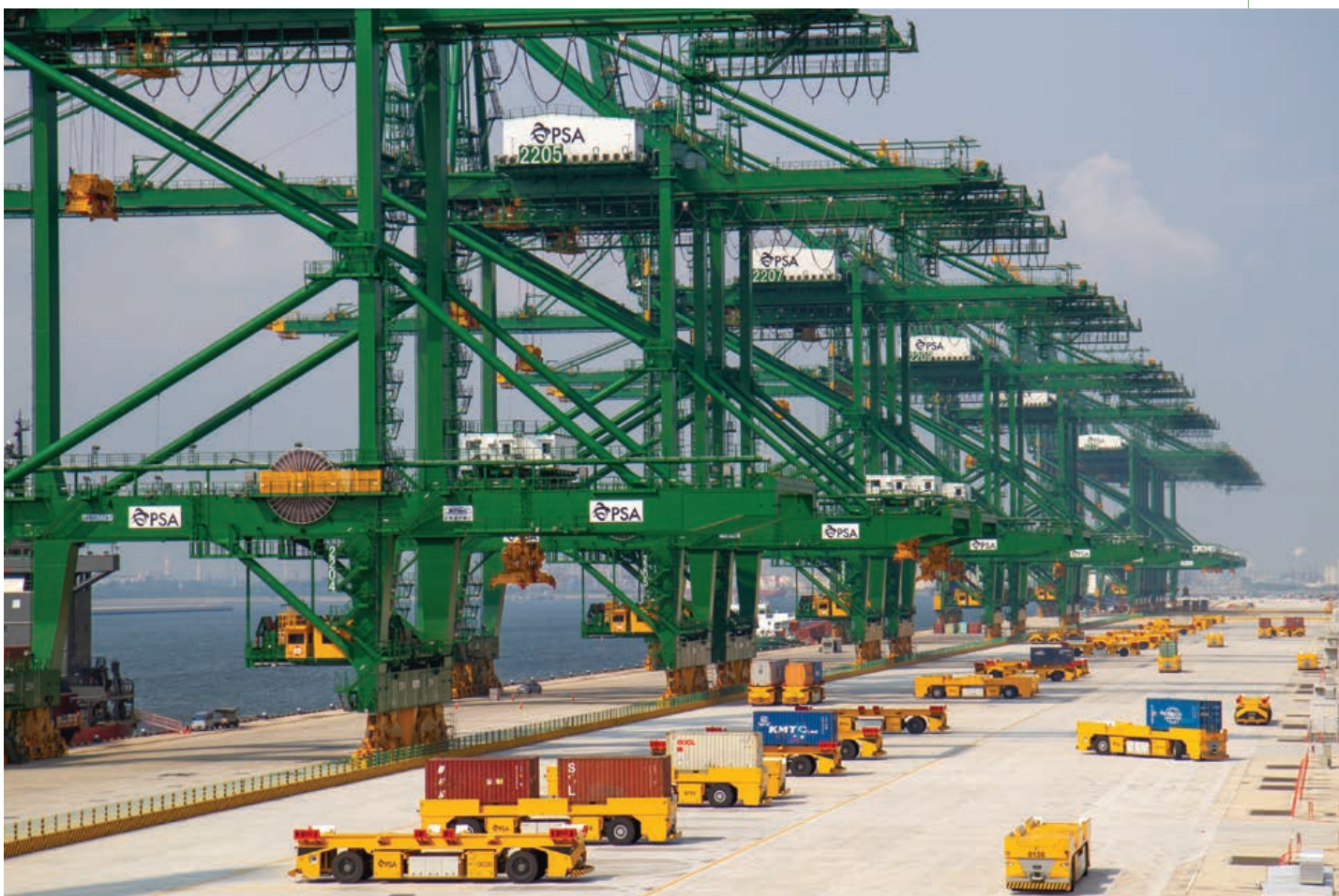
Category	Description	Potential Impact(s)
Acute physical risks	Extreme weather risks (wind, storms)	Operational difficulties, damage to infrastructure / container handling equipment, disruption to supply chain and shipping schedules.
Chronic physical risks	Rising mean sea levels	Increased risks of coastal inundation of quay infrastructure and flooding risks.
Chronic physical risks	Rising mean temperatures	Loss of workforce productivity, higher occurrence and intensity of transboundary haze events.

Transition Risks and Opportunities

Category	Description	Potential Impact(s)
Policy / legal risks	Rapidly evolving regulatory and legal landscape over climate and ESG issues.	Risks emerging from current and future carbon taxes alongside increased compliance reporting requirements impacting supply chains and terminal operations, escalating compliance requirements relating to climate related and ESG regulations and disclosures.
Market risks	Changing market preferences and demographics.	Customers, including shipping lines and cargo owners, are increasingly considering environmental factors in their supply chain decisions. Opportunity: The growing focus on sustainability provides emerging market opportunities via green supply chain initiatives such as participation in end-to-end green shipping lanes.
Technology risks	Rapidly evolving innovation and technological developments.	The transition to a low-carbon economy is driving technological advancements, such as the development of electric and autonomous vehicles, digitisation, and smart port technologies. However, adopting these technologies can be costly and entail significant adaptation efforts, including retraining of workforce. Opportunity: Enhancement of productivity, competitiveness and sustainability of operations through right application of technologies.
Reputational risks	Failure to meet compliance, societal and stakeholder expectations on material ESG matters such as climate response.	PSA's brand name and reputation are critical to maintaining stakeholder relationships, including talents, solution partners and customers. A weakened brand name and reputation may also decrease our ability to recruit and retain talents.

Emissions and Energy

To curb the impacts of climate change, it is vital for every sector of society to adapt, including energy, transportation, agriculture and land use. As a major port operator, we recognise our responsibility to decarbonise port operations to achieve net zero by 2050 goal.



Automated Guided Vehicles at Tuas Port

Targets

By 2030
Reduce absolute
GHG emissions by
50%
against 2019
baseline year

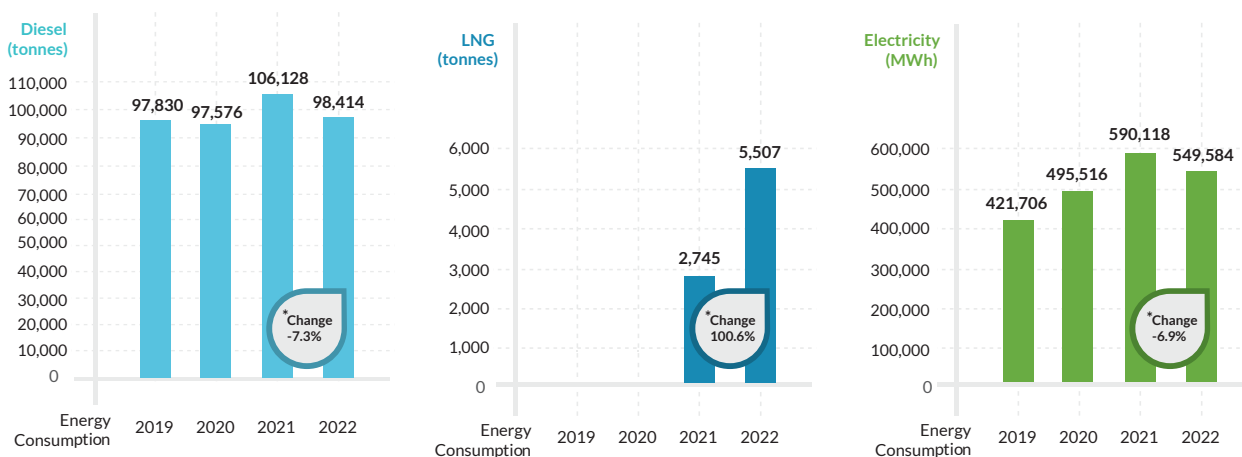
By 2040
Reduce absolute
GHG emissions by
75%
against 2019
baseline year

By 2050
**Achieve
Net Zero
Emissions**

Covering Scope 1 and 2 GHG Emissions

Environment

Total Energy Consumption in 2022



*Comparison between 2021 and 2022

Energy Consumption¹ of PSA SG

In 2022, cargo handling operations at PSA SG's terminals attributed to overall consumption of about 98,400 tonnes of diesel, 5,500 tonnes of LNG and 550 GWh of electricity.

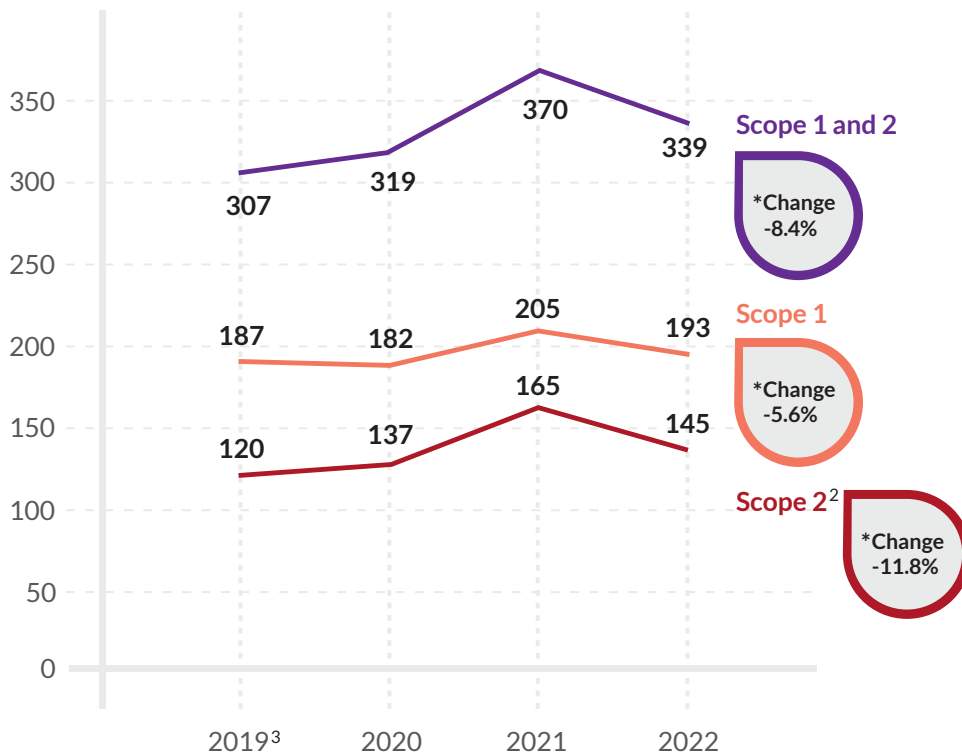
Notwithstanding the 0.8% decrease in container volume handled year-on-year compared to 2021, PSA SG's diesel and electricity use decreased more than proportionately by 7.3% and 6.9% respectively. This is due to a recovery in container dwell time and yard shuffling requirements to pre-pandemic conditions, which helped to bring about more energy-efficient operations.

This was partially mitigated by our new solar PV capacity installed at Tuas Maintenance Base. With the new capacity addition, PSA SG now operates a total of 9.4 MWp of solar PV capacity. LNG consumption doubled year-on-year, in line with the full year deployment of the 160 LNG prime movers which were first deployed in mid-2021.

¹ Energy consumption figures for 2019, 2020 and 2021 have been restated due to reporting methodologies' refinement. Energy consumption figures from outsourced services and leased assets have been excluded, considering PSA's use of the equity share approach for carbon emissions accounting.

Total Carbon Emissions Footprint in 2022

Carbon Emissions
(’000 tCO₂e)



*Comparison between 2021 and 2022

Emissions⁴ of PSA SG

Most of our Scope 1 GHG emissions can be traced back to the carbon footprint generated by our cargo handling equipment, specifically the prime movers (which include diesel and LNG variants) and diesel yard cranes. Collectively, the emissions emitted from these two categories of equipment amounted to 185 ktCO₂e, accounting for 55% of the total Scope 1 and 2 emissions, making them the largest carbon emitters, hence are areas of focus for decarbonisation.

² Scope 2 emissions were computed based on applicable market-based emission factors.

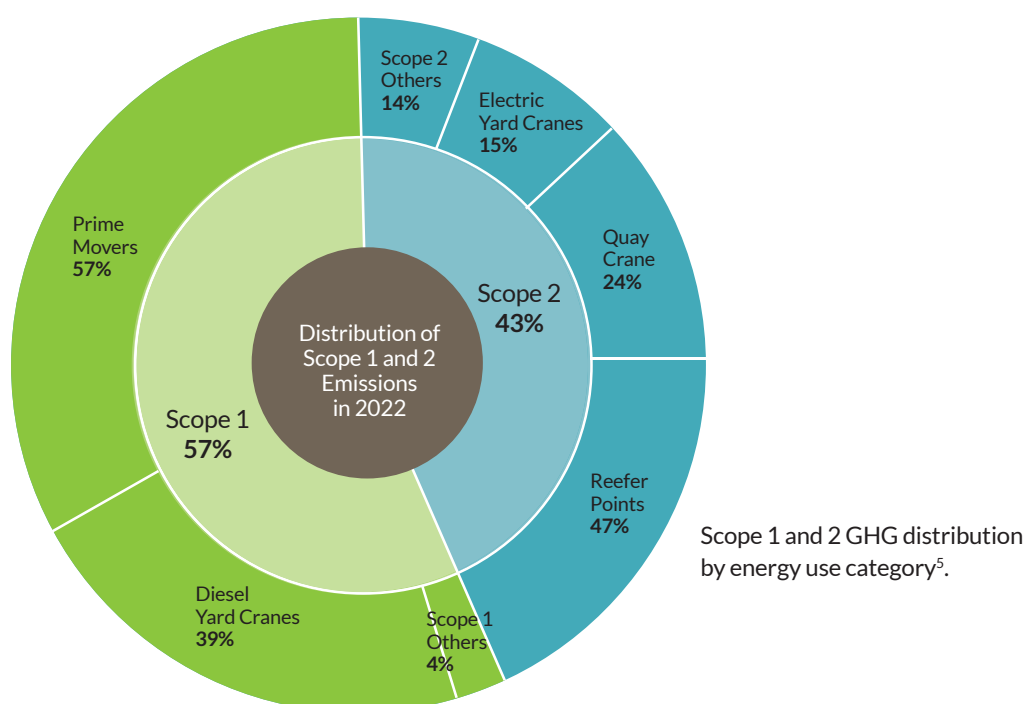
³ Carbon emissions for 2019, 2020 and 2021 have been restated due to reporting methodologies’ refinement. Carbon emissions from outsourced services and leased assets have been moved from PSA’s Scope 1 and 2 emissions to Scope 3 emissions, considering PSA’s use of the equity share approach for carbon emissions accounting, generation in 2H22.

⁴ Scope 1 and 2 emissions in the above table are computed based on an equity share consolidation approach. Gases included in the calculation are CO₂, CH₄ and N₂O. Emission factors for fuel were sourced from GHG Protocol Emission Factors for Cross Sector Tools (March 2023).

Environment

Total Carbon Emissions Footprint in 2022

Our Scope 2 GHG emissions amounted to 145 ktCO₂e, making up the 43% of total Scope 1 and 2 GHG emissions. These emissions stem from the consumption of electricity in powering our reefer points and operating quay and electric yard cranes. PSA SG deploys various types of electric-powered yard cranes including electric-automated rubber tyre gantry cranes, automated/manual rail-mounted gantry cranes, and bridge cranes. As volume handling progressively switches to Tuas Port in line with transition plans, we expect the proportion of scope 2 emissions to account for most of total scope 1 and 2 emissions, to about 60% by 2030.



Overall, total scope 1 and 2 GHG emissions, based on equity share, in 2022 is 339 ktCO₂e, -8.4% lower than 2021. This notable decrease in GHG emissions in 2022 can be attributed to several main drivers, such as the higher scope 1 abatement contribution from our 160 LNG prime movers that are currently deployed. The recovery of energy consumption rates also brought about a reduction in carbon emissions intensity of container handling operations, towards pre-pandemic levels.

In 2022, PSA SG switched to a new electricity provider with a lower grid emission factor⁶. With Tuas Port commencing operations in Q4 of 2022, about 2% of the total container volume in 2022 was handled by Tuas Port's fully electric container handling equipment fleet. The shift in energy use from fuel to electricity has led to lower handling emissions.

⁵ Scope 1 others – including diesel use by forklifts, port service vehicles and diesel generators. Scope 2 others – including electricity use by terminal administrative buildings, workshops, other ancillary facilities as well as T&D losses.

⁶ PSA SG adopts a market-based emission approach for the accounting of scope 2 GHG emissions. The computation of 2022 scope 2 GHG emissions took into consideration the quantity of supply and emission factor of both electricity suppliers.

Key Pathways to Achieve Our Decarbonisation Goals

To achieve our long-term goal of net zero by 2050, PSA SG actively seeks to decarbonise our port operations. We are pleased to report that we are on track towards achieving our near-term target of reducing port GHG emissions by 50% by 2030, against a 2019 baseline. Our outlook towards decarbonisation can be summarised in three main pathways.

With our long-term masterplan to consolidate container volume handling at Tuas Port, more of PSA SG's overall business volumes will be handled at lower energy and carbon emissions intensity. By 2030, more than one third of total volumes will be handled at Tuas Port, allowing the mitigation of higher operational carbon footprint due to organic business growth.

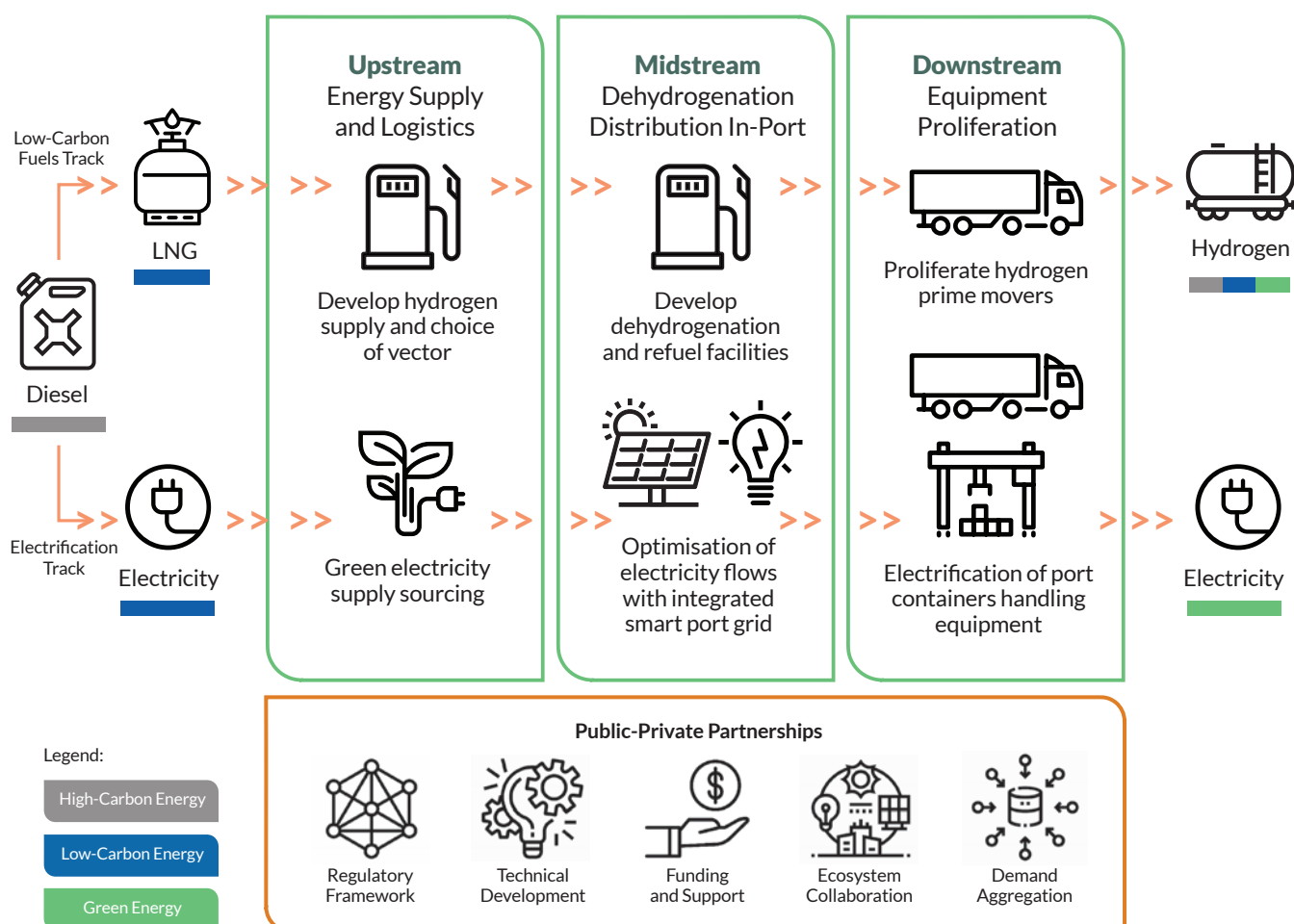
Our green projects to be completed between 2023 and 2030 are also expected to reduce emissions from volumes handled at PPT. For example, in view of the GHG emissions that result from the use of diesel to power our port equipment and vehicles, we have looked towards transforming our energy use through two concurrent tracks. The first track entails the adoption of cleaner alternative fuels, with the long-term goal of transitioning towards using hydrogen to power our port operations.

The second track centres around the substitution from diesel to electric-powered container handling equipment (CHE), using green electricity so that carbon emissions are reduced. By 2030, PSA SG would deploy up to 700 electric prime movers and replace more than 90% of diesel yard cranes (about 200 units) with electric or hybrid variants.



Environment

Key Pathways to Achieve Our Decarbonisation Goals



While we have established these tracks, further action is necessary to achieve our net zero goals. Currently, our electric-powered CHE rely on brown electricity generated by fossil fuels such as natural gas. To reduce total GHG emissions by 50% by 2030, it is imperative that PSA SG obtains and utilises green electricity produced from renewable sources like wind and solar power. Depending on the emission factor of the supply, we expect 60 – 80% of total electricity supply to comprise of low-carbon or green electricity.

We acknowledge the value in forming public-private partnerships to overcome the challenges to decarbonisation. We form meaningful collaborations with stakeholders across diverse sectors such as government agencies, industry players, IHLs and research institutes to develop the right ecosystem to not only support our own decarbonisation initiatives, but also catalyse change through the industry.

For more information on PSA SG's collaborations, please refer to [Collaborative Partnerships with Common Goals](#).

Green Buildings

To further reduce our scope 2 emissions and achieve net-zero scope 2 emissions, PSA SG has embarked on several initiatives to improve the green features of our corporate buildings, through the following pathways.

1. Integrated Energy Management System (iEMS)

PSA SG has installed an iEMS for advanced monitoring of energy consumption for PSA Liveable City's (LC) development. With the iEMS, real time monitoring of energy assets across different building systems and geographical locations can be tracked. This allows PSA SG to expeditiously identify and investigate any unexpected increase in energy consumption of various equipment within the building via meter data analysis.

2. Solar Photovoltaic (Solar PV) System

As a targeted shift towards renewable sources of energy, PSA SG has also installed Solar PV systems at all available rooftop locations across PPT for embedded solar generation.

On PSA Alongside's rooftop, there is a total of 210KWp Solar PV installation that consists of 534 solar PV modules (395Wp each). Many factors were taken into consideration for each panel layout, to obtain maximum efficiency such as optimal system performance, string sizing (referring to number of panels grouped and plugged into one input), sun's angle and position, and Maximum Power Point Tracking – an algorithm to extract maximum available power from the panels under prevailing weather conditions. In 2022, PSA SG's installed solar capacity increased to 9.4MWp, sufficient to power the equivalent of 2,450 four-room HDB flats.

Solar PV installation at PSA Alongside rooftop



Environment

Green Buildings

3. Centralised Cooling Optimisation

PSA Horizons is currently running on a centralised cooling system whereby a series of equipment operates at different load to deliver the optimum environmental indoor temperature for building occupants. Through weather forecasting techniques, the installed Heating Ventilation Air-Conditioning (HVAC) application derives the best operating levels of the various cooling equipment such as chillers, cooling towers, pumps, and Air Handling Units for a specific time period. This ensures that the overall cooling system of the building is operating at its best efficiency level at the prevailing weather condition, optimising energy consumption at various operating levels.

4. Renewable Energy Credits (RECs)

To compensate for the remaining emissions, PSA SG has purchased RECs from Energy Market Company to offset PSA LC's scope 2 emissions to zero, making PSA LC carbon neutral. A carbon tracking dashboard is installed to track scope 1 and scope 2 carbon emissions incurred from building operations. RECs serve as temporary measure to support our decarbonisation strategy as we comb for more innovative ways to reduce emissions throughout our operations.

As a result of the emissions reduction initiatives taken, PSA LC which comprises of PSA Horizons (PSA's corporate headquarters) and PSA Alongside has received the Green Mark Platinum award, under the Green Mark Scheme that is administered by the Building and Construction Authority. Tuas Port Maintenance Base Admin Building is also a Green Mark Platinum (Super Low Energy Building).



Tuas Port Maintenance Base Admin Building, a Green Mark Platinum (Super Low Energy Building)

Green Data Centres

Data Centres (DCs) are critical installations in organisations big on digitalisation, including PSA SG. Just like the port, our DCs also operate 24/7. Since the participation of the nationwide DC Power Usage Effectiveness (PUE) study in 2011, which we recorded a PUE of 1.83 vs the national average of 2.31, we have been focusing on improving our energy usage effectiveness. Our PUE is now 1.5. In 2022, we implemented rack containments and digital twin Artificial Intelligence (AI) to further improve energy efficiency and savings.

Overcoming Upstream, Midstream and Downstream Challenges

Decarbonising our operations comes with different challenges across our supply chain. At the upstream, our priority is to procure the appropriate energy sources for upcoming low-carbon operations. This includes acquiring hydrogen molecules for the low-carbon fuels pathway, as well as obtaining renewable-generated green electricity for the electrification pathway. Currently, the supply of green electricity in Singapore is limited. This inevitably impedes our transition to green electricity to power our operations.

At the midstream, converting these renewable energy sources into the appropriate form and distributing it for equipment operations is a major challenge. For hydrogen, this involves the conversion of hydrogen from its carrier form via dehydrogenation. For electricity, this entails the development of suitable charging infrastructure for our electric port equipment and optimisation of electricity consumption through developing a smart grid and driving energy efficiency. Hence, we are taking a long-term view through research and development, innovations and partnerships.

At the downstream, we seek to proliferate use of both types of green energy sources in the operations of port equipment, including the development of suitable operating and safety protocols.

For more information on PSA SG's decarbonisation initiatives, please refer to [Innovation and Technology](#).



Environment

Environmental Protection

Air and noise pollution are of significant concerns to PSA SG. Generated from the equipment, trucks, and cargo operations, they pose a health risk to the workers, nearby communities, and the environment. PSA SG adopts proactive approaches to minimise the environmental impact to assure the safety of our people. We strive to ensure air quality and boundary noise levels within healthy limits with active monitoring and good haze response management.



Ambient Air Quality Monitoring (AAQM)

PSA SG complies fully with the National Environment Agency's (NEA) guidelines and requirements, under the Environmental Protection and Management Regulations. We ensure that the air quality in our terminals is maintained within the NEA's Ambient Air Quality Targets. As part of our due diligence, we conduct the AAQM annually at PSA SG's terminals.

From 5 to 9 December 2022, NEA's licensed operator, Axiom Laboratory Pte Ltd installed sampling stations at 20 locations, 4 at Brani Terminal, 4 at Keppel Terminal, 8 at PPT 1-6 and 4 at Tuas Port to assess the air quality. The level of air pollutants namely, Particulate Matters PM_{2.5} (<2.5 µm) and PM₁₀ (<10 µm), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) were actively monitored throughout a 24-hour sampling regime.

Ambient Air Quality Monitoring (AAQM)

The results confirmed we meet NEA Singapore Ambient Air Quality Targets. The average values of the 16 monitoring sampling locations were as follows:

Type of Air Pollutant	Value Recorded	Within Healthy Limit
Nitrogen Dioxide	< 20 $\mu\text{g}/\text{m}^3$	200 $\mu\text{g}/\text{m}^3$ (1hr)
Carbon Monoxide	1.2 to 2.4 mg/m^3	10 mg/m^3 (8hr)
PM 10	4 to 18 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$ (24hr)
PM 2.5	3 to 15 $\mu\text{g}/\text{m}^3$	37.5 $\mu\text{g}/\text{m}^3$ (24hr)

Boundary Noise Assessment

Adhering to the guidelines established under the NEA Environmental Pollution and Management Act 2008, PSA SG ensures that the noise levels emitted from the terminals are within the safe limits specified in the Environmental Protection and Management (Boundary Noise Limits for Factory Premises) Regulations 2008.

From 22 November to 2 December 2022, PSA SG engaged NEA's licensed operator, A*Star Laboratory Pte Ltd, to conduct our annual boundary noise monitoring exercise. The exercise not only provided an extensive assessment of the noise levels of over 100 locations within PSA SG, but it also accounted for the effect of noise pollution to the community surrounding the terminals with a 24-hour noise monitoring station set up along the boundary of each site. The results confirmed that our terminals operate within the permissible limits of NEA's Maximum Permissible Boundary Noise Levels (up to 75 dB) during the day. The 24-hour boundary noise levels were also generally within the permissible range.

Environment

Haze Response Management

Occasionally, Singapore experiences smoke haze, arising primarily from forest fires in the region. There was no severe transboundary haze in 2022.

PSA SG continues to take precautionary steps to ensure that we are well prepared to deal with any haze condition. These included the provision of advisories, early haze warnings, measurement and dissemination of air quality information, and guidelines for dealing with haze-related issues.

Haze Response Plan and Guidelines



Understand transboundary haze and haze risks management



Ensure sufficient provision of PPE (N95 masks) for our colleagues and stakeholders



Different levels of haze alerts and escalation of haze response according to well-defined severity situations



Clear guidelines for response during different severity levels



Defined roles and responsibilities of the haze committee, taskforce and coordinators in the event of response plan activation



Understand environmental health issues relating to haze and how to mitigate them

Green Port Culture

Aligning with PSA's Health, Safety, Security and Sustainability (HSSS) Policy, we are dedicated to promoting sustainable development in the communities where we operate. At PSA SG, we believe that people are the catalysts for change. We are committed to onboarding and engaging all employees in sustainability initiatives to create a future-ready and united team. Our vision is to strengthen a green thinking culture for all colleagues. Additional Green Port Culture's contents are reported in Community Relations - [PSA SG in Bloom](#) and [Go Green CSR](#) and [Green Partnerships](#).

Tree-planting by PSA SG volunteers in front of PSA Horizons



Environment

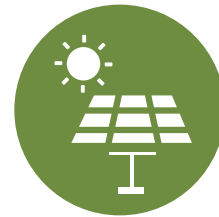
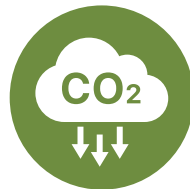
Empower and Equip

To promote a company-wide awareness of sustainability topics, we have developed a diverse portfolio of engagement activities, including briefings, talks, workshops, training courses, and e-publications.

We offer a 1-day competency environmental activists training programme to all colleagues. In 2022, we conducted two runs, reaching 32 participants. Our focus this year was on SG Green Plan 2030, PSA SG's sustainability strategy and efforts and how their individual efforts can make a positive impact on climate change. The session included hands-on activities, where participants learned how to upcycle a name card from milk cartons box, fabric bag from t-shirt and a LED lamp from plastic cartons.



As part of Climate Action Education, we introduced “Environmental Sustainability Management” course, a 1-day competency training programme in 2021, curated for PSA SG’s departmental and section managers. The objective of this programme is to build a culture and mindset attuned to global, national and organisational goals that support environmental sustainability and its management. Course coverage includes the United Nations Sustainability Development Goals (SDGs) and the roles of PSA SG as well as Singapore’s contribution to environmental sustainability, climate change, biodiversity and conservation. It equips participants with knowledge and understanding on a broad base of sustainability-related topics. Participants would also learn about PSA SG’s sustainability strategy, efforts and how to be better managers in identifying and reducing environmental impacts and increasing sustainability efficiency within legal and regulatory frameworks. With positive feedback, this programme was extended to deputy managers in 2022. More than 500 colleagues were trained since ESM’s launch in 2021 with 262 of them trained in 2022.



To underpin PSA SG’s strong commitment to sustainability, we have also incorporated a segment on PSA SG’s sustainability journey, targets, and strategies into various other training programmes, including orientation programmes for both executives and non-executives, as well as leadership programmes for newly promoted section managers.

With increasing focus on sustainability, we conducted briefings in 2022 to educate our employees on the business case for sustainability reporting, reporting principles and frameworks with a focus on Global Reporting Initiative Standards, and what makes a good sustainability report.

Environment

Green Port Conversation Series

Green Port Conversation Series, launched in 2020, is a future-ready leadership series where subject matter experts are invited to share on topics relating to sustainability. Since its launch, PSA SG has conducted five webinars, with two Future-Ready webinars held in 2022 on “Implementation of Carbon Pricing and Its Impact to Business” and “Accelerating Decarbonisation Globally and How PSA can Make a Difference”. The sessions provided insights on key global and national regulations, trends in decarbonisation, implementation of carbon pricing in businesses and possible impacts that PSA SG can make. The sessions were met with great enthusiasm and participation, drawing in over 100 attendees.



Participants of “Implementation of Carbon Pricing and Its Impact to Business”

Greenfish Climate Action (Lite) E-learning Programme

This 4-hour e-learning programme covers the timeline and lead up to the current state of global climate change, the global climate action change agenda, and roles of individuals in climate action. The training will encourage staff to reframe their mindsets, create opportunity from the foreseeable risks, and rethink the way of life and how it affects the environment, as well as to take individual actions to protect the environment. The Greenfish Climate Action e-learning was successfully rolled out to close to 3,000 PSA SG’s executives and will be rolled out to PSA SG’s 6,000 non-executives, including frontline colleagues in 2023 and beyond.

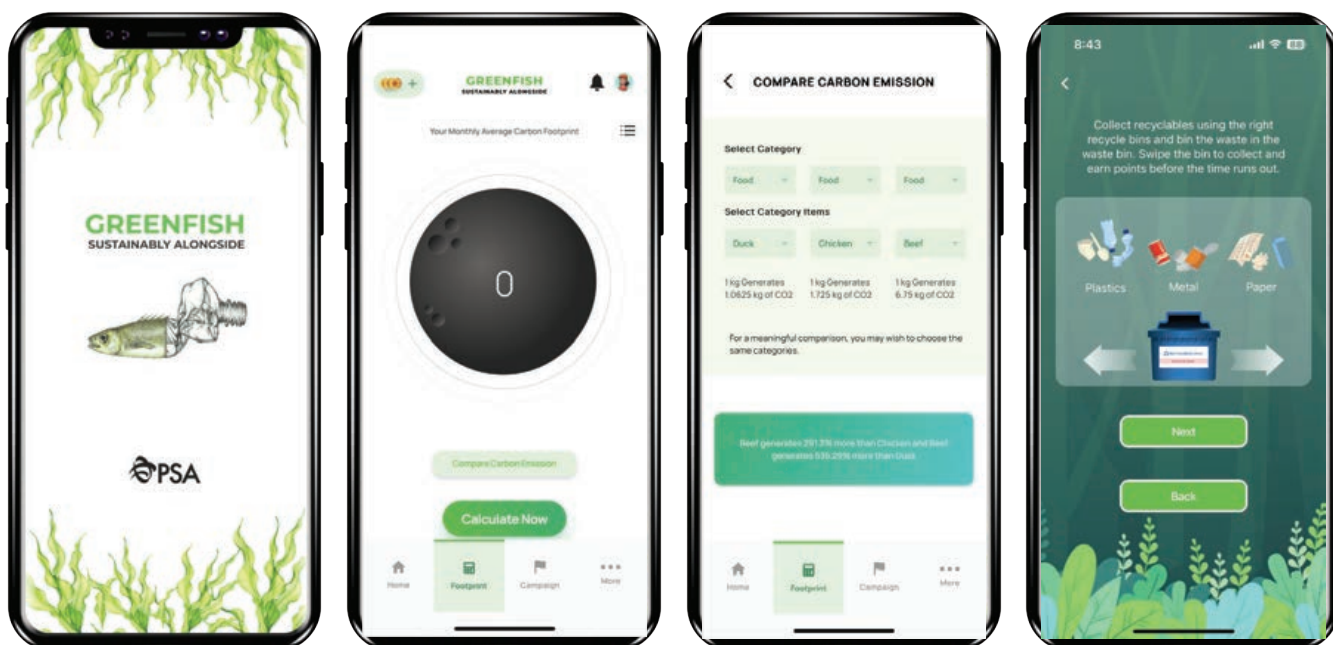
Greenfish Sustainability Mobile App

To enhance the accessibility of engagement and ease of communication with our employees on sustainability topics, we have launched the Greenfish Sustainability Mobile App (Greenfish App) in June 2022. This app allows users to easily compute and track their personal carbon footprint, as well as actively participate in ongoing sustainability campaigns.

Following the app's launch, PSA SG initiated a company-wide campaign called "Greenfish – Everybody Makes a Difference". To encourage staff to adopt and practise green habits as a way of life, curated activities such as submitting a pledge, taking part in a quiz, and watching an educational video, were offered on the app for employees' participation. We are pleased to report that 70% of PSA SG's employees have started using the app.

We aim to engage 80% of our employees on sustainability through the Greenfish App. As we continue to strive for increased employee participation, we will roll out Phase 2 of the app with more engaging features in 2023.

**70% of
PSA SG
employees
are using
the
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App.**



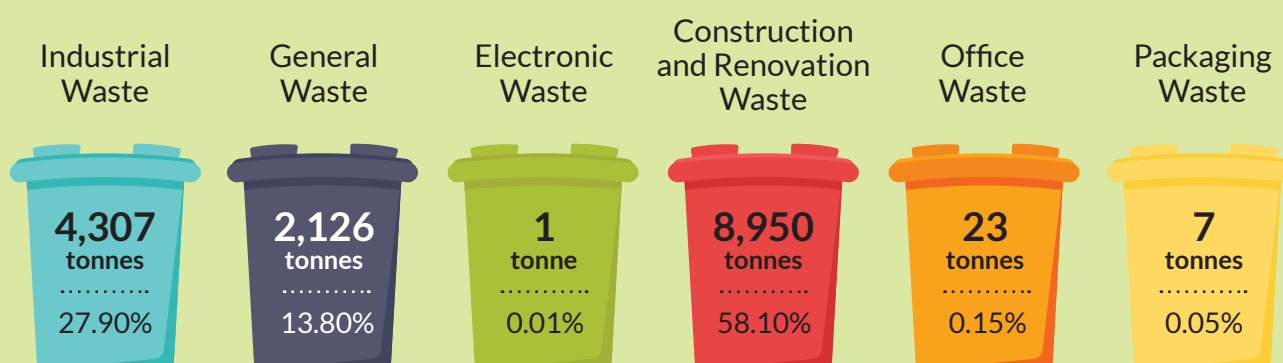
Environment

Waste Management and Recycling

PSA SG is committed to minimising waste and maximising resource efficiency through our waste management and recycling initiatives, which are guided by the principles of Reduce, Reuse, and Recycle Right. The primary source of material consumption and waste generation for PSA SG is from the operation, repair and maintenance of our fleet of Container Handling Equipment (CHE). The waste generated is classified into two streams: general waste, which includes food waste, and industrial waste.



TOTAL: **15,414** tonnes





The waste recycled includes industrial waste, e-waste, construction and renovation waste, office waste and packaging waste. Construction and renovation waste constitutes the largest percentage of waste generated. The amount of construction and renovation waste is attributed to the construction of Tuas Port, and 100% of this waste generated has been recycled since 2021.

In a linear economy where we typically adopt the practice of 'take, make, throw', the potential second life value of resources which are finite in nature will be wasted. To complement the various recycling efforts across the organisation, we are actively working with industry partners to collaborate on exploring technology and innovation to improve our waste valorisation strategy and to drive a circular economy of our precious resources.

One such example is the used rubber tyres from the fleet of prime mover trailers. While it has been the norm to retread and reuse these rubber tyres to extend and maximise their lifespan, more than 100 tonnes of rubber tyres will still reach end of useable life per month. Though the current practice is to offload these used rubber tyres to an appointed recycler to repurpose this resource, the rubber reclaiming and recycling process is typically conducted outside of Singapore.

To this end, we are working on new partnerships to better manage the supply chain of this resource by collaborating with local service providers who can repurpose the used rubber tyres in country via environmentally friendly technology. This will mitigate the need of exporting the resources for treatment overseas which will result in more carbon emissions. An important result will also be creating more value for the Singapore economy.



Environment

Use of Reclaimed Refrigerant

As part of PSA SG's drive to build a sustainable supply chain, PSA SG initiated a new process to recover refrigerant, which is released during laden reefer repairs. The recovered refrigerant is then cleaned, processed, and certified before it is re-used and pumped back into the laden reefers. First successful trial was seen in May 2022 through close collaboration with shipping lines and a solution partner.

With its implementation from July 2022 till April 2023, 1,840 kg of refrigerant has been recovered i.e., equivalent to 2,635 tons of CO₂ not released into the atmosphere.

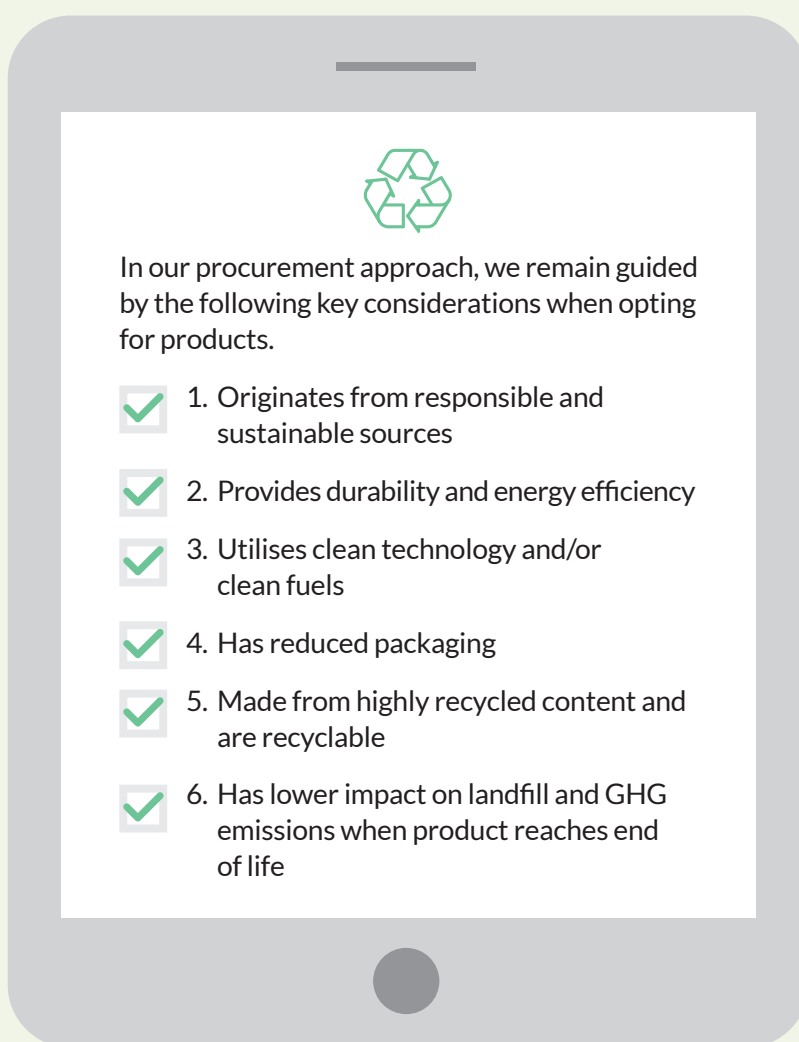
PSA SG has brought alongside our shipping lines to support this green initiative with 100% recovery of refrigerant during repairs being achieved. Majority of our shipping lines have started using reclaimed refrigerant and more will be onboarded after conducting trials to validate the performance.



Reefer platforms at a terminal in Singapore

Circularity Survey for Suppliers

To achieve PSA SG's sustainability goals, our suppliers play an integral part in the products and services rendered. PSA SG stays committed to the responsible procurement of high-quality resources from ethical sources, environmentally sustainable, and technologically innovative at competitive prices.



Our suppliers are also key partners with an important role in the circular resource management strategy. Working together with our procurement team to close the resource loop, a Circularity Survey based on the core principles of PSA Sustainable Procurement Framework has been developed. The survey serves to enhance our understanding on how sustainable a product is, circularity element the product is designed with, data on embodied and life-cycle carbon of the product and enrich procurement decision with sustainability and circularity considerations.

Environment

Recycle for a Good Cause

During the annual PSA SG Go Green Month in September, PSA SG collaborated with South West Community Development Council (SWCDC) to launch a collection drive of clothes and papers in exchange for rice and instant noodles to be donated to The Food Bank. Staff across PSA SG, PSA Marine and PSA Group's Corporate Centre participated enthusiastically. A total of 523kg of clothes and 598kg of papers were collected, translating to 175kg of rice and 150 packets of instant noodles to benefit the under-resourced in our community.



Collection for Recycle for a Good Cause

Adoption of Leasing Model for Laptops

PSA SG adopted leasing-as-a-service for our laptop devices in 2022. As opposed to our previous approach of direct purchase, laptops under leasing model will be returned to the principal who are able to optimally ensure the refurbishing of devices for reuse or recycle them in compliance with regulatory guidelines if they are no longer fit for reuse. The reusing and recycling programme helps to extend the lifespan of the devices and ensure valuable materials are extracted to return to the production chain instead of going to the landfill.

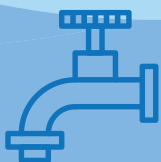





Water Use and Pollution

Water is a very valuable resource and PSA SG is committed to using and discharging water in a sustainable manner. To ensure proper handling of wastewater, sewage and oil receptacles, water management systems are designed and installed according to industrial best practices and standards.

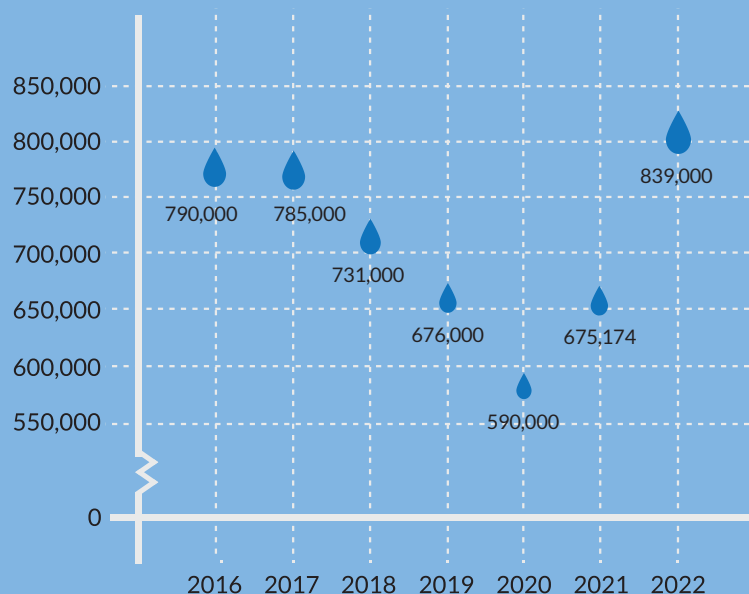
Singapore has effectively closed the “water loop” by efficiently managing the entire water cycle, encompassing rainwater collection, purification, and supply of drinking water, as well as the treatment and reclamation of used water into NEWater, which is Singapore’s own high-quality recycled water brand.

PSA SG draws inspiration from Singapore’s water story and strives to manage and conserve water usage while closing the loop wherever possible. In compliance with regulatory requirements, PSA SG submits an annual review and comprehensive water usage statistics to PUB, which is Singapore’s national water agency. This is part of our commitment to transparency and accountability in managing our water consumption and promoting responsible water usage practices.



-  All PSA SG buildings and port facilities are equipped with efficient plumbing and sanitation to reduce water usage
-  Close monitoring of water usage and consumption habits, with early detection and rectification of leakages
-  Annual review and submission of water usage statistics to PUB

Annual Water Consumption
(cubic metre)



2021 and 2022 figures indicate annual water consumption minus leakage.

Environment

As we gradually welcome more colleagues back into the workplace with the easing of Covid-19 measures, there has been a notable increase in our water consumption for the year 2022. Specifically, the Tuas Port, which began operations towards the end of 2021, has accounted for 133,467m³ of water usage.



PSA Tuas Port

Despite the increase in consumption, we have saved close to 16,000m³ of potable water in 2022, enough to fill up more than 6 Olympic-sized swimming pools through our water conservation efforts. The potable water savings are from nine rainwater collection tanks spread across our engineering workshops in City Terminals and PPT, corporate headquarters PSA Horizons, PSA Alongside and Tuas Port, use of NEWater for one cooling tower of air-conditioners at Tuas Port and condensate water harvesting from air-conditioning system at PSA Horizons.

As we anticipate further growth in business activities that may impact our water consumption, we maintain our unwavering commitment to water conservation practices and are actively exploring new and innovative ways to reduce our water usage.

Smart Water Flow Monitoring System

All PSA SG buildings and port facilities are equipped with efficient plumbing and sanitation for efficient water usage. This allows for close monitoring of water usage and consumption habits, with early detection and rectification of leakages. To facilitate real time checks on water use and leak detection in our network of pipes, PSA SG implemented a smart water flow monitoring system in PPT in 2022.

With real-time monitoring, we were able to detect and arrest a leaked pipe in the shortest possible time. This effectively reduces water wastage and maximises the lifespan of our water pipe network, by identifying and strengthening the pipe section with higher pressure. Building on the success of the smart water flow monitoring system implemented at PPT, PSA SG plans to adopt this system in other terminals as well, including Tuas Port in 2023.

Grey Water and Rainwater Recycling at Tuas Port

There are standalone mini water reclamation plants to treat collected grey water⁷ and rainwater, saving 24m³ of potable water a year. It is viable to have such water reclamation plants on-site in the absence of sewerage system and the high costs involved to run an approximately 3.5km long sewer line to the nearest manhole.

In Tuas Port, the used water from washing electric Rubber Tyre Gantry Cranes (eRTG) and rainwater is drained into the underground drains via surface runoff and temporarily stored in an underground sump tank. The water is subsequently directed to a feed tank via an underground pipe and pumped into the treatment system, where the water will undergo screening, biological treatment, filters, and ultra-filtration. The treated used water meets reuse and discharge standards and is re-used for container handling equipment washing.

⁷ Grey water refers to used water from CHE washing.

All PSA SG buildings and port facilities are equipped with efficient plumbing and sanitation for efficient water usage.



PSA Tuas Port

Social



Occupational Health

Fostering a Sustainable and Healthy Working Environment

A healthy workforce is key to the overall success of any organisation. PSA SG is committed to promoting physical and mental wellness, by providing our staff and solution partners with practical handles and encouraging personal responsibility of one's health. Through various targeted initiatives and programmes, we aim to inculcate a culture of wellbeing and ensure that mental health remains a key priority at our workplace.

To continuously enhance the quality and effectiveness of our initiatives, PSA SG actively encourages our staff and solution partners to share their thoughts and opinions on the training courses, workshops, and talks organised. PSA SG highly values the feedback of our employees and remains committed to fostering a culture of continual improvement through active employee engagement and feedback.



PSA and ONE staff making a difference at the Waterways Clean-up activity

Social

Confidant Programme

The Confidant Programme is an in-house para-counselling initiative, launched in 2021. Under the “Aware, Detect and Support” mental wellness framework, it provides an alternative channel and listening ear to staff who need support. To ensure that employees have access to appropriate resources and expertise to address their mental health needs effectively, PSA SG formed a team of specially selected officers who possessed the desired qualities to ‘Be there’ and ‘Support’ their colleagues in times of need. In 2022, the programme was further enhanced to include an “Employee Assistance Programme”, whereby PSA SG formalised a direct channel to Care Corner’s professional counselling resources. Staff who needed more support could tap on this channel as a form of staff welfare and benefits.

New Training Course on “Workplace Mindfulness”

As a part of PSA SG’s HSSS Core Competency training, our leaders undergo a course that equips them with essential skill sets to lead with empathy and awareness of mind and body processes, facilitating good decision-making. The course incorporates practical and evidence-based mindfulness practices that complement existing leadership competencies. By integrating mindfulness into their leadership approach, participants could enhance their ability to make informed decisions, cultivate empathy and be more aware of their own and others’ wellbeing. This course underscores our commitment to promoting a holistic approach to leadership that encompasses both physical and mental wellbeing.



Mental Health Experiential Workshops and Mental Health Talks

In 2022, PSA SG engaged professionals to conduct a wide range of exciting workshops for employees to participate in. These workshops were designed to promote physical and mental health, and covered various topics such as stress management, mindfulness, resilience-building, and other areas relevant to employee wellbeing. PSA SG enlisted professionals to conduct these workshops to provide our employees with expert guidance and resources to support their overall wellbeing.

A series of Mental Health Experiential Workshops by Health Promotion Board (HPB) were held at various PSA SG's premises to promote good mental health through therapeutic craftwork with mental wellbeing messages woven into the experience. The craftwork activities included terrarium building, marbling coaster and leather coin pouch and key fob making. The therapeutic session of "Art for Wellbeing" workshop was led by a certified art therapist. The session focused on self-care and coping strategies during challenging times.

PSA SG also collaborated with Institute of Mental Health (IMH) to impart skill sets to empower colleagues to support co-workers experiencing various levels of distress. The training on "Psychological First Aid" and talks on "Stress, Burn-out and Using Mindfulness for Better Mental Wellbeing" and "Mental Resilience and Coping Strategies for Better Mental Health" were conducted by the doctors from the institute.

PSA Staff participating in coin pouch and key fob making, part of the Mental Health Experiential Workshops by HPB

PSA enlisted professionals to conduct workshops to provide our employees with expert guidance and resources to support their overall wellbeing.



Social

Customised Health Programme for Lashing and Engineering Colleagues

Recognising the unique needs of different employees, we took a proactive approach to customise health programmes for specific groups to provide comprehensive support for all. An example was the six-month long Health Programme conducted at PSA SG's dormitories and terminals for our lashing and engineering colleagues. The programme provided participants with targeted health coaching to improve their physical and mental health through health screening, physical activities, nutrition as well as stress and sleep management.

Health Screening

PSA SG recognises the importance of preventive health measures and encourages its employees to take proactive steps towards maintaining their health and wellbeing. Opportunities were created for employees to monitor their health through our sponsored health screening sessions. At the HSSS Week 2022, some 400 PSA SG colleagues had their health screened at six different sites. The health screening sessions include height, weight and body mass index measurements, blood pressure reading, blood glucose check and each participant walked away with an individualised report. Health screening and coaching was also made available at the PSA SG Health Roadshow 2022.



Health screening

Awards and Recognition

Silver Ribbon Mental Health Awards for Employers 2022

We are pleased to announce that PSA SG has been recognised for our efforts in promoting a mental health-friendly workplace at the Silver Ribbon Mental Health Awards for Employers 2022 by Silver Ribbon (Singapore) for the second consecutive year.

PSA SG supports the Silver Ribbon (Singapore)'s vision in promoting a positive attitude towards mental health amongst our community. PSA SG was amongst 11 Singapore-based organisations recognised by Silver Ribbon (Singapore) for combating mental health stigma and promote a positive attitude towards mental health.

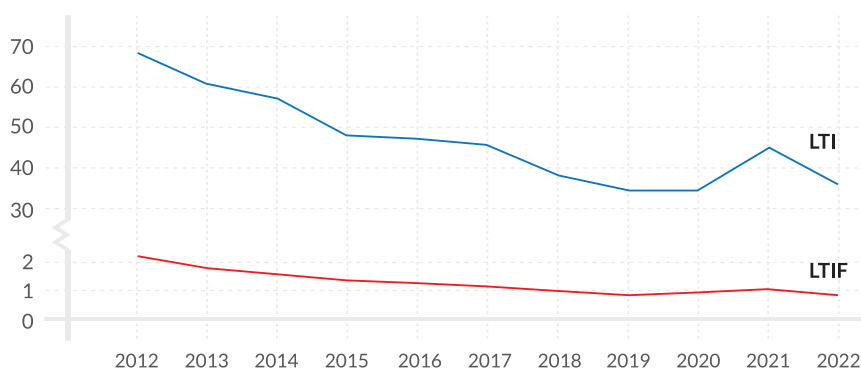


Social

Safety

Our Topmost Priority

Port operations involve various heavy machinery, equipment, and transportation vehicles, which can pose significant risks if improperly managed. Hence, cultivating a strong safety culture is essential to sustaining port operations. This helps to prevent incidents, protect human lives and assets, comply with regulations, and maintain the trust and confidence of stakeholders. PSA SG continues to instil and co-create a generative safety culture in our people and solution partners, and work alongside with stakeholders on 3 key strategic trusts of building a generative safety culture, feeling the ground, and leveraging on technology as an enabler of safety excellence.



Note: PSA SG Loss Time Injury (LTI) and Loss Time Injury Frequency (LTIF) Performance from 2012 – 2021

LTI and LTIF at PSA SG have reduced significantly over the past 10 years. In 2022, there was an improvement of 18% in LTI to 36 incidents as compared with 44 incidents in the year before. There was also a corresponding 20% improvement in LTIF from 1.0 to 0.8 in 2022. There were no significant incidents in 2022.

	PSA SG employees	PSA SG solution partners
No. of fatalities	0	0
Rate of fatalities as a result of work-related injury ⁸	0	0
No. of high-consequence work-related injuries ⁹	0	0
Rate of high-consequence work-related injuries ¹⁰	0	0
No. of recordable work-related injuries ¹¹	17	19
Rate of recordable work-related injuries ¹²	0.7	0.8
No. of occupational disease incidents	0	0

⁸ Rate of Fatalities = No. of Fatalities per 200,000 or 1,000,000 hours worked

⁹ High-consequence work-related injuries, work-related injury that results in a fatality or in an injury from which the worker cannot, does not, or is not expected to recover fully to pre-injury health status within 6 months

¹⁰ Rate of High-consequence work-related injuries = No. of High-consequence injuries per 200,000 or 1,000,000 hours worked

¹¹ Recordable work-related injury or ill-health, that results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness; or significant injury or ill health diagnosed by a physician or other licensed healthcare professional even if it does not result in death, days away from work, restricted work or job transfer, medical treatment beyond first aid, or loss of consciousness

¹² Rate of Recordable work-related injury = No. of work-related injury per 200,000 or 1,000,000 hours worked

Enhancing Safety Culture

PSA SG believes that every employee shares the responsibility of creating a safe and healthy work environment. Take 5+ is a 5-step hazard identification tool adopted by all of PSA employees and solution partners. Before commencing any task, colleagues are trained to actively watch out for each other's safety and wellbeing at the workplace, fostering a culture of mutual care and vigilance. Hazard reporting or near-miss reporting is encouraged without blame or fault, to promote a positive safety culture where lessons learnt from incidents could be reviewed for improvement.



PSA SG colleagues and solution partners also go through PSA SG's signature in-house programme – Starfish Safety Workshop. The workshop is designed to cultivate a safety mindset amongst PSA staff and solution partners. In 2022, 1,411 PSA SG's staff and 549 solution partners attended the physical workshops. Since its inception, 6,660 PSA SG's staff and 1,174 solution partners were trained, reflecting PSA SG's ongoing commitment to promote safety awareness and best practices amongst our workforce and solution partners.

Social

Feeling the Ground

Human capital has always been PSA SG's greatest asset and be it our employees, solution partners or port users, they are all cultivated to create a safe and healthy workplace for all.

Health, Safety, Safety and Sustainability (HSSS) Launch 2022

PSA SG HSSS Launch is an annual event to raise awareness and encourage all staff and solution partners to actively pursue HSSS both at work and in the community. At this event, PSA SG's leaders, staff, representatives from government agencies, unions, associations and solution partners reaffirm their collective commitment to HSSS. At the 2022's launch, safety efforts of the business units were recognised. The contributions and hard work of PSA SG's confidants in the Confidant Programme and the pandemic coordinators were each presented a special recognition award.

Another highlight was the Management-Unions HSSS Walkabout. To demonstrate the management and unions' commitment to HSSS, 14 cross-functional teams engaged staff and solution partners, emphasising the importance of valuing lives, practising the TAKE5+ principles, maintaining good health and doing their part for the environment and port's security.

The week also featured four online talks, "Safe Riding for Motorcyclists" by Traffic Police, "Anti-Scam and Crime Prevention" by Singapore Police Force, "Effects of Drugs and its Consequences" by Central Narcotics Bureau and "Implementation of Carbon Pricing and Its Impact on Business" by Carbon Pricing Leadership Coalition Singapore. The well-received talks attracted more than 300 participants.



HSSS Launch 2022

PSA SG Health Roadshow 2022

On 21 October 2022, PSA SG successfully hosted the much-awaited physical PSA SG Health Roadshow, held in abeyance due to the Covid-19 pandemic. The roadshow, themed “Be Happy, Live Healthy. Prioritise Your Mental Health,” drew an enthusiastic response from 800 staff and solution partners. The roadshow featured educational booths from HPB, Silver Ribbon, and National Dental Care Singapore where participants learned about managing chronic diseases, importance of mental wellbeing and how to improve their lives with good oral health.

Participants were also treated to “The Healthy and Yummy Cook-Off Challenge”, mass workout session, interactive games, health screening and coaching, and terrarium building. They also had the opportunity to contribute to a worthy cause, by raising funds for charity at the Row for Charity Station. \$50 was raised for every kilometre clocked on the rowing machine. This applaudable fund-raising effort raised \$5,000 for the Care Corner Singapore’s CAREVOLUTION, which supports individuals with mental health challenges to receive counselling and therapy sessions.

Care Corner is a leading social service agency with more than 40 service points across the nation, serving children with special learning needs or from disadvantaged backgrounds, youth-at-risk, troubled families, vulnerable seniors, and individuals with counselling and mental health needs.



PSA SG Health Roadshow 2022

Social

Embracing Technology as an Enabler

Leveraging on technologies to detect and prevent workplace accidents, PSA SG adopted the use of Video Analytics (VA) in monitoring compliance of port users according to the stipulated safe work procedures (SWP) at the wharf aprons and donning of personal protective equipment (PPE) requirements. Road traffic rules were being reviewed periodically based on historical data and accident trends to ensure a safe traffic environment for all.

For prompt and efficient reporting on safety-related matters, PSA SG also launched a mobile application, Mobile Safety Inspection System (MSIS), for staff and solution partners.

To aid drivers in improving their driving behaviours, the Prime Mover Telematics (PM Telematics) are fitted on PSA SG's fleet of prime movers. This technology captures a wide array of parameters such as drowsiness, hard braking / turning and speeding etc. In addition to PM telematics, driving aids such as cameras and sensors are installed on the prime movers to form a full suite of safety system. The data captured from the telematics and various driver aids are transmitted live to a back-end server for immediate intervention, post-event review and analysis. At-risk drivers are engaged for debriefing and coaching to ensure driving behaviour improves overtime.

On 4 November 2022, PSA SG showcased our Health, Safety and Security (HSS) management system at the event, Media Learning Journey at PSA SG, held in collaboration with Workplace Safety and Health Council (WSHC). This event provided the opportunity for PSA SG to share our approach in creating a robust safety culture, reaching out and engaging the logistic community.

PSA SG shares its HSS management system during WSHC's Media Learning Journey event



Awards and Recognition

Workplace Safety and Health (WSH) Innovation Awards for Logistics and Transport Sector 2022

PSA SG clinched the Gold and Silver Awards at the Workplace Safety and Health (WSH) Innovation Awards for Logistics and Transport Sector 2022 for two projects – “Automated Handling of Hauliers and Inter Gateway Haulage Prime Movers with Video Analytics” and “Video Analytics and Electric OverHeight Frames (EOH) Wireless Recovery” respectively.

Singapore Road Safety Awards (SRSA) 2022

PSA SG and one of our staff, Mr Chai Suk Yung, from Prime Mover Resource Department (PRMD), were recognised at the SRSA 2022 organised by the Singapore Road Safety Council (SRSC). PSA SG received the Merit Award and Mr Chai Suk Yung, the Safe Driver Excellence Award in the Heavy Goods Vehicle Category. SRSA is a joint effort between SRSC, Traffic Police, Land Transport Authority and WSH Council to recognise exemplary companies and company drivers for their effort to conscientiously work towards keeping the roads safe.



PSA SG colleagues receiving the Merit award at the SRSA 2022

Social

People Development

PSA SG continues to put capabilities building at its forefront. In pursuit of service excellence, we remained committed in our reskilling and multi-skilling efforts and continues to support lifelong learning so that our workforce remains relevant and future ready.

Workforce Agility and Transformation

As part of our commitment to internal upgrading and staff development, PSA SG has introduced new integrated roles such as Automated Guided Vehicle and Automated Area Leads, and Reefer Leads. These roles are designed to leverage the full potential of a multi-disciplinary and agile workforce, allowing employees to contribute to various aspects of the business.

Furthermore, PSA SG has evolved roles in the field of Information and Communications Technology (ICT) and Cybersecurity, providing opportunities for our workforce to deepen their skills mastery in their respective fields. PSA SG also rotates both our non-executives and executives to encourage multi-skilling, build agility and develop T-shape managers. Our executives (assistant manager and above) are rotated either within the same domain or across different domains, including movements to our overseas entities within the PSA Group.

PSA SG also continues to offer employees internal job vacancies to provide them greater empowerment in their career management. Multi-skilling is also encouraged for frontline staff to ensure that they are future-ready, where staff are trained to either operate or maintain new equipment, such as Automated Guided Vehicles and Dual Trolley Quay Cranes.



PSA SG participated in the group-wide initiative, TalentTech 4.0 (TT4.0), a digital platform offering projects, mentorships, and learning opportunities across PSA to promote talent and skills transformation across the horizons of growth and enable staff to take greater ownership of their development.

Spearheaded by Group HR and supported by PSA SG, TT4.0 seeks to build greater organisational capabilities and agility towards a more diverse and innovative global workforce, harness resources and synergies across PSA SG, and provide additional development opportunities to support the career growth of our employees. A pilot launch of the TT4.0 was made to a small select group of 56 early adopters in PSA SG in August 2022, and will be further cascaded to all senior officers in the first half of 2023.

Having a sustainable pipeline of strong talents who embrace agility is pivotal in powering the continual business growth and transformation of PSA. With a focus on SEA region, a cross-functional team was formed to look into 3 key areas of growing global mobility in talents, attracting and retaining talent, and building capabilities for the future.

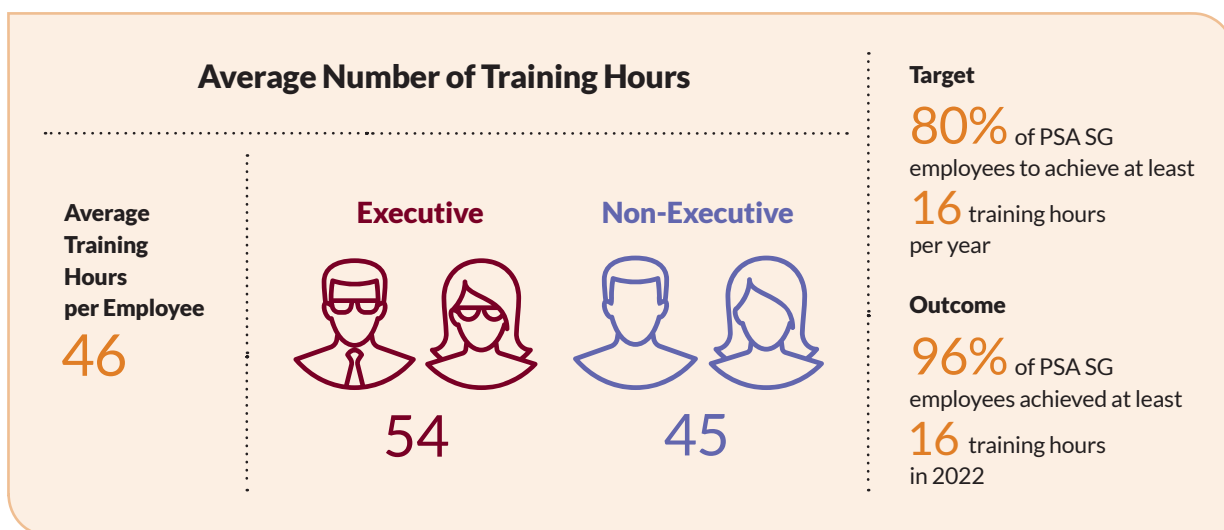
Several initiatives have since been rolled out, including running a Global Mobility series in our inhouse newsletter “Portraits” to feature the experiences of current and past overseas assignees, conducting fireside chats for high-potential staff with Senior Leaders and inculcating the importance of embracing global mobility in careers and igniting the will through sharing sessions.

PSA SG has introduced new integrated roles which are designed to leverage the full potential of a multi-disciplinary and agile workforce.



Social

Strengthening Key Capabilities for a Future-Ready Workforce



Building on our efforts to develop future-ready competencies for our staff, two new e-learning programmes were introduced in 2022.

Cardinalfish aims to develop a data protection and governance mindset, introducing key terms and our obligations under Singapore’s Personal Data Protection Act, explaining the rationale behind a data protection regime, and sharing the consequences of a breach. *Archerfish* aims to provide staff with a basic appreciation of Supply Chain and Cargo Solutions, including common terms and key players that we will often encounter in this ecosystem.

As PSA SG transits to operationalise the next-generation automated Tuas Port, we aim to familiarise frontline employees with technological changes and helping them gain critical skills required. Adding onto existing programmes such as “Automation Familiarisation” and “Gearing Up for a Digital Workplace”, PSA SG also introduced a new programme “Thriving in a Digital Workplace” in 2022. As of end 2022, more than 200 employees had gone through the “Thriving in a Digital Workplace” programme. This is part of PSA SG’s ongoing efforts to help our employees adapt and thrive in an increasingly digital and technology enabled world and work environment.

PSA University (PSAU) launched the “Work Study Diploma in Port Automation Technology” (WSDIP-PAT) programme, which is jointly developed by PSAU, PSA SG and Singapore’s Institute of Technical Education. This 30-month long training programme was tailored to equip participants with fundamental skills and knowledge in automation and smart

technology to handle the new automated equipment and systems that would be prevalent in Tuas Port. The WSDIP-PAT programme will ensure that PSA SG can continue to build future-ready capabilities while providing professional upgrading opportunities for our staff. Automation has also increased the efficiency of our staff, allowing them to take on higher value tasks as they undergo reskilling, multiskilling, or upskilling. This includes the roll out of the Automated Equipment Specialists (AES) scheme, where employees transit towards managing a wider scale of operations and equipment. The first phase of the roll-out saw 190 staff being redesignated to AES.



An AES undergoing training to handle operational exceptions remotely at the Tuas Port Next-Gen Control Centre

Growing the People Developer Culture

Expanding on the series of initiatives to prepare PSA SG for the Future of Work under the Global Organisational Development Movement, pulse surveys were rolled out to gather staff sentiments and introduce the necessary interventions. A Career Conversations Campaign was also launched to encourage proactive discussions on staff's career development through a series of comic strips and culminating in the development of a Career Conversations Guidebook and refresher workshop for PSA SG leaders.

Social

A new half-day sharing session on effective mentoring, was also developed to strengthen our leaders' effectiveness in their role as mentors and be more confident in engaging staff in developmental interactions to guide their career growth. This sharing session complements existing efforts to onboard divisions in PSA SG to the divisional mentoring programme initiative as we strive to provide additional avenues to support staff career development. In 2022, Container Business Division and Cyber Security SEA Division launched their inaugural divisional mentoring programmes to broaden perspectives and give structured career guidance to a select group of staff within their divisions. They join IT, Finance, Human Resource and Technology and Sustainability Solutions divisions who already have established divisional mentoring programmes.

As part of leadership transition training, PSA SG continues to cascade the "Conducting Performance Appraisal" workshop to new managers and department heads to strengthen our leaders' competency in managing the performance appraisal process and guiding staff to grow their capabilities towards high performance in their present and future jobs.

All employees receive regular performance and career development review.



Note: All staff are required to complete an annual performance appraisal. There is a minority who are unable to complete due to reasons such as staff being away on long leave for unforeseen reasons, staff serving notice/resigned and new hires under probation. They will undergo performance review upon completion of their probation.

Growing our Talent Pipeline

PSA SG continues to raise its mindshare among local undergraduates through a series of virtual engagement sessions to excite them about various PSA SG's programmes – Management Associate, Junior S.E.A.L. and Scholarships. In addition to leveraging the Gradsingapore portal, PSA SG also partnered institutions such as the Singapore Maritime Foundation and MOE-SglS to feature career stories, articles, and social media posts to increase PSA's visibility, and held careers as well as scholarships sharing sessions to attract talent. We continue our branding and recruitment efforts to students and job seekers through institutional outreach, career fairs, and talks. PSA SG also worked with selected junior colleges to offer work attachment programmes as part of early mindshare-building efforts.

A hackathon "PSA Code Sprint 2022" was organised with more than 250 students participating from various IHLs and junior colleges. They were invited to work on problem statements related to supply chain, sustainability, and human resource, providing them with opportunities to learn more about PSA and its businesses.



Hackathon "PSA Code Sprint 2022"

Social

Community Relations

PSA SG strives to co-create positive and constructive relationships with different communities by listening, understanding and engaging with them. Our programmes are guided by three factors:

Resilient Core

We stay true to our mission of stewarding responsible business in the communities that we operate in, regardless of challenges faced.

Value Creation

We provide a variety of volunteering activities, with the aim of multiplying our impact and outreach to involve different stakeholders.

Sustainability

We work with partners to increase our and the community's awareness in sustainability and to encourage a green thinking culture.

PSA SG's flagship community programme, Health@Home (H@H), was launched in 2015 to support home-based healthcare and eldercare through corporate volunteerism among its Singapore-based staff. The H@H initiative is built on two fundamentals – sharing caregiving knowledge with staff to help the seniors and themselves; and building the volunteerism spirit amongst employees – to fulfil both societal and community needs.

According to the annual Population in Brief report released in September 2022, one in four Singaporeans will be aged 65 and above by 2030. Recognising and focusing on ageing issues ensure that we are well-prepared for the challenges of an ageing society. At PSA SG, we want to empower our employees and all individuals, including our beneficiaries, to age with grace and dignity.

The easing of Covid-19 measures in 2022 was welcomed by our pool of over 600 H@H volunteers, as physical volunteering activities could resume at our partner beneficiaries, including St Luke's ElderCare, HCA Hospice, National University Health System and Lions Befrienders. Through active volunteerism with our beneficiaries, PSA SG looks to support, enrich and bring joy to the lives of the seniors in our community.



H@H Initiatives

- **Division CSR Coordinators (DCCs)**

The DCCs initiative was introduced in 2022 and seeks to have a representative from each division in PSA SG to help promote and encourage volunteerism within their division. This includes organising volunteering activities and outings for our partner beneficiaries. This is important as it cultivates volunteerism spirit among employees, underscoring the significance of taking time out from their busy schedules to do good. Ten volunteering activities were organised by the DCCs in 2022, with the activities ranging from centre-based Go-Green related activities to group outings, where the seniors were taken to visit places of interests in Singapore.



- **Retiree Volunteer Programme (RVP)**

Doing good and contributing to the community does not stop when the employee retires. The RVP initiative allows PSA SG employees to continue volunteering even after retiring. Aligned with our aim of active aging for our employees, retiree volunteers who join the RVP initiative will not only get to keep in touch with friends but also acquire some eldercare skills that will be beneficial to them, keeping themselves both mentally and physically active. This allows them to age gracefully and at the same time, continue to contribute to the community.



Batik painting with a senior (right) at SLEC

Social

Together, We Can Make a Difference



• Multiplying our 'Doing Good' Movement

In line with our vision to expand our “Doing Good” movement, the PSA Community Engagement team started involving our various stakeholders in our giving journey, allowing our partners to reach out to our beneficiaries as well. In 2022, PSA SG organised a total of 23 activities – of which 19 activities are with our beneficiaries, with another 4 organised in collaboration with our stakeholders namely PSA Marine, CrimsonLogic, Regional Container Lines (RCL) and Ocean Network Express (ONE).

- Together with ONE, PSA SG organised a river clean-up activity at Kallang River. A total of 80kg of trash were collected from the river.
- As part of the Christmas celebrations, we partnered with RCL to distribute festive meals to one of PSA's beneficiaries, HCA Hospice.
- We also teamed up with our sister company, PSA Marine, where our volunteers harvested 120kg of pesticide-free vegetables grown in Gerické, PSA Marine's hydroponics rooftop farm. The vegetables were then given to the beneficiaries from St Luke's ElderCare.
- PSA SG also worked closely with the South West Community Development Council (SWCDC) by reaching out to their residents/students in rental homes. Through these initiatives, it allows us to expand and extend our sphere of influence among like-minded organisations.



PSA SG in Bloom

PSA SG engages the wider community to foster a sense of togetherness in this collective pursuit towards sustainability. Our PSA SG in Bloom programme aims to bring nature and biodiversity closer to the port and local community through a diverse range of activities, including tree-planting, food gardens, and recreational gardens.

Following up on our sponsorship to the Garden City Fund in 2019 towards the development and beautifying of Pasir Panjang Park, we have made an additional \$150,000 contribution to the building of 3 container shelters in two locations within the park. The park forms a physical link and a mutual connection for the public to access the viewing deck at PSA Alongside which overlooks Pasir Panjang Terminal. In line with PSA SG's community outreach programmes, the community can enjoy the greenery and be closer to the port. In preparation for Phase 2 opening of the park in 2023, PSA SG participated in the community planting organised by the National Parks Board (NParks) and planted 6 trees. Since 2016, PSA SG has supported NParks' OneMillionTrees movement, planting a total of 55 trees over the years.

To promote the consumption of locally sourced food, PSA SG built food gardens across its premises. From the first food garden in 2019, there are now six food gardens spread across PSA SG, with the latest addition at Tanjong Pagar Complex. With our dedicated staff volunteers managing these gardens, we were able to produce a combined harvest of 750kg of fresh produce to-date, consisting of an impressive array of 140 different types of flowering plants, fruits, herbs, and vegetables. 75kg of fresh produce were donated to charitable causes and the remaining produce was shared amongst garden volunteers and colleagues.



Long beans at one of the food gardens



Rock melon at one of the food gardens



Team bonding at Botanicals Sky @ MB, a rooftop food garden in PSA

Social

Go Green Corporate Social Responsibility (CSR) and Green Partnerships

Started in 2021, Go Green CSR seeks to empower our CSR partners, their beneficiaries, and the wider community to be more sustainable. This is achieved through a variety of events and educational workshops specially tailored to our diverse partners and their beneficiaries. As a good corporate citizen, we are dedicated to empowering and positively influencing communities to collectively build a stronger nation for our children and future generations.

In 2022, PSA SG extended the benefits of its food gardens to its corporate social responsibility (CSR) partner, The Haven. Beneficiaries from The Haven had the opportunity to visit one of the food gardens and actively participate in the hands-on activity of harvesting the produce. In November 2022, PSA SG's staff volunteers also took the initiative to refresh The Haven's food garden, which was initially established by PSA SG in 2017, demonstrating our continued commitment to promoting locally sourced food and support our CSR partners.

Upcycled planters at PATIO@PPTB3



To create greater awareness on waste-related topics, PSA SG has also organised educational workshops for our corporate partners. Four workshops were conducted for HCA Hospice staff and Lions Befriender beneficiaries from Clementi, in partnership with Zero Waste SG. Through this experience, participants learnt about zero-waste habits, minimising food waste, recycling and took part in upcycling activities.

As part of our green efforts, we have been actively engaging youths at various events to share about our sustainability efforts and to mobilise them in creating solutions for a sustainable future. In May 2022, we hosted the inaugural activity for the “SG75: Singapore Our Home Competition”. This annual competition encourages each generation to plan for the future of Singapore. With this year’s theme being “Inclusive Singapore”, over 360 youths from local secondary and tertiary institutions attended the seminar to learn more about sustainability.

On 8 June 2022, PSA SG participated in a panel discussion for 80 tertiary and postgraduate students from Singapore and Asia as part of the Youth Ecosperity Dialogue (YED) 2022. Through a series of conversations, industry engagements and workshops, student leaders across the region were challenged to formulate solutions to tackle pressing sustainability issues, as well as consider pathways to accelerate change for sustainable practices in industries and businesses.



YED 2022

Social

Awards and Recognition

PSA SG's unwavering commitment to promoting sustainability has earned us recognition for our efforts. We were featured in CNA's Climate Trailblazers docuseries, which was produced in collaboration with Ecosperity and centred on the topics of An Energy Revolution and Decarbonising Transport.

Member of Alliance for Action on Corporate Purpose (AfA-CP)

Organised by the National Volunteer and Philanthropy Centre (NVPC), the AfA-CP comes together to co-design and co-develop a national framework and blueprint that defines a shared vision of what corporate purpose means in Singapore. Being one of NVPC's Company of Good partners, PSA SG was selected as we have demonstrated commitment to corporate giving and supported social causes in the community with our flagship H@H programme. PSA SG's contributions will help shape national policies or initiatives to encourage other companies to integrate purpose as part of their corporate strategy and operations, aligning industry purpose with social needs.



Ms Ong Chiew Suan (2nd Row, second from right), Head of Corporate Branding and Commercial, representing PSA at the Alliance for Action on Corporate Purpose ("AfA-CP") organised by NVPC

Champions of Good Award by NVPC

PSA SG has been recognised as a "Champion of Good" by the NVPC, recognising our efforts in being an exemplary leader in advocating a culture of giving amongst employees and multiplying corporate giving to catalyse social change.



Employee Diversity and Inclusion

PSA SG strives to create a workplace that celebrates diversity, embraces inclusion, and provides a safe and supportive environment for all employees to thrive and contribute their unique perspectives and talents. For instance, we continuously enhance our work environment and work processes to be age-friendly. Our corporate headquarters and most terminal buildings also have nursing rooms to support new mothers' transition back to work.

While PSA SG is committed to creating a diverse workplace for all genders, despite the industry traditionally being more male-dominated due to the nature of operations. Nevertheless, we strive to improve gender diversity at PSA SG. PSA SG actively tracks gender diversity within its talent pool as part of the annual talent review process. We observe an improvement in turnover rates from 12% in 2021 to 10% in 2022. This is lower than the national turnover rate of 20.4%¹³.

PSA SG also participates in the group-wide talent development programme, STRIDE (Short-Term International Development Experience), to enable our talents to glean global perspectives for development, broaden horizons and network across business units/functions, and contribute to valuable business projects and assignments across the Group. Through the STRIDE programme, we seek to nurture global mindsets and groom talents who embrace and harness diversity, as we shape the future as One PSA.

¹³ The national turnover rate was extracted from the Labour Market Report Fourth Quarter 2022, published by the Ministry of Manpower.

**PSA SG
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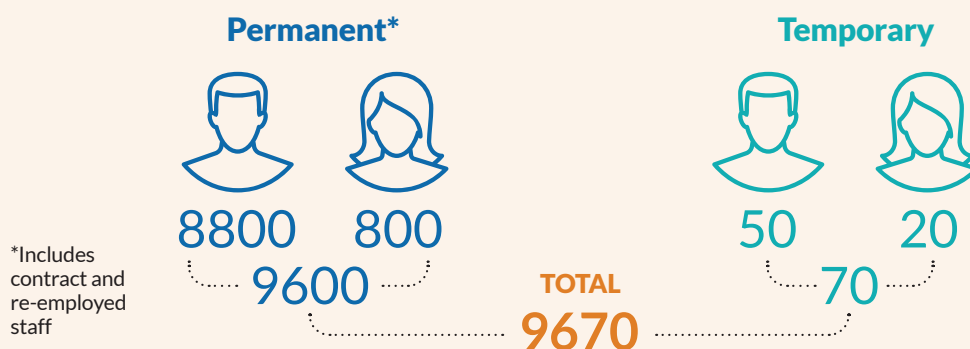


PSA Alongside Games 2022

Social

Overview of Employee Profile

Number of employees by employment contract (permanent and temporary), by gender, in PSA SG

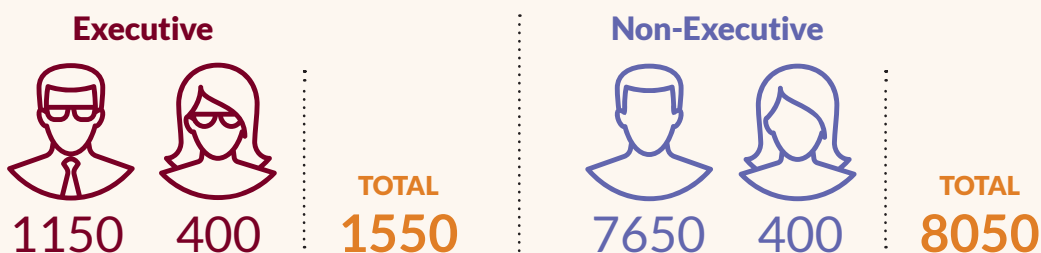


Number of employees by employment type (full time and part time), by gender, in PSA SG






*These are our permanent staff, and they are on part-time arrangements due to personal reasons.

Diversity of governance bodies and employees, by gender, in PSA SG



Diversity of governance bodies and employees, by age group, in PSA SG

	 <30 years	 30-50 years	 >50 years	TOTAL
Executive	300	1000	250	1550
Non-Executive	2000	4650	1400	8050




Total number and rate of new employee hires in PSA SG

Total new hires	1180
Overall new hire rate (Denominator: total number of employees)	12%

Rate of turnover in PSA SG



No. of voluntary turnover	820
No. of non-voluntary turnover	160
No. of voluntary and non-voluntary turnover	980
Rate of total turnover (Denominator: total number of employees)	10%

Rate of turnover, by age group, in PSA SG

	 <30 years	 30-50 years	 >50 years
No. of voluntary turnover	310	470	40
No. of non-voluntary turnover	40	50	70
No. of voluntary and non-voluntary turnover	350	520	110
Rate of voluntary and non-voluntary turnover (Denominator: total number of employees)	4%	5%	1%
Rate of voluntary and non-voluntary turnover (Denominator: total number of employees in age group)	14%	9%	7%

Social

Rate of turnover, by gender, in PSA SG

		
No. of voluntary turnover	750	70
No. of non-voluntary turnover	150	10
No. of voluntary and non-voluntary turnover	900	80
Rate of voluntary and non-voluntary turnover (Denominator: total number of employees)	9%	1%

Labour Relations and Worker Wellbeing

As part of our commitment to responsible and ethical employment, we place a high emphasis on building and maintaining strong relationships and engagement with labour unions to create a fair and conducive working environment for all employees.

We uphold best practice labour standards, including the respect for human rights, and has a zero-tolerance policy towards modern slavery in any form. We hold regular dialogues with staff and unions, and are dedicated to ensuring that all employees, including workers in its supply chain, are treated with dignity, respect, and fairness, and that they are always protected. Rationale and circumstances for any changes are communicated and sufficient time is given to all parties before implementation. In FY22, 77% of our employees are covered by collective bargaining agreements.

Alongside our Unions

Strengthening labour management relations and staying alongside our staff and unions remain key to a safe, agile and resilient workforce. Together with our unions, Singapore Port Workers Union (SPWU) and Port Officers' Union (POU) – we embarked on several initiatives.

Together with HR, divisions and departments in PSA SG have monthly engagements with the unions to share new initiatives and workforce related issues. Our senior management holds regular discussions and get-togethers to keep union leaders abreast of the business outlook and future developments. The unions and management embarked on joint committees and projects such as the SkillsFuture Council which focused on long-term workforce strategies to steer career development and to build a future-ready workforce.

As part of its culture building efforts, the unions and management worked together on initiatives aimed at promoting lifelong learning, creating a positive workplace, improving mental wellness, and promoting sustainability behaviours through our “Towards Enduring Partnership (TEP)” programmes. The “Be Kind, Be Gracious, Be There” campaign was launched to encourage a culture of appreciation and graciousness amongst our teams. The “Greenfish - Everybody Makes a Difference” campaign was also launched in 2022 to encourage staff to adopt and practise green habits as a way of life and contribute to PSA SG’s sustainability journey.

Improving Employee Experience

At PSA SG, we recognise that our people are at the heart of creating value and bringing success to our organisation. We are therefore committed to creating a “Great Smell of the Place” for everyone. Having a resilient workforce and looking after the mental wellbeing of our employees is a key focus and we have introduced many resources to support this aspect. Of which, one of the key initiatives launched was the “Confidant Programme”.

In efforts to improve staff overall wellbeing, PSA SG introduced a guidebook, “Towards Work-life Harmony”, covering the areas of good practices for effective meetings and gracious communications, in particular, after work hours communications. We have also introduced a “Towards Mental Wellness” toolkit to raise awareness with tips on building mental wellness. The toolkit includes information on how to recognise the first signs of stress, as well as strategies and resources in navigating challenges.

To further enhance the onboarding experience of new hires, complementing the corporate orientation programmes and port tours arranged for them, a suite of onboarding e-learning programmes was introduced to better acclimatise every new hire to their new work environment and culture. These programmes cover various topics such as cybersecurity, identifying suspicious characters, behaviours, and activities to keep PSA SG a safe and secure workplace, working effectively with office productivity tools, complying with the PDPA, leveraging data analytics for work, and understanding more about the environmental issues and PSA SG’s sustainability efforts.

Having a resilient workforce and looking after the mental wellbeing of our employees is a key focus and we have introduced many resources to support this aspect.

Governance





Ethical Business Conduct

The Code

It is PSA's firm belief that business must not only be conducted according to the highest standards of economic efficiency but the highest ethical standards as well.

These standards go beyond minimum legal requirements and reflect PSA's long-term commitment to building a business that is successful, honest, and responsible that all our employees can take pride in. The Code embodies PSA's business principles and provides guidance to our employees on how to navigate critical issues in a manner consistent with the company's values and expectations.

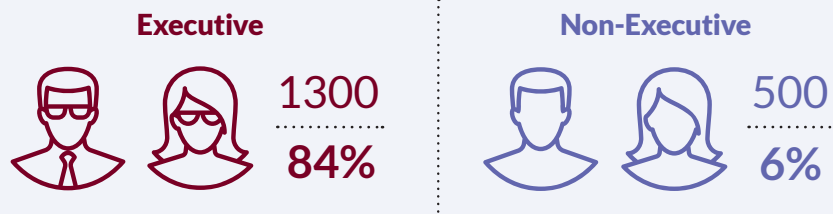
There are zero instances of non-compliance with laws and regulations in FY22, including both monetary and non-monetary penalties.



Percentage of employees that have signed letter of acceptance, acknowledging compliance with the Code of Conduct

100%

Number and percentage of employees that have completed "The Code" e-learning*



*Defined as staff who has completed one-off "The Code" E-learning in 2020

All PSA employees are required to understand and comply with The Code. This resource is made accessible online and reinforced regularly through various internal communications channels. All new hires must also acknowledge their commitment to comply with the Code of Conduct, in which compliance to The Code is stated.

As part of PSA's commitment to upholding integrity at all times, The Code includes the Whistle Blowing policy and channels for employees to report their concerns, such as via a Whistle Blowing hotline or email.

For more information on the Whistle Blowing Policy, please visit [The Code](#).

Governance

Innovation and Technology

As part of our sustainability strategy at PSA SG, we prioritise innovation and technology as key enablers for our efforts. We recognise the significance of leveraging new innovations and technologies to develop sustainable solutions that mitigate the impacts of our operations. By investing in Research and development projects, PSA SG can enhance our sustainability initiatives to attain enhanced operational efficiency, and a reduced carbon footprint. These efforts are integral to our pursuit of business success while promoting environmental sustainability.





Smart Grid Management System (SGMS) for Port Applications

PSA SG is developing smart grid solutions and battery energy storage systems to optimise energy use in port operations.

In 2019, PSA SG and Singapore's Energy Market Authority (EMA) launched a joint grant call to develop a smart grid system for port applications at PPT. The scope of the project includes introduction of SGMS for orchestration of Distributed Energy Resources (DER) to optimise port energy use and installation of a Battery Energy Storage System (BESS) and Solar Photovoltaic system. The system builds upon an Artificial Intelligence and Internet of Things (AIoT) platform, encompassing Digital Twin for Power Simulation, Smart Power Asset Management, Intelligent Energy Procurement and AI-based Cybersecurity Protection.

The BESS is used to participate in the National Electricity Market of Singapore through provision of ancillary services like frequency regulation and energy arbitrage, to reduce PSA SG's energy cost. Through the Proof-Of-Concept (POC) project, insights can be derived to validate the possibility for commercial and industrial users to adopt ESS for multiple purposes, such as on-site demand management and providing ancillary services to stabilise the grid.



Battery Energy Storage System at Pasir Panjang Terminal

Governance

The SGMS is also equipped with a deterministic optimisation algorithm. The system will forecast half-hourly wholesale electricity prices and schedule charging and discharging operations of BESS at strategic time intervals. This will facilitate optimised bidding into the different schemes in the electricity market.

Singapore's first Energy Storage System is now operationalised at PSA Pasir Panjang Terminal.

Electrification of PSA's Horizontal Transport Ecosystem

In line with electrification efforts for PSA SG's land transport ecosystem, we embarked on a Proof of Concept (POC) project to establish the commercial and operational readiness to onboard electrification of PSA SG's horizontal transport equipment and the charging and battery swap infrastructure.



For illustration only

The electric inter-gateway haulier (eIGH) and electric prime mover (ePM), collectively also known as electric trucks, are key technology enablers for the proliferation of the electrification ecosystem. Upcoming efforts under the POC include developing the Battery Charge and Swapping Stations (BCSS), Swappable Battery Systems (SBS) and Electric Vehicle Charging Station (EVCS) infrastructure.



This POC allows us to assess and build standards, industry and market readiness, and cultivate supplier diversity for eIGH and ePM. Similarly for the electric infrastructure ecosystem, we will assess and build standards, industry and market readiness, and develop interoperability between vehicle and swap station.

Electric truck ecosystem is still nascent in Singapore and PSA SG is taking the lead to engage various government agencies and stakeholders to jointly develop safety and operational standards. Areas of support and alignment required includes programme and standards development, grid framework and homologation.

The operational trials will commence in 2023 with 8 units of electric trucks – 2 units of eIGH and 6 units of ePMs and successful operational trials will accelerate the adoption of electrification in PSA SG and potentially promote the Energy Transition and Decarbonisation of the Container Truck Industry, including the Heavy Goods Vehicles (HGVs) and Very Heavy Goods Vehicles (VHGVs) in Singapore.



Governance

Hydrogen POC Project

In step with Singapore's hydrogen strategy to accelerate transition to net zero emissions and PSA SG's commitment to sustainability, we are developing the first POC hydrogen use project for horizontal port transportation in Singapore. Hydrogen will be used as a potential sustainable green energy source for horizontal transportation, fueled by Chiyoda's SPERA Hydrogen™ technology¹⁴.

PSA SG has partnered with six industry partners to assess the technical and commercial feasibility of hydrogen as a viable low-carbon energy source while developing a business case for hydrogen imports. The POC will play a pivotal role in expanding the use of hydrogen fuel within PSA and Singapore, hastening our energy transition towards net-zero emissions. This collective effort demonstrates to government agencies that hydrogen remains a viable decarbonisation pathway through demand aggregation and innovation.



As part of this collaboration, PSA SG will develop the first POC hydrogen use project for horizontal port transportation and aims to augment its core business of port operations and adjacent ecosystems. The POC will feature Chiyoda's SPERA technology, a hydrogen refueling station and one fuel cell electric prime mover. Additionally, PSA SG is collaborating with various industry stakeholders and agencies to create standards for hydrogen refueling stations and safe refueling operations. These standards are vital for addressing regulatory concerns and clarifying design and safety aspects, thereby accelerating the adoption of hydrogen fuel.

The trial is scheduled to begin in 2024 and will run for a year. If successful and when hydrogen reaches cost parity, there is potential to replace diesel prime movers with hydrogen fuel cell electric prime movers. This transition would promote the adoption of low-carbon alternatives in Singapore and significantly reduce both PSA SG and Singapore's carbon footprint, aligning with the nation's environmental sustainability objectives.

¹⁴ SPERA is a technology to transport and store hydrogen at normal atmosphere temperature and pressure, utilising Methylcyclohexane (MCH), a Liquid Organic Hydrogen Carrier (LOHC).



Automated Quay Crane (aQC)

To further improve operational efficiency and consistent equipment handling, PSA SG has adopted an automated quay crane (aQC) retrofitting project, integrating sub-systems that utilises technologies such as sensors, video analytics, optimisation algorithms, and assisted remote handling. In 2022, we have completed our testing on aQCs fitted with the latest high-resolution Light Detection and Ranging (LiDAR) and image fusion technology. This advanced system utilises laser light to develop a distance map of the objects in the scene, providing a better visualisation of the operations within its surroundings.

PSA SG looks to further equip the aQC with autonomous technologies and has begun a new collaboration with Nanyang Technological University in December 2022 to work on this, with funding from Singapore Maritime Institute. Through this project, the academic researchers will have a better understanding on key challenges in the maritime industry such as safety concerns of the close proximity of humans and non-standardised vessel cell guides during vessel side operation. The project is expected to complete in 2024.



Governance

Autonomous Prime Mover (aPM)

An aPM adopts autonomous vehicle technology and leverages on self-driving autonomy capabilities for port horizontal transport, enabling deployment in mixed traffic conditions and with minimal infrastructure changes.



We are in the midst of conducting trials on the aPMs and are collaborating with solution partners to refine and test these solutions.

In the ecosystem level testing in 2022, aPMs were successfully integrated with fleet management systems and Vehicle-2-Everything (V2X) applications to augment aPM safety and performance in the port environment. The aPM is currently capable of navigating live traffic, signalised and unsignalised junctions, and has precise docking accuracy for mounting and offloading with aRMGs. The goal is to scale and operationalise a fleet of aPMs for yard shifting by the end of 2023, supported by remote exception handling. At the same time, we have embarked on developing wharf capabilities to enable full ship operations.



Vessel and Wharfside Automation and Mechanisation

Vessel and wharfside activities are labour-intensive, high-risk and subjected to weather conditions. In seeking to automate these activities for increased productivity and safety, we are collaborating with Institutes of Higher Learning (IHLs) on research and prototype development, and industry partners to co-develop automation and mechanisation solutions.

Wharfside Automation and Mechanisation

We are working with industry collaborators to co-develop a robotic platform to enable automated coning and de-coning operations. In 2022, we have demonstrated the key capabilities for each of the core technologies developed and have started conducting field trials.

Leveraging on this experience, we are bifurcating and developing this robotic platform solution onto the Double-Trolley Quay Crane (DTQC) lashing platform at Tuas Port.

We have also established a 3-year collaboration with an IHL through the Maritime Transformation Programme (MTP) to develop Autonomous Mobile Robots (AMR) with a universal gripper technology, to demonstrate automated coordinated coning and de-coning alongside horizontal transport at the wharf by 2023.

These technologies will enhance productivity and create a safer environment for the lashing workers at the wharf.



Testing of robotic technology to automate coning and deconing operations

Governance

Vessel Side Automation and Mechanisation

In conventional vessel side operations, lashing workers are deployed on top of the containers onboard the vessel to unlock the twistlocks at height.

A 3-year grant call collaboration with an IHL was established to develop a robotic module fitted with end grippers to unlock semi-automatic twistlocks fitted on the containers. Robotic unlocking capabilities were demonstrated in a lab environment and expected to commence field trials by 2023.

Another grant call project which commenced in 2022 aims to develop innovative solutions for the container securing system on vessels to improve the efficiency and safety of operations. The proposed solution involves the development of smart locks augmented by robots. This industry disruptive solution to secure the containers would minimise human involvement both on the vessel and at the wharfside providing a safer environment for lashing operations.





Launch of Opt-E-Arrive

Opt-E-Arrive is a dynamic intelligence system that allows the synchronisation of transparent real-time activities and automation of data exchange between the carrier and the port operator. It reduces bunker consumption by allowing vessels to skip the anchorage stop and optimise vessel speed to be timely for berth, mitigating greenhouse gas emissions.

Drive Digital Transformation Within the Local Haulage Industry

Responding to the growing need for supply chains to be more resilient and agile, PSA SG has developed and launched more than 50 Application Programming Interfaces (APIs) to enable digital transformation and enhance digital integration within the haulage industry in Singapore. Digitally connected with PSA's Portnet®, the hauliers' existing in-house systems can now be digitally connected, thereby streamlining and automating their work processes including port documentation. The need for manual documentation or job order filling will become a thing of the past, as digitalised processes enable greater efficiency, reliability, timeliness, and transparency in goods movement across supply chains.

Through this initiative, PSA SG seeks to encourage our logistics and haulage partners to innovate their business processes and at the same time, provides the sharing of real-time information for enhanced planning and decision-making. Moving forward, we will work towards building capacities to strengthen the overall business ecosystem. PSA SG has been working closely with key stakeholders, including trade associations and chambers to help companies, especially small and medium-sized enterprises, move in tandem with the emerging needs of the digital economy and a post-pandemic future.

Governance

Cybersecurity and Data Privacy

Being a key player in Singapore's economy and global trade as one of the busiest and most technologically advanced ports in the world, PSA SG understands the critical importance of cybersecurity and data privacy as an imperative to safeguard PSA SG's critical infrastructure, including IT systems, networks and communication channels, from potential cyber threats that could disrupt port operations, compromise data integrity, or result in financial loss.

Aligning to Group, PSA SG is committed to protecting its business systems and ensuring data privacy through the implementation of robust cybersecurity measures. All employees are required to abide Group's policy including PSA Group Data Policy, PSA Group IT Security Policy, PSA Group Document and Information Policy and PSA Personal Data Protection Policy.

For more information on PSA Group's policies, please refer to [PSAI's Sustainability Report 2022](#).

Personal Data Protection Office

In 2021, PSA established the Personal Data Protection Office (PDPO) to oversee corporate compliance with the PDPA. The PDPO is responsible for implementing internal policies aimed at minimising the risk of regulatory or legal exposure related to data protection. This includes designing data protection management programmes, developing capabilities and fostering a culture of data protection within the organisation. In FY22, there were zero cases of substantiated complaints received concerning breaches of customer privacy. There were also zero cases of identified leaks, thefts or loss of customer data.



Exercise CyberMaritime 2022

PSA SG was a key participant in Exercise CyberMaritime 2022 conducted by the Maritime and Port Authority of Singapore (MPA), the maritime sector lead for Critical Information Infrastructures (CIIs). MPA, PSA SG and Jurong Port are the Critical Information Infrastructure Owners (CIIOs) in the maritime sector. This sectoral table-top exercise is designed to assess sectoral processes and procedures for the coordination and communication of responses against threats targeting connected and automated systems. One activity of particular interest was the exercise of inter and intra-agency communications and information sharing during a targeted sector wide cyber-crisis.

CyberPSA 2022

On 6 May 2022, PSA SG organised a tabletop exercise for the management of PSA SG and selected PSA Southeast Asia (PSA SEA) business units. This experiential learning through scenario-based exercises set out to achieve below objectives:

1. Reinforce confidence in roles and responsibilities in crisis management plans
2. Identify strengths and improvement areas
3. Enhance ability and readiness to respond and manage cybersecurity incidents

The exercise took two months of collaborative planning among IT Security Governance, Operational Technology (OT) Security, Enterprise Risk Management, Cybersecurity Operations, Corporate Branding, Container Business, IT and Engineering teams. Information from key stakeholders were collected to better understand their business priorities and critical IT/OT assets, then analysed with the threat landscape to deepen the realism of the exercise scenarios. The objectives were delivered through experiential learning using the scenario-based exercises.

The strengths and areas of improvement observed during the exercise was reported as part of continuous improvement for the long-term sustainability of cyber readiness.

Governance

Sustainable Procurement

PSA SG remains steadfast in our commitment to responsible procurement, which involves sourcing high-quality resources, products and services from ethical sources that uphold governance and human rights, are environmentally sustainable and technologically innovative, all while maintaining competitive prices.

Bringing Suppliers Alongside our PSA SG's Sustainability Journey

PSA SG had integrated the Group Sustainable Procurement Framework into ways of working with our suppliers and contractors in 2022. Two sustainability-related elements rolled out in 2022 are the Suppliers' Code of Conduct (SCC) and the Circularity Survey.

The SCC highlights PSA SG's expectations of our suppliers and our shared commitment to ESG performance, aiming to improve the reputation of both PSA and our suppliers. The SCC lays out guidelines on how business should be conducted and provides guidance on the standards of behaviour expected of all PSA SG suppliers, which also encompasses their sub-suppliers, partners and agents. PSA SG requires that all suppliers meet the standards set out within the SCC. The SCC was rolled out in Q4 2022 and will be implemented in all major contracts in 2023.





To better understand our suppliers' sustainability initiatives, a Circularity Survey had been included in goods and equipment tenders from Q4 2022. The survey inputs will support PSA SG to develop consistent sustainability measurements or assessments and build the requirements into tender specification. This is to set sustainability as a feature of the product offering that has tangible impact to PSA SG and the environment.

PSA SG supported PSAI on the development of the Greenstone+ platform from middle of 2022. The platform will be used to track suppliers' GHG footprint as well as for assessing ESG maturity of our suppliers by using survey questions covering Health, Safety and Environment, Compliance and Cybersecurity. This survey has been tested with a few suppliers and will be rolled out in 2023 to larger suppliers as well as for supplier pre-qualification in major tenders. The survey results collated will help facilitate closer collaboration and action planning with key suppliers to close ESG gaps or co-develop new solutions. In the long run, this will help to ensure that PSA work with like-minded suppliers that share our GHG emission reduction and ESG vision.

PSA Suppliers Alongside 2022 Xchange

During the inaugural PSA Suppliers Alongside 2022 Xchange held on 24 November 2022, we shared the upcoming activities to track ESG and GHG emission in the hope of inspiring our suppliers to follow suit. Recognising that many of our suppliers may be at different stages in their sustainability journey, we aspire to share our sustainability strategy framework and vision with our key suppliers to bring them alongside PSA SG's sustainability journey.

Mr Ong Kim Pong, RCEO SEA, speaking at the PSA Suppliers Alongside 2022 Xchange



Governance

Procurement Team of the Year

PSA SG had been named “Procurement Team of the Year – Large Organisation” at the Chartered Institute of Procurement and Supply (CIPS) Asia Excellence in Procurement Awards 2022, held during ProcureCon Asia in July 2022. Jointly organised by ProcureCon and the CIPS, the Awards are widely considered to be one of the most prestigious recognitions in the procurement and supply chain profession, as well as a benchmark for procurement excellence. This award recognises a high-performing procurement team that has made significant improvements to their performance and culture, resulting in increased effectiveness, influence, efficiencies, savings, or a competitive advantage. This event marks the team’s first-ever participation in the Awards and PSA SG is proud to clinch this distinguished title on our first try.

PSA SG’s “Tuas Megaport – World’s Largest Sustainable Port” submission was highly commended under the “Best Sustainable Project of the Year” award category, which recognises social, environmental and responsible procurement projects.



PSA SG receives the “Procurement Team of the Year – Large Organisation” award



Governance

Optimisation of Global Supply Chain

Optimising the supply chain is crucial for achieving operational excellence and remaining competitive in the global business landscape. PSA SG acknowledges the importance of operating in an environmentally responsible manner to meet sustainability goals. As such, we are committed to driving sustainability enhancements in local and regional global shipping and logistics supply chains through collaborative efforts with our suppliers, partners and customers. This proactive approach aligns with our commitment towards achieving the national target of reaching net zero emissions by 2050.

A Greener Mode of Transport for the Energy and Chemicals Manufacturers at Jurong Island

In support of the Singapore Green Plan 2030, PSA SG strives to streamline the supply chain processes of the businesses on Jurong Island, improving efficiency and cargo connectivity to aid in the transformation of Jurong Island into a sustainable energy and chemicals park.

In 2022, PSA SG continues to work closely with the Jurong Island Terminal (JIT) community to promote the use of barging as a greener alternative to the conventional haulier trucking. The barging volume increased 26% year-on-year and PSA JIT achieved a record-breaking container throughput of more than 130,000 twenty-foot equivalent units (TEUs) since the terminal began operations in 2012. This solution saved more than 130,000 truck trips between Jurong Island and PSA Terminals on mainland Singapore, reducing up to 37% of carbon emissions per TEU equivalent to savings of 1,950 tCO₂e.

PSA Jurong Island Terminal provides barging as a greener alternative to move containers between terminals





Creative Cargo Solutions

In May 2022, Sembcorp was appointed by the Singapore Energy Markets Authority (EMA) to build the largest battery storage system in Southeast Asia on Jurong Island with a nominal/contracted capacity of 285 MWh/200 MWh. PSA Cargo Solutions (SEA) Pte Ltd (PCSS), now known as Port+ Services (SEA), was appointed the logistics service provider and played an integral role in ensuring the timely delivery of all imported goods to the two sites on Jurong Island.

The team utilised the close proximity of JIT to the two project sites and designated it as the Onward Hub for barging cargoes from main PSA Terminals into Jurong Island, as an alternative to trucking. Despite supply chain disruptions, PCSS successfully delivered 250 containers for the Energy Storage System (ESS) projects on Jurong Island within a short span of two months, enabling Jurong Island's Battery Energy Storage System (BESS) to be online in just six months, compared to the typical lead time of 15 to 18 months.

In recognition of our excellent service, PCSS was honoured with two awards from Sembcorp Industries (Sembcorp). The Supplier Appreciation Day 2022 saw PSA Cargo Solutions receiving the Best Logistics Support Award, and an appreciation plaque was also presented to PCSS during Sembcorp ESS Partners' Appreciation Day 2022. The team is proud to contribute towards securing Singapore's energy supply and grid reliability by being part of this significant milestone. The successful completion of the project will allow EMA to achieve the national 200MWh energy storage deployment target by 2025.



Governance

Launch of OptETruck

In November 2022, PSA SG together with Enterprise Singapore, Container Depot Association of Singapore and Singapore Transport Association, launched OptETruck to the haulier community to enable asset pooling and optimise the matching of trucks to jobs. OptETruck is a cloud-based management solution that features two key smart capabilities, an automated scheduler that can maximise resource utilisation with AI-based resource matching algorithms and an asset pooling that can optimise resource across haulier companies in the community. These capabilities help to reduce empty trips by up to 50%, improving asset utilisation, increasing manpower savings and reducing overall carbon footprint by eliminating inefficiencies.



Hauliers at the terminal flow through gate



Sustainable Port Development

PSA SG places a high priority on ensuring that the planning, design, and development of our port infrastructure and operations are carried out in a manner that considers and effectively addresses the environmental impacts resulting from land development and reclamation activities. By incorporating environmental considerations into our planning and development processes, PSA SG aims to achieve a balance between economic growth and environmental sustainability in our operations.

Sustainable Tuas Port Development

Tuas Port officially opened on 1 September 2022 with five berths operational by end 2022. Tuas Port is being progressively developed in four phases and will be fully operational in the 2040s.



PSA Tuas Port

Governance

The berth and yard construction are built using Green Concrete. Green Concrete uses Portland Blast Furnace Cement (PBFC) with 80% Grand Granulated Blast-Furnace Slag (GGBFS) and 20% Ordinary Portland Cement (OPC). This is a PSA standard in civil construction.

Concrete is one of the world's most consumed materials (second to water) and cement production accounts for 7% of global carbon emissions. Having GGBFS reduces carbon emissions and embodied carbon in the built environment by more than 70% compared to ordinary cement. We estimate that 1.4 million tonnes CO₂e of carbon will be saved by using PBFC for Tuas Port.

CarbonCure Technology

To further expand our sustainability footprint, carbon mineralisation has been introduced for Tuas Port development following the successful test-bedding of CarbonCure Technology. CarbonCure Technology introduces carbon dioxide into fresh concrete without compromising performance. Once injected, the carbon dioxide becomes permanently embedded through a chemical process.

The use of carbon mineralisation helps to save another 35,224 tonnes of CO₂e for the rest of Tuas Port development, on top of the 1.4 million tonnes CO₂e saved from the use of GGBFS.

Recycled Concrete Aggregate

There is a concrete recycling plant at Tuas Port development site to recycle salvaged concrete. Salvaged concrete can be cut-off concrete from reinforced concrete piles or caissons. Reinforced concrete piles are used for foundation whilst caissons are used for our berth's construction. The concrete recycling plant is an effort to further drive a green and sustainable Tuas Port development. To date, 69,754 tonnes of concrete were recycled, with 8,950 tonnes of concrete recycled in 2022.

Berth and yard construction using green concrete at Tuas Port



The SGBC-BCA Leadership in Sustainability Awards

PSA SG received the Business Leadership in Sustainability Award in the Transformation category for our green efforts in 2022.

The awards ceremony is co-organised by the Singapore Green Building Council (SGBC) and the Building and Construction Authority (BCA) to recognise professionals, organisations and building projects for their contributions and significant achievements in the development of a green and sustainable built environment.



Mr Alvin Foo (second from right), Head of Technology and Sustainability Solutions, representing PSA to receive the Business Leadership in Sustainability Award

Governance

Port Security

PSA SG Ensures Safety and Security in its Port Operations

PSA SG is a protected area, protected place and Free Trade Zone and we aim for zero port security breaches. To safeguard entrepot trade and transshipment activities, a team of port facility security officers, emergency response team, auxiliary police officers and operations staff ensures PSA SG's security through a holistic security regime. PSA SG works closely with the relevant ministries and government agencies and complies with all international and local laws and regulations. There was zero port security breach in 2022.

The training on Threat-Oriented Person Screening Integrated System (TOPSIS) programme continued with the cascade to port users such as cleaners, to equip all non-security trained personnel to identify suspicious behavior and tell-tale indicators and to report them. Security awareness was validated through a series of red teaming exercises so that potential security breaches could be quickly de-escalated with the trained ground personnel.

Technology and digitalisation are important enablers in port security. They allow port security personnel to perform their duties more efficiently, streamline processes and in turn enhance port security through more precise and quicker responses. Technology adoptions for projects such as perimeter fence and gate intrusion systems, speeding enforcement, video analytics for seafront monitoring and online pass application for port users factor in sustainability considerations. One example is the adoption of Power over Ethernet (PoE) technology for PSA SG's closed-circuit television system, which are more energy and cost efficient.

Security Evacuation Exercise

In October 2022, a security evacuation exercise was conducted at a building in PPT. A suspicious package was placed in the building. The exercise was successfully concluded with relevant parties responding responsibly to such a scenario with minimal impact to the port operations.



Exercise Yellow Storm with Singapore Civil Defence Force (SCDF)

In October 2022, an inaugural joint exercise was conducted with SCDF. It involved multiple scenarios, hazardous materials and mass casualties occurring simultaneously at Tuas Port, to stress test the responses and capabilities of the Company Emergency Response Team (CERT).

21 SCDF emergency vehicles, equipment and 100 SCDF responders from SCDF HQ and various fire stations participated in the exercise. The exercise validated our response plans and strengthened collaboration between SCDF and PSA SG.



Exercise Yellow Storm – a joint exercise conducted with SCDF

Awards and Recognition

PSA SG was recognised by the National Safety and Security Watch Group for enhancing the safety and security at our workplace. We received the TOPSIS High Commendation Award 2022 for our role in cascading the TOPSIS framework to all staff, solution partners and port users.

PSA SG was also presented with the letter of appreciation from the Central Narcotics Bureau for our support and assistance rendered to many of their operations to keep Singapore drug-free.

Regional Development

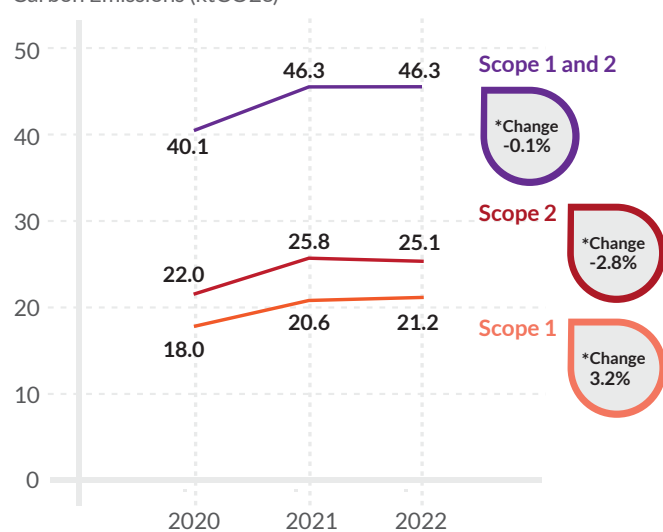
Overview

PSA upholds its pledge to safeguard the environment and drives the promotion of environmental sustainability through its terminals worldwide. The following section of this report demonstrates the performance of other terminals located in Southeast Asia, excluding Singapore, and highlights the efforts and initiatives they have undertaken to support PSA's vision in managing energy, emissions, waste and water.



Energy Emissions of PSA's Southeast Asia Terminals (excluding PSA SG)

Carbon Emissions (ktCO₂e)



*Comparison between 2021 and 2022

The SEA BUs Scope 1 emissions is 21.2 ktCO₂e and Scope 2 emissions is 25.1 ktCO₂e, bringing the total Scopes 1 and 2 emissions to 46.3 ktCO₂e. The increase in total emissions in 2022 from 2021 is mostly attributed to an increase in terminal activities.

Water Withdrawal (excluding PSA SG)

	Water Withdrawal ('mil litres)	% Change
2020	79.0	-
2021	78.5	-0.4
2022	80.2	2.2

Water withdrawal by SEA BUs in 2022 indicated a slight increase of 2.2% from our baseline year 2020. This increase can be attributed to an increase in terminal activities.

Promoting Environmental Sustainability in Southeast Asia

ESCO

ESCO operates Container Terminal B3 at Laem Chabang Port, which is the key point of entry for Thailand's container traffic.

During World Environment Day in June, ESCO staff and management planted *Tabebuia rosea* trees at Khao Tabag Community Forest at Sriracha District, Chonburi Province, Thailand. The Khao Tabage Community Forest is developed as a tourist attraction and nature study place.

ESCO and vendors donated solar-powered spotlights and LED lighting to Karunyawet Home for Persons with Disabilities. This initiative supports the reduction of electricity consumption and GHG emissions from the home.

ESCO held an upcycling competition for staff during Go Green 2022.



Upcycled planters made from caps of bottled drinks by ESCO colleagues

Regional Development

Green Project Updates

ESCO purchased 2 hybrid reach stackers in 2022 to reduce GHG emissions and fuel consumption. The new reach stackers will be delivered on April 2023. The fuel consumption is expected to reduce by 30% for each new reach stacker compared to a diesel-powered reach stacker.



Tree-planting by ESCO staff and management

SP-PSA

During Go Green month, SP-PSA staff and management participated in the cleaning of the port to symbolise the joint commitment towards the environment and climate change.

SP-PSA has also converted its existing diesel passenger trucks used by operations and technical staff into electric carts after considering usage patterns and requirements. SP-PSA aims to progressively convert the lighting system to LED based technology for carbon emission savings.



A briefing before SP-PSA staff and management clean the port



PCSID

A tree planting activity was carried out on 11 October 2022 during Go Green month where participants pledged to collaborate for change.

NPCT1

To strengthen environmental awareness of employees, contractors, tenants and visitors, NPCT1 has established a Trash Bin Classification programme. This programme encourages employees, contractors, visitors and related parties to always discard their trash in specific bins which are classified as organic, inorganic and hazardous waste that are placed in strategic locations at NPCT1.

Employees and unions also come together to plant trees at the terminal.

Employee Education and Awareness

Hazardous waste such as used batteries are properly managed with employees returning them before ordering new ones. NPCT1 also educated its operators to turn off the equipment engine while not in use. Email reminders are sent to employees to switch off electricity when not in use.

TCT

In 2022, TCT created awareness of energy related environmental issues and mobilise action among the event's target groups. They initiated a series of Go Green activities which include changing the building's lighting from fluorescent to LED, optimising and reducing the number of office containers, recycling old and worn clothes/uniforms.

GRI Content Index

Statement of use: PSA SG has reported the information cited in this GRI content index for the period, 1 January 2022 to 31 December 2022, in accordance with the GRI Standards.

GRI 1 used: GRI 1: Foundation 2021

Overview

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
General Disclosures			
GRI 2: General Disclosures 2021	2-1	Organisational details	About PSA Singapore, Pg 9
	2-2	Entities included in the Organisation's Sustainability Reporting	About this Report, Pg 3
	2-3	Reporting Period, Frequency and Contact Point	About this Report, Pg 3
	2-4	Restatements of Information	About this Report, Pg 3
	2-5	External Assurance	About this Report, Pg 3
	2-6	Activities, Value-Chain and Other Business Relationships	About PSA Singapore, Pg 9
	2-7	Employees	Social > Employee Diversity and Inclusion, Pg 84
	2-8	Workers who are not employees	Not Applicable: Due to the nature of our business, PSA SG does not have any workers who are not employees
	2-9	Governance Structure and composition	Our Approach to Sustainability > Our Sustainability Governance, Pg 26
	2-10	Nomination and selection of the highest governance body	Confidentiality constraints: PSA is a private entity and does not currently disclose the following information.
	2-11	Chair of the highest governance body	Refer to PSAI AR2022, Pg 9
	2-12	Role of the highest governance body in overseeing the management of impacts	Refer to PSAI SR2022, Pg 27-31

Overview

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
General Disclosures			
GRI 2: General Disclosures 2021	2-13	Delegation of responsibility for managing impacts	Refer to PSAI SR2022, Pg 27-28
	2-14	Role of the highest governance body in sustainability reporting	Refer to PSAI SR2022, Pg 27
	2-15	Conflicts of interest	Confidentiality constraints: PSA is a private entity and does not currently disclose the following information.
	2-16	Communication of critical concerns	Refer to PSAI SR2022, Pg 28
	2-17	Collective knowledge of the highest governance body	Refer to PSAI SR2022, Pg 27
	2-18	Evaluation of the performance of the highest governance body	Confidentiality constraints: PSA is a private entity and does not currently disclose the following information.
	2-19	Remuneration policies	Confidentiality constraints: PSA is a private entity and does not currently disclose the following information.
	2-20	Process to determine remuneration	Confidentiality constraints: PSA is a private entity and does not currently disclose the following information.
	2-21	Annual total compensation ratio	Confidentiality constraints: PSA is a private entity and does not currently disclose the following information.
	2-22	Statement on sustainable development strategy	Regional CEO Southeast Asia's Message, Pg 4-7
	2-23	Policy Commitments	Governance > Ethical Business Conduct, Pg 89
	2-24	Embedding policy commitments	Governance > Ethical Business Conduct, Pg 89
	2-25	Processes to remediate negative impacts	Refer to PSAI SR2022, Pg 92

GRI Content Index

Overview

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
General Disclosures			
GRI 2: General Disclosures 2021	2-26	Mechanisms for seeking advice and raising concerns	Governance > Ethical Business Conduct, Pg 89
	2-27	Compliance with laws and regulations	Ethical Business Conduct, Pg 89
	2-28	Membership associations	Collaborative Partnerships with Common Goals, Pg 18-24
	2-29	Approach to stakeholder engagement	Material Sustainability Topics, Pg 15-17
	2-30	Collective bargaining agreements	Social > Labour Relations and Worker Wellbeing, Pg 86

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
Topic Specific Disclosures			
GRI 3: Material Topics 2021	3-1	Process to determine material topics	Material Sustainability Topics, Pg 15-17
	3-2	List of material topics	Material Sustainability Topics, Pg 15-17

Environmental

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
Climate Change Adaptation			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Environment > Climate Change Adaptation, Pg 29-32
Emissions and Energy			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Environment > Emissions and Energy, Pg 33-41
GRI 302: Energy 2016	302-1	Energy consumption within the organisation	Environment > Emissions and Energy, Pg 34

Environmental

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
Emissions and Energy			
GRI 305: Emissions 2016	305-1	Direct (Scope 1) GHG Emissions	Environment > Emissions and Energy, Pg 35
	305-2	Energy indirect (Scope 2) GHG Emissions	Environment > Emissions and Energy, Pg 35
Environmental Protection			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Environment > Environmental Protection, Pg 42-44
Green Port Culture			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Environment > Green Port Culture, Pg 45-49 Social > Community Relations, Pg 79-81
Waste Management and Recycling			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Environment > Waste Management and Recycling, Pg 50-54
GRI 306: Waste 2020	306-3	Waste generated	Environment > Waste Management and Recycling, Pg 50
Water Use and Pollution			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Environment > Water Use and Pollution, Pg 55-57

GRI Content Index

Social

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
Occupational Health and Safety			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Social > Occupational Health, Pg 59-63 Social > Safety, Pg 64-69
GRI 403: Occupational Health and Safety 2018	403-5	Worker training on occupational health and safety	Social > Occupational Health, Pg 60-61 Social > Safety, Pg 65
	403-6	Promotion of worker health	Social > Occupational Health, Pg 61-62
	403-9	Work-related injuries	Social > Safety, Pg 64
People Development			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Social > People Development, Pg 70-75
GRI 404: Training and Education 2016	404-1	Average hours of trainings per year per employee	Social > People Development, Pg 72
	404-2	Programmes for upgrading employee skills and transition assistance programmes	Social > People Development, Pg 73-74
Community Relations			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Social > Community Relations, Pg 76-82
Employee Diversity and Inclusion			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Social > Employee Diversity and Inclusion, Pg 83
GRI 401: Employment 2016	401-1	New employee hires and employee turnover	Social > Employee Diversity and Inclusion, Pg 85
Labour Relations and Worker Wellbeing			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Social > Labour Relations and Worker Wellbeing, Pg 86-87

Governance

GRI Standard	Disclosure Number	Disclosure Title	Page Number and Reasons for Omissions, if applicable
Ethical Business Conduct			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Ethical Business Conduct, Pg 89
Innovation and Technology			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Innovation and Technology, Pg 90-99
Cybersecurity and Data Privacy			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Cybersecurity and Data Privacy, Pg 100-101
GRI 418: Customer Privacy 2016	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	Governance > Cybersecurity and Data Privacy, Pg 100
Sustainable Procurement			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Sustainable Procurement, Pg 102-104
Optimisation of Global Supply Chain			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Optimisation of Global Supply Chain, Pg 106-108
Sustainable Port Development			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Sustainable Port Development, Pg 109-111
Port Security			
GRI 3: Material Topics 2021	3-3	Evaluation of the management approach	Governance > Port Security, Pg 109-113



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