

SUSTAINABILITY

@ PSA Singapore
for year 2020



Message from RCEO, SEA

Dear Stakeholders,

This is PSA Singapore's fourth update on our sustainability journey.

COMMITMENT TO SUSTAINABILITY

Sustainability has become increasingly important. We should not be handing to the next generation a world that is polluted and facing global warming. Our strategy, therefore, is to create long-term sustainable value with the focus on Environment, Social and Governance or ESG in short. We will continue our three "C" approach for our sustainability journey:

- First C is "Carbon Reduction"
- Second C is "Circular Economy"
- Third C is "Culture"

This approach also provides a platform for innovation and strengthens our partnership with you, our stakeholders.

MAKING PROGRESS IN DECARBONISATION

In line with the UN's Sustainable Development Goals, and Temasek's *abc World* framework, PSA Singapore aims to reduce our absolute greenhouse gas (GHG) emissions by 50% by 2030. Our decarbonisation goal will be supported by efforts across Scopes 1, 2 and 3.

As part of efforts to reduce our Scope 1 and 2 GHG emissions, we signed a Memorandum of Understanding (MOU) with six like-minded industry partners in early 2020 to pioneer ways to utilise hydrogen as a viable low-carbon green energy source in Singapore.

The signing of the MOU allows PSA to strengthen our green initiatives. Lowering carbon emissions to reduce the impact of climate change is a vital pillar of our business, and the direct outcomes of reducing

our carbon footprint through this project is exciting. Powering our horizontal transport with hydrogen is just the beginning, and we will see its application expanding in the future, playing a part in our Smart Grid systems with EMA, and augmenting business adjacencies in our future Tuas Ecosystem.

Addressing Scope 3 will require a truly green transformation, not only within PSA Singapore, but also alongside our value chain partners to enable supply chain-wide GHG reductions. To this end, we formed PSA Cargo Solutions to support and enable shippers to make greener logistics choices. We believe that by working together with our partners and customers, we can leverage data to orchestrate supply chains better – optimising delivery routes to reduce wastage during transport, and choosing transport modes that are more fuel efficient.

Everybody makes a difference. The global COVID-19 pandemic has changed the way businesses operate and highlighted the importance of ESG, given that disruptions such as pandemics and climate change can have adverse impact on business continuity.

In this aspect, I would like to highlight that PSA appreciates the efforts and sacrifices made by our people during the pandemic. I would also like to thank our unions, our business units and the agencies who have strongly supported us and remained alongside PSA in many ways to ensure a healthy, safe, secure, and sustainable environment for all.

We can all do our part to make a difference towards sustainability for our future generations.



Ong Kim Pong

Regional CEO, Southeast Asia
PSA International Pte Ltd



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Note to readers:
Some of the activities and events featured took place before COVID-19

Sustainability @ PSA Singapore

This is PSA Singapore's 4th update on our sustainability journey using the GRI Standards as guidance. Today, 80% of N100 companies worldwide now report on sustainability, with the Global Reporting Initiative (GRI) being the most adopted global standard for sustainability reporting. In Singapore, the Singapore Exchange (SGX) requires listed companies to provide sustainability reporting. Although sustainability reporting is not mandatory for PSA, we have opted to do for good practice and our sustainability progression.

PSA Corporation Ltd reaffirms our commitment to sustainability, with this being our 4th iteration, as we continue to scale and extend our coverage to more material aspects. These information are based on our financial year from 1 January to 31 December. Since our first update in 2017, we have been continually expanding our scope. Based on our Green Hub Port @PSA SG sustainability framework which covers the 3 areas of Environment, Social and Governance, this 2020 edition is our most comprehensive. For feedback, you can reach us at psac_corpcomms@globalpsa.com.



ABOUT PSA SINGAPORE

PSA Singapore operates the world's largest container transshipment hub in Singapore, handling 36.6 million TEUs of containers in 2020. With connections to 600 ports globally, shippers have access to daily sailings to every major port in the world, operating 24/7 all year round. Beyond port operations, PSA also offers cargo solutions to customers operating in advanced manufacturing, cold chain, e-commerce, and energy & chemicals. This value adding service is enabled by CALISTA™, a digital platform that facilitates trade and helps shippers to better manage their physical movement of goods, trade financing and compliance.

PSA Singapore is a fully owned subsidiary of PSA International, a leading port group and trusted partner to cargo stakeholders. With flagship operations in Singapore and Antwerp, PSA's global network encompasses over 50 locations in 26 countries around the world. The Group's portfolio comprises more than 60 deepsea, rail and inland terminals, as well as affiliated businesses in distriparks, warehouses and marine services. Drawing on the deep expertise and experience from a diverse global team, PSA actively collaborates with its customers and partners to deliver world-class port services alongside, develop innovative cargo solutions and co-create an Internet of Logistics. As the partner of choice in the global supply chain, PSA is "The World's Port of Call".





Key Figures of PSA Singapore FY 2020



36.6 mil

Total Throughput (TEUs)



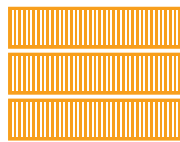
600 ports

Connectivity



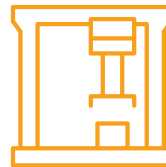
53

Number of Berths



100,000

Average number of containers handled daily



50 mil

Designed Capacity (TEUs)

Our Mission Statement

To be the port operator of choice in the world's gateway hubs, renowned for best-in-class services and successful partnerships.

Our Core Values



Committed to Excellence



Dedicated to Customers



Focused on People



Integrated Globally

Review of Results

PSA Group revenue increased by 2.5% on higher throughput and business acquisitions during the year. Profit from operations was lower by 4.2%, and overall net profit for the year decreased by 6.2% from previous year due to lower other income and increase in other operating expenses. PSA's balance sheet remains strong with a gross debt equity ratio of 0.58 times at the close of 2020.

PSA Singapore contributed 36.6 million TEUs, a decline of 0.9% from 2019. PSA terminals outside Singapore delivered a total throughput of 50 million TEUs, increasing 3.7% over 2019.



SUSTAINABILITY JOURNEY



1972: Arrival of first containership in Singapore. Tanjong Pagar Terminal starts operations.

1997: PSA corporatises and is renamed PSA Corporation Limited



1991: Keppel Terminal starts operations

1992: Brani Terminal opens



2000: Pasir Panjang Terminal (PPT) opens. Use of electric-based yard cranes for the first time

2003: PSA International Pte Ltd becomes the main holding company for PSA Group



2015: Official opening of PPT4-6 by Prime Minister Lee Hsien Loong. The terminal has a full fleet of nearly 200 electric automated yard cranes

2014: PSA Singapore is the first port in the world to have cumulatively handled 500 million TEUs

2018:

- PSA produces the first sustainability report
- PSA Singapore receives the Singapore Environmental Achievement Award (Maritime Category) awarded by the Singapore Environment Council
- PSA Singapore receives the APSN Green Port Award by APEC Port Services Network (APSN)

2019:

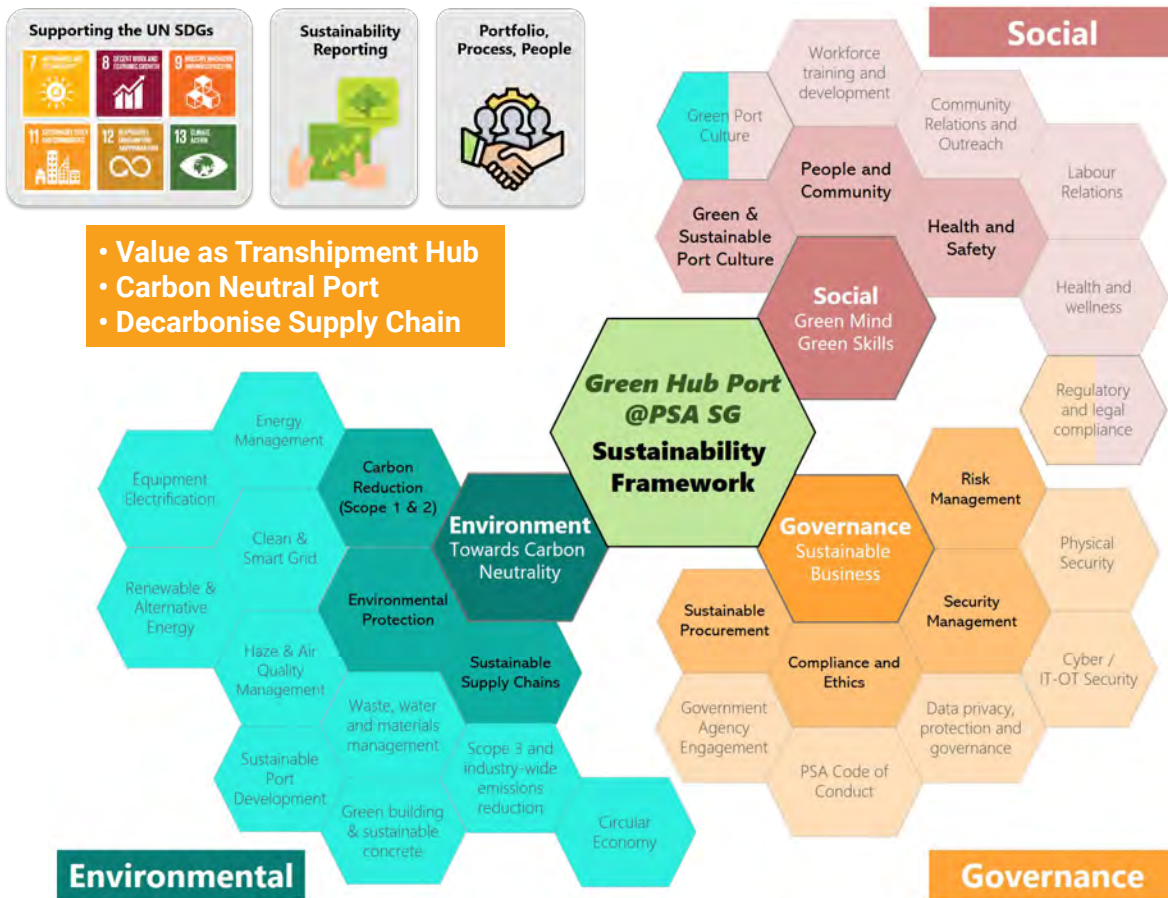
- Official groundbreaking for Tuas Port. PSA to build a Tuas ecosystem to synergise port operations & co-create supply chain orchestration
- Opening of first food garden at PATIO@PPT Building 3
- PSA Singapore donates \$3.5mil to the Garden City Fund, to co-develop the Pasir Panjang Park with NParks



PSA SG Sustainability Framework

Environmental, Social and Governance (ESG)

In line with the UN's Sustainable Development Goals, and Temasek's abc World framework, PSA Singapore aims to reduce our absolute carbon emissions by 50% by 2030. Our decarbonisation objective will be supported by efforts across Scope 1, 2 and 3. We believe in managing our ESG factors effectively to create sustainable value over the long term



OUR SUSTAINABILITY DRIVERS

(covering the aspects of environment, social and governance)

- 

1. CARBON REDUCTION
Reduce our carbon footprint through energy management and decarbonisation of our operations
- 

2. ENVIRONMENTAL PROTECTION
Minimise negative impacts on our environment as well as protecting our people from environmental hazards
- 

3. SUSTAINABLE SUPPLY CHAINS
Develop sustainable supply chains by helping our partners to decarbonise and reduce carbon footprint

- 

1. GREEN AND SUSTAINABLE PORT CULTURE
Cultivate a generative port culture where sustainability is integral
- 

2. PEOPLE AND COMMUNITY
Nurture and empower our people to excel and contribute to the communities that we operate in
- 

3. HEALTH AND SAFETY
Cultivating good health and wellness for our people and keeping them safe from work hazards

- 

1. RISK MANAGEMENT
Identify and include sustainability risks and have in place mitigation and adaptation measures
- 

2. SECURITY MANAGEMENT
Protecting our stakeholders by fostering both physical and cyber security
- 

3. COMPLIANCE AND ETHICS
Meeting all regulatory and legal requirements and always performing our business with ethics and integrity
- 

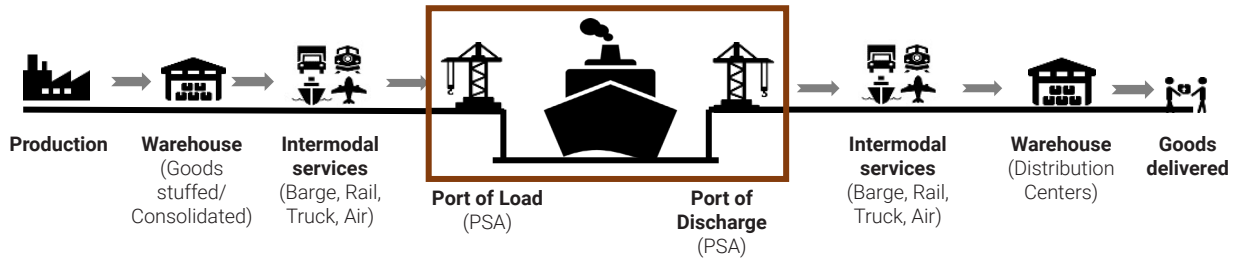
4. PROCUREMENT PRACTICES
Integrate traceability, transparency and stakeholder engagement into our sustainable procurement practices



Value-chain Wide Approach

Covering Scopes 1, 2, 3 and value-chain GHG emissions

Our decarbonisation approach will cover the entirety of our value chain. These include Scope 1 which involves direct emissions from our equipment, Scope 2 which involves our indirect emissions from power generation, as well as Scope 3 which involves all other indirect emissions in our value chain.



SUPPLY CHAIN WIDE

Value-chain GHG emissions (Upstream)

- Part Manufacturers & Production
- Material Suppliers
- Goods and Service Providers
- Shippers
- Warehouse Operators
- Storage, Handling & Transportation
- Logistics & First Mile Delivery (Barge, Rail, Truck Operators, Air Controllers)
- Regulatory Authorities

WITHIN PSA SINGAPORE

Scope 1 & 2 GHG emissions

- **Scope 1 emission** (direct emissions from owned or controlled sources) i.e., diesel and marine gas oil used during port operations
- **Scope 2 emissions** (indirect emissions from the generation of purchased electricity) i.e., electricity use for port operations, buildings and infrastructure

SUPPLY CHAIN WIDE

Value-chain GHG emissions (Downstream)

- Consignees
- Warehouse Operators
- Storage, Handling, Transportation & Distribution
- Logistics & Last Mile Delivery (Barge, Rail, Truck Operators, Air Controllers)
- Regulatory Authorities

Scope 3 GHG emissions

(all other indirect emissions that occur in PSA Singapore's valuechain)

1. Purchased goods and services	2. Capital goods	3. Fuel & energy-related activities (not in Scope 1 or 2)	4. Upstream transportation and distribution
5. Waste generated in operations	6. Business travel	7. Employee commuting	8. Upstream leased assets
9. Downstream transportation and distribution	10. Processing of sold products	11. Use of sold products	12. End-of-life treatment of sold products
13. Downstream leased assets	14. Franchises	15. Investments	

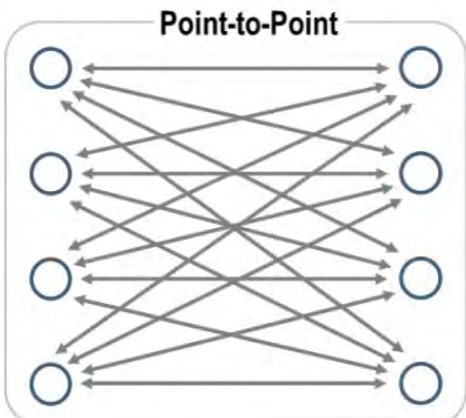


Green Values of Transshipment

Contributing to the reduction of overall shipping GHG emissions

Accounting for the impact of saved connections and size of vessels, carbon emissions are about 50% less than that generated by the alternative of direct shipping.

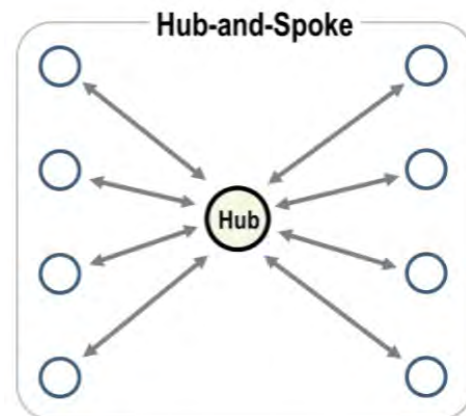
Without a transshipment hub, cargoes would have to be connected direct from source to market ports. The Port of Singapore currently connects to some 600 ports via 300 service routes, linking up some 28,000 port-pairs. Without transshipment, shipping directly would have required many more additional services.



A typical 15 origin port to 15 destination port direct shipping arrangement will require:

15 x 15 = 225 voyages

Without a transshipment hub, the number of shipping voyages required is geometric (i.e., A x B)



A typical 15 origin port to 15 destination port direct shipping arrangement will require:

15 + 15 = 30 voyages

Without a transshipment hub, the number of shipping voyages required is arithmetic (i.e., A + B)

KEY GREEN VALUES OF A TRANSHIPMENT HUB



Reduction in shipping voyages significantly.

Use of larger, fuel efficient vessels is enabled due to the consolidation of cargo volumes. This results in lower carbon mileages.

More carbon efficient container handling operations at the terminal arising from economies of scale from the volume consolidation, resulting in overall lower handling emissions.



HSSE Developments

Health, Safety, Security and Environmental Management System

The Health, Safety, Security and Environmental Management System (HSSE MS) is a systematic process of controls and is the key enabler for achieving sustainable business performance and effective risk management. Apart from being one of the critical business continuity management systems, this management system also assists PSA's terminals to meet or exceed our regulatory and legislative responsibilities.

It also plays a vital role to provide our people with a safe, secure, healthy workplace and to promote sustainable development in the communities we

operate in. Implementation of a HSSE MS is a requirement for all PSA Group managed terminals.

The current version 4 of the PSA HSSE Management system (HSSE MS 4.0) adopts the Plan, Do, Check, Act methodology and is established with respect to ISO standards aligning with:

ISO45001:2018 Occupational Health & Safety Management Systems, and **ISO14001:2015** Environmental Management Systems.



CURRENT STATUS OF HSSE MS 4.0 IMPLEMENTATION, PSA SOUTHEAST ASIA TERMINALS

<p>Implemented: PSA Singapore (since 2019)</p>	<p>Conversion to MS 4.0 New Priok CT1, NPCT1 (by 2021), ESCO Eastern Sea Laem Chabang Terminal (by 2021)</p>	<p>Implementation of MS 4.0 SP-PSA Intl Port (by 2022) TCT Thai Connectivity Terminal, THCT (by 2022)</p>
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Sustainability Highlights

PSA Singapore 2020

Reduction in normalised GHG emission by

19.4%

vs. 2010

p22

Reduction in overall annual water withdrawal by

12.7%

vs. previous year

p30

Compliance

with air quality and boundary noise standards and within allowable limits per NEA guidelines

p24 - p25



Environmental

Loss Time Injury Frequency of

0.9

Below threshold of 1.1 for PSA Singapore

p50

Understand Your Culture score of

4.13

Putting PSA SG on the Proactive Stage of the safety culture ladder

p53

Productive employment and decent work for

12,000

Staff

p55



Social

Full compliance with applicable laws and regulations, with

Zero

Notices of non-compliance

Robust physical security performance with

Zero

Security incident

Cybersecurity performance rating of

810

From Bitsight*

p73



Corporate Governance

*BitSight rating is an indication of cybersecurity performance. A rating of 810 is well above average across the transportation sector



Decarbonising Our Port Operations

Decoupling carbon emissions from growth, and working towards carbon neutrality

At PSA Singapore, we were heavily reliant on diesel to power our container handling equipment. As part of overall carbon reduction plans, we are in the process of transiting to cleaner electrical power as we continue to modernise. By phasing out diesel engines and switching to electricity, we can significantly reduce our carbon footprint for a cleaner environment.

By 2040, we will have completed this transition, with Tuas Port deploying a fully electric-powered fleet of container handling equipment.



By 2030:
Achieve reduction in absolute emissions by

50%
from 2019 levels

KEY CHALLENGE:

- Reducing absolute emissions by 50% amidst volume growth projections will require reduction of emissions intensity by > 60%
- This will require full transition away from use of high-carbon fossil fuels (i.e., diesel) and high adoption rate of renewable energy

By 2050:
Achieve net

Zero
emissions

KEY CHALLENGE:

- Reducing carbon footprint further via high adoption rate of zero-carbon energy sources (e.g., Hydrogen generated using renewable energy)

REDUCING OUR OPERATIONAL CARBON FOOTPRINT

Electrification of equipment plays a core role in PSA Singapore's overall decarbonisation plans.

Typically, cranes and vehicles that run solely on electricity instead of diesel can generate some 30% reduction in GHG emissions per crane and per vehicle each year.





Our Key Decarbonisation Pathways

Achieving our decarbonisation goals



Battery-powered Automated Guided Vehicles



Solar Panel Systems



Electric Vehicles (port usage)



Smart Grid & Battery Energy Storage System



Electric-Automated Rail Mounted Gantry Cranes



LNG / Hydrogen Prime Movers



Super Low Energy Building



Electric Rubber Tyre Gantry Cranes

Focus on reduction of port operations GHG emissions

- Electrification of diesel-based equipment
- Adoption of alternative lower GHG-fuels
- Maximise harnessing of solar energy
- Energy optimisation through Smart Grid
- Use of Hydrogen for horizontal transport



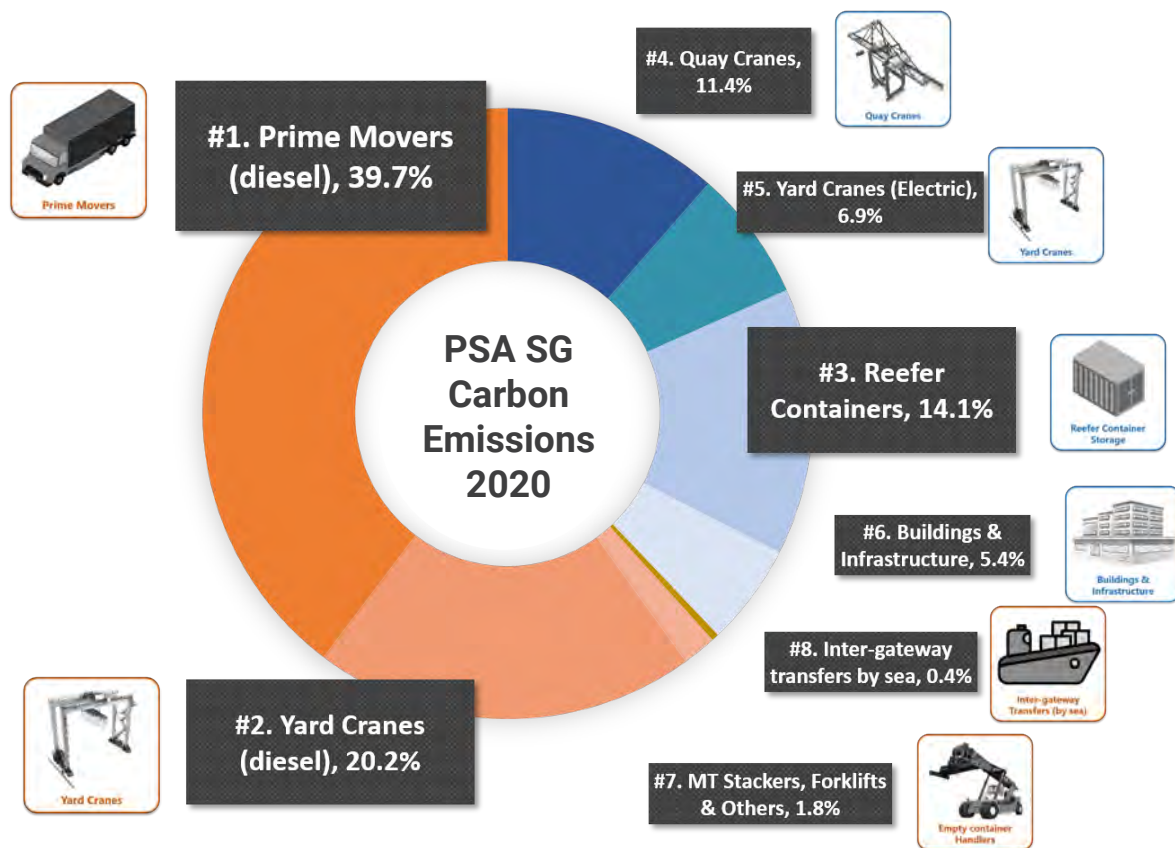
Scope 1 and Scope 2 emissions, 2020

Carbon footprint from our operations and facilities

Based on our energy use profile in 2020, the majority of our GHG emissions continue to be attributed to our diesel use, accounting for some 61.7% of overall Scope 1 and Scope 2 GHG emissions, while electricity use accounted for 37.9% of emissions, with use of marine gas oil accounting for the balance of 0.4%.

Among individual consumption categories, prime movers' diesel use is the top contributor of GHG emissions, accounting for 39.7%. This is followed by yard cranes' diesel use at 20.2%, and reefer containers' electricity use at 14.1%.

Tracking our carbon footprint is a key part of our overall decarbonisation approach, as it gives us a sound basis to develop our decarbonisation plans and projects.



Note: Top-up of refrigerants for reefers excluded from Scope 1 GHG reporting as it is outside of PSA's boundary / control

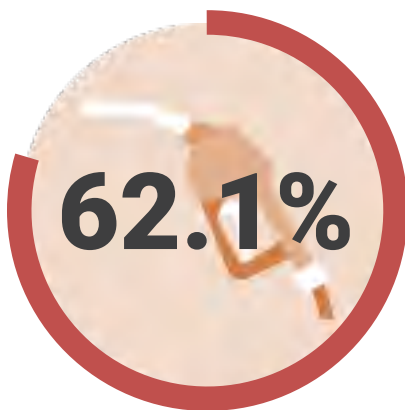


Decarbonisation Projects

Focused projects to reduce our Scope 1 and Scope 2 GHG emissions

Understanding where our GHG emissions come from is important, as it helps us to determine which decarbonisation projects can have the highest potential impact. Equipment electrification

remains at the core of our decarbonisation plans, and we are also adopting cleaner alternative fuels such as LNG, while maximising use of available rooftop space for solar energy harnessing.



Our use of fossil fuels (diesel and marine gas oil) to power our container handling equipment releases carbon dioxide directly into the atmosphere when these fuels are burned.



EA-RTG CONVERSION

Converting our diesel RTGs to run on electricity (E) improves the emissions factor. Automating (A) improves our labour productivity.



ADOPT LNG PRIME MOVERS

Switching our PMs to LNG to reduce overall emissions. Using LNG Prime Movers reduces GHG emissions by about 20% for the same work done.



TRANSITING TO AGVs

By 2nd half of 2021, we will commence port operations at Tuas Port, with horizontal transport operations running on a full fleet of battery-powered AGVs.

SMART GRID

At Pasir Panjang Terminal, we will adopt a smart energy grid to improve the way we use and harness electricity



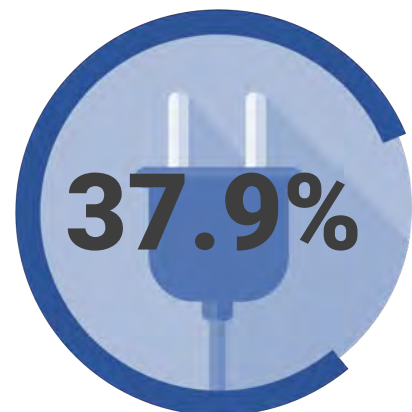
Super Low Energy Building (SLEB)

Tuas Maintenance Base will be our first SLEB, achieving 58% energy savings vs. benchmark



HARNESS SOLAR ENERGY

Solar Photovoltaic systems will also be installed at Tuas Maintenance Base, turning it into a net zero energy building.



Our use of electricity also releases carbon dioxide into the atmosphere, as electricity is generated using natural gas, a fossil fuel. However, it is less carbon intensive than diesel.



Decarbonisation Projects

Focused projects to reduce our Scope 1 and Scope 2 GHG emissions

To meet our environmental sustainability goals, it is vital that we continue to decarbonise our port operations, via the implementation of green projects:



EA-RTG CONVERSION

By 2026, a total of 174 of our diesel yard cranes would be converted to run on electricity instead of diesel, reducing operational carbon footprint by 30%.

With automation, our crane specialists will be able to remotely supervise the operation of multiple yard cranes from the comfort of a command centre, aided by AI-based planning platforms to optimise yard operations

Converting diesel RTG yard cranes to run on electricity will reduce their carbon footprint by at least:

30%

DOUBLING SOLAR PV INSTALLATIONS

In 2021, with new solar photovoltaic systems installed at Pasir Panjang Terminals and Tuas Terminals, we will double the amount solar energy harnessed.

The new projects can generate some 5.6-gigawatt hours of solar electricity and help us to reduce more than 2,200 tons of carbon emissions.

New solar PV installations in 2021 will double our solar energy generating capacity, producing an additional

5.6 GWh
of clean electricity annually





Decarbonisation Projects

Focused projects to reduce our Scope 1 and Scope 2 GHG emissions

ADOPTION OF LNG PRIME MOVERS

By 2021, PSA Singapore will phase in the adoption of LNG (Liquefied Natural Gas) Prime Movers, with a total of 160 units deployed by the end of the year.

An additional 140 units are expected to be added in 2022, bringing the total to 300 units or about a quarter of the total number of prime movers that we deploy at Pasir Panjang Terminals.

Although LNG is derived from natural gas which is a fossil fuel, it is cleaner and less carbon intensive as compared to diesel.

Each LNG prime mover can operate with a 20% lower operational carbon footprint as compared to that of a conventional diesel Prime Mover.

Each LNG prime mover
can operate with a

↓20%

Lower operational carbon footprint vs.
a standard diesel prime mover

INDUSTRY COLLABORATION ON SETTING OF STANDARDS FOR SAFE USE OF LNG:

PSA Singapore is part of the working group which led to the development of the Singapore Standards Technical Reference 74 (TR 74:2020) on the Code of Practice for storage, land transportation and handling of LNG.



Energy Reset:

Transiting from diesel prime movers

By 2021, PSA Singapore will phase in the adoption of LNG Prime Movers, with a total of 160 units deployed by the end of the year and another 140 units in 2022.

As part of this project, we have developed the first LNG refuelling kiosk for prime movers in Singapore.





Decarbonisation Projects

Focused projects to reduce our Scope 1 and Scope 2 GHG emissions

SG SMART GRID SYSTEM

In 2019, PSA and EMA launched a joint grant call of S\$8M, to develop a Smart Grid system for Port applications at Pasir Panjang Terminals 4, 5 and 6. The scope of the project included an artificial intelligence based SGMS (SmartGrid Management System) and a 2MW/2MWh BESS (Battery Energy Storage System).

The project was awarded in April 2020 to a Consortium led by Envision Digital International, together with Durapower, Anacle, SUTD and NUS. The SGMS is developed based an AIoT (Artificial Internet of Things) platform to optimize energy management for the port, Digital Twin for Power Simulation, Smart Power Asset Management, Intelligent Energy Procurement and AI-based Cyber Security Protection for the SmartGrid System.

ENERGY MARKET PARTICIPATION

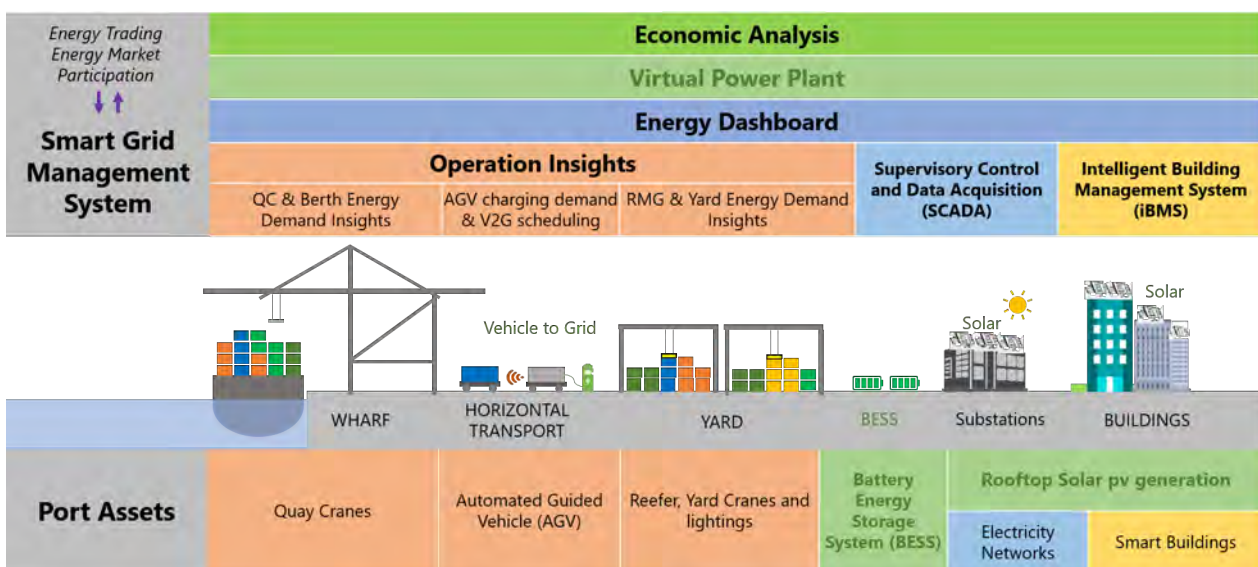
SGMS will operate the the BESS and other distributed energy resources as a Virtual Power Plant (VPP) for Peak Power Management and Energy Market participation.

The SGMS is equipped with algorithms to perform Economic Analysis to better facilitate the business decisions in energy generation, purchase, and trading, without compromising the port operation performance.

The SG Smart Grid System will also be implemented at Tuas Port from

2022

To integrate and optimise our energy use





Managing Our Energy Use

Use of energy for port operations and facilities

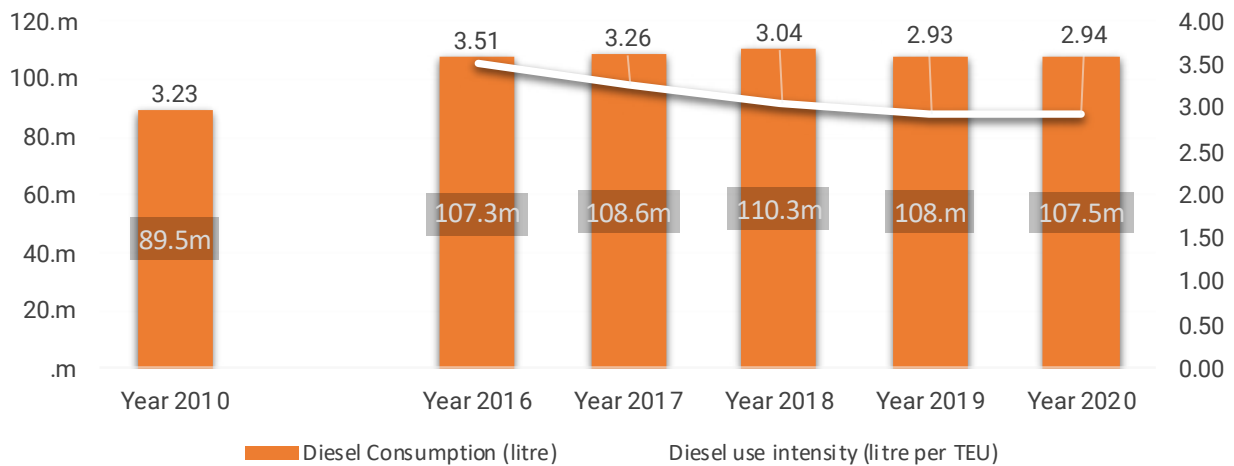
In 2020, PSA Singapore consumed 107.5 million litres of diesel and 447.3 million kilowatt hours of electricity.

For the year 2020, PSA Singapore handled a total of 36.6m TEU of containers, a decrease of 0.9% year-on-year. As COVID-19 significantly impacts global trade, cargo flows changed and overall, container dwell time has increased. The increase in reefer dwell time had a significant bearing on our overall electricity use, resulting in an increase of 7.0% vs. 2019 on a normalized basis.

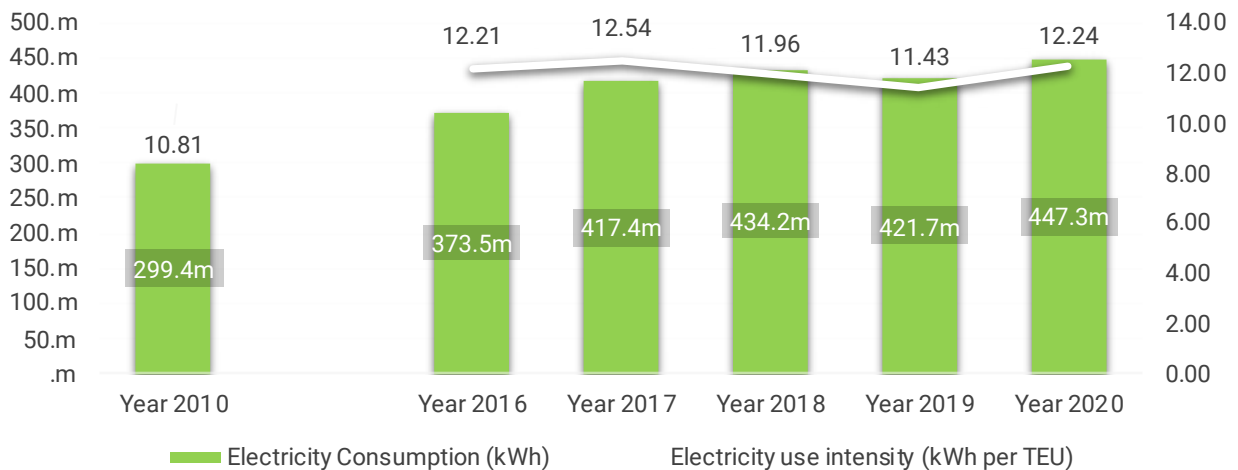
As we continue to transit to electricity-based container handling equipment, our diesel use intensity has decreased by

↓ 9.9%
vs. 2010

Diesel Consumption



Electricity Consumption





Managing Our Energy Use

Carbon emissions from port operations and facilities

In 2020, PSA Singapore accounted for 289.6m kgCO₂e of Scope 1 emissions and 176.7m kgCO₂e of Scope 2 emissions.

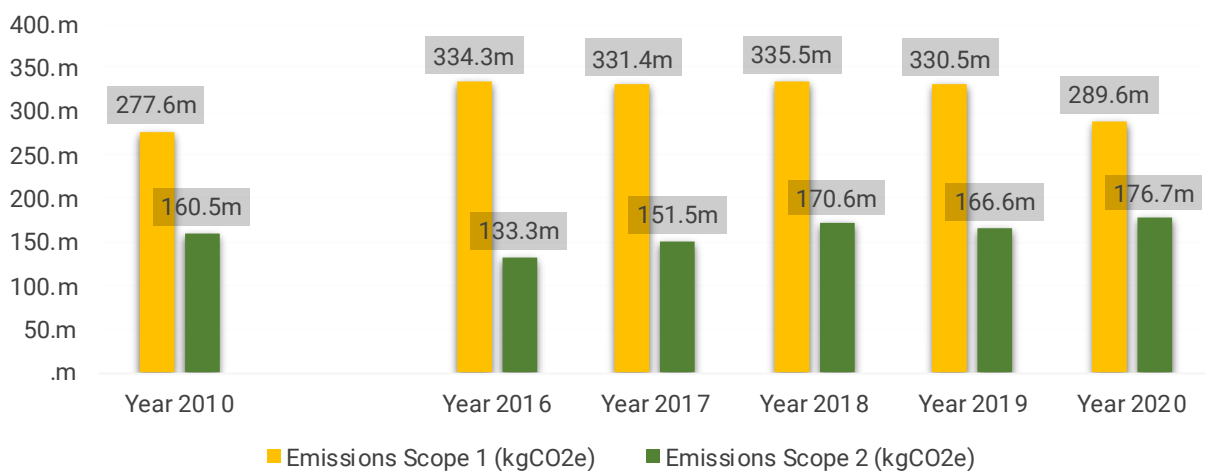
The decrease in Scope 1 emissions was mainly due to the omission of reefer top-up refrigerants from Scope 1 GHG computation, in line with revised PSA Group guidance in 2020.

The increase in reefer dwell time had a significant bearing on our overall Scope 2 emissions. Overall electricity consumption increased by 6.1%, attributable to higher reefer storage consumption as dwell time increased by about 20% in 2020.

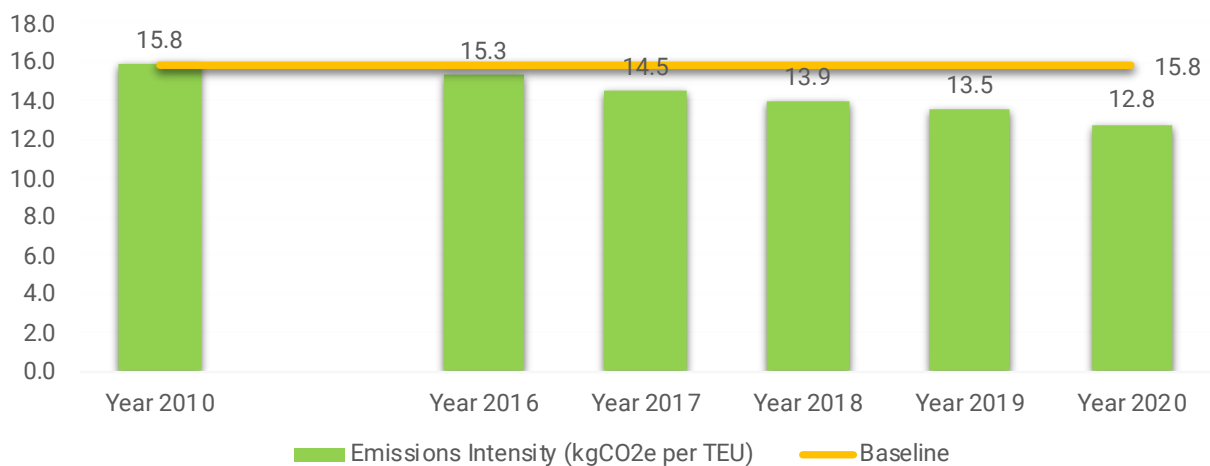
With continual progression in our decarbonisation plans, our carbon emissions intensity has reduced by

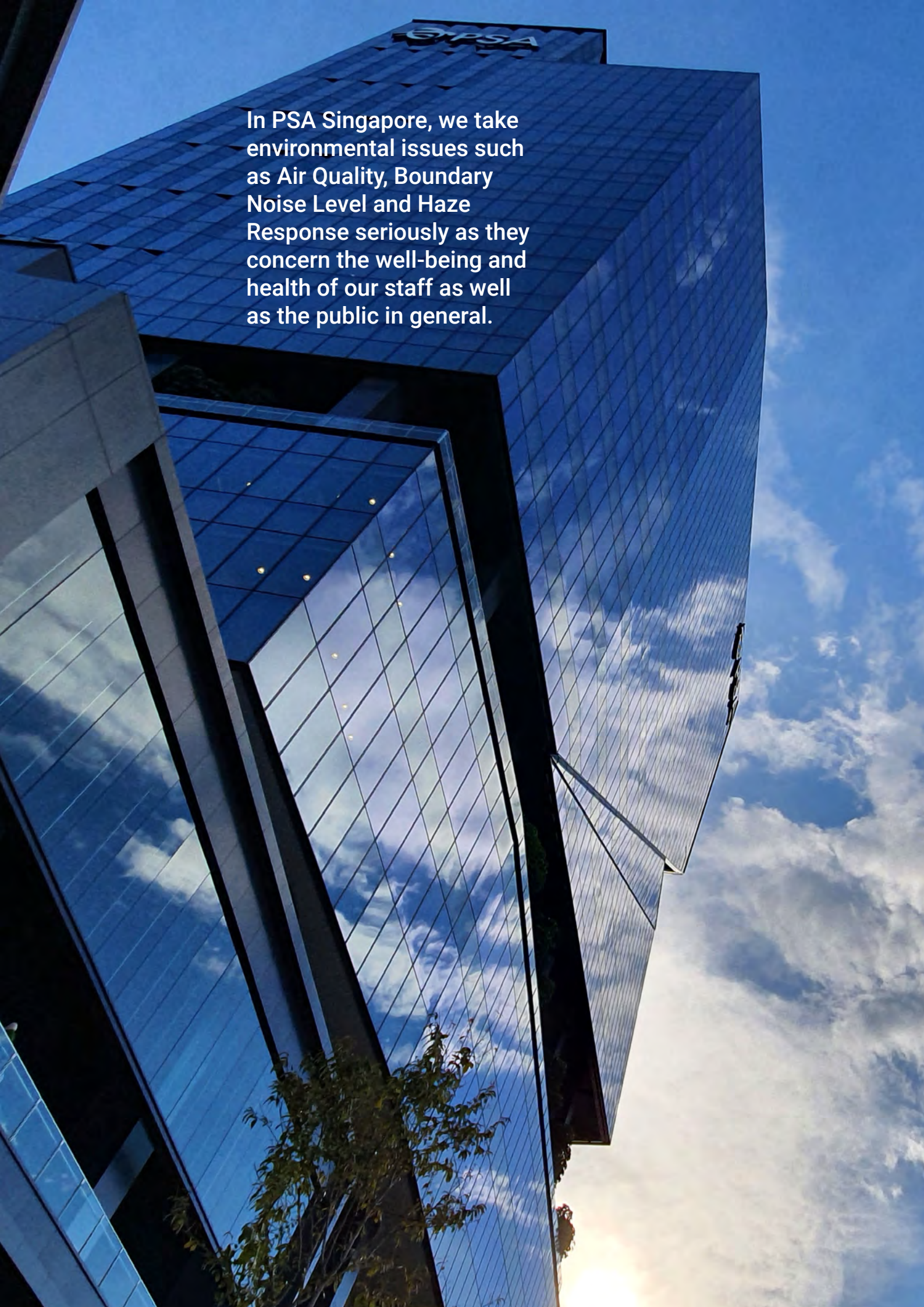
↓ 19.4%
vs. 2010

Carbon Emissions



Emissions Intensity





In PSA Singapore, we take environmental issues such as Air Quality, Boundary Noise Level and Haze Response seriously as they concern the well-being and health of our staff as well as the public in general.



Ambient Air Quality Monitoring

The Ambient Air Quality Monitoring is conducted annually at various locations within the port premises to ensure PSA Singapore complies with NEA’s guidelines and requirement under the Environmental Protection and Management Regulations. AAQM covers the monitoring of level of the air pollutants; namely, nitrogen dioxide (NO₂), carbon monoxide (CO) and particulate matter (both PM₁₀ and PM_{2.5}, with diameters of

less than 10 and 2.5 micrometres, respectively) throughout a 24-hour sampling regime.

From 10 Nov to 1 Dec 2020, NEA’s licensed operator Astar Laboratory Pte Ltd was engaged to install the meters at 16 PSA terminal’s sampling locations: 4 points in Brani Terminal, 4 points in Keppel Terminal and 8 points in Pasir Panjang Terminal respectively.



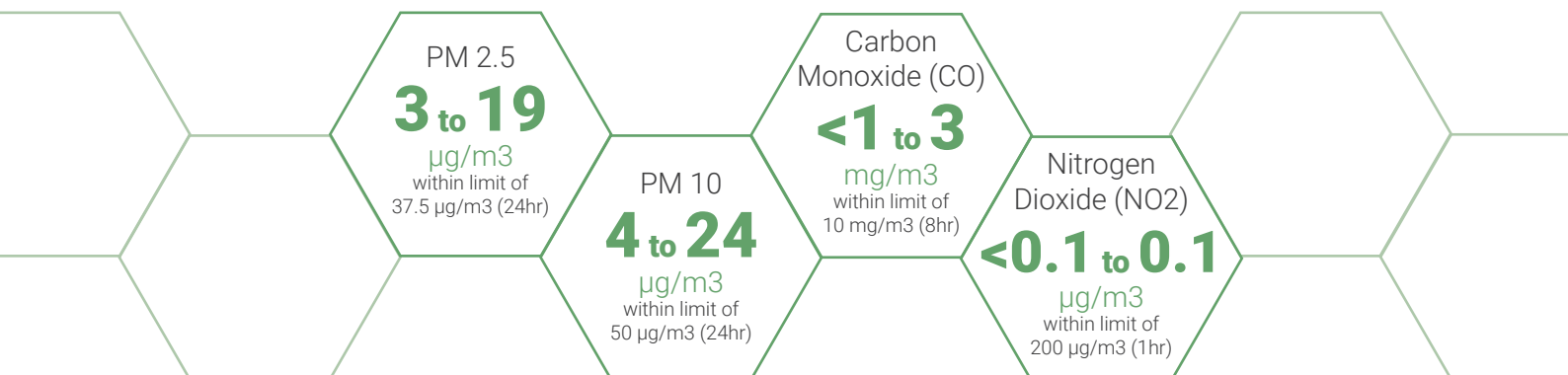
AAQM at Pasir Panjang Terminal



AAQM at Brani Terminal

Photos: Ambient Air Quality Monitoring Meters Installed at PSA Terminals

The values measured are within and comply with the respective limits of NEA Singapore Ambient Air Quality Targets in 2020. The average values of the 16 monitoring sampling locations are ranged as follows:





Boundary Noise Assessment

The objective of boundary noise monitoring is to assess the noise levels emitted at Pasir Panjang Terminal premises in compliance with the National Environmental Agency’s (NEA) Environmental Pollution and Management Act 2008.

From 6 Nov to 8 Dec 2020, PSA Singapore engaged NEA’s licensed operator Astar Laboratory Pte Ltd to measure noise levels of the

PSA site boundaries at 210 sampling locations. The sound pressure levels were measured over a one minute sampling period every 20 meters along the selected route from the corner of FTZ fencing between PSA Maintenance Base and Pasir Panjang Distripark to the corner of FTZ fencing adjacent to West Coast Ferry Road and Republic of Singapore Yacht Club covering total of 4.2km.

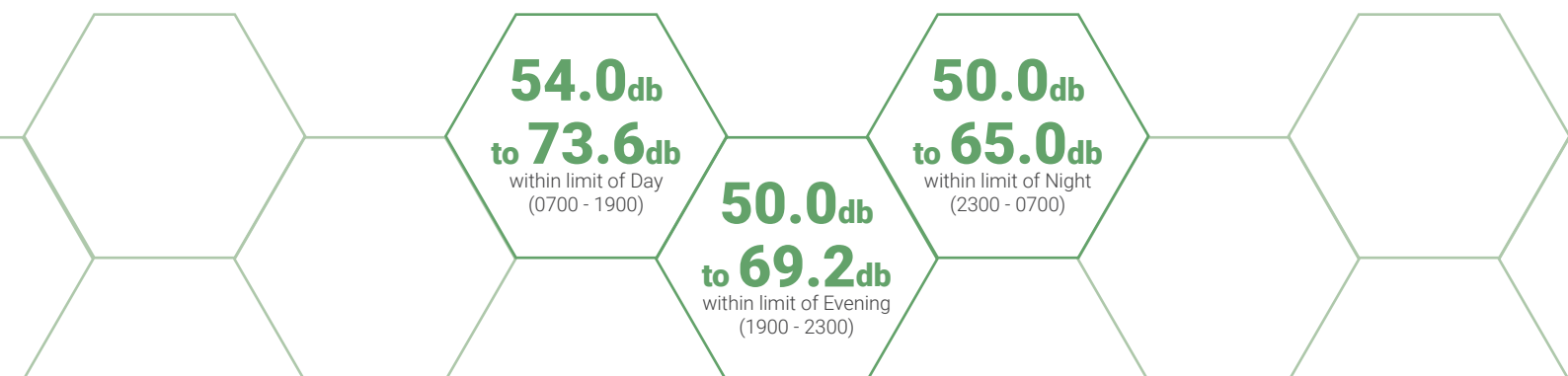


Sound Level Meter Installation

Photo: Annual Noise Level Assessment conducted at PSA Terminal’s Boundary

The results of 210 sampling boundary locations are within and comply with the permissible limits of NEA Singapore Boundary Noise Regulations (up to 75 db) during the day.

An additional 24-hr monitoring point was set up at Gate 3 (near PSA Alongside) where the highest reading was 73.6db, and 24-hr readings taken are within permissible limits. The values of the monitoring sampling location range are as follows:





Managing Haze In PSA Singapore

Singapore experiences smoke haze from time to time. The haze is caused by forest fires in the region which arise when open burning is carried out to clear land for agricultural uses. It can be made worse by dry seasons, changes in wind direction, and when precipitation is low. Prevailing winds sometimes carry smoke haze produced by the forest fires over Singapore's skies, particularly during the Southwest monsoon season.

While the ultimate solution to the issue of haze lies in collaborative efforts to reduce burning of forest cover among nations, PSA Singapore is taking steps to ensure its staff is well equipped to deal with haze when it occurs. Such steps include the provision of HSSE advisory, early haze warnings, measurement and dissemination of air quality information, and guidelines for dealing with haze-related issues.

Our haze response plan and guidelines help us respond swiftly and effectively to take good care of people's well being and health when a haze situation occurs.

HAZE RESPONSE PLAN AND GUIDELINES

To fully prepare and protect its staff for any haze situation, PSA Singapore has a comprehensive haze response plan and guidelines which comprise the following:



Understanding transboundary haze and haze risks management



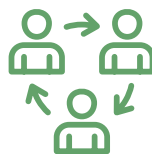
Ensuring enough PPE (N95 masks) for our people and stakeholders



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



Clear guidelines for response during different severity levels



Roles and responsibilities of Haze Committees, Taskforces, Co-ordinators, ICs and procedures in the event of response plan activation



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



Reduce, Reuse and Recycle Right

Managing our materials consumption and waste generation

As a port operator, we do not generate waste from the manufacturing of raw materials into products. However, we consume materials as part of running, repair and maintenance activities.

Minimising waste generation is one of the ways we contribute towards the development of a circular economy approach at PSA Singapore. We have two main streams of waste: general waste (includes food waste) and industrial waste. Additionally, we also support the Recycling the Nation's Electronic Waste (RENEW) programme, with 3 E-waste deposit bins at our terminal buildings.

Here's a summary of what gets recycled at PSA Singapore:



Empty chemical drums



Steel wire ropes



Pneumatic tyres



Solid tyres



Vehicle batteries



Hydraulic oil



Steel cables



Air-condition units



Scrap metal



Crane rails



Reduce, Reuse and Recycle Right

Managing our materials consumption and waste generation

For these materials, the managing of our generated waste begins even before we generate them. For example, the inclusion of provisions for the recollection of the materials at the end of their respective life cycles.

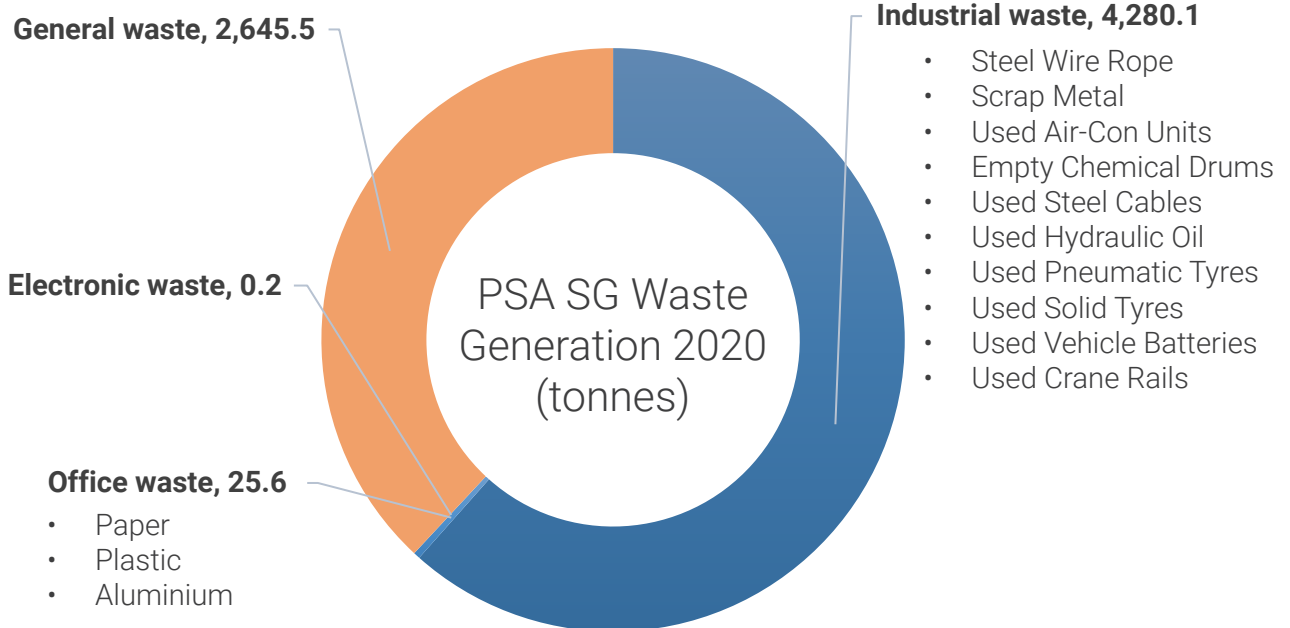
Where this is not available, separate tenders are called for these to be provided by a specialist contractor.

Doing so allows us to achieve a high recycle rate for our used materials.

In 2020, our recycling rate for waste generated at PSA Singapore is

61.9%

Including industrial waste, e-waste and office waste items



Notes:

- Waste diverted from disposal are reused / recycled accordingly
- General waste directed to disposal are handled via the national solid waste management infrastructure, to one of Singapore’s 4 waste-to-energy incineration plants.
- Electronic waste data is based on recycling done via RENEW programme



Pulau Semakau

Finite space available for landfilling of post-incineration waste ash

Minimising waste generation

is one of the ways we contribute towards the development of a circular economy approach at PSA Singapore.

Other than office recycling of paper, plastic and metal cans, we also recycle our industrial items such as drums, tyres, wire ropes, etc.



Water Conservation and Management

Towards a Circular Economy-based Sustainability Approach

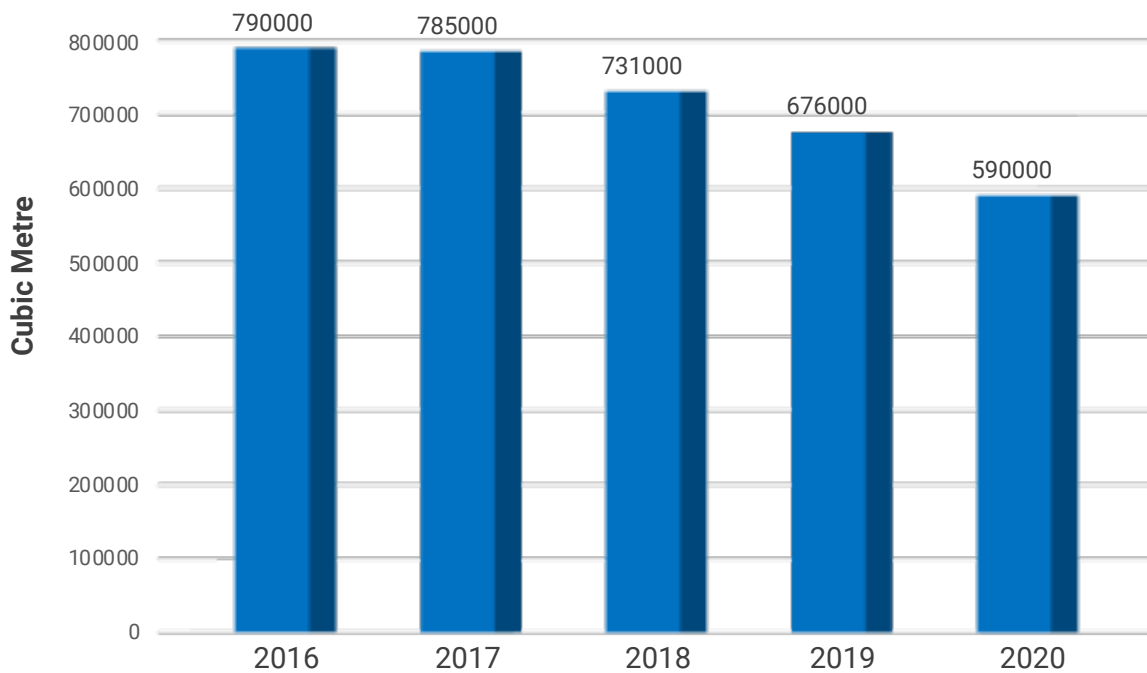
PSA Singapore has been actively raising staff awareness on water conservation displaying posters on minimising water wastage and educating staff residing at the dormitories through roadshows. PSA Singapore has also installed water efficient plumbing and sanitary wares to lower water consumption.

In addition, PSA Singapore has a periodic water consumption and usage monitoring process to track for abnormal water consumption, which translates to early detection of water pipe leakage and activating prompt follow up rectification. Proper sewage system and oil receptacles have been designed and installed according to

industrial best practices and standards to ensure proper handling of waste water.

Various water conservation projects include air-con condensate recycling, greywater recycling and use of NEWater for the cooling towers of air-conditioners. To further reduce reliance on potable water, rainwater harvesting tanks have been installed at engineering workshops to make use of harvested rainwater to wash our equipment.

PSA Singapore Annual Water Consumption in 2016-2020





PSA Singapore Water Conservation Measures



Water saving taps are installed at toilets located within our buildings & port facilities



Close monitoring of water usage and early rectification of leakages



Water usage statistics are reviewed & submitted to PUB on an annual basis

PSA Singapore is exploring potential collaboration on an Integrated Sustainable Water Solution which includes wastewater treatment, water recycling and rainwater harvesting in the container yard.

Staff Outreach on Water Conservation



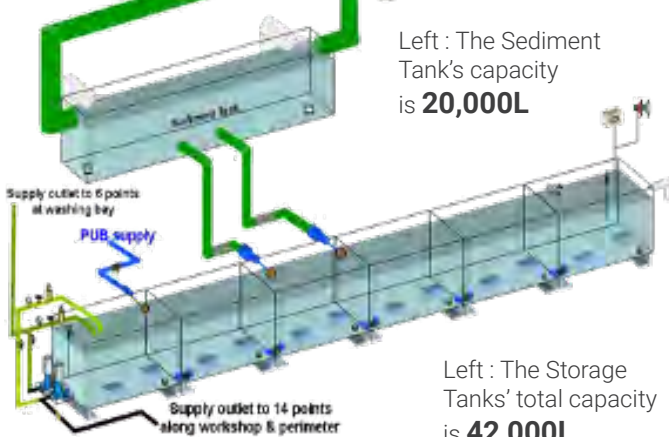
Water conservation campaigns are held regularly to educate our stakeholders on its correct usage

Recycling of Rain Water at Engineering Workshops

Right : Illustration shown is based on Keppel Workshop



Left : The Sediment Tank's capacity is **20,000L**



Left : The Storage Tanks' total capacity is **42,000L**



Rainwater is collected at the rooftop catchment area.



Collected rainwater are stored within the system's tanks.



Water is used for non-potable taps e.g. washing of workshop floor and equipment washing.

In PSA Singapore, there are 6 rainwater collection tanks at 5 locations:

- 1) Tuas Maintenance Base
- 2) Keppel Workshop
- 3) Brani Workshop
- 4) PPT2 Workshop
- 5) 2 in PPT Maintenance Base



Water Conservation Initiatives

Our water conservation efforts to reduce potable water consumption



Cooling Towers at Maintenance Base, Tuas Port

- PSA Singapore has adopted the use of NEWater for our buildings' cooling towers at Tuas Port in our effort to reduce potable water consumption. The Tuas Maintenance Base will be the first PSA facility to use NEWater.
- Approximately 37,200 cubic metres of potable water will be saved annually.

Harvesting condensate water from air-conditioning system at PSA Horizons

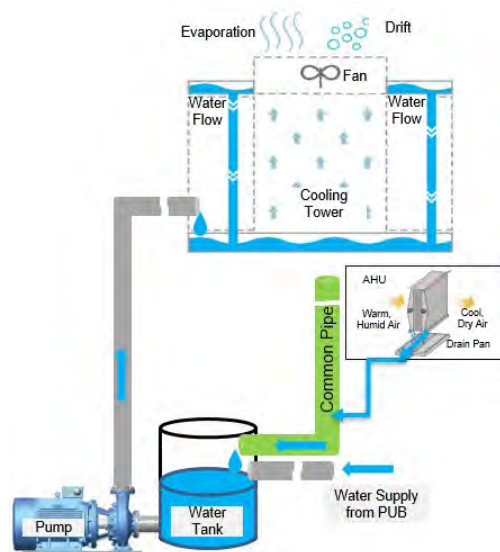


Diagram to illustrate the harvesting of condensate water at PSA Horizons

During the process of heat transfer at the cooling coil, water vapour in the air will be removed through condensation.

Instead of discharging into the drainage system, the condensate water from each individual AHU is channelled to a collection tank and used for the cooling towers at PSA Horizons.

Approximately 2,800 cubic metres of potable water are saved annually.

A tall, modern office building with a dark blue glass facade. The building has a unique, angular design with a prominent corner. The PSA logo is visible on the upper part of the building. The sky is blue with some light clouds. In the foreground, there is a street with a railing and some greenery.

PSA Horizons

Being a Green Mark Platinum Building, PSA Horizons is fully equipped with water efficient taps and flush components, and a rainwater harvesting system. In addition, two initiatives were implemented, which are rain sensors for irrigation and a water leakage detection system.

Upon the detection of rain, the sensors will trigger the irrigation controller to switch off the scheduled watering. The programmed irrigation schedule will resume after the rain has stopped.

The water leakage detection system will promptly alert the facilities management team of any detected leak so that immediate follow up action can be taken to minimise water loss. By having the isolation zones within the building, the shutting of valves at the affected location will not disrupt the water supply to the non-affected offices.

- Installation of Rain Sensors for Irrigation and Water Leakage Detection System at PSA Horizons
- A Green Mark Platinum Building



Environmentally Sustainable Depot at Pasir Panjang Terminal

- A trial site at Pasir Panjang Terminal container washing depot will be set up to harvest rainwater, and recycle grey water and black water.
- Rainwater and grey water from the washing of containers will be collected and treated at a water treatment facility and re-used for the washing of containers at the depot.
- Black water from sanitation systems will be collected, treated and re-used for toilet flushing at the depot admin building and irrigation for the green wall.
- Approximately 1,500 cubic metres of potable water will be saved annually.

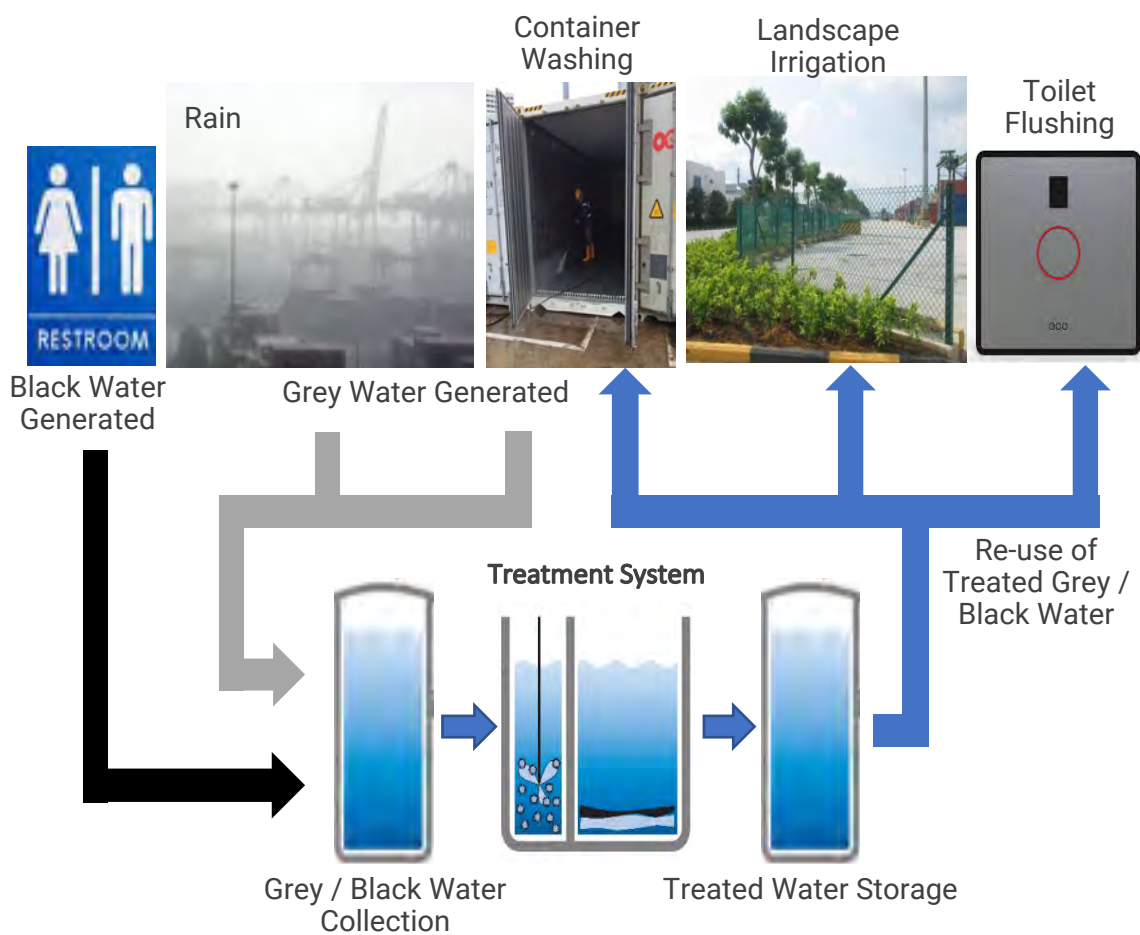


Diagram to illustrate the collection, treatment and re-using of grey / black water



PSA Singapore Green Port Commitment

Strong and unwavering commitment to develop a circular economy and reduce our carbon footprint

PSA aims to be a global leader in climate action, driving sustainable growth in the port and logistics industry. We seek to bring about decarbonisation, energy saving, water conservation and waste reduction within our portfolio of assets, and enable green logistics choices through partnership and collaboration.

PSA Singapore is cognizant of the impact we have on the environment. We have a strong and unwavering commitment to develop a circular economy and reduce our carbon footprint by promoting sustainable development in the communities we operate in.





Green Port Culture

In the face of COVID-19, we might have to change some of the ways we do things, but our commitment remains the same

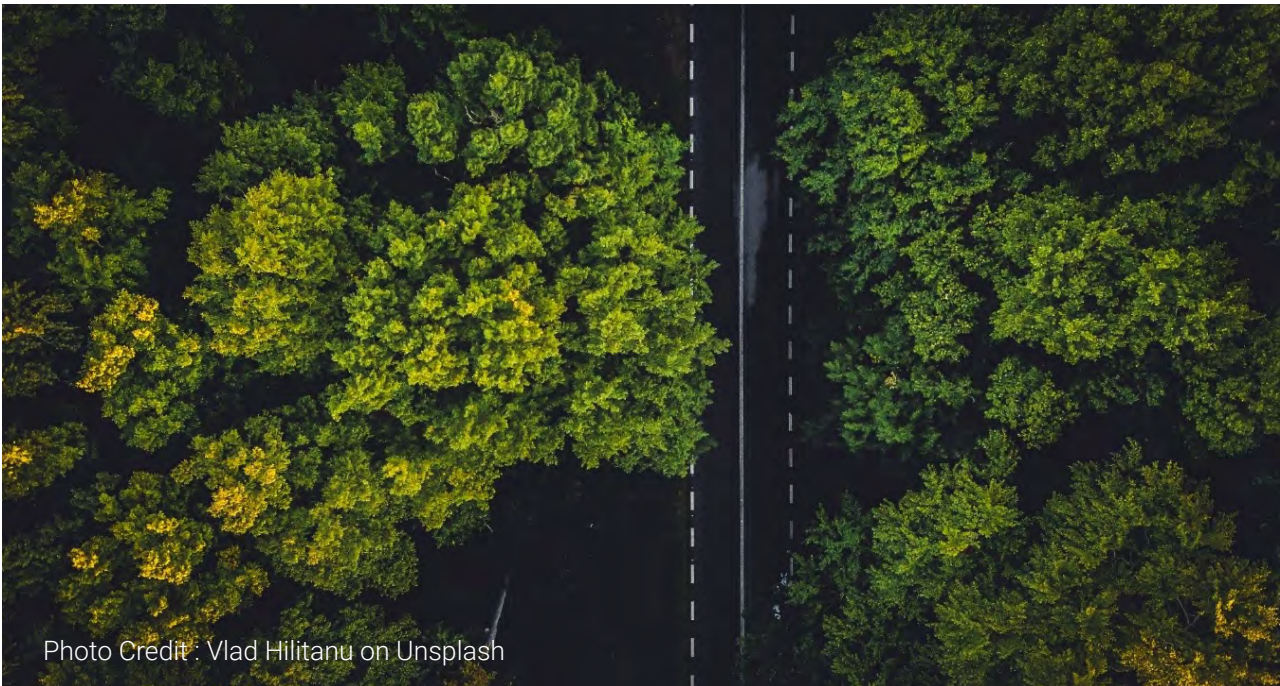


Photo Credit : Vlad Hilitanu on Unsplash

GREEN PORT CULTURE VISION

We aspire to cultivate a port culture where people are green-minded and green-skilled.

With COVID-19, we shifted a lot of our outreach activities and events online.

In the face of Circuit Breaker, we reached out to our partners in government ministries and agencies to conduct online lunch time talks and training courses.

While we continue our work in areas such as PSA SG In Bloom Programme, various e-publications and e-learning, we have also introduced new programmes.

TEP! GO GREEN

TEP refers to Towards Enduring Partnership. TEP! Go Green is a collaboration between various stakeholders - including Human Resource, (HR) Health, Safety, Security and Environment Southeast Asia (HSSE SEA), Port Officers' Union (POU) and Singapore Port Workers' Union (SPWU) to reach out to our colleagues.

GREEN PORT CONVERSATION SERIES

During our annual PSA SG Go Green Month in September, packed with sustainability related events, we launched one of our signature programmes -- the Green Port Conversation which is our leadership series on topics relating to sustainability.

EVERYBODY MAKES A DIFFERENCE MOVEMENT

This movement encourages ownership in reducing personal carbon footprint. The team curated a series of 10 e-posters to provide ideas on how our everyday decisions can affect our personal carbon footprint and how each of us can make a difference.

This culminates in a call to action whereby PSA Singapore's colleagues were encouraged to pledge their commitment.



PSA Singapore in Bloom Programme

From PATIO@PPTB3, our inaugural food garden located at the rooftop of Pasir Panjang Terminal Building 3, we added two food gardens, bringing the total planting area to about 130 square metres.



The second food garden, Botanicals Sky @ MB, is located at the rooftop of Pasir Panjang Maintenance Base (MB).

The project is partially funded by NParks Skyrise Greenery Incentive Scheme and consists of eight concrete planters and eight planters upcycled from used oil drums.

Another upcycling element is the use of plastic milk bottles as planters on the vertical wall.





The third garden, Botanicals Earth @ MB is located next to the carpark which was originally planted with some fruit trees by staff. To make space for the garden, these were relocated to areas along the fence.

The garden consists of five concrete planters and four planters upcycled from used oil drums.

To provide irrigation, a water tank with self-timer functionality was installed. The tank is also

equipped with an auto-cut off device to allow the refilling to turn off automatically when the tank is almost full.

All three food gardens are maintained by staff volunteers and harvests are shared amongst colleagues and stall holders in MB canteen.

The food gardens are such a welcome sight in Pasir Panjang Terminal!



HOW WERE THE OIL DRUMS UPCYCLED INTO PLANTERS?

To create the planters, used oil drums were cleaned, cut into halves and drainage holes were drilled. The cut drums were then placed on a metal stand.

The making of the planters by upcycling used materials is one of the ways we put sustainability into action, by repurposing our waste instead of sending them for disposal.



more than
140
 types of vegetables
 including leafy, rooted and
 fruit-bearing varieties, herbs
 and creeping vines

more than
50
 staff volunteers
 with regular hands-on
 sessions

Close to
500 kg
 harvested & shared





TEP! Go Green

TEP refers to Towards Enduring Partnership, a collaboration between HR, HSSE SEA, POU and SPWU to reach out and engage our colleagues on sustainability matters. This is also where Captain GAIA makes its first appearance!



Captain GAIA, Always Alongside in Sustainability

Green Port Conversation Series

Launched during PSA SG Go Green Month in September 2020, it is a leadership series on topics relating to sustainability.

Sep 2020 :

Transforming Organization Towards a Sustainable Strategy – Challenges and Opportunities

by Ms Goh Swee Chen, President of Global Compact Network Singapore (GCNS)

Dec 2020:

Embracing Circular Economy in the Organization – Opportunities and Challenges

by Dr Kua Harn Wei from NUS



Everybody Makes A Difference

This movement seeks to encourage ownership in reducing personal carbon footprint. After a series of 10 e-posters to provide ideas on how our everyday decisions can affect our personal carbon footprint and how each of us can make a difference, 2,409 commitment pledges were received, amounting to emissions reduction of more than 500,000 kg of carbon emissions.

10 e-Posters Providing Personal Carbon Footprint Saving Ideas

DO YOU KNOW Our Daily Choices Affect PERSONAL CARBON FOOTPRINT

According to SF Green's [Life Cycle Assessment](#), calculating the average consumption patterns of a consumer in Singapore result in more than eight tonnes of carbon emissions annually. To abate this impact on the environment, more than 400 real choices are offered. Let us look at our choices and its carbon footprint (ranked from lowest (dark green) to highest (light green)). **CHOOSE WISELY & MAKE A DIFFERENCE.**

8:00am - Waking Your Teeth Reusable plastic toothbrush Reusable toothbrush Plastic toothbrush Electric toothbrush	8:30am - Shower Jug/Walk/Cycle/Bike/Water Dryer/Exercise Equipment With Water Heater	8:45am - Shower Without Water Heater With Water Heater	8:55am - Breakfast Locally Produced Bread Imported Bread	9:05am - Getting Out of House Stairs Elevator Shared Car Car	9:05am - Getting to Work Cycle/Walk Public Transport (Train/Bus) Shared Car Car
1:30pm - Back to Office Cycle/Walk Public Transport (Train/Bus) Electric Car Car	12:45pm - Lunch Local Vegetables Chicken Mutton Beef	12:55pm - Lunch Out Cycle/Walk Public Transport (Train/Bus) Electric Car Car	12:55pm - Leaving Office Stairs Elevator Shared Car Car	1:05pm - Getting into Office Stairs Elevator Shared Car Car	1:45pm - Coffee/Tea Office 8oz Cup Disposable Cup
5:30pm - Leaving Office Stairs Elevator Shared Car Car	6:30pm - Getting Home Cycle/Walk Public Transport (Train/Bus) Electric Car Car	6:30pm - Shower Without Water Heater With Water Heater	7pm - Dinner Local Vegetables Chicken Mutton Beef	10pm - Waking Your Teeth Reusable plastic toothbrush Reusable toothbrush Plastic toothbrush Electric toothbrush	10:30pm - Sleep Fan Air Con 1 hr + Fan for rest of night Air Con

GHG Emissions (kgCO₂e per kg of food)

Leafy Vegetables 0.4
Chicken 3.5
Beef 24.4

REDUCE YOUR CARBON FOOTPRINT by eating more LEAFY VEGETABLES and SUPPORT LOCAL PRODUCE

Carbon footprint of a single-use plastic straw may be just 1.5g.

If each PSA Singapore employee use 5 single-use plastic straws per week, the carbon footprint per year will be **4,680 kg of CO₂e** equivalent to the weight of more than **1 male Asian elephant**.

"It's just ONE straw..."
- Said **12,000** PSA Singapore employees

PM Driver Saves 17 kg CO₂e in 12-Hour Shift WITHOUT Sudden Acceleration & Hard Braking

Dear PM Driver,
How you drive the PM during your shift matters.
Sudden acceleration & hard braking are unsafe acts.
More fuel will be consumed and it harms the environment.
Everybody Makes a Difference and I am counting on you.

Yours sincerely,
MOTHER EARTH

Carbon Footprint Of Coffee & Tea

Coffee or Tea? With Milk or Without Milk?

- Cup of Black Coffee or Tea: 1.21g CO₂e
- Cup of Coffee or Tea with Milk: 1.53g CO₂e
- Large Cup of Cappuccino: 1.235g CO₂e
- Large Cup of Latte: 1.840g CO₂e

Do You Know Series e-Poster #2
CO₂e refers to CO₂ equivalent
Source: The Carbon Trust

Carbon Footprint of a Smoked Cigarette

is 14g of CO₂e.
If you smoke a pack daily, you would have emitted more than **100 kgCO₂e** in a year



HSSE Week 2020

3 Green Port Culture events were organized during the week



26 colleagues viewed the screening of the award-winning environmental documentary, Blue the Film at Pasir Panjang Terminal Building 1 Auditorium on 13 January. The documentary showcases the destruction caused to our marine life by industrial scale fishing, habitat destruction, species loss and pollution.



On 16 January, eight colleagues went on a learning journey on How to Safeguard our Waterways, facilitated by Waterways Watch Society. They participated in litter picking for this on-foot activity along Kallang Riverside Park's riverbank. They learnt about Singapore's four national taps, how the waterways are polluted and what we can do to protect them.

On 17 January, 10 staff rolled up their sleeves and took part in a hands-on transplanting and harvesting session at PATIO@PPTB3 and brought home the harvested produce to share with their loved ones. 2kg of produce such as Japanese bitter melon, purple bak choy, purple perilla, mint, rosemary and black general were harvested.





Online Lunch-Time Talks

Due to COVID-19 restrictions, we curated a series of 6 online lunch-time talks to continue reaching out to colleagues. These talks were held in collaboration with government agencies and NGOs.

Learning and conversations on how we can do our part continues.

Date	Title	Speaker's Organisation
18 Jun	Climate Change, Plastics and Us	Zero Waste SG
25 Jun	Food Waste, Causes and Implications	Zero Waste SG
16 Jul	DO YOU KNOW What Makes a Successful Garden?	National Parks Board (NParks)
24 Sep	DO YOU KNOW How You Can Prevent Dengue?	National Environment Agency (NEA)
8 Oct	DO YOU KNOW Tips for Indoor Planting?	NParks
15 Oct	DO YOU KNOW Singapore Food Security Strategy?	Singapore Food Agency (SFA) and Edible Garden City

To further engage the participants, pre-event surveys were deployed, where applicable. Consolidated responses to each Q&A session and additional resources were sent to the participants after each talk.

Through the organization of the talks, we also deepened our collaborations with the government agencies.

Some of the positive responses we received are:

“Interesting talk. Look forward to more. Well Done!”

“Good for our knowledge and how we can contribute to environment.”

“It is good to have such talks during lunch / WFH. A good break.”



Climate Action Week

In support of the annual Climate Action Week from 15 to 21 August, helmed by the Ministry of Sustainability and the Environment (MSE), we organised two events which were included in MSE’s media release and featured in PSA Singapore’s social media.



DONATION & RECYCLING DRIVE

Jointly organized with POU and SPWU, collection points were set up from 17 to 21 August. 700 kg of new and lightly used items were donated to The Salvation Army.



10 KG OF PRODUCE HARVESTED FROM PATIO@PPTB3

“30 by 30 Goal” is a target to grow enough food locally to meet 30% of Singapore’s nutritional needs by 2030. Singapore currently imports over 90% of our food, making us susceptible to global supply shocks due to natural calamities.



PSA SG Go Green Month

PSA SG Go Green Month is held every September, with a myriad of Go Green outreach activities organised. In 2020, activities were conducted online or in small groups due to COVID-19 safe distancing needs.



Ms Goh Swee Chen (4th from right) and Dr Ryal (2nd from right) with members of the PSA Singapore management.

INAUGURAL GREEN PORT CONVERSATION SERIES

The highlight of Go Green Month is the launch of Green Port Conversation Series, a leadership series on topics relating to sustainability, on 30 September.

The guest speaker, Ms Goh Swee Chen, spoke on “Transforming Organization Towards a Sustainable Strategy – Challenges and Opportunities” at this hybrid event with a small group of guests on site at PSA University and 120 participants tuned in via Microsoft Teams. The talk also addressed the concerns and questions collated earlier in a pre-event survey.

Ms Chen is the President of Global Compact Network Singapore (GCNS), the Singapore chapter of the United Nations Global Compact.

OTHER EVENTS & ACTIVITIES HELD IN GO GREEN MONTH

Date	Event / Activity
1 & 29	2 sessions of Training for Environmental Activists, a one-day course was conducted online.
2 & 4	2 sessions of hands-on transplanting of seedlings at Botanicals Sky @ MB and Botanicals Earth @ MB
3	Virtual Learning Journey to Sustainable Singapore Gallery Marina Barrage where participants learn about Singapore’s sustainability pathways, conducted during lunch time.
8	Online UPcycling workshop to upcycle beverage carton into mask holder, conducted during lunch time.
15	Online UPcycling workshop to upcycle fabric from used cotton t-shirt into fabric coaster, conducted during lunch time.
24	Online lunch time talk by NEA on DO YOU KNOW How to Prevent Dengue?



Tree Planting



SYMBOLIC TREE PLANTING @ TUAS PORT

On 3 November, PSA Singapore's management team and Union leaders planted three Bucida Molineti trees on the grounds of Tuas Port.

This year's tree planting not only symbolizes PSA Singapore's commitment to go green, but also the planting of seeds for our future.



PSA SINGAPORE SUPPORTS "GIVE TO THE GARDENS PROGRAMME" & DECORATES A TREE

PSA Singapore donated S\$3,000 to the NParks' programme which supports the Singapore Botanic Gardens' research, conservation, education and outreach projects. As part of this programme, 10 trees each with a PSA tag were located at "The Trees of the World" display, which took place at the Botanic Gardens from 5 December 2020 to 3 January 2021.

One of the 10 trees was filled with beautifully crafted PSA themed decorations.



HSSE as Core Competency

ENVIRONMENTAL COMPETENCY TRAINING



Two online runs of “Training for Environmental Activists” were conducted on 1 and 29 September during PSA Singapore Go Green Month. Each run was fully subscribed. First organized in 2018, this course covers climate change and its impact. Participants were also taught how to make a difference, and learn how to upcycle various materials into usable products such as holders, name card cases and functional LED lamps.

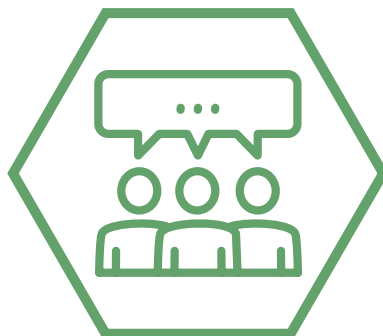
On 13 November, the inaugural run of “Risks & Opportunities in Low Carbon Economy” was conducted online.

e-LEARNING



In 2020, three new e-learning modules were introduced. This brings the total to six modules, as follows:

- Module 1:** Reduce, Reuse and Recycle Right
- Module 2:** Vector Control
- Module 3:** Food Waste Reduction
- Module 4:** Energy & Water Conservation
- Module 5:** E-Waste
- Module 6:** Recycling Right



GREEN PORT CONVERSATION SERIES

This was covered in page 45.



e-PUBLICATIONS

We can learn through reading and there is a plethora of reading resources available, such as HSSE Care and ENView.

We launched a DO YOU KNOW series, comprising of 12 x HSSE Care articles over a 6-month period from March to August.





Decarbonisation of Supply Chains

Creating sustainable operations and transport modes to reduce stakeholders' carbon emissions



Aerial view of Pasir Panjang Terminal

CARGO ADVANCEMENT ENABLED BY PSA ACE™

As a world's busiest transshipment hub, PSA serves as a critical supply chain node connecting upstream and downstream ports to support the efficient movement of goods amongst countries.

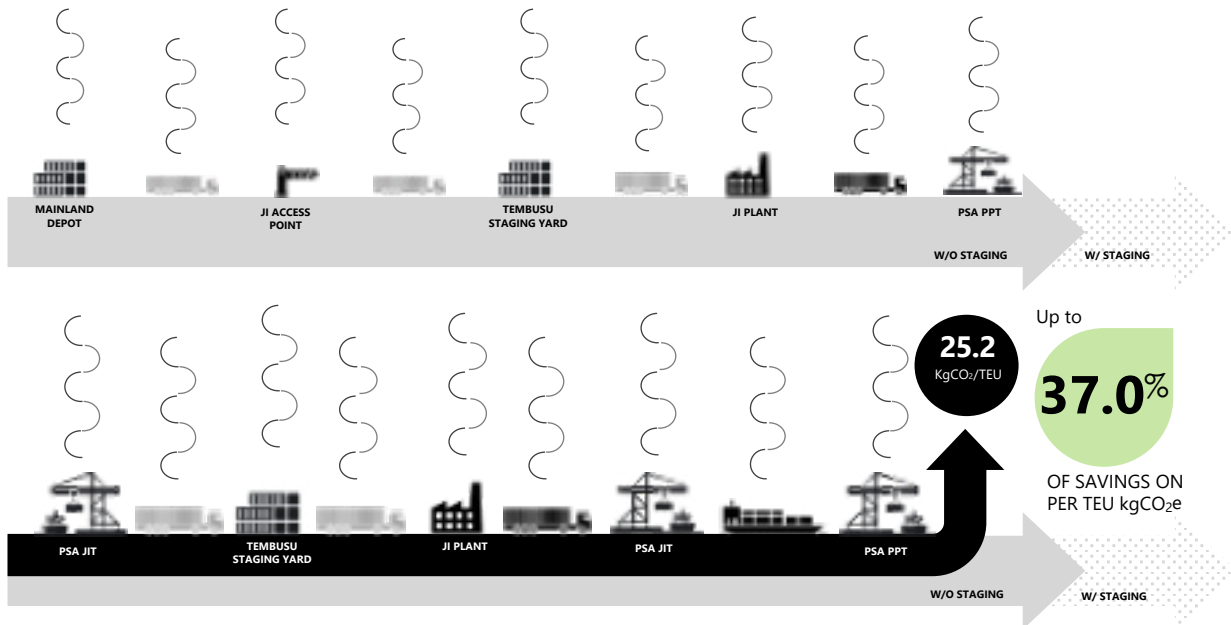
Singapore's excellent connectivity to all regions and wide choice of shipping lines helps facilitate fast connection of cargo globally. PSA has developed its proprietary transshipment optimization engine called ACE™ to maximize vessel utilization across partner lines and better manage yard inventory:



Through ACE™, shipping lines can maximize load factor and vessel utilization by proactive management of hot connections, providing real-time visibility on slots available and recommendations for top-ups. Real savings in bunker from optimized steaming speeds and reduced waiting time driven by real-time exchange of information. Improvement in vessel utilisation by 20% will bring about a 25% reduction in carbon footprint.

Systemising of cargo advancement technology into the global transshipment ecosystem will drive the global supply chain towards sustainability.





SUSTAINABLE BARGING FOR JURONG ISLAND

The energy and chemical industry is a key segment of Singapore’s economy. More than 100 global chemical firms have operations on Jurong Island. Over 400,000 twenty-foot equivalent unit (TEU) of laden petrochemical goods are produced in Jurong Island annually and trucked to PSA terminals via road to be exported from Singapore.

On average, a round trip of collecting an empty container, trucking it to Jurong Island, and then bringing the laden container back to a PSA terminal for export, is estimated to generate up to 39.9kgCO₂e per TEU. PSA offers a daily barging service connecting Jurong Island Terminal and PSA terminals. This sustainable mode of transport can effectively reduce up to 37% of greenhouse gas emissions for Jurong Island shippers and PSA.





Occupational Safety & Health

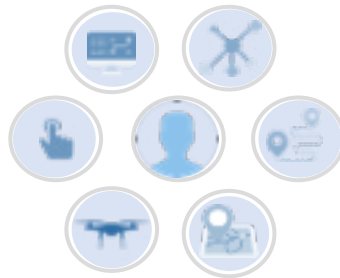
Creating a Safe and Healthy Environment

As an essential service provider, our terminals operate 24/7. As activity levels intensify, so does the corresponding potential risk exposure. It is imperative that while we strive for productivity, personal safety is not taken for granted and safe work processes are not compromised.

The journey towards a generative safety culture for both PSA staff and our solution partners must continue by focusing on our approach to the 3 HSSE key thrusts of Culture, Embrace Technology and Feel the Ground to instill and inculcate a safety mindset.



Culture



Embrace Technology



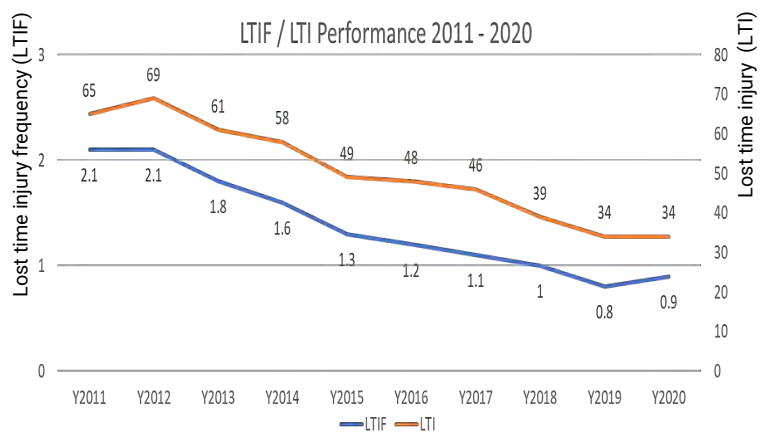
Feel the Ground

Safety Performance

Fewer Injuries Than the Years Before

Based on safety performances from 2011 to 2020, the Loss Time Injury (LTI) rate has reduced significantly, with a corresponding reduction in Loss Time Injury Frequency (LTIF) as well. In 2020, LTI was 34, a similar rate to 2019 while LTIF was 0.9, which was well within our set threshold of less than or equal to 1.1.

We will continue to instill a safety mindset in our people and solution partners by strengthening our 3 key HSSE Thrusts, to achieve a generative culture where safety is second nature to how we conduct our business.





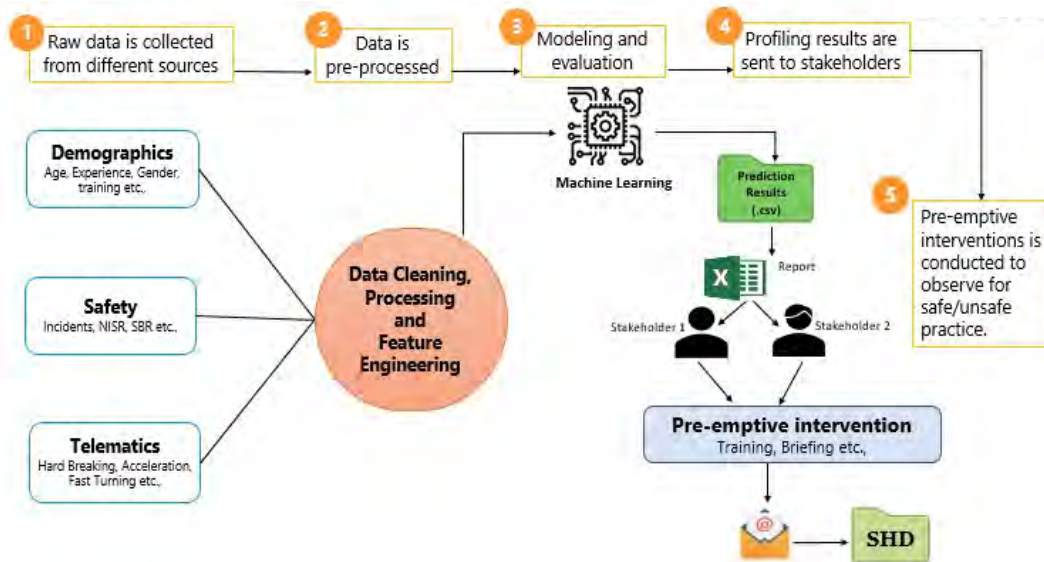
Embracing Technology

Key Enabler to Identify, Predict and Prevent Accidents

PREDICTIVE ANALYTICS

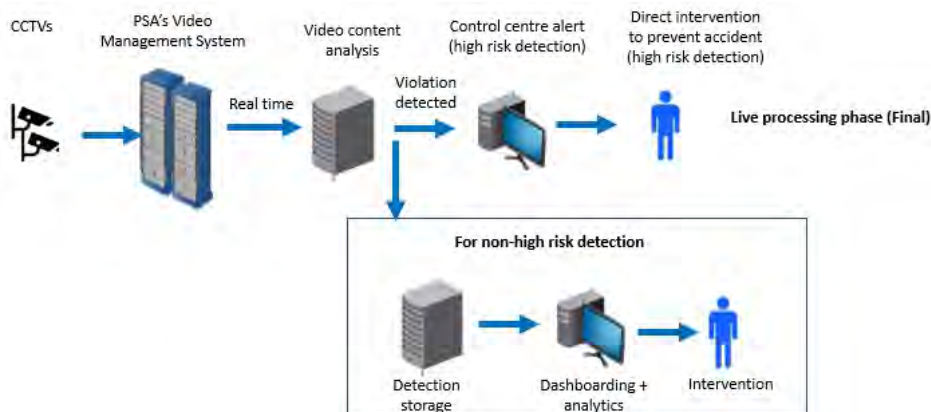
We have adopted predictive analytics to do risk profiling of our prime mover drivers. The objective is to identify high risk drivers and send them for an intervention programme (IP) to improve their driving behaviour and reduce risk of accident occurrence.

The programme has been successful, with 80% of participating drivers achieving improved telematics safety scores after attending IP, and 97% remaining accident free.



VIDEO ANALYTICS FOR SAFETY

The use of technology enables us to better detect and manage safety exceptions by relying on video analytics (VA) based smart solutions to detect and intervene to prevent safety lapses. Where it is not possible to have human eyes to continuously check for and enforce safety round-the-clock, given the scale of our operations, this can be achieved with VA. In the event of any exception or unsafe condition detected, the VA-based smart solution will then be able to trigger both system responses as well as human intervention. VA is currently applied to lashing and prime mover operations.





Cultural Change Journey

Starfish Safety Workshop to instil and inculcate a safety mindset in our people to achieve a generative culture



The Starfish Safety Workshop, our signature programme to grow a generative safety culture, leverages the four FISH principles of Choose Your Attitude, Make Their Day, Be There and Play to raise the safety awareness and instil a 'will' component in individuals to practise safety at work through a series of fun and interesting activities.

Participants are taught important applications such as Take 5+ (Pause, look at surroundings, assess risks, control measures and execute job safely) to assess risks/hazards prior to starting work to prevent accidents.

CHOOSE YOUR ATTITUDE

This segment aims to bring across the message of making the choice to work safely by exercising self-discipline in complying to all the safety regulations.

MAKE THEIR DAY

This segment aims to bring across the message of how one can make a difference in someone's day by listening, understanding, appreciating and communicating.

BE THERE

This segment aims to bring across the message of being there for Co-workers through identification of hazards and elimination of risks at work.

PLAY

This segment aims to bring across the message of playing an active role to create a safe and positive work environment for everyone and harness the spirit of innovation.

SAFE MEASURES TO ENSURE SAFETY OF ALL

In view of the COVID-19 situation and safe distancing requirements, Starfish Safety Workshop participants were split up at alternate sites while remaining connected virtually via Microsoft Teams.

Besides adhering to safe management measures during the workshop, the contents of the workshop were revised to minimize physical interaction and exposure levels.

Virtual Starfish was also curated for staff on Stay-Home Notice (SHN) as a refresher on safe work procedures.

All engineering staff have attended the workshop, which is being conducted for staff from operations as well as solution partners.

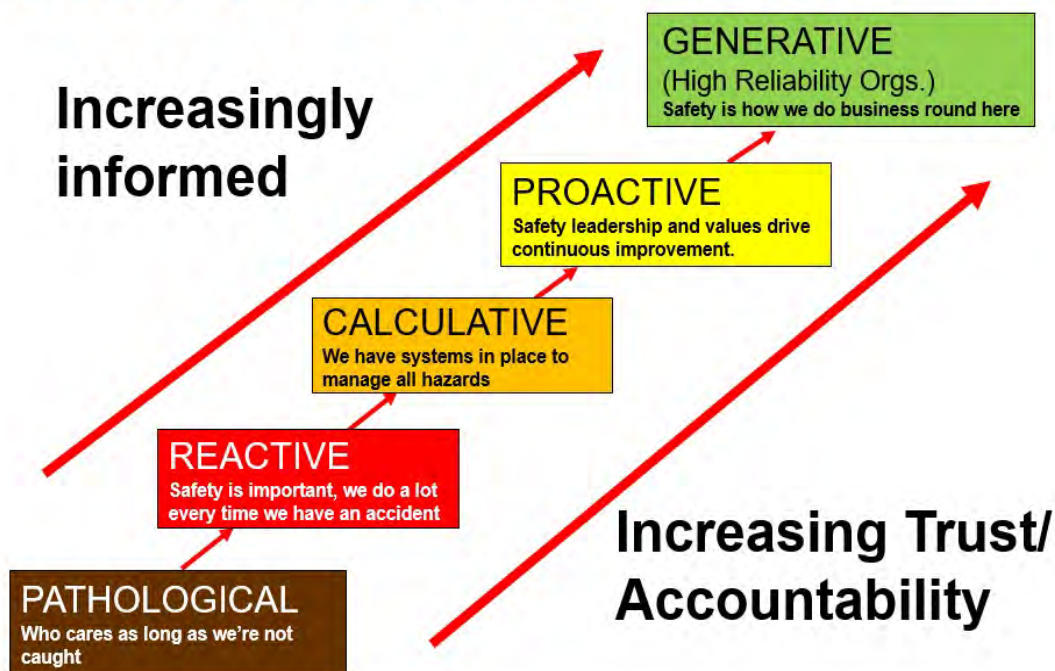
Notwithstanding the arising challenges posed by the ongoing COVID-19 situation, the workshop shall continue to be conducted so as to sustain our culture change journey towards a generative HSSE culture.



Feel The Ground

Understand Your Culture Survey to Understand Attitudes Towards Safety and Improve On Gaps

SAFETY CULTURE LADDER



The Understand Your Culture (UYC) survey serves as a tool to identify gaps and to make continuous improvement in managing workplace safety and health. The survey is part of PSA Southeast Asia’s annual HSSE assurance commitment. In PSA Singapore, we have achieved a score of 4.13 out of 5 which places us on the Proactive stage of the safety culture ladder. It is an improvement compared to a score of 3.75 in the year before.



Safety & Health – Health Initiatives

To Instill Individual Ownership to Lead a Healthy and Active Lifestyle

The health and psychological wellness of the individual have become increasingly important in the past years, especially amid the pandemic where fear and anxiety can make people feel isolated and lonely. We had revised our health programmes to better adapt to the challenges and constraints during the COVID-19 situation.

A series of virtual health programmes such as virtual health talks, PSA health challenge series and PSA Health & Wellness week were implemented for all staff, including our PSA dormitory residents to raise awareness, promote and instill individual ownership to lead a healthy and active lifestyle.



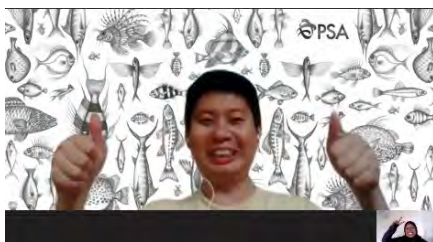
Virtual Opening Launch of PSA Health & Wellness Week



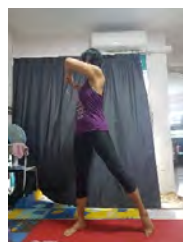
Virtual Health Talks



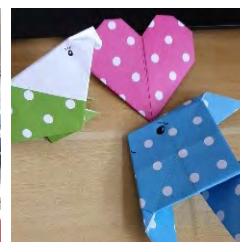
Virtual Live Workout



Virtual Health Talks



PSA Health Challenge Series



Mental Wellness Therapy – Origami Workshop



People | PSA Singapore

Workforce and Employment

STAFF STRENGTH

Direct	Indirect	Total
8,600	3,400	12,000

Responsible for operating the world's largest container transshipment hub diligently are 12,000 PSA Singapore employees. The success of our port is built upon the strong collaboration, partnership and trust forged with our Unions and staff over the years. We will continue to work alongside our stakeholders to gear up for a future-ready workforce.

STAFF CATEGORY

Frontline

8,100

(including Crane Operators, Prime Mover Drivers, Lashing Specialists)

Non Frontline

3,900

(including Operations, Engineering, Infocomm Technology and corporate functions)

AGE PROFILE

	<30 years old	30 - 50 years old	50 - 62 years old	> = 62 years old
Overall	25%	55%	14%	6%
Frontline	28%	56%	15%	10%
Non Frontline	19%	55%	15%	10%

LENGTH OF SERVICE

	<5 years	5 - 10 years	10 - 20 years	> = 20 years
Overall	30%	32%	15%	23%
Frontline	34%	34%	13%	19%
Non Frontline	22%	27%	19%	32%

Data as at 31 December 2020.
Breakdown refers to Full Time staff only.



People | A Great Place to Work

At PSA Singapore, we are committed to leading the industry, creating new possibilities and building great teams. We believe in integrating work, learn, play and these are the benefits that our full-time employees get to enjoy.

- Flexible work arrangements
- Flexible benefits to promote health, fitness and family togetherness
- Medical subsidies for employees and dependents
- Dental subsidies for employees
- Health screenings for eligible employees
- Leave covering Annual, Medical, Matrimonial, Maternity, Paternity, Childcare, Shared Parental, Compassionate, Examination, Pilgrimage, National Service, and Time-Off to attend Convocation
- Long Service Awards
- Group Term Insurance
- Fitness centre, sports and social facilities at PSA Alongside, PSA's clubhouse for staff to develop esprit de corps among employees and encourage health and fitness
- Book holiday stay at bungalows in Singapore and Bintan
- Corporate passes to places of interest in Singapore
- Staff Communications and Recreation Funds
- Staff Discounts Scheme with retail partners

In addition, PSA conducted activities under the Healthy Lifestyle Programme for employees in 2020 to promote general wellness and a healthy lifestyle.

Employees entitled to parental leave

Male	Female
357	34

Employees who took parental leave

Male	Female
315	34

Employees who returned to work* after end of parental leave

Male	Female
315 (100%)	34 (100%)

Retention of employees who took parental leave**

Male	Female
288 (91%)	31 (91%)

*Employees who returned to work after parental leave ended or still taking parental leave, as of 31 Dec 20

**Employees who returned to work after parental leave ended and who are still employed, as of 28 Feb 21



People | Workforce Transformation and Employee Relations

STRONGER ALONGSIDE

In a year filled with unprecedented disruptions, the need to continue strengthening our Labour Management Relations and staying alongside our staff and Unions remains key to enable 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 as we walk through the journey of Saving Lives, Sustaining Livelihoods and Securing our Future.

Some of the joint efforts and collaborations include:

- New partnerships forged to bring our workforce up to speed in digitalisation, including the use of collaboration tools for communications and online learning. This had enabled our regular engagements and communications with HR, Division Leaders and Senior Management to remain undisrupted, so that our workforce continues to be updated and aligned with our business outlook and future directions.
- Team-building, Professional Development Seminars and other joint activities deepened our strong relations with our Unions and tripartite partners.
- SkillsFuture Council and Workgroups that focus on Tuas Port, long term workforce strategies and steer the development of quality careers, and a future-ready workforce.
- Signature 'Towards Enduring Partnership' Programmes enabled us to co-create a safe and sustainable work environment through Gracious Movement Acts and Go Green activities.



Joint activities that strengthen and deepen our Labour Management Relations



Oldest union in Singapore: registered in 1946, representing the Rank & File



Registered in 1967, representing the Executives



People | Training and Education

Successful People, Successful Business. PSA recognises the value our employees bring to our success, and human capital development is a key pillar in the overall business transformation roadmap. This involves 3 main thrusts as follows:

- Building agility through nurturing our people to have the right skills and attitudes to meet dynamic business needs and changing job roles.
- Cultivating a culture that empowers our people to excel and embrace a growth mindset to continuously reskill and upskill where needed.
- Create an enabling environment with a recognition framework and allocation of resources to support the learning and development of our people, to realise our vision of the future of work.

This entails a whole-of-PSA effort involving our business units, Unions, Human Resource and our corporate training arm (PSA University) working closely together to deliver the outcome.

Our training framework focuses on equipping our employees with new competencies e.g. in areas of digitalisation, data, sustainability, leadership and soft skills, as well as deepening technical and professional skills to enable our employees to excel in the current business and be future-ready.

Apart from company-directed training, PSA also has initiatives such as the “Hooked on Learning” programme and funding schemes (Self-Development Scheme and Lifelong Learning Scheme) to encourage self-directed learning among our employees.

PSA believes in supporting our employees to perform well and progress in their career. Besides making the annual performance appraisal a requirement for all staff, we also focus on equipping our managers and leaders with People Developer skillsets through in-house developed courses such as “Career Conversation Workshop” and “Tao of Coaching” programme.

TRAINING HOURS PER EMPLOYEE

Overall	63	Overall	63
Frontline	67	Male	64
Non-Frontline	56	Female	50



COVID-19 Pandemic

Saving Lives and Sustaining Livelihoods While Keeping the Supply Chain Flowing

PORTFOLIO	Non-Invasive Thermal Scanning System	PROCESS	Safe Distancing in all PSA premises	Compliance to Govt initiatives	PEOPLE	Compulsory Wearing of Mask	Temperature check at least twice a day
	Isolation rooms in place for exception cases.		Safe Management Officers & Safe Distance Ambassadors	Maintain Good Personal Hygiene		Do Not Attend Work if unwell	
	Pandemic plans / BCP at all BUs		Daily Management Reporting	Pufferfish COVID-19 e-Learning			
	Health & Temp Declaration through QR		Staggered work and break timings	Essential training only		Increased cleaning frequency	Eq. & workstations wipe-down procedure
	Advisory, Memo, to all stakeholders		Split teams & alt. sites arrangement	e-toolbox briefing		Provide disinfectant	Clean Lanes
			Adopt teleconferencing	Non essential events to be cancelled		Reusable Mask	Face Shield
	Case Management Protocols and tracking of all exception cases (e.g. LOA, Quarantine, MC)						

COVID-19 Measures Implemented in PSA Singapore

The year 2020 will be remembered for the COVID-19 pandemic, one of the most serious global health crises of the century that has affected lives and livelihood. It has caused world-wide disruption to our daily lives and to global economic activities. Border closures, travel restrictions and lockdowns contributed to a global recession and increased unemployment in nearly every country.

ESSENTIAL BUSINESS

As an essential business, keeping our terminals running is vital to sustain global supply chains and movement of pandemic supplies. During the COVID-19 situation, it is imperative to manage the risk of infection among staff and port users necessary for the running of the port. As a sea checkpoint, our terminals are also exposed to overseas personnel movement such as arrival of ship crew.

To minimise the risk of infection, our business continuity plans were put in place, implementing various safe management measures to minimise the risk of infection to our stakeholders.



COVID-19 Measures Implemented in PSA Singapore

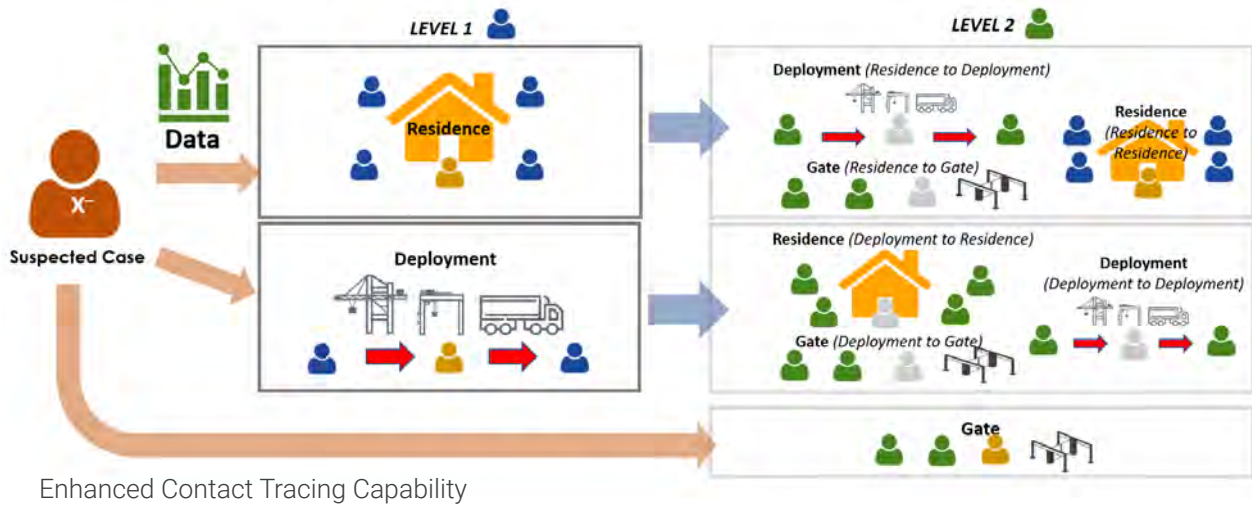


Deployment of Safe Distancing Ambassadors



Scope of Contact Tracing

Data Generation of Level 1 & 2 Staff



LEVERAGING TECHNOLOGY

To stay resilient in the current pandemic, we have leveraged technology to enhance our contact tracing capability by using data residing in our various systems to identify close contacts of any suspected or positive case. This allows us to quickly ringfence and reduce the risk of transmission to protect lives and ensure business continuity.

Our work processes were reviewed to ensure that physical interactions were minimised. Thermal cameras were installed at most entrances and exits



Thermal Cameras @ Access Points

to detect any exception cases from entering and exiting the premise.



Deployment of Safe Distancing Ambassadors

BEST PRACTICES IN DORMITORY MANAGEMENT

PSA Singapore had only two cases of infection in the dormitories since the onset of the pandemic. We have adopted industry best practices in our dormitory management as part of our safe management measures during the pandemic.

ROSTERED ROUTINE TESTING (RRT)

PSA staff and solution partners whose job nature are of greater exposure risks are placed under



RRT @ PSA Dorms

the RRT programme in line with the directions from the Ministry of Health (MOH) to detect any infection early. This include dormitory residents where the transmission risk is higher due to communal living.

COMMUNICATIONS

HSSE advisories were constantly sent to give timely reminders and updates on the pandemic so that our people are aware of any new implementation or change in policies.



HSSE Advisory



SUPPORTING NATIONAL EFFORTS

As part of national efforts to contain the COVID-19 virus and prevent further infections in the community, PSA provided logistical support and hosted community care facilities for infected migrant workers at the Singapore Expo as well as Tanjong Pagar Terminal.

At the same time, we stay connected by constantly engaging and understanding the needs of our people. We have organised management and union walkabouts to engage people on the ground to cascade the importance of adhering to safe management measures.



"PSA Management Union Walkabout Engagement"

As we recover from the pandemic, the priorities remain to save lives, sustain livelihoods and continue efforts to ensure the adoption of safe management measures.



PSA Health@Home

Being Alongside Our Communities



Our Health@Home volunteers.

As the World's Port of Call, PSA recognises the importance of connecting communities by listening, understanding and communicating. Being alongside our communities is what defines our DNA. As such, our corporate social responsibility (CSR) efforts in Singapore have focused by and large on the aging population. With over 65,000 aged 65 years old and above in 2020, or 15% of total population, the resources

available to manage this sector are stretched. By embarking on the CSR initiative titled 'PSA Health@Home' in 2015, PSA has diligently pursued two fundamentals – sharing the knowledge of caregiving with our staff to help the elderly and themselves; and building a spirit of volunteerism amongst PSA employees, in order to fulfil a societal and community need. Effectively, we provide the support to partners managing these vulnerable segments of society, and at the same time touching the lives of both our staff and the elderly through a range of socially responsible and sustainable programmes. PSA sets out to mould these groups into valuable assets of society.



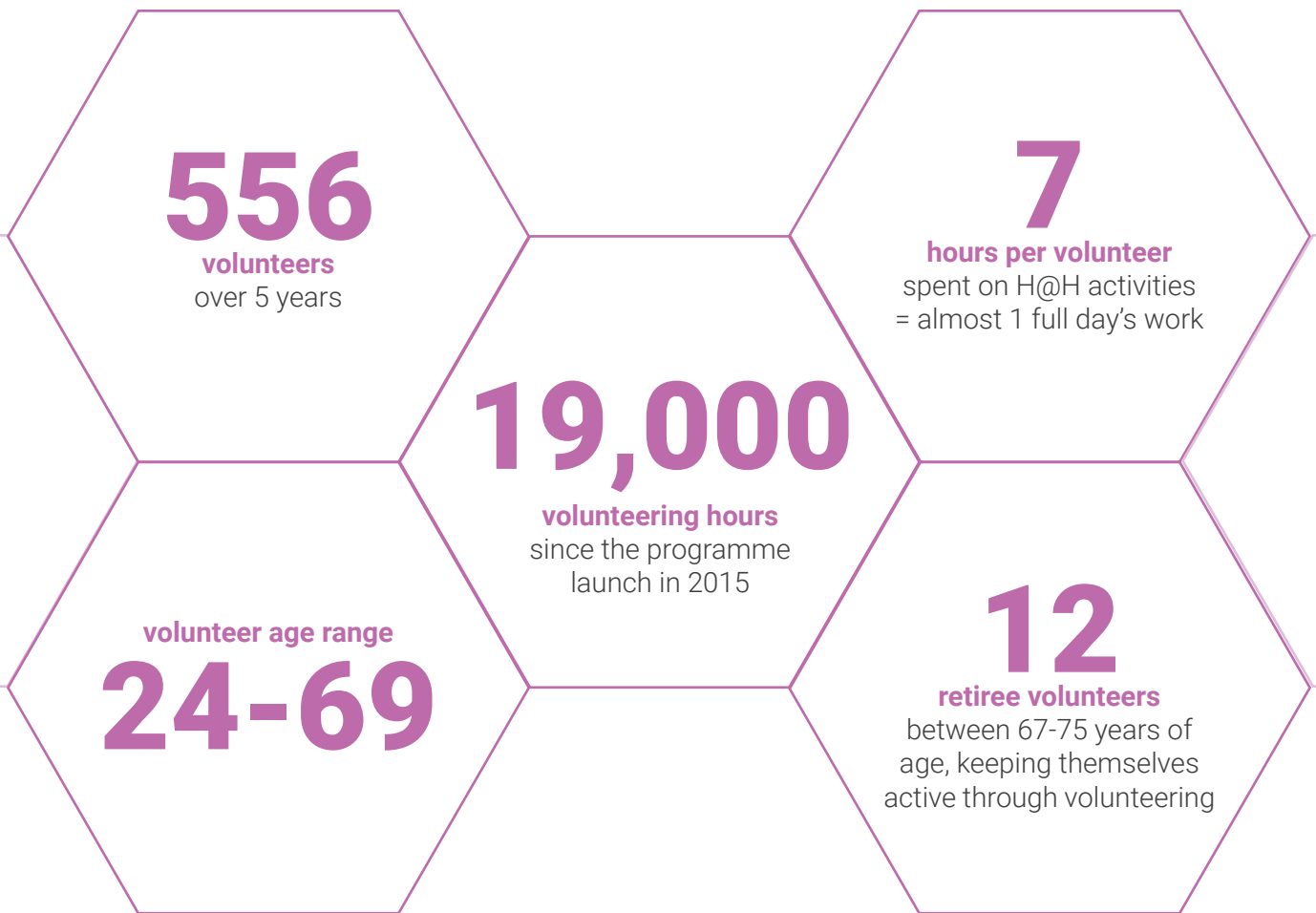
Our 'en'abled retiree volunteers.

In this, PSA partners and collaborates with organisations such as HCA Hospice Care, NUHS, and St Luke's ElderCare to play a significant role by enabling sustained support, progress and development for both volunteers and beneficiaries. We leverage our strengths, skills and resources to take positive and sustainable actions to benefit these groups.



A STRONG SPIRIT OF VOLUNTEERISM

At PSA, our spirit of volunteerism shines strong. PSA's Fish Culture with principles such as 'Be There', 'Play', 'Make Their Day' and 'Choose Your Attitude' mirror the principles of volunteerism, and as such, we are able to harness the strong spirit of volunteerism among our staff, and thus engage and rally them to volunteer readily. Our numbers speak for themselves:



ENGAGING OUR PARTNERS

PSA recognises the important roles played by our partners. Since 2015, our partners and us have forged a strong bond, fuelled by the same aim and aspirations to remain alongside and support these segments of society that were the pioneers in the building of Singapore. In essence, the PSA's Health@Home programme offers staff a holistic experience in terms of volunteering, from engaging the elders to palliative care and more.





PSA's Response to Covid-19

We choose to be alongside our beneficiaries during the current pandemic.

With the onset of the pandemic, and the necessary safe measures implemented by the government, the Health@Home team had to respond decisively and yet creatively to remain alongside our beneficiaries. We had to suspend all physical activities and gatherings, and as the situation worsened, the team sprang into action, introducing "PSAssist", with the tagline of "Apart In Distance, But Never in Heart!". Besides

sending 'care packs' to our frontliners, the team utilised technology which allowed virtual gatherings between volunteers and beneficiaries. This meant that our volunteers could reach out virtually, enabling us to resume our volunteering programmes, while taking necessary safe measures. The ability to pivot successfully is the result of PSA's manifesto of being always alongside our communities.



- » 11 families received sponsored grocery packs of essential food items
- » HCA patients were treated to a dim sum party
- » Bubbletea drinks for HCA frontline staff



- » NUHS staff were called to assist at the dormitories with the testing of migrant workers
- » Staff & volunteers were treated to ice-cream sandwiches to lift their spirits



STRENGTH IN NUMBERS

As the pandemic continues to cause disruptions to lives and livelihoods, PSA maintains our engagement with beneficiaries through various national initiatives. With the coming together of staff, volunteering time and energy, our strength in numbers ensures that we are able to continue our efforts despite the difficult situation.

August 2020 - In support of NDP 2020 campaign, PSA collaborated with our sister subsidiary CrimsonLogic to co-sponsored care packs for 200 lower income families in the South West CDC district. With safe measures in place, our volunteers packed and distributed goody bags, consisting of essential groceries, face masks and, books and stationery vouchers.

December 2020 - PSA again collaborated with CrimsonLogic to organise "Wishes for 500



Smiles", where staff chipped in time, money and effort to grant the wishes of 500 needy individuals. Gifts included household items, daily necessities and other white goods. This activity was done in conjunction with Singapore's SG Cares Giving Week 2020.

Pasir Panjang Park

Going Green



Pasir Panjang Park

Beyond our community activities, PSA Singapore sponsored S\$3.5m to the Garden City Fund (GCF). The GCF was established in 2002, under the founding patron of then Prime Minister Lee Kuan Yew, to support projects that fulfil its vision of City in Nature.

The sponsorship will go to the development and beautifying of a 2.5km stretch of the Pasir Panjang Park, located directly in front of PSA Horizons. The park forms a physical link for the public to access the viewing deck of PSA Alongside, overlooking the port. This is in line with PSA's community outreach programmes, bringing the community closer to the port.



Howe Yoon Chong PSA Endowment Fund



Howe Yoon Chong Awards in 2018

The Howe Yoon Chong PSA endowment fund was set up in 2008 to honour the late Mr Howe Yoon Chong. Mr Howe was a visionary Singaporean who made significant contributions to Singapore, including the building of Singapore's first container terminal. The former Cabinet Minister also held the position of Chairman of the then Port of Singapore Authority.

Through his astute leadership, Mr Howe transformed the port and laid the foundation for PSA's growth into a leading global port group. To honour him, PSA set up the endowment fund to award bond-free scholarships to Singapore citizens. The endowment is under the auspices of Trailblazer Foundation Ltd, a registered

charity under the purview of the Commissioner of Charities of Singapore, and comprises contributions from PSA, Temasek Holdings and NSL Ltd (formerly NATSTEEL LTD).

The Howe Yoon Chong PSA Scholarships aim to provide financial assistance to Singaporean students from lower income families, especially those who have made a difference to their community or society. These scholarships cover tuition fees, book and living allowances, as well as other compulsory fees. To date, the scholarship has touched the lives of over 200 students from diverse backgrounds, helping them to achieve both their educational and life goals.

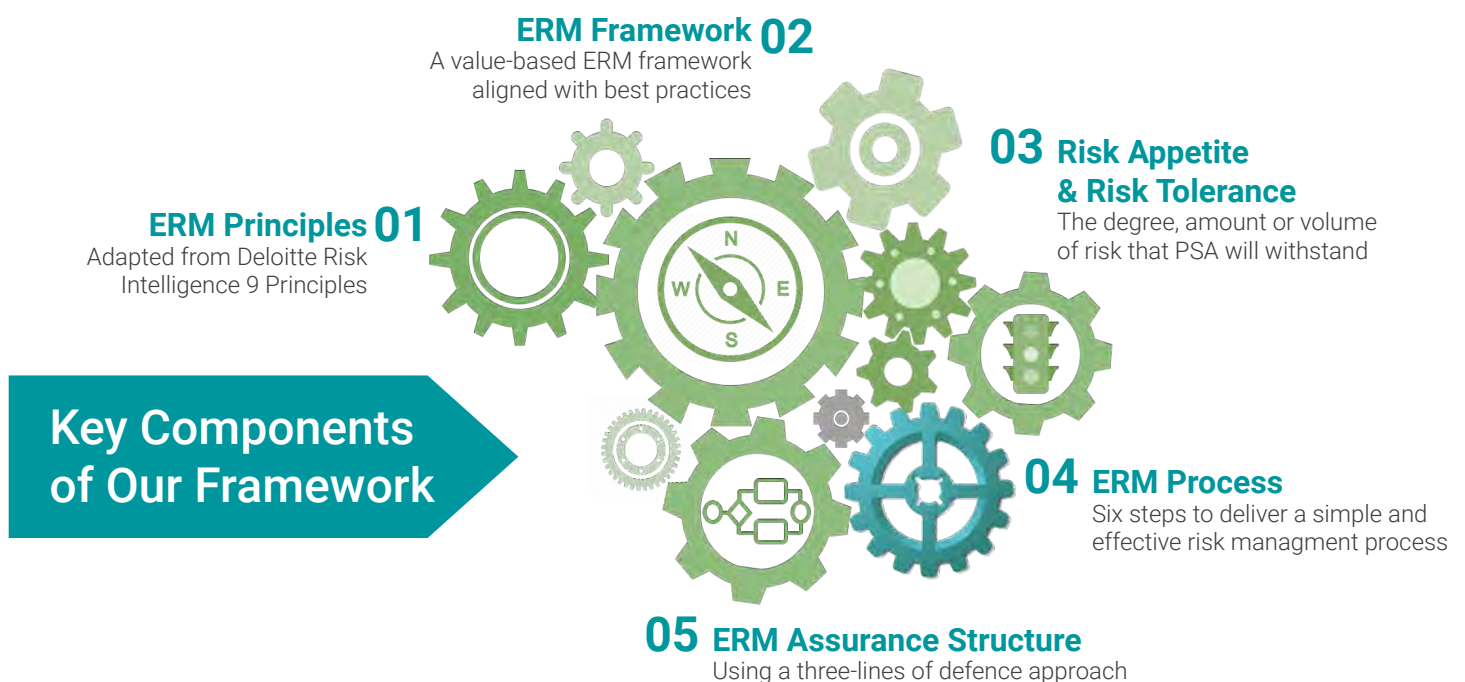


Enterprise Risk Management and Business Continuity

Managing risks and ensuring preparedness

PSA is a leading global port operator. As an industry leader, we acknowledge the importance of enterprise risk management as one of the key elements in achieving our overall mission and objectives. Thus we are committed to understanding the risks faced in order to protect its employees, assets and earnings against potential losses.

The objective of PSA enterprise risk management is to have an effective and robust risk management system in place to assist the Board and Senior Management Council (SMC) to better manage the risks that may affect the accomplishment of corporate objectives on a timely basis.



Aligned with leading ERM framework, our ERM framework and methodology aims to:

- Ensure a **consistent and systematic process** to identify, evaluate and manage corporate risks, and opportunities on an ongoing basis.
- **Improve governance** to achieve greater effectiveness of operational and management practices.
- Ensure **accurate risk information** is reported and shared across PSA for **timely decision-making** and capturing lessons learnt for continual improvement.
- Ensure quality **contingency and business continuity planning** to cope with incidents and emergencies.
- Define roles and responsibilities for proper **accountability and risk ownership**.
- Appreciate the need for **loss prevention and reduction** of total cost of insurable risk.



Enterprise Risk Management and Business Continuity

Risk Management Process

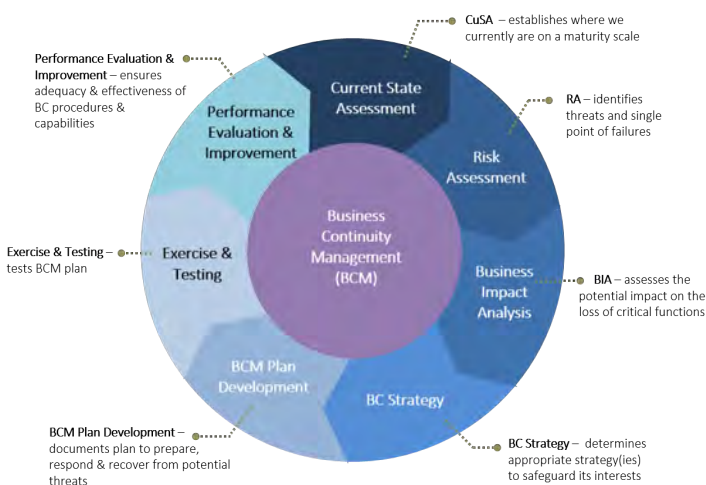
PSA carries out risk management activities such as Risk Assessment and Control Self-Assessment (CSA) on an integrated and holistic basis bi-annually. This requires business units / risk owners to identify, assess and document material risks along with their key controls and mitigating measures.

With respect to individual risks, a Risk Champion is appointed to spearhead the implementation of the effective management of risk assigned.

The Enterprise & Emerging Risk function monitors the status of each key risk, including the progress and effect of the mitigation action plans, and present those materials risks at the bi-annual Risk Council meeting.

Business Continuity Management complements our Risk Management

PSA Business Continuity Management (BCM) programme focuses on the effects / consequences of an incident, rather than the risk event. This allows PSA to be prepared for a wider range of possible threats.



In line with this approach, PSA adopts a structured planning process to gather the necessary information through Business Impact Analysis (BIA) and formulate viable Business Continuity strategies for a number of impact based scenarios.

These Business Continuity Plans are developed to provide predetermined management decisions and guidelines for operational response to assist BU Crisis Management Committee (CMC) and BCM Team in managing and mitigating the effects of a disaster/ major operational disruption.



Our Commitment - Security

PSA Singapore is committed and will do what it takes to provide a safe and secure port through a security regime, leveraging technology and the collective efforts of Port Facility Security Officers (PFSOs), Auxiliary Police Officers and operational staff. Our Pass and Terminal Access Control System (TACS) also effectively controls the access of personnel and vehicles.

The Port of Singapore is the lifeline of Singapore. Hence, port security is a vital concern as the consequences will be dire if there is any compromise.

PSA SINGAPORE'S SECURITY REGIME

Together with the Maritime and Port Authority of Singapore (MPA), Immigration and Checkpoints Authority (ICA), Singapore Customs and Singapore Police Force (SPF), we work to ensure that all legislation are met and the baseline security measures surpassed.

PSA is in compliance with the International Maritime Organisation (IMO)'s International Ship and Port Facility Security (ISPS) Code, MPA Act, ICA Act, Free Trade Zone (FTZ) Act and Infrastructure Protection Act (IPA).

PSA Singapore is certified under the Singapore Customs' Secure Trade Partnership Programme, which is consistent with World Customs Organisation's SAFE Framework of Standards to secure and facilitate global trade. It supports Singapore Customs' initiatives such as the Cargo Targeting System (CTS), Container Security Initiative (CSI) for US-bound goods and Radiation Detection Initiative (RDI) for export containers





Alongside Heroes



We stand proud to be a part of the PSA Singapore Team



With COVID-19 affecting the community, PSA participated actively in national projects to combat and adapt to the new normal.

- Facilitated the floatel and tentage projects at Tanjong Pagar Terminal with a pass office set up at the gate
- Accommodated workers at our City Terminal for the construction of 4,350 reefer points
- Implemented all health advisories, SafeEntry and safe management measures including the set-up of thermal scanners and “clean lanes”
- Supported the swabbing operations for Brani Residence and Pasir Panjang Residence and provided the “Dormitory Resident Tracking Report” to monitor the residents’ movements





Exploiting Technology

PSA is constantly at the forefront of exploring and harnessing technology to streamline process and enhance security.



DEVELOPMENT OF ACCESS CONTROL FOR TUAS PORT AND UPGRADE OF TERMINAL ACCESS CONTROL SYSTEM (TACS)

Implementing the use of Singapore Standard for Smart Card Identification (SSID) and advanced encryption standard, AES 256 and incorporating facial recognition (FR) as an added authentication factor at the Tuas Port.

SELF-SERVICE CAMERA FOR EMPTY CONTAINER CLEARANCE AT THE FLOW-THROUGH GATE

We think out of the box and share new ideas, such as haulier drivers using self-service cameras to confirm a container is empty before they are allowed to leave the terminal.

Process Flow





PSA Singapore Cyber Security Framework

Towards a Cyber Resilient Organization

Cyber Resilience is our ability to withstand and recover from adversities brought about by cyberattacks. From a business context, being cyber resilient allows an organization to fulfil their mission critical functions and greatly enhances their overall business continuity.

With greater risks and exposure from highly evolving cyber threats, organizations have embraced the need for greater cyber resilience as part of their overall digitalization efforts.

However, cyber resilience can only be realized through a holistic approach of investing in the right **technology**, disciplined execution of **process** and greater awareness and accountability in our **people**.

CYBER SECURITY KEY THRUSTS

PSA Singapore security policies are governed by both internal and external regulations. Our cyber security management are aligned and referenced closely to internationally recognized frameworks and adhering to strict regulatory practices.

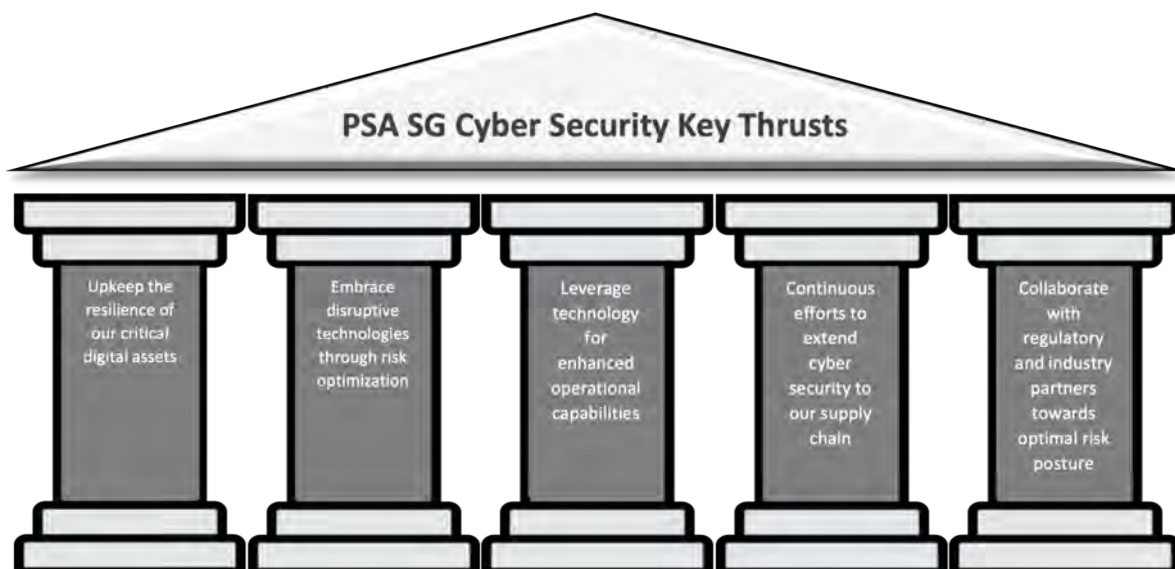
PSA Singapore has identified five key thrusts to support our organization’s mission and vision, as well as to strengthen our cybersecurity posture.

ALIGNING TO NIST FRAMEWORK



The framework of the NIST - the National Institute of Standards and Technology under the U.S Department of Commerce - comprises five functions to aid organizations in the assessment of cybersecurity risks.

PSA Singapore aligns with the NIST framework to **Identify, Protect, Detect, Respond** and **Recover** from cyber security incidents. The framework helps manage cybersecurity risk by organizing information, enabling risk management decisions, addressing threats, and learning from previous activities.





Building our Cyber Resilience

As part of our efforts to upkeep cyber resilience, PSA Singapore regularly performs a series of engagements throughout the year.



Vulnerability Assessment



Penetration Test



Risk Assessment



Audit



Business Continuity Plan / Disaster Recovery



Crisis Communications



Cybersecurity Exercise

Year 2020 PSA Singapore Cyber Security Performance

Benchmarking Against Our Industry

810

Security Rating from BitSight*, which is above average across transportation sector.



*BitSight rating is an indication of cybersecurity performance which helps our organization to understand our own security performance, as well as vendors' and clients'.

PHISHING CLICK RATE PERFORMANCE

In June 2020, Singapore was named as 1 of 6 countries to be targeted in global phishing campaigns. There is significant increase in phishing emails as cyber activities are seen capitalizing on pandemic-related content.

Our phishing click rate for year 2020 simulated exercise is

2%

which fares better as compared to our industry sector at 5.4%!

40,938

phishing emails were blocked at PSA SG email exchange.



Buying Right

Greater consideration of the environmental impact of our purchases

PSA Singapore’s business is closely related to international trade. We have a long-standing commitment to protect our environment, the communities we operate in and our employees’ health and safety.

As a major transshipment hub for the movement of containers, we are deeply mindful of the effects of global climate change, and the importance of doing our part for environmental sustainability as a responsible global corporate citizen.

Globally, a greater consideration of the environmental impact of materials and products consumed and utilized is advocated.

PSA is committed to the responsible procurement of high-quality resources (products and services) that are environmentally sustainable, from ethical sources and technologically innovative at competitive prices.

At PSA Singapore, our stance is to avoid the use of single-use disposable items as far as possible. Where unavoidable, we will choose bio-degradable disposals as an alternative.

In our purchasing and sourcing decision making, we are guided by the following key considerations to opt for products which:





Buying Right

Putting Green Procurement into Practice

Selected examples of green procurement in practice

Spare parts: With longer life span to reduce frequent disposal (lighting / filter etc.)

Lubricant: Bulk order instead of deliver in small number of pails/drums (requires frequent disposal)

Pantry Items: Remove all plastic utensils and procure bio-based utensils

Copier Paper: Supply to come from sources that are environmentally responsible, socially beneficial and economically managed with certification. Paper to carry Singapore Green Label

Development of Green Infrastructures: Super Low Energy Building (SLEB), solar photovoltaic, LNG, electric yard cranes and AGV infrastructures etc. frequent disposal)

Canteen Operators: Requirement for operator to use biodegradable wares and packing and have in place food waste collection and segregation receptacles. Collected food waste are required to be sent to a NEA-licensed waste disposal facility for treatment.

Green tyres (trial): Tyres are naturally derived, carbon neutral and renewable with natural rubber-based nanocomposites



Green tyres currently on trial at PSA Singapore



Buying Right

Putting Green Procurement into Practice – Tyre Management

As part of our green procurement approach, we encompass the 3Rs (reduce, reuse, recycle) in the way we manage our material use. For example:

Reduce: Extend lifespan of existing prime mover tyres by use of rethreading services

Reuse: Use of remanufactured solid tyres

Recycle: End-of-life recycling of used tyres into other useful products



G

REEN TYRE TRIALS CONDUCTED ON GRI ECO1, ECO2 AND ECO3 TYRES

Together with our supplier, a leading manufacturer of eco friendly tyres, reliability trials were conducted. The eco friendliness of the tyres range from use of natural oils (instead of petroleum-based oils), use of recycled and naturally derived renewable materials.

R

EMANUFACTURED TYRES

Tyre carcasses are re-used at a third of the cost of brand-new carcass without compromising the tyre’s safety standards. The tyre carcass provides the tyre with strength in the sidewall area and are made with layers of rubber-coated fabric which have the cords running radially from bead to bead.

E

LIMINATE (DISPOSE) RESPONSIBLY

Used tyres are recycled into various products such as rubber powder to pave roads and playgrounds. This diverts used tyres from the landfill and reduces greenhouse gas emissions.

E

LIMINATE USE OF PALLETS TO REDUCE PACKAGING

Tyres are stacked and delivered in a way to facilitate handling by a forklift without the use of pallets, thereby reducing packaging material waste.

N

ETWORKING WITH LIKE-MINDED SUPPLIERS

Important to work with environmentally conscious suppliers with green policy, processes and practices in place, from the use of renewable energy, sustainably sourced materials and a closed loop system.



Buying Right

HSSE considerations in Procurement Practices

PSA Singapore is committed to doing business with suppliers that can demonstrate their commitment to sustainability and in compliance with national legislations and regulations.

Key legislations and their subsidiary legislations include but are not limited to

- [Workplace Safety and Health Act](#)
- [Environmental Protection and Management Act](#)
- [Resource Sustainability Act](#)

As part of this, various Health, Safety, Security and Environment (HSSE) considerations form part of our deliberations during the procurement and tender evaluation and tender award processes.

Contract-specific HSSE considerations will be included in the specification of the tender (as appropriate) and these will form part of the evaluation criteria for both products and services that we procure.

As a baseline requirement, all tender applicants for contracts with a contract sum of more than S\$250,000 are required to meet the following:

- [Certified bizSAFE Level 3 or better](#); and
- [Compliant with PSA Pass Conditions, PSA Safety Rules and PSA Security Rules](#).

Additionally, the following checks will be conducted to assess applicants' compliance with national regulatory requirements:



Record of any workplace fatality within the timeframe of the last 3 years



Record of any issuance of Stop Work Order by the Ministry of Manpower (MOM), in the last 3 years



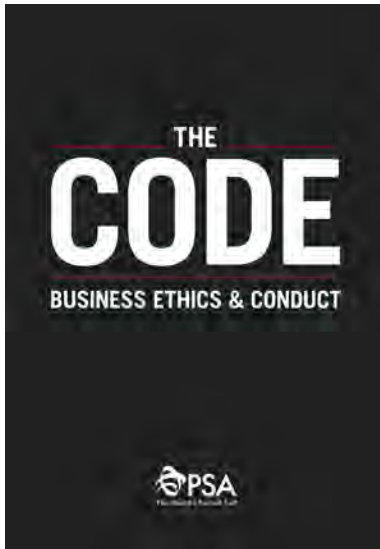
Record of any issuance under MOM's Business Under Surveillance (BUS) Programme



Record of any issuance of Stop Work Order by the National Environment Agency (NEA) in the last 3 years



Ethical Business Conduct



PSA is committed to conducting business with the highest standards of ethics and integrity. An employee guidebook (“The Code”), which reflects our business principles, serves as a moral compass in providing guidance on the standards of behaviour expected of all PSA employees.

All PSA employees are required to understand and comply with The Code which is made readily available online and reinforced during internal training and dialogues.

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



ALONGSIDE



Partnership for the Goals

Extending sustainable development beyond the port

In line with UN SDG 17 “Partnership for the Goals”, we support the notion that a successful sustainable development agenda requires partnerships between governments, the private sector and civil society. These inclusive partnerships built upon principles and values, a shared vision, and shared goals that place people and the planet at the centre, are needed at the global, regional, national and local level.



Ministry of Sustainability
and the Environment
— SINGAPORE —

- National sustainability-related policies and plans guides PSA's corresponding policies and plans
- Support for MSE-supported programmes and initiatives, including Climate Action Week and RENEW programme.



- Support and guidance on PSA's sustainability and decarbonization progression as part of the maritime sector



- Support for “PSA SG in Bloom” Programme via online talks & workshops
- Funding via Skyrise Greenery Incentive Scheme
- Co-creation of Pasir Panjang Park
- PSA support for “Give to the Gardens” programme



- Resource and advisory support on water conservation initiatives
- PSA participation in Singapore World Water Day with water conservation campaign



- Mutual support for NEA's annual Clean & Green Week programme
- Supported various environmental training, e.g., lunch time talk on Dengue Prevention
- SFA supported staff education efforts via lunch time talk on Singapore Food Security



Partnership for the Goals

Industry collaboration on technology and standards

Decoupling business and economic growth from carbon emissions requires the development, adoption and localisation of green technology both within and outside of the port. PSA Singapore believes in taking an active role to collaborate with our stakeholders and industry partners to build and operationalise local green technology capacity and standards.



Support from the Low Carbon Economy Research (LCER) co-chaired by EMA & EDB (supported by NRF & NCCS) to drive hydrogen, carbon capture utilisation and storage R&D and industry adoption



Via NRF, MOU to collaborate with like-minded companies including Jurong Port, City Gas, Sembcorp Industries, SLNG, Chiyoda Corporation and Mitsubishi Corporation to develop a Singapore-based hydrogen economy



- Funding for Tuas Maintenance Base's Super Low Energy Building development via GBIC programme.
- Tuas Maintenance Base will be the first port-based, large scale super low energy building, with a 58% energy use reduction vs. a standard building.



Development of port-based smart grid and battery energy storage systems, as well as enabling of community trading of electricity.



- Pioneer adoption of LNG prime mover for land transportation use as part of overall decarbonisation plans of PSA Singapore.
- Development of technical, safety and operational standards including setting up of refuel kiosk.



Collaboration with NTU's Maritime Energy & Sustainable Development (MESD) Centre of Excellence on feasibility of ammonia bunkering operations, including SIMOPs applications.



Regional Developments

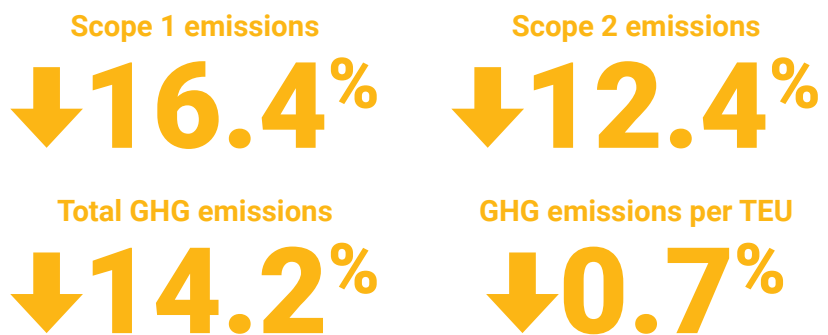
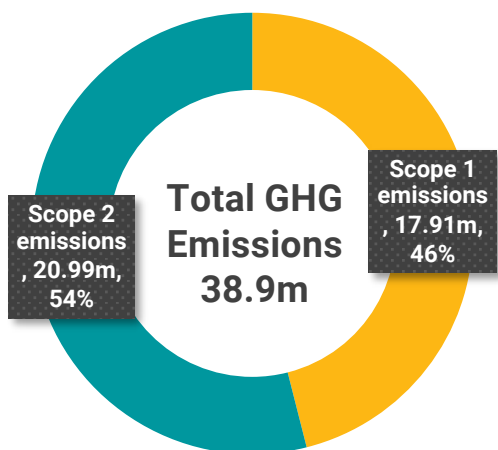
Project highlights from PSA's Southeast Asia Terminals

Alongside the implementation of a HSSE Management System, our Southeast Asia (SEA) terminals have been implementing various programmes and projects that contribute towards sustainability and environmental developments at the respective terminals.

Locations of PSA Southeast Asia terminals.



Comparison of 2019 vs 2020 data, SEA Terminals (Excluding Singapore)



Water withdrawal: 65.8m litres



Notes:

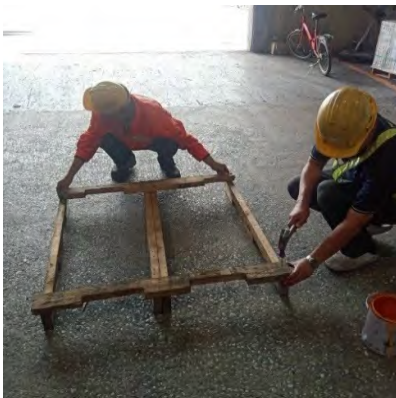
- 2020 data includes all SEA terminals, except Singapore
- Comparison vs. 2019 is based on LCMT, ESCO, SP-PSA and NPCT1. THCT is excluded as it is a new terminal commencing operations in 2020.



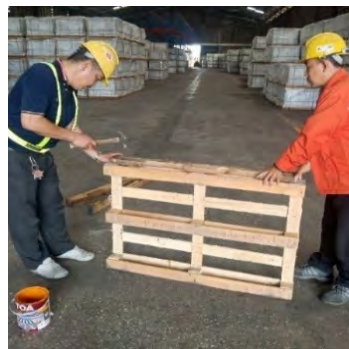
Regional Developments

Towards sustainability at SEA Terminals (selected projects)

Effective segregation of rubbish, recycling, reduction of plastic packaging are among the most important factors for the implementation of sustainable, ecological development. Various initiatives were implemented to promote greater adoption of the 3Rs of Reduce, Reuse and Recycle to minimise the amount of waste disposal.



UPCYCLING OF DUNNAGE WOOD (THCT)



Used dunnage wood in good condition are collected and made into usable pallets to support warehouse operations.



DONATION & RECYCLING DRIVE (ESCO)

The terminal mobilized port stakeholders and collected the following recyclable materials:

Glass (e.g. bottles)	Plastic (e.g. bottles)
546kg	261kg
Paper	Aluminium (e.g. cans)
729kg	26kg



RECYCLING OF E-WASTE (SP-PSA)

Recovery of more than **20 units** of computer monitors, CPUs and printers which are sent to recycling facilities. Diverting e-waste from disposal allows valuable materials like silver and aluminium to be recovered.



Regional Developments

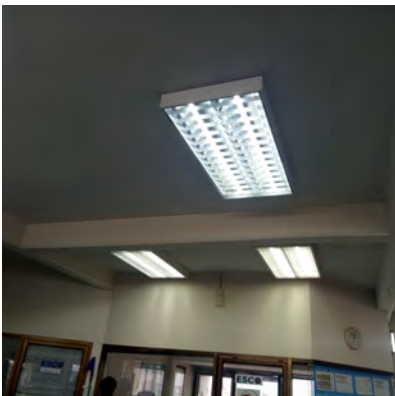
Towards sustainability at SEA Terminals (selected projects)

The decarbonisation of our port operations is a common sustainability theme adopted at all our Southeast Asia terminals. To this end, various green projects were adopted to bring about the reduction of Scope 1 and Scope 2 greenhouse gases (GHG) emissions.



ADOPTION OF BIODIESEL (NPCT1)

Biodiesel B30 is a mix of 30% biodiesel and 70% diesel. As a fuel, biodiesel provides more usable energy than the fossil energy needed for its production, which gives a net reduction of greenhouse gases (GHGs) and air pollutants. Biodiesel is nontoxic and biodegradable.



PORT-WIDE LED LIGHTING ADOPTION AT TERMINAL BUILDINGS (ESCO)

ESCO completed the installation of LED lighting at the terminal buildings, covering LKB Admin building, warehouse office, booth gate, workshop office and guardhouse buildings. A total of 480 conventional lighting tubes were replaced with LED lighting.



ADOPTION OF LED LIGHTING (NPCT1, SP-PSA)

Both terminals have also adopted LED lighting, replacing conventional lighting. LED Lighting provides more light (lumens) for the same power consumption, reducing GHG emissions.



Regional Developments

Towards sustainability at SEA Terminals (selected projects)

A key part of environmental sustainability is about the cultivating of a Green Port Culture, where people are educated on being green-minded and green-skilled. The scope of this extends to not just within the port premises, but to our local communities as well, in the form of outreach and CSR support programmes.



CSR FOR KIDS - DONATION OF SCHOOL UNIFORMS, COVID-19 ESSENTIALS (LCMT)



LCMT organized a donation drive focusing on the collection of COVID-19 essentials (food and hygiene supplies) and school uniforms for the benefit of local, needy children.



3R WORKSHOP ON REDUCE REUSE RECYCLE (THCT)

In Sep 2020, THCT organised a material management workshop for terminal staff, focusing on the 3Rs of reduce, reuse and recycle.



WASTE MANAGEMENT WORKSHOPS (ESCO)

ESCO organised various waste management workshops for staff. Coverage includes waste issues in Thailand, type of waste, waste separation as well as details of the local waste recycling bank project.



List of Key Abbreviations and Acronyms used in this report

AAQM	Ambient Air Quality Monitoring	MHA	Ministry of Home Affairs of Singapore
AGV	Automated Guided Vehicle	MOH	Ministry of Health of Singapore
AHU	Air Handling Unit	MOU	Memorandum of Understanding
APSN	APEC Port Services Network	MPA	Maritime and Port Authority of Singapore
BNA	Boundary Noise Assessment	MS	Management System
BUS	Business Under Surveillance	MT	Empty Containers
CALISTA	Cargo Logistics, Inventory Streamlining and Trade Aggregation	NCCS	National Climate Change Secretariat
CNB	Central Narcotics Bureau	NDP	National Day Parade
CO	Carbon Monoxide	NEA	National Environment Agency
CO2	Carbon Dioxide	NIST	National Institute of Standards and Technology
CO2e	Carbon Dioxide Equivalent	NO2	Nitrogen Dioxide
COVID-19	Corona Virus Disease 2019	Nparks	National Parks Board
CSI	Container Security Initiative	NRF	National Research Foundation Singapore
CSR	Corporate Social Responsibility	PFSO	Port Facility Security Officer
CTS	Cargo Targeting System	PM	Particulate Matter
EA-RTG	Electric Automated Rubber Tyre Gantry (Crane)	POU	Port Officers' Union
EDB	Economic Development Board	PPTB3	Pasir Panjang Terminal Building 3
EMA	Energy Market Authority	PSA SG	PSA Singapore
ESG	Environmental, Social, Governance	PUB	Public Utilities Board
FTZ	Free Trade Zone	RDI	Radiation Detection Initiative
GBIC	Green Buildings Innovation Cluster	RENEW	Recycling the Nation's Electronic Waste
GCF	Garden City Fund	RTG	Rubber Tyre Gantry (Crane)
GHG	Greenhouse Gas	SDG	Sustainable Development Goal
GRI	Global Reporting Initiative	SIMOPs	Simultaneous Operations
HR	Human Resource	SLEB	Super Low Energy Building
HSSE	Health, Safety, Security & Environment	SMM	Safe Management Measures
ICA	Immigration and Checkpoints Authority	SPF	Singapore Police Force
IGF	Inter Gateway Ferry	SPWU	Singapore Port Workers Union
IMO	International Maritime Organization	TACS	Terminal Access Control System
IPA	Infrastructure Protection Act	TEP	Towards Enduring Partnership
ISPS	International Ship and Port Facility Security	TEU	Twenty-foot Equivalent Unit
LNG	Liquefied Natural Gas	TOPSIS	Threat Oriented Passenger Screening Integrated System
LTI	Loss Time Injury	UN	United Nations
LTIF	Loss Time Injury Frequency	UYC	Understand Your Culture
MB	Maintenance Base		



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	102-4 Location of operations	
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GRI 306	306-3 Waste generated	Managing our materials consumption and waste generation: 28
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GRI 307	307-1 Non-compliance with environmental laws and regulations	No case of non-compliance; Compliance initiatives: 23 – 25, 69, 77
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