

An aerial photograph of the Port of Brisbane, showing industrial buildings, shipping cranes, and a large body of water. A dark blue semi-transparent rectangle is overlaid on the top half of the image, containing the title text.

PORT OF BRISBANE

Climate Change Disclosures

2021

Our Position On Climate Change

The Port of Brisbane is an important economic asset facilitating trade-related growth for Queensland and Australia. It is one of the country's largest and most diverse multi-cargo ports, providing critical export and import links to world markets.

As a coastal asset, our infrastructure, operations, and activities are susceptible to climate change impacts. We recognise that climate change has the potential to impact how we operate the Port of Brisbane in the short-term and into the future. As Port Manager, Port of Brisbane Pty Ltd (PBPL) and its related entities must ensure our climate-related risks are appropriately identified, managed, and mitigated.

We support the global action to mitigate climate change impacts and the transition to a lower-carbon future through our commitment to achieving net zero emissions (scope 1 and 2) by 2030. Our securityholders also support action to mitigate climate change impacts; Queensland Investment Corporation (QIC), IFM Investors, and Caisse de dépôt et placement du Québec (CDPO) all have net zero emissions targets.

This is our first year reporting aligning to the Financial Stability Board's recommendations on the Task Force on Climate-related Financial Disclosures (TCFD). The TCFD recommendations are a global framework that enables all sectors to assess the potential risks and opportunities from climate change and encourages transparent and consistent climate reporting.



OUR PROGRESS IN ALIGNING TO THE TCFD

The table below outlines our FY21 progress in aligning to the TCFD and our proposed FY22 actions.

TABLE 1: TCFD PROGRESS AND ACTIONS

TCFD theme	Our progress	FY22 actions
Governance	<p>Board oversees the management of climate-related risks (ongoing)</p> <p>Board reviews and endorses climate-related targets (ongoing)</p>	<p>Continue to engage with our Board regularly on climate change management and progress towards targets</p>
Strategy	<p>Climate change incorporated within PBPL's Sustainability Strategy</p> <p>Identified and assessed physical and transitional risks related to the Port of Brisbane</p> <p>Identified and assessed key risks to commodities traded through the port as a result of decarbonisation</p>	<p>Remain up-to-date with changes in climate science</p> <p>Continue to monitor localised changes in key climate parameters</p> <p>Incorporate findings from the climate change risk assessment into PBPL's Business Strategy</p> <p>Undertake economic scenario analysis to identify and assess additional potential transition impacts and opportunities</p>
Risk Management	<p>Identified climate risks and opportunities</p> <p>Risks managed through PBPL's Risk Management Framework</p> <p>Nonlinear Channel Optimisation Simulator (NCOS) Online climate change module developed to manage and identify ongoing physical climate change risks and impacts</p>	<p>Include climate change resilience framework in our Strategic Asset Management Plan</p> <p>Further embed climate change risks into the Operational Risk Registers and Strategic Risk Registers</p>
Metrics and Targets	<p>Commitment to emissions reduction target (net zero by 2030) for scope 1 and 2 emissions</p>	<p>To increase PBPL's understanding of Scope 3 emissions, including sources, data availability, and ability to influence emissions reductions</p>

Climate Governance

PBPL's Board has the highest level of oversight of our climate-related risks, strategies, and opportunities for our business. Our Board meets regularly and oversees the management of climate-related risks to PBPL and Port of Brisbane through:

- undertaking workshops to assess and discuss identified climate risks
 - this year, the Board undertook a climate change workshop with the Executive Leadership Team (ELT) to understand the identified climate risks and operational impacts, and to understand climate change resilience
- holding an annual Board Strategy Day which includes Board members, ELT members and key employees undertaking a robust review of specific areas of the business strategy
 - this year, the strategy day included a dedicated session on decarbonisation, which is now a key area of focus within the business strategy
- approving our Environment Policy and Sustainability Policy which recognise climate change risk
- approving and monitoring performance against our 2030 sustainability targets, including metrics relating to climate change
- considering climate-related risks when approving budgets and business plans.

Our Executive Leadership Team is responsible for:

- developing and implementing all business policies
- reviewing and approving climate change risks assessments, scenario analysis and ongoing monitoring
- managing and monitoring our progress against our 2030 sustainability targets (including targets relating to climate change)
- developing annual budgets and business plans that support actions to reduce climate-related risks
- engaging and educating our customers on climate-related risks.

Accountability for management of our climate-related risks sits with PBPL's Chief Executive Officer, Chief Development Officer, and Sustainability Lead. Each of these positions have key performance indicators (KPIs) that relate to the management of climate-related risks. Our Executive Leadership Team also has a responsibility to deliver on sustainability commitments.

Climate Strategy

Port of Brisbane operates under a 'landlord port' management model. As Port Manager, PBPL manages 123 customer leases and oversees the development and on-going management of a diverse range of land uses, including industrial, transport operations, marine infrastructure, retail/commercial, and environmental buffers.

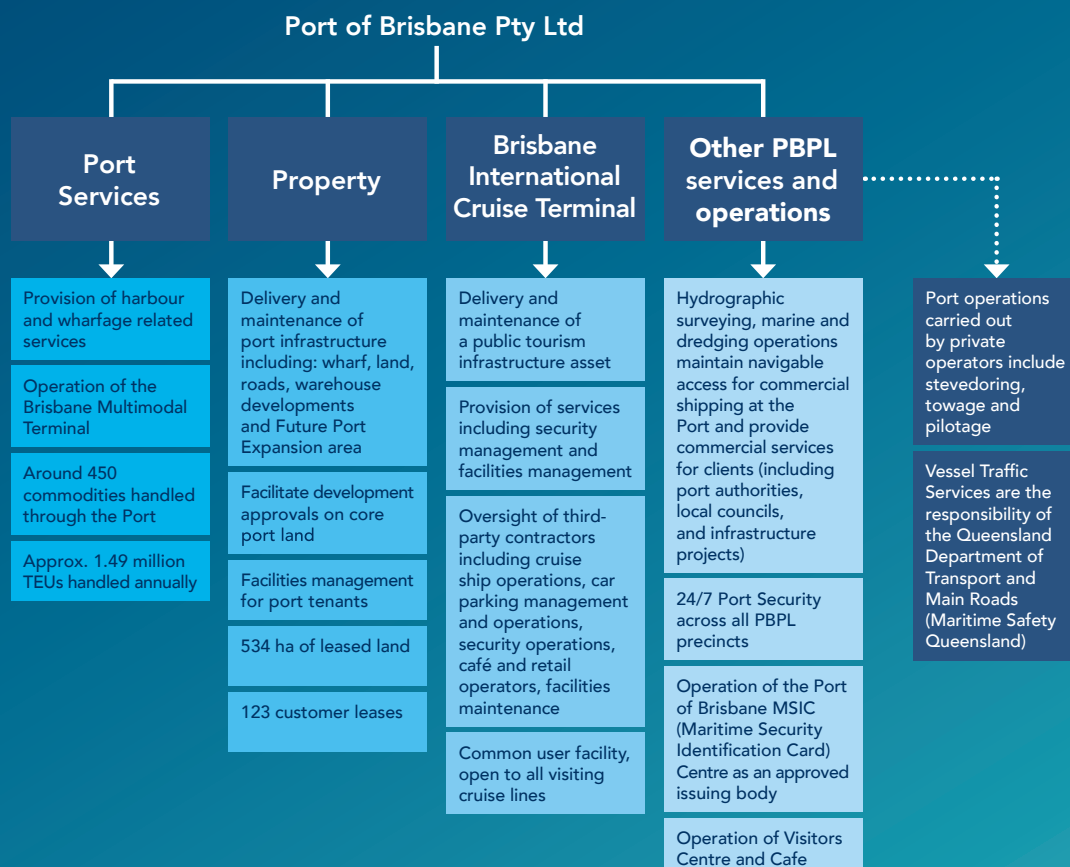
We are also responsible for delivering new, and maintaining the operational resilience of, port infrastructure which includes:

- maintaining safe, navigable access through the Port's 90km shipping channel, undertaken by our marine and dredging operations
- development of core port land through ongoing land reclamation process at our Future Port Expansion area and Port West industrial estate
- development and maintenance of port infrastructure (roads, wharves, buildings etc.)

Due to the diverse range of land uses and significant infrastructure under PBPL management, we must ensure climate-related risks are appropriately identified and managed.

Our whole-of-business Sustainability Strategy is aligned with the United Nations Sustainable Development Goals (UN SDG's) and we reference the Global Reporting Initiative (GRI) Framework. The strategy adds value to our business and the wider port community by inspiring decision-making and goal setting to deliver balanced financial, social, and environmental outcomes. The strategy has four long-term, strategic goals that are aligned to four key themes (People, Planet, Partnerships and Prosperity).

While we do not have a standalone climate change strategy, climate change is included within our Sustainability Strategy. The Sustainability Strategy outlines necessary annual actions required to minimise climate risk and increase adaptive capacity.



Scenario Analysis

The Intergovernmental Panel on Climate Change's (IPCC) fifth assessment report identified Representative Concentration Pathways (RCP) to model how the climate may change in the future based on the quantity of Greenhouse Gases (GHG) emitted. The RCPs capture the future trends and efforts to reduce emissions and predict how concentrations of GHG in the atmosphere will change in the future.

During FY20, we undertook a scenario analysis to identify physical and transition risks that may have both short and long-term impacts on our assets and operations. We took a holistic approach to understand the potential climate impacts, risks, opportunities and build resilience for our business activities and operations as well as our customers.

The impacts of climate change were considered within the local context using local modelling predictions.

Emission scenarios were used to assess both chronic (long-term shifts in climate patterns) and acute (event-driven) physical risks to the Port of Brisbane and to understand the transition (policy, economic, and regulatory changes) risks to PBPL and our customers.

For the physical risk assessment the emissions scenarios were applied to the local area and modelled at two different timescales (2050 and 2090) using our Non-linear Channel Optimisation Simulator (NCOS) climate change module.

The emission scenarios used for our assessments were:

- RCP 8.5 (high emissions scenario)
- RCP 4.5 (medium emissions scenario)
- RCP 2.6 (low emissions scenario).

Non-linear Channel Optimisation Simulator (NCOS)

NCOS Online is advanced, physics-based technology that uses all available vessel and environmental data to help optimise port and channel assets, boosting safety, efficiency, and capacity. PBPL developed NCOS Online with DHI Australia and was the first port to implement the technology in 2017.

Working with Seaport OPX, we developed a climate change module to identify potential acute and chronic physical climate-related risks and model the impacts on a local scale using the technology's hydrodynamic and wind model.

The NCOS climate change module simulates how rising sea levels, rainfall intensity, waves and wind would impact the Port of Brisbane at a local level under the emissions scenarios, allowing for a more targeted and efficient assessment and management of physical risk.

The NCOS climate change module has enabled the hydrodynamic changes to be simulated to identify potential impacts on Port infrastructure and operations.

Changing conditions such as increased temperature have not been included within the NCOS climate change module and have been based on the best available science relevant to the local climate.

The diagram below outlines the key assumptions for each scenario. It is important to note that physical risks were only identified under the RCP 8.5 scenario at a 1-in-100 year event and the Highest Astronomical Tide (HAT) at a 2090 timescale.

DIAGRAM 1: LOCAL SCENARIO SUMMARY – KEY ASSUMPTIONS



RCP 8.5 (2090) High emissions scenario

This scenario represents a 'business as usual' approach to emissions management with no changes made.

The emissions under this predicted future continue to increase with no international climate policy or support shown. There will be no behavioural or policy changes made to reduce emissions and no uptake of low-carbon solutions.

Physical parameters include:

3.9°C temperature increase

0.88m sea level rise

large increase in severe weather events



RCP 4.5 (2090) Medium emissions scenario

This scenario represents a slight effort to reduce emissions. Emissions continue to rise but less rapidly.

Reduction strategies and policies have been implemented but have not been implemented at a large scale.

Physical parameters include:

1.9°C temperature increase

0.48m sea level rise

moderate increase in severe weather events



RCP 2.6 (2090) Low emissions scenario

This scenario reflects significant effort to reduce emissions compared to RCP 8.5 and RCP 4.5).

Supportive national and international policies have been implemented and emissions levels are decreasing. Decarbonisation solutions have been implemented with market and policy support.

Physical parameters include:

1°C temperature increase

0.23m sea level rise

low increase in severe weather events



Potential Material Risks

An organisation's climate-related risks can be both physical or transitional and can manifest in both short and long-term timeframes.

Using the physical risks identified through the NCOS Climate Change module, we engaged an external consultant to identify potential transition risks to the Port of Brisbane. Their assessment did not identify any material or transition climate-related risks that pose a material threat to the achievement of our business or sustainability strategies. The risks identified are likely to emerge over the long-term and will be managed and mitigated against via our risk management and strategic planning processes.

PHYSICAL RISKS

As Port Manager, our exposure to physical climate change-related risks is reduced due to having responsibility for how the Port of Brisbane is managed and developed. In accordance with legislative requirements, we manage development at the Port of Brisbane via planning tools including the *Brisbane Port Land Use Plan 2020*, and an accompanying suite of Technical Standard and Infrastructure Plans.

The physical risks to Port of Brisbane infrastructure were only identified under the high emissions scenario modelling (RCP 8.5 scenario) when combined with a 1-in-100 year event and the Highest Astronomical Tide (HAT) at a 2090 timescale. These are identified in Table 2 opposite.




The RCP 2.6 (low emissions) and RCP 4.5 (medium emissions) scenarios did not identify any physical risks to Port of Brisbane infrastructure. This is predominately due to the historic planning and development (which included climate change projections) at the Port.

Transition risks – risks resulting from policy, market, legal, reputation, technology, and changes due to transitioning to a low carbon economy

Physical risks – risks resulting from extreme weather events (storms, floods, droughts etc.) or longer-term shifts in climate patterns (sea level rise, temperature rise etc.)



**TABLE 2: POTENTIAL PHYSICAL RISKS BASED ON THE RCP 8.5 SCENARIO ANALYSIS
(HIGH EMISSIONS, 1-IN-100 YEAR EVENT AT HAT AT A 2090 TIMESCALE)**

Climate risk	Potential impact	Mitigation response	Operations/assets disruption
 <p>Sea level rise</p>	<p>Certain wharves (wharves 1-5, coal grain and general-purpose berth) will have a short window of minor inundation or over-topping by waves (levels of up to 25cm on most wharves)</p> <p>Access roads will have short periods of inundation (<24 hours)</p> <p>Increased wave energy damages internal bunds within the Future Port Expansion (FPE) area which could results in sediment loss</p> <p>Loss of environmental assets (mangroves, seagrass, and shorebird habitat)</p> <p>Damage to utilities (electricity, water, sewerage)</p>	<p>An ability to increase infrastructure height of affected areas when asset life is concluded (wharves have a traditional asset life of approximately 50 years)</p> <p>Regular inspections of the FPE outer rock wall. Undertake maintenance repairs and raise the wall height where necessary</p> <p>Inspect, clean, and rectify wharf equipment post-event</p>	<p>Temporary port closures</p> <p>Damage to utilities (electricity, sewerage, water)</p>
 <p>Temperature increase</p>	<p>Port is subject to increased energy demand spikes causing transmission lines to become overloaded</p> <p>Increase in heat waves could result in potential safety compromises and/or lower productivity</p> <p>Heat stress damage to rail, road, and wharf infrastructure</p>	<p>Rail network designed to withstand temperatures up to 38 degrees. Above 38 degrees, max speed is reduced to 80km/hr. Rail network speeds reduced during periods of increased temperature (in line with Queensland Rail standards).</p> <p>Temperature range for Port of Brisbane roads is approximately 52 degrees under heavy loading</p> <p>Crane rails expand and contract at the same rate as the wharf concrete deck which are designed to 48 degrees</p>	<p>Reduced energy capacity – transmission lines become overloaded</p> <p>Lower productivity</p>
 <p>Severe weather events</p>	<p>Sedimentation and debris obstruction in shipping channel and swing basins from a flood (closure for up to 5 days depending on the size of the event)</p> <p>Shipping interruptions during the event (up to 48 – 60 hours)</p> <p>Damage to vessels and port infrastructure (bollards and fenders)</p> <p>Damage to buildings and infrastructure</p>	<p>Capability to survey under water infrastructure</p> <p>Dredge capability to remove debris and sediment from the shipping channel</p> <p>Support existing Maritime Safety Queensland procedures to order shipping offshore during severe weather events</p> <p>NCOS Online functionality for under keel clearance</p> <p>Structural elements within buildings are designed for wind speeds up to than 57m/s (200km/hr) in accordance with AS1170.</p>	<p>Increased port closures</p> <p>Increased dredging requirements</p>



TRANSITION RISKS

The Port of Brisbane is a key logistics hub for South East Queensland, serving as a gateway for the export and import of goods. A diverse range of commodities are handled through the Port and as such, it is exposed to potential transition risks from climate change. The transition risks identified below represent minimal exposure to the Port's day-to-day operations. However, as climate-related impacts occur across the broader industry, the Port may be exposed to risks associated with our customers (tenant rental risk) and/or cargo volume risks. We will continue to engage with our customers/

tenants and the broader industry to reduce this exposure and minimise risks to our operations.

The risk assessment identified the potential transitional risks to PBPL's top 10 import and export commodities under the IPCC RCP 4.5 (medium emissions scenario) and 8.5 (high emissions scenario) analysis.

Transition risks that have the potential to impact the Port of Brisbane's business performance are identified below.

**TABLE 3: POTENTIAL TRANSITION RISKS BASED ON THE MEDIUM AND HIGH EMISSIONS
(RCP 4.5 AND RCP 8.5) SCENARIO ANALYSIS**

Transition risk	Potential impact	Mitigation response
 Market	<p>Port of Brisbane is linked to carbon intensive sectors (such as mining, transportation, shipping etc.) and trades a small number of commodities linked to fossil fuels, which will be at risk from the decarbonisation transition</p>	<p>Our Sustainability Strategy considers decarbonisation risks and the imperative to manage these appropriately</p>
 Reputational	<p>Potential for increased stakeholder scrutiny and/or activism linked to the trade of carbon intensive commodities through the port</p> <p>Impact competitive advantage due to inability to attract customers as a result of negative stakeholder perceptions</p> <p>Increased difficulty to obtain environmental permits and approvals</p>	<p>We will continue to engage closely with customers and stakeholders to understand potential concerns and to respond to these appropriately</p>
 Financial	<p>Revenue loss due to decarbonisation and transition away from carbon intensive commodities</p> <p>Revenue loss on agricultural commodities due to physical risks (i.e. temperature risk and drought)</p> <p>Difficulty to attract investment due to ties with carbon intensive commodities and industries</p>	<p>We will continue to focus on identifying new commodities and revenue streams and working with customers to identify low carbon commodities</p> <p>Continue to demonstrate our commitment to sustainability and be considered a responsible investment by our securityholders and a responsible business by our customers, government and community</p>
 Technology	<p>Significant technological and innovative solutions required</p> <p>Increased energy costs</p> <p>Regulatory/investor pressure to reduce emissions</p> <p>Energy security risks</p>	<p>Ongoing monitoring of developments associated with global energy transition and the risks and opportunities it presents to PBPL</p> <p>Our Energy Transition Plan provides a roadmap to transition to zero emission energy technologies across our operations, which includes partnering with customers to identify alternative fuel and energy solutions</p>
 Policy and legal	<p>Uncertainty regarding energy and climate policies</p> <p>Increased regulatory pressure</p>	<p>Continue to demonstrate our commitment to sustainability and be considered a responsible investment by our securityholders and a responsible business by our customers, government and community</p>

We have identified the need to undertake further scenario assessments on the transition risks to the Port of Brisbane. This work will be incorporated into our 2022 Climate Change Disclosures report.

How Are We Responding?

We believe that every sector has a role to play in the transition to a zero emissions future. PBPL seeks to play a leading role in energy transition for Australia's ports and logistics sector through the implementation of low carbon technologies across our business. We will also seek to support our customers' transition to low carbon technologies within their operations, where practical.

It is important for us to consider the identified risks to both our operations and our customers' operations.

The information identified from the physical risk assessments paired with our internal expertise will inform future decision making regarding the development of port infrastructure. The commodities that will most likely be impacted by climate changes have been identified within the transition risk assessment. This will allow us to develop decarbonisation strategies that may also benefit the broader Port of Brisbane community.

Whilst decarbonisation presents a risk to our business it also presents opportunities. Decarbonisation potentially provides for new revenue streams through trading new commodities that support the transition to renewable energy and the global transition to decarbonise (e.g. hydrogen and wind turbines).

Decarbonisation can also reduce costs and increase operational efficiency through implementing renewable energy solutions (e.g. electric vehicles powered by solar or implementing technological innovations/advancements).

Decarbonisation has implications beyond the Port's commodity base, and we recognise that energy provision and transport supply chain logistics may also be disrupted in the future as a result of the decarbonisation transition.

We are currently working with our customers, industry partners and government to identify alternative fuel solutions for transport and marine operations, such as biofuels. This involves partnering with customers to undertake trials which will also help provide industry with more knowledge and an understanding of technological advancements to use within their future planning.

Decarbonisation refers to the global shift to reduce the amount of GHG emitted into the atmosphere through investing in low or zero emission technology.



Risk Management

Our approach to managing risk is outlined within our Risk Management Framework which includes our Risk Management Policy, Risk Appetite Statement and Risk Management Standard. These documents support a structured and focused approach to the process of identifying, assessing, mitigating, and managing residual risks. Climate change is an area of focus within our Environment Policy, which is underpinned by the Environmental Management System (accredited to ISO14001).

Climate change is acknowledged under our Strategic Risk Register and our standalone Climate Change Risk Register. Climate change is identified, assessed, and managed through our corporate risk framework.

Our comprehensive Climate Change Risk Register has identified all climate-related risks, outlines

management actions and is reviewed annually and as new science becomes available. Our Strategic Risk Register is reviewed quarterly by our Executive Leadership Team and is approved through the Audit and Risk Committee.

The Board and Executive Leadership Team encourage regular consideration of emerging climate-related risks and seek external expertise when required. The ongoing climate change physical risk assessment and management process is predominantly conducted through PBPL's Non-linear Channel Optimisation Simulator (NCOS). Transition risks will be continually monitored and supplemented by other climate scenario and risk modelling to identify any changes within the energy transition or emerging markets that could both impact or present opportunities to the business.

DIAGRAM 2: PBPL'S CLIMATE RISK MANAGEMENT APPROACH



Metrics and Targets

Sustainability is a key indicator of our business' long-term success.

Our Sustainability Strategy is structured under four pillars – People, Prosperity, Planet and Partnerships – each with a 2030 target.

Each 'P' comprises key focus areas with annual targets to ensure we achieve our long-term sustainability goals.

Progress towards those targets relevant to climate change are shown below.

Focus Area	FY30 Focus Area Target	FY21 Progress		
Energy Efficiency	Net zero emissions (scope 1 and 2)	6,680 tCO ₂ e	3,483 tCO ₂ e	
		scope 1 emissions	scope 2 emissions	
		94,620 L	134 L	5,576 GJ
		total diesel consumption	total unleaded fuel consumption	renewable energy generated
Climate Change	Minimise our climate risk and increase our adaptive capacity	Climate risk assessments completed	First TCFD report published	
Supply chain enablement	Landside: Increase rail modal share	1.7% containers moved by rail	29,308,764 tonnes	
	Waterside: Advance channel preparations for 14,000 TEU vessels		overall trade (import and export)	
Customer partnerships	90% customer satisfaction rating from annual pulse survey	74.4% customer satisfaction		





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