

Greenport Framework



PORT
AUTHORITY
OF TONGA

It is with great pleasure that we present the Port Authority of Tonga's 'GreenPORT Framework' which will drive our environmental performance - now and into the future.

This 'GreenPORT Framework' outlines our strong commitment to protecting and enhancing critical environmental values in and around our port precinct, while delivering economic prosperity for the Kingdom of Tonga through trade, tourism and domestic industries.

The Framework is founded upon the determined commitment of our Board and Executive Team to advance responsibility and stewardship of our natural environment. It is consistent with the 'Pacific Ports Vision 2030-2050 Recognition Framework' as we aspire to be cleaner, greener and more resilient to increasing climatic impacts.

We want to drive change in Tonga and lead by example.

Our various Port precincts in Nuku'alofa are not only critical for our domestic connections to outer islands throughout our Kingdom – they also connect Tonga to the world, so strong environmental management is vitally important to ensure our ability to operate and grow into the future.

At the Port Authority of Tonga, we believe that environmental protection is not just about regulatory compliance – so our 'GreenPORT Framework' will cover six strategic themes including: Governance, Pollution & Waste Management, Emission Reduction & Decarbonisation, Climate Adaptation & Resilience, Biodiversity Management and Disaster Preparedness.

As a Pacific Nation, we understand climate change - we live it every day. So our focus on addressing climate change through emission reduction and decarbonisation endeavours will be strong.

Our Framework sets out our ambitious emission reduction targets which we will strive to achieve over the life of this Framework – and beyond.

We also appreciate that we operate adjacent to multiple public areas along the Nuku'alofa foreshore with neighbouring residential activities – and we commit to actions under this Framework to reducing impacts from operations on these areas.

With the recently completed upgrade to the Queen Sālote International Wharf precinct, our organisation is ready to take Tonga trade to a new level – and stronger environmental focus is part of that forward pathway.

Finally, can I thank our stakeholders involved in the development of this Framework. Success of the Framework will only be achieved through collaboration with our port users, surrounding community and Government entities.

We look forward to working collectively to ensure our beautiful Pacific environment is protected, enhanced and well managed in coming years.

Malo 'Aupito.

'Alo-ki-hakau Maileseni
Chief Executive Officer

Contents

Overview	4
Development of the Framework	4
Consistency with Domestic, Regional and International Environmental Frameworks	5
Domestic	6
Regional	7
International	8
PART ONE: Scene Setting	10
Overview of Port Authority of Tonga Operations & Governance	10
Environmental Settings and Values	14
Port Activities	15
Environmental Achievements to Date	16
PART TWO: The GreenPORT Framework	21
Overview	21
Our Key Themes & Focus Areas	22
Scope of Framework	23
Consultation with Stakeholders	23

Governance	25
Policies & Codes	26
Environmental Management System	26
GreenPORT Stakeholders Group	27
Human & Capital Resources	28
Industry Collaboration, Outreach & Partnerships	28
Pollution & Waste Management	30
Water Quality	31
Air Quality	31
Construction & Demolition Waste (including scrap metal)	32
Noise & Lighting	32
Liquid Waste	33
Abandoned (unseaworthy) vessels	34
Emission Reduction & Decarbonisation	36
Emission Profiling & Baseline	37
Energy Transition / Carbon Reduction	38
Infrastructure Decarbonisation	39

Climate Adaptation & Resilience	41
Climate Risk & Vulnerability Assessment	42
Resilient Infrastructure Design	42
Operational Resilience & Business Continuity	43
Capacity Building & Climate Literacy	43
Biodiversity Management	45
Biodiversity Baseline & Monitoring	46
Protecting & Enhancing Sensitive Habitats	46
Disaster Preparedness	48
Risk Identification	49
Disaster Planning & Emergency Response	50
Stakeholder Coordination & Partnerships	50
Forward Actions	52
Operationalising the Framework	53
Tracking Progress	53
Sprint Projects	54

Overview

This GreenPort Framework has been structured in two parts:

'Scene Setting'

- Overview of Port of Authority of Tonga operations
- Environmental Settings and Values
- Port Activities
- Environmental Achievements to Date

'The GreenPort Framework'

- Framework Development & Overview
- Key Framework Themes & Focus Areas
- Scope of Framework
- Consultation Activities
- Forward Actions / Review of Framework / 'Sprint Projects'

Development of the Framework

This GreenPort Framework has been developed by the Port Authority of Tonga in partnership with Australia's National Transport Research Organisation (NTR0).

Strong collaboration has been central in this work and the Port Authority of Tonga thanks all stakeholders for their contributions, feedback and their willingness to share ideas and develop forward action plans together.



Consistency with Domestic, Regional and International Environmental Frameworks

This GreenPort Framework has been developed consistent with a number of domestic, regional and international environmental management and sustainability frameworks and policies.

These frameworks provide guidance for policy, operations, environmental monitoring, and implementation of climate resilience measures for a Pacific island port authority such as PAT.

Domestic

‘Ocean Management Act 2025’

Our new Ocean Management Act 2025 establishes a national framework for the integrated management of Tonga’s ocean territory (around 700,000 km²).

It enables marine spatial planning and zoning to balance environmental protection with sustainable economic use, strengthens environmental oversight and permitting for ocean activities, recognises customary and community stewardship of marine areas, and establishes funding mechanisms to support implementation. The legislation aims to safeguard marine biodiversity while supporting long-term, sustainable development of Tonga’s ocean resources.

The Act provides for a ‘National Ocean Policy’ and a legally binding ‘Marine Spatial Plan’. Together these planning instruments will set zoning across Tonga’s ocean, including fully protected marine reserves and general-use areas, and guide all sector decisions (eg. fisheries, mining, tourism, energy, shipping).

PAT looks forward to contributing to the development of the planning framework particularly in and around port zones and operational shipping channels.

‘National Biodiversity Strategy Action Plan to 2030’

The National Biodiversity Strategy and Action Plan (NBSAP) to 2030 is Tonga’s national policy framework for protecting, conserving and sustainably managing the country’s biodiversity. It implements Tonga’s commitments under the Convention on Biological Diversity (CBD) and aligns national environmental policy with global biodiversity targets and the United Nations Sustainable Development Goals.

The strategy recognises Tonga’s unique ecosystems including forests, coral reefs, marine habitats and endemic species, and addresses key threats such as habitat loss, invasive species, over-exploitation of resources and climate change.

‘Tonga Low Emission Development Strategy (LEDS) 2021–2050’

The Tonga Low Emission Development Strategy (LEDS) 2021–2050 is the Government long-term strategy for transitioning to a low-carbon and climate-resilient economy, submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2021 as part of Tonga’s commitments under the Paris Agreement.

The strategy provides a long-term pathway to 2050 that aligns national development, climate action and sectoral policies with global efforts to limit climate change while strengthening Tonga’s resilience and self-reliance.

Joint National Action Plan on Climate Change and Disaster Risk Management (JNAP)

The Joint National Action Plan on Climate Change and Disaster Risk Management (JNAP) is Tonga’s national strategy to integrate climate change adaptation and disaster risk management into a single coordinated framework. As Tonga is highly vulnerable to tropical cyclones, sea-level rise, coastal flooding, and earthquakes, the plan aims to strengthen national resilience by aligning government agencies, communities, and development partners around common priorities. The JNAP focuses on improving risk assessment and early warning systems, strengthening resilient infrastructure and coastal protection, safeguarding water and food security, protecting ecosystems, and enhancing community preparedness and response capacity.

Regional

‘Pacific Ports Vision 2030-2050’ Recognition Framework

The Pacific Ports Vision 2030-2050 Recognition Framework is a regional long-term sustainability and performance framework developed under the leadership of the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environment Programme (SPREP), with support from partners like the International Maritime Organization (IMO).

It provides a structured recognition and performance system to guide Pacific Islands ports toward achieving the Vision’s long-term objectives for sustainability, resilience, and environmental stewardship through to 2050.

Core Themes

- **Resilient Ports:** Ports are encouraged to adapt infrastructure and operations to climate change, natural disasters, and emergencies; strengthen operational continuity; and improve compliance with international standards and cybersecurity readiness.
- **Green Ports:** Ports are encouraged to work to minimise carbon emissions, improve energy efficiency, incentivise green shipping, and embed climate mitigation actions into planning and investments.
- **Clean Ports:** Ports are encouraged to reduce environmental impacts on marine and local ecosystems, strengthen waste and spill management, protect water quality, and foster community engagement and environmental compliance.

PAT is a party to this framework. We have ensured our GreenPORT framework is consistent with the objectives of this important regional policy instrument.

‘Pacific Quality Infrastructure Principles’

The Pacific Quality Infrastructure (PQI) Principles are a set of regionally-endorsed guidelines aimed at lifting the quality, resilience and long-term value of infrastructure in Pacific Island countries, in alignment with Pacific-identified priorities and the 2050 Strategy for the Blue Pacific Continent.

They provide a shared framework to guide infrastructure planning, financing, delivery and governance across the region and include a very clear objective in terms of encouraging climate resilience infrastructure.

‘2050 Strategy for the Blue Pacific Continent’

The 2050 Strategy for the Blue Pacific Continent is a regionally-owned, long-term strategic blueprint adopted by Pacific Islands Forum Leaders that sets a collective vision, priorities and actions for Pacific Island countries and territories through to 2050. It reflects the shared identity of the Pacific as the Blue Pacific Continent - acknowledging the ocean’s central role in culture, livelihood, governance and future prosperity.

The central theme is that the Pacific be conceptualised as a ‘Blue Pacific Continent’ - a vast ocean linked region whose collective resources, cultures and futures are interconnected. The Strategy organises action around seven interconnected thematic areas that encompass social, economic, environmental and technological priorities.





International

United Nations Sustainable Development Goals (SDGs)

Our GreenPORT Framework is underpinned by the United Nations Sustainable Development Goals (SDGs).

The Kingdom of Tonga understands the 17 SDGs are a call to action by all countries to promote prosperity while protecting the planet. They provide a common platform where all can contribute to solving the world's biggest sustainable development challenges.

It is clear that impacts of climate change are being felt across the planet and urgent action is required across all levels of society to enable the change required to create stronger, healthier and more sustainable global development. To advance the goals, we must therefore prioritise environmental protection and social inclusion whilst building a healthy economy.

PAT is determined to positively contribute towards a number of relevant SDGs.

After careful review, PAT has determined that our GreenPORT Framework will advance actions - consistent with the aspirations of the following SDGs:



Consistent with 'World Bank (2025) Port Reform Toolkit Module 8 - Environmental Sustainability' we see a clear relationship between the following environmental issues and SDGs:

Environmental priorities	3	6	7	9	12	13	14	15	17
Air quality	✓			✓		✓			✓
Climate change			✓	✓	✓	✓			✓
Water quality	✓	✓		✓			✓		✓
Waste	✓	✓		✓	✓	✓	✓	✓	✓
Light pollution	✓			✓					✓
Noise pollution	✓			✓					✓
Land use				✓	✓				✓
Biodiversity		✓					✓	✓	✓

We have ensured these environmental issues are included within our Framework as 'focus areas'.

We have also highlighted the relevant SDGs for each key (strategic) theme of our Framework.



Paris Agreement

The Paris Agreement was ratified by Tonga in 2016. Tonga participates through its Nationally Determined Contributions (NDCs) national climate action plans submitted to the United Nations Framework Convention on Climate Change.

Tonga's position emphasises that climate change is an existential threat to small island states, and it advocates for ambitious global action to limit warming to 1.5 °C above pre-industrial levels. Despite contributing only a negligible share of global greenhouse gas emissions, Tonga has committed to domestic mitigation and resilience actions, including transitioning to 70% renewable electricity by 2030, improving energy efficiency, expanding marine protection, and strengthening climate adaptation measures.

MARPOL Convention

The International Convention for the Prevention of Pollution from Ships is highly relevant to Tonga because it establishes international rules to prevent marine pollution from ships, including oil spills, sewage discharge, garbage, and air emissions.

As an island nation with a large ocean territory and strong reliance on shipping for trade and connectivity, Tonga applies MARPOL standards to regulate vessels operating in its waters and calling at its ports. Implementation of the convention helps protect Tonga's marine ecosystems, fisheries, tourism assets, and coastal communities from pollution risks associated with maritime transport.

It also guides port management practices such as waste reception facilities and pollution control procedures supporting environmentally responsible operations at the Port of Nuku'alofa and ensuring alignment with international maritime environmental standards.

World Bank Port Reform Toolkit – Module 8 'Environmental Sustainability'

The World Bank Group's Port Reform ToolKit 3rd Edition (Module 8) is highly relevant to the development of our GreenPORT Framework.

It has been reviewed as part of our Framework development with the aim of ensuring consistency with preferred 'motivations and objectives' of the ToolKit.

Our Framework has also been developed consistent with the recommended 'Roadmap for Implementing an Environmental Strategy' outlined in the ToolKit.

01 Scene Setting

Overview of Port Authority of Tonga Operations & Governance

The Port Authority of Tonga (PAT) is the statutory body and public enterprise responsible for managing, operating and developing Tonga's port infrastructure and services, particularly at the Kingdom's main international gateway in the city of Nuku'alofa.

The international and domestic port facilities in Nuku'alofa connect the main island of Tonga'tapu with outer islands throughout the Kingdom – and world markets.

The port is a key component of Tonga's economic infrastructure, providing a major gateway for transport and the distribution of imports and exports.

With more than 98 per cent of imports arriving by sea, Tonga is reliant on this service for shipping for food and other imports. As the key port, it is critical for access to international markets with the port providing vital connectivity both domestically in Tonga and internationally.

The primary function of the port is to ensure commercially viable, efficient, secure and safe for shipping and cargo exchange operations.

As a public enterprise established under the Ports Authority Act, PAT operates under that legal framework to manage Tonga's ports and associated assets.



PAT Core Responsibilities & Powers

PAT has a range of specific core responsibilities, including:

- Managing and maintaining ports and their facilities to ensure they are adequate, efficient and secure.
- Providing goods and services necessary to support port activities.
- Regulating navigation and maintaining navigational aids within port areas.
- Marketing and promoting port use and development.
- Co-ordinating all operations within ports to streamline activities and services.

To carry out its functions, PAT is granted broad legal powers to act in ways that further the objectives of the Act, including:

- Operating and managing ports as commercial undertakings, including setting and adjusting port charges and fees.
- Appointing and employing staff needed to perform its duties.
- Entering contracts and agreements as necessary for port development and operations.

PAT Vision & Mission

PAT has a range of specific core responsibilities, including:

- Managing and maintaining ports and their facilities to ensure they are adequate, efficient and secure.
- Providing goods and services necessary to support port activities.
- Regulating navigation and maintaining navigational aids within port areas.
- Marketing and promoting port use and development.
- Co-ordinating all operations within ports to streamline activities and services.

To carry out its functions, PAT is granted broad legal powers to act in ways that further the objectives of the Act, including:

- Operating and managing ports as commercial undertakings, including setting and adjusting port charges and fees.
- Appointing and employing staff needed to perform its duties.
- Entering contracts and agreements as necessary for port development and operations.

PAT Governance & Structure

As a Tongan Government 'Public Enterprise', PAT is overseen by a Board of Directors appointed by the Hon. Minister of Public Enterprises, with a Chief Executive Officer heading day-to-day operations.

Robust governance structures ensure accountability to the Government of Tonga and compliance with statutory requirements.

Our Port's Contribution to the Kingdom of Tonga

We are a maritime nation bound by the amazing Pacific Ocean – our home.

Our Port in Nuku'alofa is critical for our everyday lives and our connection to world markets.

Our Port is critical for the continued development of our nation.

Our work at PAT in maintaining and upgrading port facilities (such as the recent modernisation of the Queen Sālote International Wharf in Nuku'alofa) is critical for the Tongan economy and our way of life.

Using the Pacific Quality Infrastructure Principles to help ensure our projects are resilient to future impacts of climate change and natural disasters, the Port is now serviced by modern wharf and cargo handling areas, allowing sustainable operations and trade growth.



...more than 27,000 teu's per annum



...more than 430k revenue tonnes per annum (85% dry cargo, 15% liquid cargo)



...more than 220 ship calls per annum



... upgraded wharves and container terminal can now handle over 45,000teu / pa



...2 primary international port wharves + multiple domestic wharves and barge ramps



...multiple port tenants and stevedoring operations



...more than 80 PAT staff



...connecting with 6-10 direct international hubs within the Pacific region – and then onwards to world markets across Australia, Asia and North America



...extensive land & ocean area within PAT Port Limits

The Port also serves as a critical link to the rest of the world in times of significant natural disasters.

Case Study – Port's critical role in natural disaster recovery

Our Port played a critical logistical and strategic role in the aftermath of the Hunga Tonga - Hunga Haʻapai volcanic eruption (and subsequent tsunami) in January 2022 – particularly in terms of how the recovery and response unfolded.

Tonga's economy and connectivity rely heavily on maritime transport – with seaports acting as essential lifelines for delivering food, fuel, building materials, equipment and humanitarian assistance across the nation. After the eruption and tsunami, re-establishing functional Port facilities became a priority for the government and aid partners to support recovery efforts.

With much of international communication cut (the single undersea fibre-optic cable was severed), our Port in Nuku'alofa became critical to enable the handling (receiving) of aid and supplies while communications were restored and the Fuaʻamotu Airport runway was repaired.

The Port became an indispensable portal for transporting aid and supporting recovery. As a result, ensuring increased infrastructure resilience in the aftermath of the disaster has been a central focus of the Government – highlighted by the significant investment in improving Queen Sālote International Port including climate-resilient upgrades such as seawalls, lighting and drainage – to better withstand future extreme events, including tsunamis and storms.

Ensuring these maritime facilities are strengthened against future events remains a key part of Tonga's ongoing recovery and climate resilience strategy.



Environmental Settings and Values

In today's world, organisations across all sectors increasingly recognise the importance of demonstrating strong environmental performance. As global awareness of environmental challenges grows, businesses are expected to actively manage and reduce the environmental impacts of their activities.

PAT adopts a proactive approach to environmental management to not only ensure compliance with legal requirements but to also contribute to sustainability, enhanced public trust, and strength our organisational reputation.

Tonga's natural environmental values are tightly tied to our Pacific Ocean context, volcanic origins, and strong cultural connections to land and sea.

The ocean is central to our way of life, playing host to:

- **Coral reefs:** Fringing and barrier reefs which protect coastlines, support fisheries, and host high marine biodiversity.
- **Seagrass meadows & mangroves:** Important nursery habitats for fish, carbon storage, and coastal protection.
- **Marine Species:** Tonga has a wide variety of marine fauna with warm tropical waters and healthy coral reef systems. Common species include particular types of reef fish including parrotfish, butterflyfish, surgeonfish, groupers, and snappers, which are important for both food and reef health. Larger ocean species like tuna and mahi-mahi are also common and support local fishing. Tonga is well known as a breeding and calving ground for humpback whales, which migrate to its waters each year, along with several species of dolphins. Sharks, rays, and sea turtles such as green and hawksbill turtles are also found around our reefs and lagoons.

These marine animals play an important role in our country's ecosystem, culture, and economy.

Collectively, these systems support food security, tourism, and traditional fishing practices – highlighting the importance of strong environmental protection and management in and around the Port precinct.

Port Activities

The following activities typically occur at the Port of Nuku'alofa either by PAT or third parties:

Activity	PAT	Third Party / Port Tenants
Berthing	✓	✓
Vessel Loading/Unloading	✓	✓
Asset Maintenance	✓	
Dangerous Goods Management	✓	✓
Warehousing	✓	✓
Storage of bulk goods	✓	✓
Inter-Modal Transport movements (road, rail, pipeline, conveyor)	✓	✓
Waste Disposal	✓	✓
Stevedoring		✓
Fishing Vessel loading/unloading		✓
Food processing (fisheries)		✓
Boat repairs and maritime services		✓
Bunkering		✓
Pilotage and Towage	✓	

It is important that our GreenPORT Framework includes measures and focus areas that address each of these typical activities – and promotes enhanced environmental performance in forward years.

Environmental Achievements to Date

PAT has been focussed on sound environmental practice to date with various achievements evident across port operations and governance including:




ISO 14001 accreditation

PAT has recently **gained accreditation** against the internationally recognised ISO 14001, the global standard for environmental management systems (EMS).

ISO 14001 outlines a structured approach to identify, manage, monitor and continuously improve environmental performance. It focuses on:

- identifying environmental risks and impacts
- ensuring compliance with environmental regulations
- reducing pollution and waste
- improving energy and resource efficiency
- continuous improvement through audits and management review

The development of our GreenPORT Framework supports the implementation of the ISO14001 standard at the Port across a number of areas – and will help drive continuous improvement in environmental performance.




Solar Panel Installation – Domestic Wharf Building

The solar installation at the Port (located on the roof of the domestic ferry terminal building) is a relatively small but innovative renewable-energy project designed to support clean port operations and vessel electrification, particularly at the domestic ferry terminal in Nukuʻalofa.

The photovoltaic (PV) array generates electricity that contributes to the power of the shore-power system, which allows ferries to switch off their diesel engines while berthed.

Although relatively modest in scale, the solar installation delivers several important sustainability outcomes:

- **Reduces port-area emissions:** switching ferries from diesel generators to solar-supported shore power significantly cuts carbon emissions, noise and local air pollution while vessels are berthed.
- **Demonstrates renewable energy leadership in Pacific ports:** for small island ports, even modest solar installations can reduce reliance on imported diesel fuel and demonstrate green port practices.
- **Supports maritime decarbonisation initiatives:** the project aligns with global initiatives reduce emissions from port operations.
- **Improves operational resilience:** on-site renewable energy reduces vulnerability to fuel supply disruptions and supports more reliable port operations.




Shore Power Capability (Domestic Wharves)

PAT has introduced shore-power connections at the domestic ferry terminal so vessels can plug into electricity rather than run auxiliary diesel engines while berthed in Nukuʻalofa.

The system is powered partly by solar energy installed on the terminal building, helping reduce carbon emissions and improve air quality at the port.

The benefits of the project include:

- **Reduce carbon emissions:** reduced carbon footprint of local ferries while they are berthed at the port
- **Promotion of sustainable practices:** supports the global shift towards greener and more resilient port operations
- **Alignment with regional vision:** Supports the commitments outlined in the ‘Pacific Ports Vision 2030-250 Recognition Framework’
- **Contributes to Maritime Decarbonization and Green Corridor Shipping:** Supports PAT’s role in the global Maritime Decarbonization campaign and the establishment of Green Shipping Corridors (domestic connections)



Climate-resilient port infrastructure

One of PAT’s most significant achievements has been the redevelopment of the Queen Sālote International Wharf to improve operational capability, and resilience to climate change, extreme weather and natural disasters.

This significant redevelopment project incorporated various environmental / climate resilience features such as:

1. **construction of a seawall and strengthened coastal protection including innovative recycled rock protection bags** to address erosion, scour, sea-level rise and storm surges
2. **raised surface levels and improved drainage** to reduce flooding risks

These improvements will assist with both environmental protection and operational continuity during (and following) major weather events such as cyclones, heavy rainfall and potential natural disasters.



Major waste reduction and recycling during port redevelopment

The Queen Sālote International Wharf upgrade project delivered strong **'circular-economy' outcomes:**

- approx. 85% of construction waste diverted from landfill
- approx. 126 tonnes of steel was recycled
- approx. 11 tonnes of waste oil was recycled
- approx. 2,160 tonnes of demolished concrete was reused for erosion-protection rock bags – providing increased climate resilience along the eastern side of the port

In addition, it is estimated that more than 100 tonnes of debris and scrap metal were removed from the port area and recycled, reducing contamination and improving the marine environment.



Green port operational initiatives

PAT has implemented practical operational environmental measures such as purchasing **low-emission environmental sweepers** to maintain cleaner port surfaces and reduce dust and pollutants.

Although diesel-powered, the new sweeper is fully compliant with the latest Euro 6 (European) and Tier 4 (U.S.) emission standards. These standards are designed to minimize harmful nitrogen oxides (NO_x), particulate matter (PM), and other emissions, while also meeting legislative requirements for gaseous and noise emissions.

This has made the sweeper environmentally safe and consistent with PAT's sustainability goals.

The Queen Sālote International Wharf redevelopment project has incorporated various environmental / climate resilience features including: **energy-efficient electrical systems** and LED lighting across the new terminal area and **rainwater harvesting systems** and upgraded water management.



Green port operational initiatives

PAT has installed 3 x 27,000 litre **waste oil storage tanks** at the Port of Nuku'alofa.

The facility is used by both port (operators, ferries, fishing fleet etc) and non-port operators to better manage waste oil on Tonga'tapu.

A focus on the capacity and quantity of waste oil in future years will be undertaken as part of the forward focus areas under this Framework.





GreenPort Framework

KEY THEMES

The GreenPORT Framework

Overview

The Port Authority of Tonga (PAT) has strong environmental aspirations.

We acknowledge that achieving improved environmental performance is no longer optional - it is essential for ensuring sustainable growth and resilience in a rapidly changing world.

“ We want to drive change in Tonga and lead by example.

The PAT Environmental Management System (EMS) is driven by our commitment to regulatory compliance, continuous improvement, and the achievement of our sustainability goals. By adopting an EMS, PAT aims to systematically manage and minimise environmental impacts, promote a culture of environmental stewardship, and align port operations with both national and international environmental frameworks.

Our recently accredited EMS provides a structured framework for monitoring, evaluating, and improving environmental performance over time. It also ensures that we not only meet but strive to exceed environmental standards, contributing positively to Tonga's national vision for a sustainable and low-emission future.

Building on programs and initiatives already in place, including our EMS, our GreenPORT Framework has been developed to strategically guide, shape and drive improved environmental performance at the port.

Our GreenPORT Framework and its initiatives are built around 6 key themes - identified and shaped through extensive consultation across the business and with a range of port stakeholders including our port tenants and Government agencies.

Critically, our Framework has used the United Nations Sustainable Development Goals (SDGs) as a platform to help test and shape our commitments.

Our Key Themes & Focus Areas

Our GreenPORT Framework with six (6) **key themes** and **focus areas** is outlined below:

Disaster Preparedness

- Risk Identification
- Disaster Planning & Emergency Response
- Infrastructure Standards
- Stakeholder Coordination & Partnerships

Biodiversity Management

- Biodiversity Baseline & Monitoring
- Protecting & Enhancing Sensitive Habitats

Climate Adaptation & Resilience

- Climate Risk & Vulnerability Assessment
- Resilient Infrastructure Design
- Operational Resilience & Business Continuity
- Capacity Building & Climate Literacy



Governance

- Policies & Codes
- Environmental Management System
- Greenport Stakeholders Group
- Human & Capital Resources
- Industry Collaboration, Outreach & Partnerships

Pollution & Waste Management

- Water Quality
- Air Quality
- Construction & Demolition Waste (including scrap metal)
- Noise & Lighting
- Liquid Waste
- Abandoned (unseaworthy) vessels

Emission Reduction & Decarbonisation

- Emission Profiling / Baseline
- Energy Transition / Carbon Reduction
- Infrastructure Decarbonisation

Scope of Framework

The Framework captures all operations and activities within the responsibility of PAT on port lands and within port limits (marine area). Scope 1 and 2 emissions are covered in this Framework – with work towards capturing Scope 3 emissions to be undertaken in future years.

Vessel emission data is limited to domestically operating vessels within port limits - consistent with the Tongan Low Emission Development Strategy 2021-2050 as only GHG emissions from domestic aviation and shipping are counted towards national emissions.

Consultation with Stakeholders

The development of our Framework involved various consultation sessions with PAT team members, port tenants/operators and Government Departments. These sessions provided valuable insights into the most important (material) issues for port stakeholders for us to consider in the final Framework.

We value stakeholder input into our policy development process and express our sincere gratitude for the time and contributions made by those attending our consultation sessions.





Governance



Focus areas:

- Policies & Codes
- Environmental Management System
- Greenport Stakeholders Group
- Human & Capital Resources
- Industry Collaboration, Outreach & Partnerships

Relevant Sustainable Development Goals:



Why is this important?

Strong, stable and robust environmental management governance refers to the specific systems, policies, and practices that guide how PAT will manage environmental responsibilities and interactions with ecosystems, local communities, and regulatory bodies.

Strong governance strengthens climate resilience, emission reductions and adaptation planning; outlines pollution and waste management expectations; and increases investor and customer confidence by aligning port policies and systems with international standards and increasing environmental expectations.

In practice, strong governance underpins our long-term viability, competitiveness, and credibility as a responsible gateway for trade.

Focus Areas

We have identified several focus areas under our **Governance** theme as follows:

Policies & Codes

Policies and Codes are critical to ensure the achievement of environmental improvements across the port. They set expectations and standards in terms of behaviours of both our team and broader port stakeholder groups.

Port activities in Tonga sometimes involve potentially high-impact activities – vessel operations, fuel handling, construction, storage / warehousing and land transport at the interface between land and sea.

Clear policies and enforceable codes help prevent pollution of coastal and marine ecosystems, protect biodiversity, and manage risks such as spills, air emissions, waste streams and undue noise and lighting. They also provide a consistent framework for sustainable development, ensuring that port operations (and future expansion) balance economic growth with environmental stewardship.

Beyond environmental protection, strong policies and codes support regulatory compliance, reduce operational and legal risk, and enhance our social licence to operate (and grow) with local communities and adjoining areas in Nuku'alofa.

Environmental Management System

An internationally accredited Environmental Management System (EMS) is critical in our Pacific context due to our environmentally sensitive location, our high exposure to climate change, natural hazards, and potential cumulative impacts from maritime activity. Our EMS must provide a structured, systematic way to identify, manage, and reduce environmental risks such as marine pollution, waste, air and noise emissions, impacts from port operations, and potential impacts on mangroves and fisheries critical for our livelihood and food security.

Our EMS also strengthens climate resilience by integrating adaptation measures for sea-level rise, cyclones, storm surge, and flooding into day-to-day port operations and planning.

Our accreditation against international standards supports compliance with national regulations and international maritime conventions, builds capacity within port stakeholders, and improves transparency and accountability with governments, donor countries and local communities.

Our GreenPORT Framework will support our continued EMS accreditation under ISO 14001.

GreenPORT Stakeholders Group

Under this Framework we will establish a GreenPORT Stakeholder Group which will help with effective planning, operation, and long-term success of our Framework. We believe engaging a wide range of stakeholders ensures that decisions are informed, balanced, and broadly supported.

We have identified key reasons why our GreenPORT Stakeholder Group will be critical for our Framework:

- Social licence to operate (and grow): Port stakeholders those working in the maritime industry influence public acceptance of port activities. Early and ongoing engagement helps manage impacts such as noise, traffic and land use reducing, conflict and delays.
- Operational effectiveness and efficiency: Shipping lines, terminal operators, logistics providers, and regulators assist with the optimisation of port operations and safety.
- Environmental protection and sustainability: Environmental agencies, NGOs, and research institutions contribute expertise to protect marine and coastal ecosystems and to strengthen environmental management and climate resilience.
- Regulatory compliance and risk management: Government authorities and emergency services help ensure compliance with laws, international conventions, and preparedness for significant incidents.
- Economic development and investment confidence: Businesses and development partners rely on transparent stakeholder processes to assess risk, support growth, and align the port with national and regional development goals.
- Resilience and long-term planning: Collaboration with stakeholders enables better planning for climate change, technological change, and future trade demands.

Overall, our GreenPORT Stakeholder Group will build trust, improve decision-making, reduce risk, and help the PAT deliver economic benefits while responsibly managing potential environmental and social impacts.



Human & Capital Resources

Human and capital resources are critical to the successful implementation of our GreenPORT framework as successful outcomes rely on being properly resourced and sustained in day-to-day operations.

Human resources provide the capability to translate the framework into action. Skilled staff are needed to identify environmental risks, operate and maintain control measures, monitor performance, manage incidents, and ensure compliance with regulations and international standards. Without adequate people and expertise, our GreenPORT Framework will remain an aspiration - rather than a reality.

Capital resources are critical for fit-for-purpose infrastructure, equipment, and systems. Investment is required for pollution control facilities, waste and wastewater systems, spill response equipment, monitoring technology, resilient design upgrades, and data management systems. Capital funding for the GreenPORT Framework also supports adaptation to climate risks such as sea-level rise, flooding, and extreme weather, which are particularly acute for Tonga.

Industry Collaboration, Outreach & Partnerships

Industry collaboration, partnerships, and outreach efforts are vital for the success of our GreenPORT Framework.

Industry collaboration enables consistent environmental standards and practices across shipping lines, terminal operators, stevedores, fuel suppliers, and logistics providers. Sharing knowledge, data, and innovation will help reduce emissions, prevent pollution, improve waste management, and respond effectively to incidents.

Partnerships with governments, subject matter experts, research institutions, NGOs and development partners strengthen technical capacity, access to funding, and alignment with national, regional, and international environmental goals. These partnerships support adoption of best practice, climate resilience measures, and compliance with international conventions, which is particularly important for our port which faces increasing climatic impacts and resource constraints.

We will also look to develop a 'Sister-Port' partnership within the Pacific region – in the spirit of SDG #17.

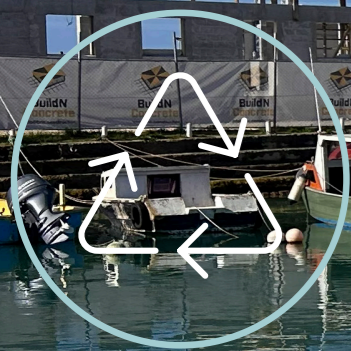


Table of Actions

We have identified short, medium- and longer-term actions for each of the focus areas, with items in **red** identified for immediate **sprint projects**. The PAT commits to working with stakeholders in partnership as we address each of these focus areas:

Focus Areas	Governance			
	Short Term (0-2 years)	Medium Term (2-5yrs)	Long term (5 years+)	Aspiration
Policies & Codes	<ul style="list-style-type: none"> Maintain ISO 14001 accreditation (audit preparation) Support ISO 9001 & 45001 Refresh PAT Environment Policy reflecting GreenPORT Framework 	<ul style="list-style-type: none"> Manage EMS Maintain ISO 14001 Support ISO 45001 and ISO 9001 	<ul style="list-style-type: none"> Manage EMS Maintain ISO 14001 Support ISO 45001 and ISO 9001 	<ul style="list-style-type: none"> ANNUAL Compliance / Audit ANNUAL Reporting
Environmental Management System & Environmental Policy	<ul style="list-style-type: none"> Manage EMS & PAT Environmental Policy Prepare & implement GreenPORT Framework 'Action Plan' Identify continuous improvement opportunities 	<ul style="list-style-type: none"> Manage EMS & PAT Environmental Policy Manage GreenPORT Framework Identify continuous improvement opportunities Communicate EMS & GreenPORT Framework with Port Stakeholders 	<ul style="list-style-type: none"> Manage EMS & PAT Environmental Policy Manage GreenPORT Framework Undertake Formal Review of EMS, GreenPORT Framework and PAT Environmental Policy 	<ul style="list-style-type: none"> FULL Compliance / No non-conformance ANNUAL Reporting
GreenPORT Stakeholders	<ul style="list-style-type: none"> Participate in Monthly Operations Meetings Develop 'GreenPORT User Group' Committee Communicate EMS & GreenPORT Framework with Port Stakeholders, Government Stakeholders and Community 	<ul style="list-style-type: none"> Participate in Monthly Operations Meetings Host 'GreenPORT User Group' Committee meetings (Quarterly) 	<ul style="list-style-type: none"> Participate in Monthly Operations Meetings Host 'GreenPORT User Group' Committee meetings (Quarterly) 	<ul style="list-style-type: none"> EMS and GreenPORT Framework are integrated into BAU
Human & Capital Resources	<p>Human Resources:</p> <ul style="list-style-type: none"> Identify Human Resources needs for implementation of GreenPort Framework Budget and secure external assistance for 'Sprint Projects' <p>Identify PAT team members (from other Departments) to assist with GreenPort Framework</p> <p>Capital Resources:</p> <ul style="list-style-type: none"> Secure funding for new capital equipment identified in each GreenPort Stream 			<ul style="list-style-type: none"> BAU
Industry Collaboration, Outreach & Partnerships	<ul style="list-style-type: none"> Identify opportunities to liaise with Pacific / Australian Port Sector Attend recognised Industry Conferences and Forums Seek 'Sister Port' Relationship with Pacific / Australian Port Sector 			

Pollution & Waste Management



Focus areas:

Water Quality

Air Quality

Construction & Demolition Waste
(including scrap metal)

Noise & Lighting

Liquid Waste

Abandoned (unseaworthy) vessels

Relevant Sustainable Development Goals:



Why is this important?

Pollution and waste management is critical for sustainable operations - our Port in Nuku'alofa sits directly within sensitive coastal and marine ecosystems that support fisheries, food security, tourism, and overall community wellbeing.

As a small island nation, Tonga has limited land availability for waste disposal, limited treatment facilities, and high exposure to climate-related events that can compound pollution risks.

Ports and shipping lines must manage liquid waste in accordance with international conventions such as International Maritime Organization standards and agreements like International Convention for the Prevention of Pollution from Ships (MARPOL).

Effective pollution and waste management therefore ensures we protect marine environments, safeguard public health, reduce operational risk, and maintain compliance with international maritime obligations. It will also strengthen our reputation as a responsible Pacific port and builds the confidence of partners, shipping lines and donor entities.

Focus Areas

We have identified several focus areas under our **Pollution and Waste Management** theme as follows:

Water Quality

Protecting water quality is essential because the port operates at the interface between land and sea, where even small pollution events can quickly impact marine ecosystems, reef health, mangroves, and local fisheries that Tonga's communities rely on for food and livelihoods.

Port activities such as stormwater runoff, vessel operations, fuel handling and uncontrolled waste/spills can pose risks of hydrocarbon spills, sediment plumes, heavy metals and eutrophication (nutrient pollution).

As a Pacific Island port, safeguarding water quality is critical due to limited natural buffering capacity, high ecological sensitivity, and the reliance of communities on nearby coastal waters for subsistence and cultural practices. Effective water quality management will help us prevent environmental damage, maintain compliance with regulations, and demonstrate stewardship of Tonga's marine resources.

As part of our forward work, Oil spill kits (spill response kits) will be procured, and a site-wide management plan prepared to provide immediate containment and cleanup capacity, helping prevent environmental, economic, and social harm.

An oil spill in Tonga would have serious environmental, economic, and social impacts, due to the sensitive coastal ecosystems in and around the Port precinct.

Air Quality

Air quality is an increasingly important issue for ports in the Pacific region, where communities, businesses, and schools are often located very close to port boundaries. Emissions from vessels at berth, generators, heavy machinery, trucks, and fuel storage can impact local air quality, contributing to environmental pollution and a reduced community acceptance of port operations.

In Tonga, where the majority of electricity generation currently relies on diesel and where prevailing winds can carry emissions across densely populated coastal areas, managing air quality is essential for the community and for maintaining our social licence to operate (and grow).

Strong air quality management will support alignment with decarbonisation pathways, improve operational efficiency, and reduce the environmental footprint of port activity.



Construction & Demolition Waste (including scrap metal)

Construction and demolition (C&D) activities are among the highest-impact activities at any port, and in Tonga they present particular risks because of limited land for waste storage, limited recycling capacity, and the proximity of works to sensitive coastal areas.

Uncontrolled C&D waste can introduce contaminants, sediment, plastics, and debris into the marine environment, affecting coral reefs, fish habitats, and community recreation spaces.

Additionally, the foreshore around the port is used by local communities for fishing, gathering, and access to the waterfront. Proper management of C&D waste is, therefore, essential to protect community safety, and environmental & social (amenity) values.

Clear procedures and responsible waste handling reduce pollution risk, prevent damage during capital works, will help ensure we meet environmental obligations while supporting sustainable infrastructure development.

Noise & Lighting

While MARPOL regulates the release of harmful substances by ships into the water (relating to Water Quality and Waste) and air (relating to Air Quality), noise and light pollution are not covered.

Noise and lighting emissions from port operations such as vessel movements, cargo handling equipment, construction activities, and night-time loading/unloading operations can affect nearby residential areas and marine life. In Nuku'alofa, the port is located close to homes, businesses, and public areas, meaning noise and lighting impacts can sometimes be experienced by surrounding communities.

In the broader Pacific context, excessive lighting can disrupt seabird behaviour, turtle nesting, and nearshore ecosystems, while high noise levels can affect marine mammals and fish populations. Whilst not being identified as a significant issue for the Port in Nuku'alofa, effective noise and lighting controls are, therefore, essential for protecting ecological values and maintaining community acceptance.

Diligent management of noise and lighting pollution also supports our reputation as a responsible, community-centred port and strengthens our relationships with stakeholders.

Liquid Waste

Liquid waste is a significant environmental and operational issue for ports in small island nations such as at main port of Port precinct in Nuku'alofa due to the concentration of concentrate shipping and fishing fleets, fuel storage, cargo handling, and vessel servicing activities within a small coastal area that is often directly adjacent to sensitive marine ecosystems.

Ships visiting Tonga produce a range of liquid wastes including bilge water (oil-contaminated water from engine rooms), sewage, greywater and oily residues. If adequate port reception facilities are not available, vessels may have limited options for disposal, increasing the risk of illegal discharge into harbour waters, leading to oil contamination and nutrient pollution.

Typical port operations also generate liquid wastes including fuel handling and bunkering, equipment maintenance, cargo washing, and stormwater runoff from paved surfaces that may carry oil, sediments, or chemicals into surrounding waters.

Liquid waste spills or discharges can quickly affect surrounding coral reefs, seagrass beds, and fisheries that are vital to local livelihoods and food security in Tonga. Even small quantities of oil or chemicals can harm marine life and damage coastal ecosystems that support tourism and subsistence fishing.

In general terms, we understand that Ports and Shipping Lines must manage liquid waste in accordance with international conventions such as International Maritime Organization standards and agreements like International Convention for the Prevention of Pollution from Ships (MARPOL), which require ports to provide adequate facilities for receiving ship-generated waste.



Abandoned (unseaworthy) vessels

Abandoned or unseaworthy vessels are a persistent issue for Tonga. These vessels create environmental, navigational, and financial challenges for PAT and the Kingdom of Tonga.

The main issues are:

- **Marine pollution risks:** Old or deteriorating vessels often contain fuel, lubricating oil, batteries, paints, and other hazardous materials. When vessels are abandoned, these substances can leak into the harbour / surrounding waters.
- **Navigational hazards:** Unseaworthy vessels left in harbour areas can obstruct shipping channels, turning basins, and anchorage areas. This can interfere with commercial shipping, ferries, and fishing vessels - increasing the risk of collisions or grounding.
- **Visual and tourism impacts:** Tonga relies heavily on tourism and the natural beauty of its coastal waters. Rusting or partially sunk vessels create visual pollution in harbour areas and can damage the perception of a clean marine environment for visiting cruise ships and yachts.
- **High removal costs:** Removing wrecks or abandoned vessels can be very expensive. PAT has limited funding and specialised equipment for salvage operations. If vessel owners cannot be identified or refuse responsibility, the financial burden often falls on PAT or Government.
- **Safety risks:** Derelict vessels may break apart during storms or cyclones, releasing debris that can damage port infrastructure, vessels, or coastal areas. They can also pose physical dangers to small boats and local fishers.
- **Legal and regulatory challenges:** Managing abandoned vessels requires clear legal authority to detain, remove, or dispose of vessels. Tongan legislation would need to be examined for such enforcement.

As part of our Framework actions, we will work with stakeholders and regulators to determine the best way to educate, manage and control this issue.



Table of Actions

We have identified short, medium- and longer-term actions for each of the focus areas, with items in **red** identified for immediate **sprint projects**. The PAT commits to working with stakeholders in partnership as we address each of these focus areas:

Pollution and Waste Management				
Focus Areas	Short Term (0-2 years)	Medium Term (2-5yrs)	Long term (5 years+)	Aspiration
Water Quality	<ul style="list-style-type: none"> • Undertake 'PAT Water Quality Baseline Assessment' to understand existing conditions • Procure Monitoring Equipment • Prepare site-wide management 'Spill Procedure' for oil spills / hazardous spills at the Port • Procure Oil Spills trailer / kit • Undertake Oil Spill Training • Work in conjunction with MOI Marine Division as regulator 	<ul style="list-style-type: none"> • Report on results & spill training • Monitor (as specified) • Identity Key Improvement Projects 	<ul style="list-style-type: none"> • Alignment with EMS aspirations • ANNUAL Reporting 	<ul style="list-style-type: none"> • ANNUAL Reporting
Air Quality	<ul style="list-style-type: none"> • Undertake 'PAT Air Quality Baseline Assessment' to understand existing conditions • Procure Monitoring Equipment 	<ul style="list-style-type: none"> • Report on results & training • Monitor (as specified) • Identity Key Improvement Projects 	<ul style="list-style-type: none"> • Alignment with EMS aspirations • ANNUAL Reporting 	<ul style="list-style-type: none"> • ANNUAL Reporting
Construction & Demolition Waste (including scrap metal)	<ul style="list-style-type: none"> • Undertake 'PAT Baseline Waste Assessment' (Community Waste, Construction Waste and Scrap Metal Waste) to determine volume(s) • Liaise with Cross Government Departments & Stakeholders 	<ul style="list-style-type: none"> • Report on results • Monitor (as specified) • Assess Potential Waste Reduction Projects • Identity Key Improvement Projects 	<ul style="list-style-type: none"> • Alignment with EMS aspirations • ANNUAL Reporting 	<ul style="list-style-type: none"> • ANNUAL Reporting
Noise & Lighting	<ul style="list-style-type: none"> • Undertake 'PAT Noise & Lighting Desktop Assessment' of existing conditions • Procure Monitoring Equipment 	<ul style="list-style-type: none"> • Report on results • Monitor (as specified) • Identity Key Improvement Projects 	<ul style="list-style-type: none"> • Alignment with EMS aspirations • ANNUAL Reporting 	<ul style="list-style-type: none"> • ANNUAL Reporting
Liquid Waste	<ul style="list-style-type: none"> • Undertake 'Review of Liquid Waste Facilities' (including existing Oil Waste Facility) to determine potential improvements 	<ul style="list-style-type: none"> • Monitor (as specified) 	<ul style="list-style-type: none"> • Alignment with EMS aspirations • ANNUAL Reporting 	<ul style="list-style-type: none"> • ANNUAL Reporting
Abandoned (unseaworthy) vessels	<ul style="list-style-type: none"> • Undertake review and extent of abandoned vessels to determine legislative action • Discuss with relevant Government Departments to develop prevention strategies & actions 	<ul style="list-style-type: none"> • Identify public education campaigns / opportunities • Report on results • Monitor (as specified) 	<ul style="list-style-type: none"> • Alignment with EMS aspirations • ANNUAL Reporting 	<ul style="list-style-type: none"> • ANNUAL Reporting

Emission Reduction & Decarbonisation



Relevant Sustainable Development Goals:



Focus areas:

Emission Profiling / Baseline

Energy Transition / Carbon Reduction

Infrastructure Decarbonisation.

Why is this important?

We live climate change – everyday.

As a Pacific port, we understand reducing greenhouse gas emissions and moving toward lower-carbon operations is critical at the PAT - maritime transport is central to Tonga's economy, yet we are highly exposed to the impacts of a changing climate.

Increasingly severe cyclones, sea-level rise, storm surge, and heat stress all threaten port operations and infrastructure – now and into the future.

Through a staged approach to emission reduction, we can strengthen energy security, cut operating costs, align with international expectations, and demonstrate leadership as a Pacific Port committed to climate resilience and global decarbonisation goals.

Focus Areas

We have identified several focus areas under our **Emission Reduction and Decarbonisation** theme as follows:

Emission Profiling & Baseline

A clear understanding of our current emission footprint is the foundation for credible emission reduction moving forward.

Ports generate greenhouse gas emissions through electricity use, diesel equipment, backup generators, vessel berthing activities, waste and municipal construction. However, without a defined baseline and accurate emissions profiles, we cannot effectively plan, set staged targets, invest or communicate progress.

Port emissions can be classified in three groups – or 'Scopes' as such:

The World Bank in the Port Reform Toolkit (3rd Edition) suggest that emissions from ships in port comprise 70 to 100 percent of total seaport emissions, trucks and vehicles represent up to 20 percent, and port operations rarely exceed 15 percent.

As part of this GreenPORT Framework our focus will be on emissions at the local / port scale. As we mature our environmental baseline, we will address Scope 3 type emissions in future years.

For Tonga, a clear baseline understanding of emissions (Scope 1 and 2) is especially crucial because:

- our port is our lifeline asset, and any efficiency gains translate directly into resilience and reduced energy dependency
- national climate commitments rely on accurate reporting across transport and energy sectors
- development partners increasingly require emissions data to unlock funding for renewable energy, electrification, and infrastructure upgrades

A robust emissions baseline / profile will allow us to identify major sources (e.g., diesel-powered equipment or vessels at berth), prioritise actions, track improvements and align with global maritime decarbonisation pathways.



Energy Transition / Carbon Reduction

Reducing our operational emissions requires a deliberate transition from diesel-dependent systems toward cleaner, more efficient energy sources. Scope 1 emissions arise from fuel used in port-controlled machinery and vehicles, while Scope 2 emissions come from grid electricity consumed at port facilities.

For PAT, our energy transition is critical because:

- diesel costs are high and volatile, placing financial pressure on port operations.
- as a nation we have excellent renewable energy potential, particularly solar, which can significantly reduce long-term operating costs.
- electrification and energy efficiency help strengthen resilience, particularly during cyclones or supply disruptions.

Key opportunities include increasing renewable energy supply (e.g., additional rooftop solar, supplementary onshore power systems (where economically feasible and supported), microgrids), transitioning to electrification of plant and equipment including PAT vehicles, improving energy efficiency and exploring alternative fuels readiness for the future.

Reducing Scope 1 and 2 emissions will support our long-term competitiveness while showing consistency with Tonga's national climate and decarbonisation commitments expressed in the Third National Determined Contributions (NDC) in September 2025 which outline an objective of achieving 70% Renewable Energy supply by 2030 and progress towards 100% Renewable Energy supply by 2035.

Work will also be focussed on working towards accreditation under ISO 50001: 2018 Energy Management System Certification Process together with the development of an Energy Management Policy.



Infrastructure Decarbonisation

Infrastructure decarbonisation refers to reducing carbon across the design, construction, upgrading, and operation of port facilities, from wharves and terminal buildings to lighting, storage, equipment, and support systems.

Infrastructure decarbonisation is critical for Tonga and the wider Pacific region because ports must withstand increasingly severe climate events, and using low-carbon, resilient materials and design approaches helps safeguard long-term functionality. Reducing the embodied carbon in construction materials such as concrete and steel also lowers overall emissions and supports more sustainable procurement pathways.

At the same time, decarbonised infrastructure is increasingly attractive for donor funding agencies seeking climate-aligned, future-ready investments. Improving efficiency across lighting, buildings, equipment, and operations further reduces both emissions and operational costs.

Collectively, progress in these areas by PAT will ensure the port evolves into a modern, efficient, low-carbon gateway that supports improved environmental performance.

Table of Actions

We have identified short, medium- and longer-term actions for each of the focus areas, with items in **red** identified for immediate **sprint projects**. The PAT commits to working with stakeholders in partnership as we address each of these focus areas:

Focus Areas	Emission Reduction & Decarbonisation			
	Short Term (0-2 years)	Medium Term (2-5yrs)	Long term (5 years+)	Aspiration
Emission Profiling & Baseline	<ul style="list-style-type: none"> Undertake 'PAT Carbon / Emission Profile Study' 	<ul style="list-style-type: none"> Monitor 'PAT Carbon / Emission Profile' Report on results 	<ul style="list-style-type: none"> Monitor 'PAT Carbon / Emission Profile' Report on results 	<ul style="list-style-type: none"> Alignment with EMS aspirations ANNUAL Carbon / Emission Profile Reporting
Energy Transition / Carbon Reduction	<ul style="list-style-type: none"> Undertake 'PAT Fleet Assessment' Undertake 'PAT Solar / Electrification Implementation & Opportunities Study' Develop Cargo Handling Equipment (CHE) Transition Strategy Develop an 'Energy Management Policy' and prepare for accreditation towards ISO 50001: 2018 	<ul style="list-style-type: none"> Migrate PAT Fleet to Hybrid and/or Electric Support the transition of CHE to Hybrid and/or Electric Identify Key Improvement Projects Undertake supplementary 'PAT Shore Power Feasibility Assessment' Acquire and Manage ISO 50001: 2018 Energy Management System Certification. 	<ul style="list-style-type: none"> Migrate PAT Fleet to Hybrid and/or Electric Transition CHE to Hybrid and/or Electric Identify Key Improvement Projects Manage ISO 50001: 2018 Energy Management System Certification 	<ul style="list-style-type: none"> Achieve 70% Renewable Energy supply for PAT by 2030 (consistent with Tonga NDC) Achieve 100% Renewable Energy supply for PAT by 2035 (consistent with Tonga NDC) Achieve 100% Hybrid / Electric PAT Transport Fleet by 2035 Achieve 100% Hybrid / Electric CHE on port by 2035 Achieve 100% Solar Landside Lighting by 2035 (Aligned to the Kingdom of Tonga Aspirations outlined in NDC) (PAT should aim for earlier achievement if possible)
Infrastructure Decarbonisation	<ul style="list-style-type: none"> Undertake 'PAT Infrastructure Standards & Technical Guidelines Review' Review availability of local materials 	<ul style="list-style-type: none"> Implement new 'PAT Standards & Technical Guidelines' including decarbonisation requirements 	<ul style="list-style-type: none"> Implement new 'PAT Standards & Technical Guidelines' 	<ul style="list-style-type: none"> Alignment with EMS aspirations ANNUAL Carbon / Emission Profile Reporting

Climate Adaptation & Resilience



Focus areas:

- Climate Risk & Vulnerability Assessment
- Resilient Infrastructure Design
- Operational Resilience & Business Continuity
- Capacity Building & Climate Literacy

Relevant Sustainable Development Goals:



Why is this important?

Climate adaptation and operational resilience are critical for our port.

Tonga is one of the world's most climate-vulnerable nations.

Increasing cyclone intensity, sea-level rise, storm surge, coastal flooding, heat stress, and shoreline erosion directly threaten port operations, infrastructure, and the national supply chain. The port is a lifeline asset for our nation - its resilience underpins community wellbeing, food security, fuel supply, emergency response and economic stability.

Building climate resilience ensures we can continue operating during and after extreme weather events, reduce long-term infrastructure degradation and loss, support safer operations, and strengthen confidence in future investments.

In short, it will allow us to protect our way of life and our maritime connection with the world.

Focus Areas

We have identified several focus areas under our **Climate Adaptation and Resilience** theme as follows:

Climate Risk & Vulnerability Assessment

Understanding our risks from increasing climatic change is the foundation of effective adaptation.

A climate risk, impact and adaptation study will identify exposure to hazards such as cyclones, storm surge, sea-level rise, flooding, coastal erosion, temperature extremes, and climate-driven environmental change. As our port is located at the interface between land and sea and directly connected to critical national supply chains, even small disruptions can have significant social and economic consequences.

This focus area is essential because:

- it will provide a clear picture of which of our assets, systems, and operations are most at risk.
- it will ensure that we prioritise investments that deliver the greatest resilience benefits.
- it will ensure that new infrastructure is designed using accurate hazard data and future climate projections.
- it will support national adaptation planning and strengthen our case for climate-finance funding.

A robust climate risk assessment will give us the evidence to strengthen long-term resilience, minimise downtime, and protect the role of our Port as Tonga's key maritime gateway.

Resilient Infrastructure Design

Resilient infrastructure design ensures that port structures, utilities, and supporting systems can withstand extreme weather, recover rapidly after disruption, and continue to serve Tonga's essential needs. Ports in the Pacific face unique vulnerabilities, including strong tropical cyclones, coastal erosion, high groundwater tables, and climate-driven sea-level rise; all of which can damage wharves, pavements, power supply, buildings, and navigational systems.

This focus area is critical because designing infrastructure for future climate conditions significantly reduces long-term repair and replacement costs, while also ensuring the port remains strong, safe, and operational during emergencies.

A resilient port plays a vital role in supporting disaster response and recovery efforts, protecting workers, port users, and surrounding communities. Resilient design measures may include: appropriate finished levels for key maritime structures (eg. wharves and operational storage and laydown areas), improved drainage, elevated electrical systems, built-in redundancy for critical utilities, cyclone-rated structures, and nature-based solutions (where appropriate).

Together, these measures will help ensure our infrastructure can remain reliable and functional for decades to come.

Operational Resilience & Business Continuity

Operational resilience ensures that even if a climate-related event occurs, our port can continue functioning or resume operations quickly. This is essential because disruption at the port affects every sector, including fuel supply, food imports, health services, construction materials, and inter-island connectivity.

This focus area is critical for Tonga because:

- the port must remain operational during emergencies to support relief and recovery efforts
- downtime has immediate impacts on national wellbeing and economic activity
- climate events can rapidly cascade into operational delays, equipment damage, and safety incidents

Operational resilience and business continuity planning may include:

- governance and emergency response procedures for cyclones, flooding, and storm surge
- backup power and communication systems
- redundant and climate-protected critical assets
- clear recovery timelines and responsibilities
- coordination with national disaster management authorities

Strong operational resilience will help to ensure that we can protect our workforce, safeguard cargo, protect areas of high environmental value and minimise disruption across Tonga's supply chain.

Capacity Building & Climate Literacy

Building capacity within the port workforce and stakeholder community is essential to ensure that adaptation measures are implemented effectively, consistently, and sustainably. Climate resilience depends not only on physical infrastructure but on the capacity of people who plan, operate, and manage critical situations.

For Tonga and the wider Pacific region, building local capacity is essential because skilled staff are needed to interpret climate data, apply resilient design standards, and respond effectively to climate-related emergencies. Strengthening local capability reduces reliance on external consultants and supports long-term self-sufficiency, while climate-aware teams are better equipped to make safe, informed decisions during adverse weather conditions.

Enhanced training also will improve coordination between government agencies, shipping lines, contractors, and emergency services. Capacity-building initiatives may include training in climate adaptation planning, emergency response, resilient asset management, nature-based solutions, and integrating climate risk considerations into daily operational decision-making.

Improving climate literacy (ie. understanding of key climate and environmental related issues) can be critical in helping stakeholders understand important environmental terminology – and the importance of a strong focus on environmental management and improved outcomes.



Table of Actions

We have identified short, medium- and longer-term actions for each of the focus areas, with items in **red** identified for immediate **sprint projects**. The PAT commits to working with stakeholders in partnership as we address each of these focus areas:

Focus Areas	Climate Adaptation & Resilience			
	Short Term (0-2 years)	Medium Term (2-5yrs)	Long term (5 years+)	Aspiration
Climate Risk & Vulnerability Assessments	<ul style="list-style-type: none"> Undertake 'PAT Climate Change Risk, Impact & Adaptation Study' 	<ul style="list-style-type: none"> Implement relevant measures / policies / controls 	<ul style="list-style-type: none"> Implement relevant measures / policies / controls 	<ul style="list-style-type: none"> Annual Climate Change Risk & Adaptation Reporting
Resilient Infrastructure Design	<ul style="list-style-type: none"> Undertake desktop 'PAT Infrastructure Resilience Study' 	<ul style="list-style-type: none"> Implement Infrastructure Resilience Projects / Opportunities 	<ul style="list-style-type: none"> Implement Infrastructure Resilience Projects / Opportunities 	<ul style="list-style-type: none"> BAU / Annual Reporting
Operational Resilience & Business Continuity	<ul style="list-style-type: none"> Review Operational Resilience Strengths & Weaknesses 	<ul style="list-style-type: none"> Implement Operational Changes (as required) 	<ul style="list-style-type: none"> Implement Operational Changes (as required) 	<ul style="list-style-type: none"> BAU / Annual Reporting
Capacity Building & Climate Literacy	<ul style="list-style-type: none"> Determine Capacity Building Requirement Consider 'PAT Climate Literacy' Training 	<ul style="list-style-type: none"> Determine Capacity Building Requirement 	<ul style="list-style-type: none"> Determine Capacity Building Requirement 	<ul style="list-style-type: none"> BAU / Annual Reporting

Biodiversity Management



Relevant Sustainable Development Goals:



Focus areas:

Biodiversity Baseline & Monitoring
Protecting & Enhancing Sensitive Habitats

Why is this important?

Biodiversity management is essential for our port as it sits within some of the Pacific's most ecologically valuable, and most vulnerable, coastal environments. The waters surrounding the port support complex environments that are critical for food security, livelihoods, and climate resilience.

Port activities, if unmanaged, can place pressure on these sensitive ecosystems through stormwater runoff, vessel operations, and construction/maintenance activities.

Managing biodiversity proactively ensures that we can protect our natural assets, prevent ecological degradation, reduce regulatory and operational risks, and strengthen our social licence to operate (and grow). It also supports Tonga's national commitments to marine conservation and aligns with international best practice across the maritime sector.

Focus Areas

We have identified several focus areas under our **Biodiversity Management** theme as follows:

Biodiversity Baseline & Monitoring

A clear biodiversity baseline and development of an ongoing monitoring program are essential to understand the ecological condition of the port environment and, to monitor changes over time so that management responses can be adapted where appropriate. Baseline information gathered in conjunction with the Ministry of Environment (MEIDECC) will provide us with a detailed picture of key ecological habitats such as mangroves and seagrass communities in nearby / adjacent coastal areas.

Biodiversity baseline and ongoing monitoring are critical because:

coastal ecosystems are highly sensitive to disturbance, and early detection of change allows timely intervention

communities rely heavily on marine ecosystems for food security, cultural practices, and economic activity

climate change is already intensifying stress on marine habitats; understanding local conditions will help the PAT manage cumulative impacts

regulators, and environmental partners increasingly require environmental baselines to support funding and compliance for major projects

A robust monitoring program will enable us to make evidence-based decisions, guide responsible development, assess the effectiveness of mitigation measures, and protect the ecological health of Nuku'alofa's foreshore and surrounding waters.

Protecting & Enhancing Sensitive Habitats

Protecting and restoring sensitive habitats ensures that port operations minimise harm to ecosystems that provide essential ecological, cultural, and climate resilience benefits. In Tonga, habitats such as mangroves and seagrass areas play a crucial role in coastal protection against storm surges and erosion, whilst also contribute to potential carbon sequestration, fishing economies, and community wellbeing.

Habitat degradation can undermine fisheries productivity, impacting local livelihoods and food systems, and restoring degraded areas builds long-term ecosystem resilience, aligning with Pacific regional and global marine conservation goals.

Protecting and restoring sensitive habitats may include mangrove restoration, marine species-friendly construction practices, sediment control, nature-based shoreline protection, and working closely with environmental agencies, researchers, and community groups.

Significant community partnerships will be achieved through targeted environmental restoration projects.

Table of Actions

We have identified short, medium- and longer-term actions for each of the focus areas, with items in **red** identified for immediate **sprint projects**. The PAT commits to working with stakeholders in partnership as we address each of these focus areas:

Focus Areas	Biodiversity Management			
	Short Term (0-2 years)	Medium Term (2-5yrs)	Long term (5 years+)	Aspiration
Biodiversity Baseline & Monitoring	<ul style="list-style-type: none"> Undertake 'PAT Biodiversity & Habitat Values Baseline Assessment' in conjunction with MEIDECC 	<ul style="list-style-type: none"> Implement Biodiversity Protection Controls 	<ul style="list-style-type: none"> Implement / Manage Biodiversity Protection Controls (including Auditing & Reporting) 	<ul style="list-style-type: none"> BAU / Annual Reporting
Protecting & Enhancing Sensitive Habitats	<ul style="list-style-type: none"> Identify potential restoration projects involving a wide range of PAT stakeholders in conjunction with MEIDECC 	<ul style="list-style-type: none"> Implement Sensitive Habitat Protection Projects 	<ul style="list-style-type: none"> Implement / Manage Habitat Protection & Restoration Projects (including Auditing & Reporting) 	<ul style="list-style-type: none"> BAU / Annual Reporting





Disaster Preparedness



Relevant Sustainable Development Goals:



Focus areas:

- Risk Identification
- Disaster Planning & Emergency Response
- Stakeholder Coordination & Partnerships

Why is this important?

We live climate change – everyday.

As a Pacific port, we understand reducing greenhouse gas emissions and moving toward lower-carbon operations is critical at the PAT - maritime transport is central to Tonga's economy, yet we are highly exposed to the impacts of a changing climate.

Increasingly severe cyclones, sea-level rise, storm surge, and heat stress all threaten port operations and infrastructure – now and into the future.

Through a staged approach to emission reduction, we can strengthen energy security, cut operating costs, align with international expectations, and demonstrate leadership as a Pacific Port committed to climate resilience and global decarbonisation goals.

Focus Areas

We have identified several focus areas under our **Disaster Preparedness** theme as follows:

Risk Identification

Understanding our disaster risk is the foundation of effective preparedness.

Risk identification involves assessing natural hazards such as cyclones, storm surge, tsunami risk, coastal inundation, earthquakes, heatwaves, volcanic ash, and maritime incidents, along with the vulnerability of port assets, people, and supply chains.

This focus area is critical for Tonga because:

- the port is located at sea level and is highly exposed to multiple hazards
- even short disruptions can impact national fuel supply, food imports, and emergency response capacity
- climate change is increasing the frequency and intensity of extreme weather events
- accurate risk identification will help us prioritise investments in protective infrastructure, contingency planning, and operational readiness

A clear understanding of disaster risks will ensure that we can make informed decisions about infrastructure design, how to best protect environmental values during critical events, proactive maintenance, emergency planning, and resource allocation.



Disaster Planning & Emergency Response

Preparedness requires more than understanding risks, it requires us to have clear, actionable plans to respond effectively when an event occurs. Having disaster planning and emergency response procedures will place will help us to ensure that we can protect our people, our environment, secure our assets, and maintain continuity of our essential operations during emergencies.

This focus area is critical for Tonga, as a nation, because:

- the port often becomes a central hub for humanitarian relief, especially after cyclones and tsunamis
- strong emergency procedures reduce the risk of injuries, equipment damage, and cargo loss
- rapid mobilisation during disasters ensures national supply chains remain functional
- clear plans support safe vessel movements, secure fuel and cargo, provide emergency communications, and guide recovery actions

Effective disaster planning includes cyclone readiness procedures, tsunami evacuation plans, storm surge protections, emergency communications, drills and training, environmental protection practices and clear recovery protocols.

This will ensure we are ready to respond immediately and maintain critical operations under stress.

Stakeholder Coordination & Partnerships

Disaster preparedness depends on strong coordination across our many partners, including government agencies, emergency services, shipping lines, port users, community groups, and regional disaster management organisations.

Our Port does not operate in isolation; therefore, effective communication and collaboration are essential before, during, and after a disaster.

This focus area is critical for Tonga (and the Pacific) because:

- national emergency response relies on close coordination between PAT, Tonga Police, Navy, Fire & Emergency Services, MEIDECC, and Health Departments
- shipping lines and cargo operators need timely, accurate information to manage vessel movements and protect cargo
- the port plays a key role in regional humanitarian coordination, often working with Pacific partners and international disaster relief agencies
- strong partnerships reduce delays, improve decision-making, and strengthen community resilience

Strong stakeholder coordination will ensure that we can operate as a reliable hub during emergencies, protect our natural environment – and support our national response and recovery efforts.



Table of Actions

We have identified short, medium- and longer-term actions for each of the focus areas, with items in **red** identified for immediate **sprint projects**. The PAT commits to working with stakeholders in partnership as we address each of these focus areas:

Focus Areas	Climate Adaptation & Resilience			
	Short Term (0-2 years)	Medium Term (2-5yrs)	Long term (5 years+)	Aspiration
Risk Identification	<ul style="list-style-type: none"> • Review PAT's Organisation / Operational / Environmental Risk Assessment 	<ul style="list-style-type: none"> • Implement & Manage Risk Assessment Outcomes • Identity Key Improvement Opportunities 	<ul style="list-style-type: none"> • Implement & Manage Risk Assessment Outcomes 	<ul style="list-style-type: none"> • BAU / Annual Reporting
Disaster Planning & Emergency Response	<ul style="list-style-type: none"> • Undertake Disaster & Emergency Planning • Undertake Disaster Planning & Emergency Event Exercises 	<ul style="list-style-type: none"> • Undertake Disaster Planning & Emergency Event Exercises • Review Events / Lessons Learned 	<ul style="list-style-type: none"> • Undertake Disaster Planning & Emergency Event Exercises • Review Events / Lessons Learned 	<ul style="list-style-type: none"> • BAU / Annual Reporting
Stakeholder Coordination & Partnerships	<ul style="list-style-type: none"> • Undertake Operations Meetings with Port Stakeholders (monthly) • Undertake GreenPORT Framework meeting (quarterly) 	<ul style="list-style-type: none"> • Undertake Operations Meetings with Port Stakeholders (monthly) • Undertake GreenPORT Framework meeting (quarterly) 	<ul style="list-style-type: none"> • Undertake Operations Meetings with Port Stakeholders (monthly) • Undertake GreenPORT Framework meeting (quarterly) 	<ul style="list-style-type: none"> • BAU / Annual Reporting



Forward Actions



Operationalising the Framework
Tracking Progress

Operationalising the Framework

Following endorsement by the PAT Board, the PAT GreenPORT Framework will now be operationalised by the following:

- Developing an implementation & action plan for the 'Sprint Projects' including the procurement of skills to assist PAT
- Ensuring budget allocations are made for sprint projects and procurement of any required monitoring / testing plant and equipment
- Establishing a GreenPORT Framework Working Group
- Ensure regular reports to PAT Board regarding tracking and process of Framework actions
- Committing to Six-Monthly and Annual Reporting of GreenPORT Framework progress

Tracking Progress

Tracking progress against all themes and Focus Areas will be undertaken by the PAT GreenPORT team under the direction of the CEO.

Six-monthly reporting will occur to track GreenPORT Framework progress.

Annual Reporting as part of the PAT Annual Report will also be conducted.



Sprint Projects

The following projects have been identified as 'Sprint Projects' – ie. those projects to commence in the short term (subject to prioritisation and resource / funding allocation).

Theme / Focus Areas	'Sprint Projects'	Timing
	Governance	
Policies & Codes	• Maintain ISO 14001 accreditation	Ongoing
	• Refresh PAT Environment Policy reflecting GreenPORT Framework	ASAP
Environmental Management System & Environmental Policy	• Prepare & implement GreenPORT Framework 'Action Plan'	ASAP
GreenPORT Stakeholders	• Develop 'GreenPORT User Group' Committee	ASAP
	• Communicate EMS & GreenPORT Framework with Port Stakeholders, Government Stakeholders and Community	ASAP
Human & Capital Resources	• Budget and secure external assistance for 'Sprint Projects'	Immediate
	• Secure funding for new capital equipment identified in each GreenPORT stream	ASAP
Industry Collaboration, Outreach & Partnerships	<ul style="list-style-type: none"> • Identify opportunities to liaise with Pacific / Australian Port Sector • Attend recognised Industry Conferences and Forums • Seek 'Sister-Port' Partnership with Pacific / Australian Port Sector 	ASAP

Theme / Focus Areas	'Sprint Projects'	Timing
Pollution & Waste Management		
Water Quality	<ul style="list-style-type: none"> Undertake 'PAT Water Quality Baseline Assessment' to understand existing conditions Procure Monitoring Equipment Prepare site-wide 'Spill Procedure' for oil spills hazardous spills at the Port Procure Oil Spills trailer / kit Undertake Oil Spill Training Work in conjunction with MOI Marine Division as regulator 	Immediate
Air Quality	<ul style="list-style-type: none"> Undertake 'PAT Air Quality Baseline Assessment' to understand existing conditions Procure Monitoring Equipment 	Immediate
Construction & Demolition Waste (including scrap metal)	<ul style="list-style-type: none"> Undertake 'PAT Baseline Waste Assessment' (Community Waste, Construction Waste, Scrap Metal Waste) to determine volume(s) 	Immediate
Noise & Lighting Controls	<ul style="list-style-type: none"> Undertake 'PAT Noise & Lighting Desktop Assessment' of existing conditions Procure Monitoring Equipment 	Immediate
Liquid Waste	<ul style="list-style-type: none"> Undertake 'Review of Liquid Waste Facilities' (including existing Oil Waste Facility) to determine potential improvements 	Year 1 / Year 2
Abandoned (unseaworthy) vessels	<ul style="list-style-type: none"> Undertake review and extent of abandoned vessels to determine legislative action Discuss with relevant Government Departments to develop prevention strategies & actions 	Year 1 / Year 2

Theme / Focus Areas	'Sprint Projects'	Timing
Emission Reduction & Decarbonisation		
Emission Profiling / Baseline	<ul style="list-style-type: none"> Undertake 'PAT Carbon / Emission Profile Study' 	Immediate
Energy Transition / Carbon Reduction	<ul style="list-style-type: none"> Undertake 'PAT Fleet Assessment' Undertake 'PAT Solar / Electrification Implementation & Opportunities Study' Develop an 'Energy Management Policy' and prepare for accreditation towards ISO 50001: 2018 	Immediate
Infrastructure Decarbonisation	<ul style="list-style-type: none"> Undertake 'PAT Infrastructure Standards & Technical Guidelines Review' 	Year 1 / Year 2
Climate Adaptation & Resilience		
Climate Risk & Vulnerability Assessments	<ul style="list-style-type: none"> Undertake 'PAT Climate Change Risk, Impact & Adaptation Study' 	Year 1 / Year 2
Resilient Infrastructure Design	<ul style="list-style-type: none"> Undertake desktop 'PAT Infrastructure Resilience Study' 	Year 1 / Year 2
Biodiversity Management		
Biodiversity Baseline & Monitoring	<ul style="list-style-type: none"> Undertake 'PAT Biodiversity & Habitat Values Baseline Assessment' 	Immediate
Protecting & Restoring Sensitive Habitats	<ul style="list-style-type: none"> Identify potential restoration projects involving a wide range of PAT stakeholders 	Immediate
Disaster Preparedness		
Risk Identification	<ul style="list-style-type: none"> Review PAT's Organisation / Operational / Environmental Risk Assessment 	Year 1
Disaster Planning & Emergency Response	<ul style="list-style-type: none"> Undertake Disaster & Emergency Planning Undertake Disaster Planning & Emergency Event Exercises 	Year 1



NTRO | Pacific
Your Partner in the Region

