GREEN ENERGY TRANSITION AND PORT DECARBONISATION PROGRAMME FOR THE PORT OF MOMBASA

Background

Country Context, Strategy and Objectives

Kenya's development strategy is built on a vision of sustainable economic growth, climate resilience and inclusive development. Key priorities are outlined in Vision 2030 and supported by the Medium-Term Plan IV (MTP IV), 2023-2027. Kenya's national climate priorities and development goals include: the National Climate Change Action Plan (NCCAP), 2023-2027, Climate Change Act, 2016, Nationally Determined Contributions (NDCs) under the Paris Agreement which focus on reducing greenhouse gas (GHG) emissions and adapting to climate change by encouraging green technologies, infrastructure, and expanding renewable energy sources like wind, Solar and geothermal. Kenya's updated NDC commits to abate GHG emissions by 32% by 2030. One of Kenya's NDC goals is to increase the share of renewable energy in the national energy mix.

The Port of Mombasa's green transition efforts include harnessing renewable energy sources. This directly contributes to Kenya's goal of generating 100% of electricity from renewable sources by 2030. Assessing and implementing alternative energy options at the Port of Mombasa will reduce reliance on fossil fuel leading to lower GHG emissions from port operations, contributing towards reducing the national and global targets.

The project also supports sustainable growth, climate resilience, and reduced greenhouse gas emissions, contributing to the achievement of SDG 13 (Climate Action), SDG 7 (Affordable and Clean Energy), and SDG 9 (Industry, Innovation, and Infrastructure). Additionally, it aligns with Africa's Agenda 2063, particularly in fostering environmentally sustainable and climate-

resilient economies (Goal 7) and promoting inclusive growth through green technologies (Goal 9).

Climate change is identified as an enabler, and the project seeks to address its effects. It embodies a model for low-carbon, climate-resilient development that promotes gender equality and sustainable growth across sectors, reinforcing Kenya's commitment to both its climate goals and inclusive development.

Sector and Institutional Context

Kenya's transport and logistics sector faces significant challenges related to climate change, particularly in ensuring the development of efficient, sustainable and resilient transport and logistics systems that can withstand projected climate impacts.

Key issues include high GHG emissions, limited technical capacity in support of mitigation initiatives, and restricted access to financing for renewable energy and transport decarbonisation projects.

Addressing these challenges is crucial for building climate-resilient infrastructure and promoting the shift towards sustainable transport systems.

In terms of policy and governance, several reforms have been introduced to support climate action in Kenya. These include the National Climate Change Framework Policy (2018), which focuses on enhancing adaptive capacity and promoting low-carbon development; the Climate Finance Policy (2018), which sets up frameworks for accessing and managing climate finance; and the National Adaptation Plan (NAP) 2015-2030, which focuses on adaptation to climate risks at both national and local levels.

As in the case of major world-class ports, Mombasa Port produces high concentrations of Green House Gasses, caused primarily by ships using heavier fuel and running their generators while in port, as well as the trucks

hauling cargo within and from the port. A study conducted by Trademark Africa in 2023 estimated the volume of emissions at the Port of Mombasa to be 532,424 tCO_2e.

The Kenya Ports Masterplan 2018 – 2047 outlines climate change mitigation and adaptation as a critical environmental concern for future port development and operations. In the year 2015 KPA developed the Green Port Policy (revised in 2024) which outlines measures and actions to mitigate possible adverse effects of port operations on the environment.

The development and early adoption of the GPP by KPA has had a positive impact in the region, including Kenya hosting the Maritime Technical Cooperation Centre for Africa and Association of Maritime Administrations (AMA), attracted climate funding from Development Partners (TMA, Danish Embassy, Embassy of Sweden, Dutch Embassy). In addition, the GPP has cemented Kenya's position as a thought leader in climate finance evidenced through the numerous international conferences hosted in Kenya (International Association of Maritime Economists (IAME) 2018, Development of Decarbonization and Digitalization in the Maritime and Ports in Africa 2022, Blue Economy Conference 2018).

The port and transport logistics sector has recently undergone massive investments creating additional capacity supported by development partners.

The government has put in place measures to identify the key elements in port capacity and logistics in order to catalyse the development of multimodal transport port / rail / road interfaces/ trade facilitation instruments at Port of Mombasa and other key inland cargo origin / destination centres. The proposed project stands to benefit from synergies with other related initiatives in the region.

By collaborating with ongoing projects, it can share infrastructure, technology and resources, leading to cost savings and enhanced knowledge exchange.

This collaborative approach will create a stronger ecosystem for the adoption of alternative energy solutions, supporting greater regional integration, emissions reduction and sustainability efforts.

The project will support this, and wide stakeholders' consultations is envisaged. The government is committed to implement whatever steps necessary to support the project achieve its objectives.

Development Partners Coordination

The Project aligns with the Kenya Ports Authority's (KPA) goals of modernizing operations, reducing carbon emissions and supporting Kenya's Vision 2030 and global sustainability targets. Development partners such as the International Maritime Organization (IMO), the World Bank, and the African Development Bank (AfDB) are crucial, offering technical expertise, funding, and complementary programs.

For instance, the IMO promotes low-carbon port operations, while the World Bank and AfDB provide financial and technical support for energy transition and capacity building. After conducting a successful feasibility study KPA plan to seek more support from other developing partners in realization of the project.

The project fosters coordination and resource mobilization for co-financing, aligning partner contributions with green energy objectives. In the past KPA has partnered with other development partners in Renewable Energy projects like Solar Energy installation at the port - funded partially by Trademark Africa and co financed by KPA resources. IMO-led alternative fuel/energy studies like Shore Power/Cold Ironing for Marine vessels to enhance KPA technical capacity. KPA has proven experience in implementing multi-stakeholder projects, including the Mombasa Port Development Project (MPDP I & II) financed by JICA and Green Port Policy Projects supported by Trademark Africa

respectively. These successes demonstrate KPA's ability to deliver large-scale, sustainable projects in partnership with development stakeholders.

PROJECT DESCRIPTION

Project Development Objective

The project's overarching objective is to transition KPA operations from fossil fuel-based terminal equipment, marine crafts and utility fleet to green energy. This is in line with its Green Port Policy which purposes to integrate climate change mitigation strategies into KPA's operations and decision-making processes, effectively reducing the carbon footprint.

This opportunity to invest in innovative technologies will not only modernize infrastructure and facilities, but it will also concurrently build climate resilience in Mombasa and KPA's other Ports. As the anticipated energy efficiency of its operational facilities will directly contribute to GHG emission reduction, the integration of sustainable development and green governance pledges the development of a highly skilled workforce, at both operational and corporate level, capable of undertaking the diversity of challenges and opportunities related to climate change.

The project target area is the Port of Mombasa due to its reliance on fossil fuel-based equipment and fleet for its operations.

The table below presents the category and quantity of equipment at the Port of Mombasa that this project aims to transition to green energy.

Category		**No**
Terminal Equipment	Forklift Trucks and Reach stackers	67
	Mobile Cranes	15
	Terminal Tractors	150
	Gantry Cranes	75
	Empty Container Handlers	23

Utility Vehicles	Lorries, Pick-ups, Vans, Fuel Bowsers	120
Marine Crafts	Berthing Tugs, Pilot Boats, Mooring Boats, Police Boat, Security Boat, Utility Boat, Pollution control Boat	20
Total		**470**

Theory of Change

Globally, ports are significant contributors to greenhouse gas (GHG) emissions due to the heavy reliance on fossil fuel-powered terminal equipment, marine crafts and utility fleet. The Port of Mombasa is no exception as it primarily utilizes fossil fuel-based equipment and fleet to support its port operations. This is part of the larger global challenge where Maritime and shipping activities have contributed approximately 3% to global GHG emissions.

This project, aimed at transitioning KPA's operations from fossil fuel dependency to green energy solutions, aims to reduce overall GHG emissions within the port premises, aligning with global climate mitigation strategies outlined in the Paris Agreement.

The project aims to achieve its main outcome of reducing GHG emissions from the Port of Mombasa.

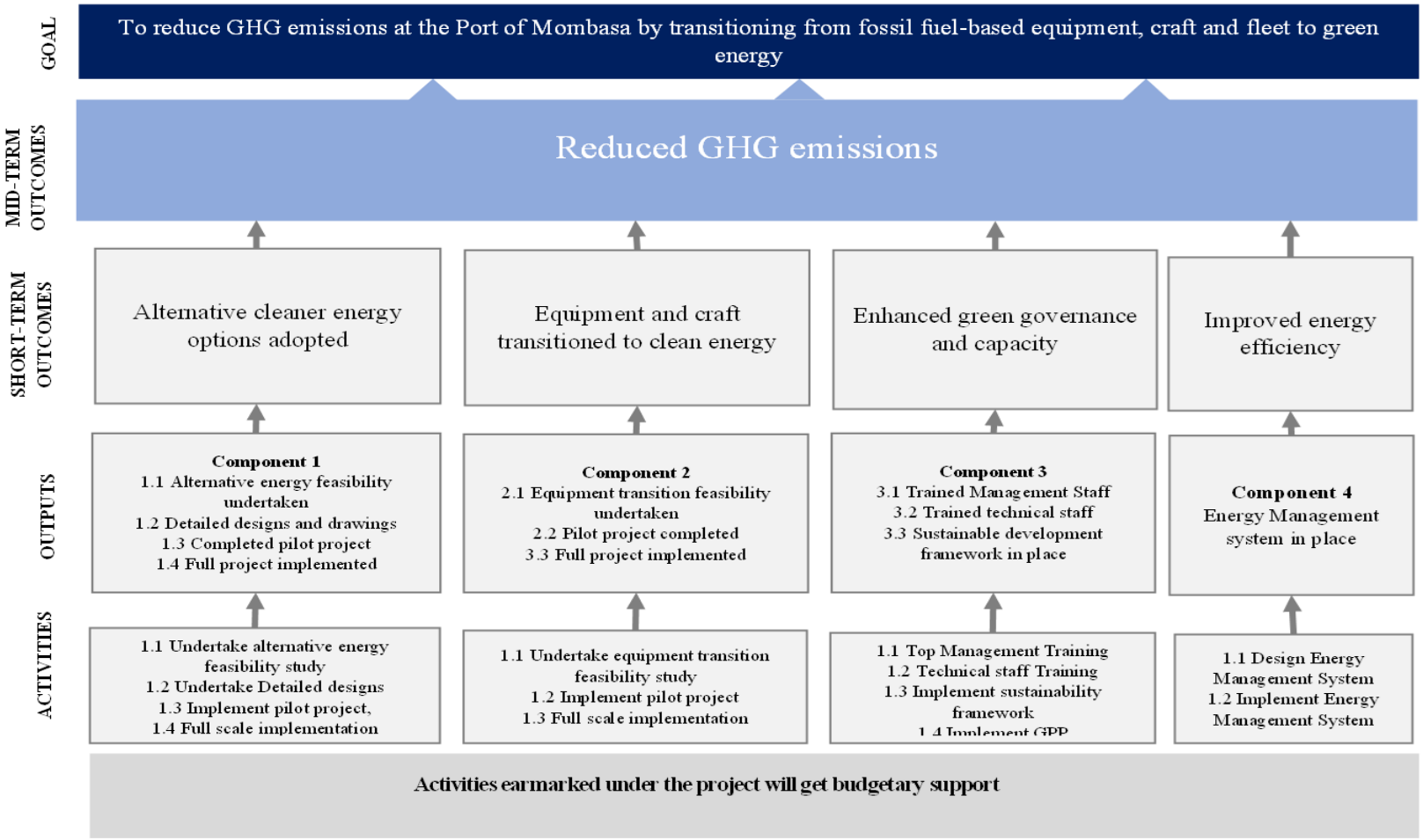
This project outcome will be supported by the following short term project outcomes aligned to the project's components:

1) Alternative cleaner energy options adopted
2) Equipment and craft transitioned to clean energy
3) Enhanced green governance and capacity and
4) Improved energy efficiency.

These outcomes will be achieved upon implementation of activities earmarked under each of the four components as described in the schematic

diagram. The main assumption is that the activities earmarked for the project will get the necessary budgets for implementation.

Theory of Change Schematic



Project Type

This project aimed at transitioning KPA's terminal equipment, marine craft and utility fleet from fossil fuel reliance to green energy is part of a programme, drawn from KPA's Green Port Policy (GPP).

The Green Port Policy was developed in 2015 and was later revised in 2024. The policy outlines different programs for KPA to undertake in the near, mid and long term to mitigate possible adverse effects of port operations on the environment. As part of KPAs overarching climate mitigation strategy, the GPP under objective 4.2 (GHG Emissions and Climate Change Mitigation) has earmarked this project aimed at reducing the amount of GHG emissions from KPA operations.

Project Components

The overall project's goal is to reduce GHG emissions at the Port of Mombasa to 50% by 2035 by transitioning from fossil fuel-based terminal equipment, marine crafts and fleet to green energy.

The latest study conducted in 2023 estimated emissions at the Port of Mombasa to be at 532,424 tCO2e. The goal will be achieved through the four subcomponents below

Project Cost and Financing Arrangements

The overall cost of the project is estimated to be USD 100,000,000.

KPA will finance USD 2,307,692 to support the installation of a pilot shore power facility at Berth 1 for KPA craft.

This project is a key step toward a broader plan to extend shore power coverage to both KPA craft and commercial vessels.

The project commenced in FY 2024/25 and runs until FY 2026/27. This initiative is integral to our strategic objective of transitioning the Port of Mombasa from reliance on fossil fuel-based equipment and fleets to green energy solutions

KPA will provide in-kind support, including the expertise of our technical team, as well as access to workspaces, meeting venues, and necessary infrastructure

The project will undergo the normal budgeting process as guided by the PIM guidelines from concept development to implementation for funding by the Kenyan Government.

Project's Target Area and Population Beneficiaries and other Stakeholders

The project will be implemented in the Port of Mombasa Geographically Located on 4°02'18"S, 39°38'39"E along the East African coastline. The Port is a major gateway to East and Central Africa frequented by ships with cargo bound or originating from its hinterland and neighbouring small island states. The overall beneficiaries will include the governments and the people of Kenya, Uganda, Northern Tanzania, Rwanda, South Sudan, Eastern DRC who constitute the business catchment hinterland of the Port of Mombasa. In addition, the Small Island developing states (SIDS) of Zanzibar, Union of the Comoros and Madagascar will also benefit from the project.

Meanwhile, the immediate beneficiary's stakeholder port community operating at the Port of Mombasa. This will include the Port of Mombasa cargo terminals and operations area. The main beneficiaries will be KPA employees (6000 No.) due to health benefits, Port users (8000 No. per day) including private and government organizations, neighbouring Mombasa city dwellers (approximately 1.3 million).

Other beneficiaries include marine vessels (approximately 1800 No. per year), equipment owners due to the availability of cleaner alternative sources of fuel. In addition, the shipping traffic of calling at the Port of Mombasa through their auxiliary engines emit pollutants during their stay at the port while loading and unloading as they stay an average of 2.3 days at dock. Similarly, the port equipment including top loaders, cranes, and terminal tractors, forklifts as well

as utility vehicles, staff cars, trucks, and buses at the port are major sources of emissions. Retrofitting and hybridization of this fleet to use alternative low carbon fuels and electric power will be of great benefit to the port community. This initiative will provide with others amongst compliance with IMO GHG's 2023 Strategy. This Strategy introduces mandatory reductions in carbon emissions for both new and existing ships hence this project will provide for the required compliance.

Finally, the management of the ports Authority will also benefit from better cost to input ratio upon adoption of operating equipment powered by clean energy. It's also anticipated that the Initiative will uplift the image and reputation of the Port of Mombasa hence catalysing additional source of revenue stream.

Environmental and Social Safeguards

- ***Environmental***

The environmental and social safeguards include measures to reduce degradation of the environment during retrofitting and construction phases, such as managing waste from decommissioned fossil fuel equipment and ensuring proper disposal or recycling. Environmental and social impact assessments (ESIA)will be conducted to identify potential risks and mitigation strategies in line with the Kenya's Environmental Management and Coordination Act and KPA green port policy.

Stakeholder engagement is central to the project's social safeguards. Consulting local communities, port users, port staff, management and Government agencies throughout implementation will ensure transparency and address any rising concerns. Mechanisms for feedback and grievance redress will be established to enhance inclusivity and foster trust. The proposed project is aimed at benefiting all stakeholders, including local communities, employees, and marginalized groups. Transitioning to green energy will create opportunities in job creation in renewable energy sectors

while also necessitating training programs for KPA staff to build technical capacity in operating and maintaining new technologies. A key component will be assessing the inclusivity impacts of the transition, with initiatives to promote women and persons with disabilities participation in renewable energy jobs and leadership roles, thus advancing equity in the workforce. The project does not anticipate any resettlement activities since the proposed site is within KPA confines.

- ***Involuntary Resettlement***

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Climate Change and Green Growth Rationale

KPA's transition to green energy is crucial for addressing climate change and fostering sustainable growth. By adopting electric and hybrid port equipment and fleet alongside renewable energy sources, KPA aims to reduce greenhouse gas emissions, improve energy efficiency, and enhance air quality. This shift supports sustainable development goals, aligns with environmental regulations, and promotes public health. Additionally, it offers economic benefits through job creation in the renewable energy sector, lower operational costs, and improved resilience by reducing reliance on volatile fossil fuels.

KPA's green transition aligns with Kenya's Nationally Determined Contributions (NDCs) and Long-Term Strategy (LTS), which prioritize reducing GHG emissions, promoting renewable energy and adopting energy-efficient technologies. It also supports sector-specific strategies like the National Climate Change Action Plan (NCCAP) and Kenya's Green Economy Strategy. Nationally Determined Contributions 2018 – 2022, National Climate Change Action Plan III 2023 – 2027.

The project shall include the development and implementation of a waste management plan that outlines proper ways of managing waste resulting from

the project activities. The plan shall entail measures to reduce degradation of the environment during retrofitting and construction phases, such as managing waste from decommissioned fossil fuel equipment and ensuring proper disposal or recycling.

The Paris Climate Agreement aims to limit global warming to below 2oC and most preferably to 1.5oC above the pre-industrial levels. Assessing alternative energy options at the Port of Mombasa will reduce reliance on fossil fuel leading to lower GHG emissions from port operations, contributing towards reducing the global warming targets. Article 2.1c of the Agreement emphasizes that state parties should ensure consistent financial flows with pathways towards Low GHG emissions and climate resilient developments. Technical support for a feasibility study to identify viable green energy solutions at the Port of Mombasa lays a major foundation for such a transition.

Other Cross-cutting Priorities

- ***Poverty reduction, Inclusiveness and Job Creation***

This project shall create new job opportunities around green technologies and renewable energies and associated value chain resulting in increased income levels and poverty reduction.

The project shall ensure that inclusion of marginalized groups including People with disabilities youth, women, and local communities. This shall be done through intentionally integrating them in the associated value chain resulting in increased income levels and poverty reduction.

- ***Opportunities for Building Resilience***

The project presents a significant opportunity to enhance resilience across multiple dimensions i.e. institutional, economic, and environmental by facilitating the transition to green energy. This transition is critical in addressing climate vulnerabilities while ensuring sustainable development through capacity-building and governance strengthening that encompasses targeted training, knowledge-sharing, and technical assistance to enhance the

institutional capacity of relevant stakeholders like government agencies, private sector actors, and local communities. The project ensures diversification of Energy sources to reduce the reliance on fossil fuels, making economies less vulnerable to price shocks and supply disruption thereby fostering economic stability. In addition, transitioning to green energy sources like use of renewable energy solutions supports climate adaptation by ensuring reliable energy for climate-smart technologies hence mitigating greenhouse gas emissions, contributing to global and national climate goals. This directly supports adaptation and mitigation efforts to combat climate change impacts.

- ***Gender Equality and Women's Empowerment Promotion***

The project shall ensure equal gender participation in policy and decision making in relation to climate actions as well as greening the port. Additionally, the project shall also ensure equal gender representation in capacity building, leadership roles, procurement opportunities and project implementation.

The project aligns with Bank's Gender Strategy (2021–2025) by promoting gender-inclusive employment, empowering women in climate change initiatives by providing skills and capacity building. It ensures economic empowerment by fostering women-led businesses in port supply chains, address barriers to equitable participation and access to social services, finance and markets.

- ***Skills Development and Capacity Building***

The project will include training and capacity-building programs in maritime logistics, engineering, and digital port management. These initiatives will promote up-skill workers, making them more competitive in the job market while ensuring the sustainability of the port's operations.

By collaborating with educational institutions, the project will create internship and apprenticeship opportunities, ensuring that the next generation is equipped with the technical skills required in the evolving maritime sector.

- ***Regional Trade Facilitation and Economic Integration***

An improved port will enhance trade efficiency, reducing shipping costs and transit times, which will benefit local and regional businesses. By improving trade connectivity with neighboring countries, the project will promote regional economic integration, strengthening Africa's position in global trade. This will also support small and medium-sized enterprises (SMEs) by providing them with improved access to export markets, thus fostering economic diversification and reducing dependency on a limited number of industries.

IMPLEMENTATION

a) Institutional and implementation Arrangements

Kenya Ports Authority will be the executing agent of the project vested with the responsibility of implementing the project. The Kenya Ports Authority is mandated to develop, maintain, improve, operate and regulate port services and related projects in the Country.

At KPA there is the Infrastructure Development department led by a General Manager who is a member of the Port's Executive Committee (EXCOM). The department primarily undertakes capital project implementation and management. The department has vast experience in implementing port development project funded by international partners i.e. World Bank, JICA, Trademark Africa, China government.

The EXCOM will serve as Steering Committee for this project and provide high level strategic guidance to the implementation process. For day-to-day coordination and implementation of this project, a multidisciplinary committee (Project implementation Team- PIT) will be constituted with members drawn from relevant divisions. For major projects such as this one, a duly appointed consultant will be required to assist in the design and supervision support of

the target interventions. Upon completion of the requisite studies, the proposed new projects requiring concept note, pre-feasibility and feasibility study will be subjected to an approval process by the Board of Directors and the National Treasury depending on the value. The Board of Directors will be appraised of the technical assistance upon approval and will be regularly appraised of the progress to ensure they provide their full support upon completion of the designated deliverables.

b) Monitoring and Evaluation

The management will appoint a Project/Contract Implementation Team as required by the Public Procurement guidelines. The team will be comprised of relevant personnel from the critical departments to oversee the day-to-day implementation and monitoring of the project. The General Manager Infrastructure Development will be the overall project manager. The project will be monitored and evaluated monthly by the Monitoring and Evaluation unit under the Corporate Planning and Strategy Division. Periodic reports will be prepared and shared with the project team and KPA management while feedback will be used to improve the project implementation as well as other projects. A budget will be allocated for the M&E for this project. The baseline data gaps will be addressed by the feasibility studies before project implementation. KPA will involve relevant stakeholders in quarterly M& E meetings to validate data gathered and reports

c) Governance

This project's framework will adopt strong operational, governance and accountability measures to safeguard its proper management and longevity. The Authority have project governance guidelines where roles and responsibilities are well outlined. KPA being a government entity, the project will be implemented under the existing government laws including public procurement and Disposal Act (PPDA), PIM regulations, Anti- corruption and Economic Crimes Act and the Constitution of Kenya 2010. KPA has a fully-

fledged department – Ethics and Integrity who will be involved in key processes. Also, the department has a comprehensive prevention plan that has specific interventions put in place in identifying bribery, risks mitigation and strategy action.

d) Sustainability

The project has secured a letter of support from the National Treasury as evidence that the project is a national priority undertaking. KPA has a Green Port Policy guiding the use of Port facilities in an environmentally sustainable manner while still maintaining economic feasibility and more important providing for allocation of resources to support energy transition and decarbonisation initiatives which are outside the core mandate of core ports authority responsibilities. Hence the GPP ensures adequate resources are provided to support investments of this nature. In addition, the GPP outlines a tactical implementation plan and accompanying budgets that will guide implementation of the initiatives. In addition, the policy recommends The Authority to pursue green financing to supplement the budget. KPA has a robust institutional framework for financing its capital projects and maintaining its operational expenditure within its budgets.

Key Performance metrics such as developing an Energy Management System, cost-savings realized through alternative energy against traditional sources, improved operational output and waste generated will be maintained. These will guide the deployment of necessary strategies such as a circular economy approach, labour up-skilling, the pursuit of further climate mitigation funding, and carbon-credit market realizations to ensure that the project's value for money is evident in its operations, while its sustainability is attained over and above its shelf life.

e) Risk Management

The Authority takes cognizance that risk is inherent in every project and can lead to unsuccessful implementation. It has a deeply entrenched risk

management culture which includes a Quality Assurance Framework and Risk Management Department. The department will be charged with developing risk identification and mitigation processes and conceptualizing responses that are dynamic to the operational environment.

The risks will ideally be classified as per each objective of this project, highlighting potential risks such as technological failures, security threats, high labour turnover amongst others. The Energy Management System and the Environmental Management System will be crucial in generating data that highlights early warning signs of impending risks and assessing risk preparedness. Mitigation measures will then be deployed under the over-arching business continuity protocol to secure consistency and efficiency whilst minimizing system downtime and failures.