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on Transport, Trade Logistics and
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9th Session

Sustainable and resilient transport and trade facilitation in times of pandemic and beyond: key challenges and opportunities

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Building sustainable smart ports as a resilience-building strategy-challenges and opportunities, Mauritius experience

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Building sustainable smart ports as resilience-building strategy: Challenges and opportunities, Mauritius experience

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Agenda

- A brief overview of Port Louis Harbour
- Smart Sustainable Port (SSP) in the Context of Greenport Initiatives
- The key drivers for adoption of SSP to enhance port resilience
- Challenges & Opportunities
- Energy transition at Port Louis Harbour – an overview

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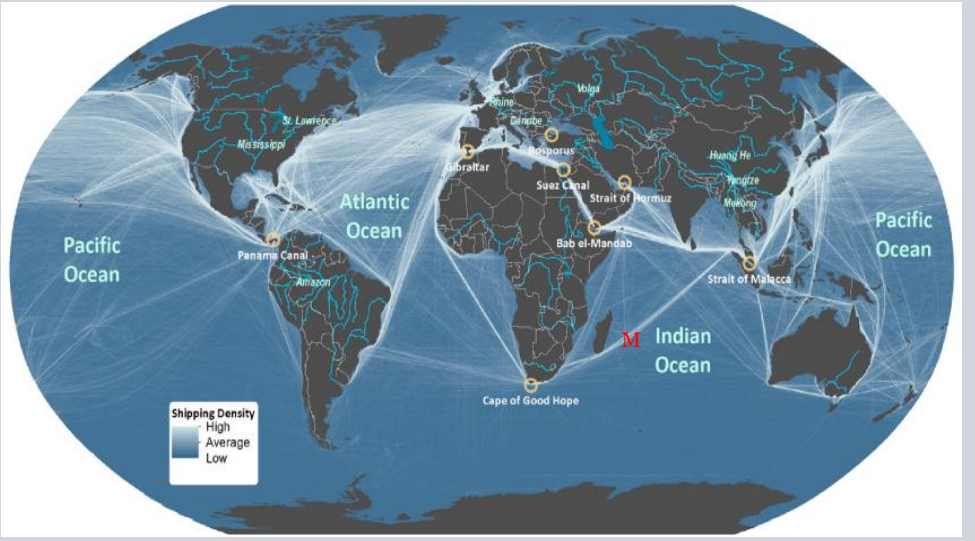
Port Louis Harbour in the Context of Global Shipping Routes



Source: Shipping density data adapted from National Center for Ecological Analysis and Synthesis, A Global Map of Human Impacts to Marine Ecosystems.

- Mauritius is located at the intersection of several different main shipping lanes, ideal for hub-and-spoke transhipment to East Africa and other Indian Ocean islands, as well as relay transhipment for longer distance routes.

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Terminal II – Multi-Purpose Terminal			
Quay	Length Mts	Dredged Depth	Cargo Handled
1	123	13.5	Bulk Fertilizer, Coal, White Oil, General Cargo
2	180	12.2	General Cargo, Containers & Bulk Cement
3	185	12.2	General Cargo & Containers
4	185	12.2	Containers, LPG & Bitumen

Terminal I (incl. Trou Fanfaron Fishing Port)			
Quay	Length Mts	Dredged Depth	Cargo Handled
A	210	12.2	Black oil, Edible oil, general cargo, Maize, Molasses, Soya Bean Meal, Wheat, Passengers, Inter-island trade
D	170	12.2	
E	135	9	Passenger, Inter-island trade
TFF 1	150	5.5	Frozen Fish
TFF 2	165	7	

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Bulk Imports



Petroleum Products Imports & Bunkering Services



LPG Storage and Distribution



Sugar

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Cruise Vessels at Port Louis Harbour


Dry Docking & ship Repairs

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Sensitivity of Port Louis Harbour

- Strategically located at the crossroad of main maritime routes b/w Far East & Africa and Europe & Australia
- Country's only maritime gateway for External trade (99%)
- Contribute 2% to the country's GDP
- Vital connection for Indian Ocean islands & peripheral regions

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Port Trade Performance
Key Figures at a glance

Total Trade Volume	**7.7**	**Million tonnes**	**(+0.5%)**
• **Containerised Cargo**	3.9	Million tonnes	**(+7.0%)**
• **Dry Bulk Cargo**	1.9	Million tonnes	**(+15.1%)**
• **Liquid Bulk Cargo**	1.9	Million tonnes	**(-17.2%)**
• **Fish Traffic**	98,961	tonnes	**(-29.1%)**
Total Container Traffic	**463,044**	**TEUs**	**(+7.8%)**
• **Captive Container**	229,772	TEUs	**(-10.1%)**
• **Transhipment Container Inwards**	233,272	TEUs	**(+34.0%)**
• **Transhipment Container Outwards**	227,353	TEUs	**(+29.8%)**
Total Container Throughput (incl. paid restows)	**697,345**	**TEUs**	**(+13.9%)**
Total Vessel Traffic	2,628	calls	**(-21.0%)**
• **Containerised Vessels**	494	calls	**(+1.4%)**
• **Fishing Vessels**	752	calls	**(-24.1%)**
Cruise Traffic	**Cruise activities suspended due to COVID-19 pandemic**		
Total Bunker Traffic	**614,113**	**tonnes**	**(-11.3%)**
• **Pipeline**	66,276	tonnes	**(-31.6%)**
• **Barges**	**547,837**	**tonnes**	**(-8.0%)**

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Cruise Terminal Building by end of 2022

Based on a forecast in 2016, the numbers of cruise vessel calls and passengers were expected to increase to 60 and 60,000 respectively by 2025.

The facility will comprise the passenger terminal, commercial areas, office space including parking facilities.

The preferred development option is estimated at about Rs 750 million & the project is expected to be completed end of 2022.

What is a Smart Port?

According to Port Technology International, a smart port is one that ensures "***no waste of space, time, money and natural resources***".

Concept of smart ports involves:-

- harnessing advanced technologies to enhance port operational efficiency
- energy efficiency
- environmental sustainability

The Smart Port concept is a subset of the broader Sustainable Smart Port philosophy::-

Sustainable Smart Ports (SSP) are ports that leverage on new data environments, energy transition of the maritime sector as well artificial intelligence and green technology-based solutions to enhance port operational efficiency, promote energy efficiency and clean/renewable energy sustainability , as well as tap into the possibility of producing clen/renewable energy production and distribution

The port of the future is expected to be 100% electric, local emissions-free, and able to process goods in less time.

Sustainable Smart Port in the context of Greenport Initiatives

- MPA has the ambition to become carbon neutral
- Energy Efficiency and Renewable Energy initiatives have already started
- Greening of Port operations is the next phase

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Sustainable Smart Port in the context of Greenport Initiatives

- Greening of Port operations
  - Solar PV installation at the Oil Jetty
  - Mauritius Container Terminal – energy management opportunities (terminal lighting, improvement in control of the operation, electric RTGs, electric vehicles, etc.) are being explored)
  - Shore power supply for Cruise Terminal
- Initiatives improve the image of Mauritius as a green destination
- Shipping lines wish to improve their image too – they look for ports who have green policies

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Key drivers for adopting Sustainable Smart Port

Decarbonization

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Key drivers for adopting Sustainable Smart Port

Technology & Digital

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Key drivers for adopting Sustainable Smart Port

Port Community

&

Environment

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Sustainable Smart Port activity domains

- **Operations**
- **Environment**
- **Energy**
- **Safety & Security**

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Sustainable Smart Port activity domains & sub-domains

Port Operations

- Productivity
- Automation
- Intelligent Infrastructure

Environment

- Environmental Management System (EMS)
- Emissions & Pollution Control
- Waste Management
- Water Management

Energy

- Efficient energy consumption
- Producing and use of renewables

Energy management

Safety & Security

- Safety Management Systems
- Security Management System
- Integrated monitoring and optimization systems

Source: International Journal of Sustainable Transportation

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Sustainable Smart Port initiatives at Port Louis Harbour

Operations

- Infrastructure Capacity (berths that can accommodate vessels of 15.5 m draft, super post-panamax crane with state of the art technology)
- Implementation of a Maritime Single Window (MSW) to cater for vessel clearance at Port Louis Harbour
- Use of NAVIS for vessels operation & yard operation at Mauritius Container Terminal to improve productivity
- Use of SCADA at the Oil Jetty to monitor the status of the strategic facility which is used to handle the country's energy imports
- Use of Building Management System at the Cruise Terminal

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Sustainable Smart Port initiatives at Port Louis Harbour

Environment

- Implementation of ISO 14001 Environmental Management System
- Visible actions towards waste management and resource conservation such as by recycling all its E-waste including batteries, used oil, promoting sustainable use of paper and setting up a rain water harvesting system.
- Air and water quality and biodiversity conservation in the port are also major aspects that are being monitored.
- Port stakeholders have also joined hands with the MPA to show their commitment for a better and more sustainable port environment through the signing of a Port Environment Charter.

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Sustainable Smart Port initiatives at Port Louis Harbour

Energy

- Greenport Initiatives started in 2013 at Port Louis Harbour
- EU Technical Cooperation Facility funded the study titled "Port Energy Efficiency and Renewable Energy Strategic Planning"
- Efforts on sustainability have been pursued since then

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Sustainable Smart Port initiatives at Port Louis Harbour

Most deployed technologies in ports

Solar PV

Wind

Electric/Hybrid Vehicle

Hybrid/Electric CHE

OPS

RE/LED Lighting

Sustainable Smart Port Initiatives at Port Louis Harbour

Safety & Security

Safety

- Adherence to the guiding principles of the ILO Occupational Safety & Health Management system
- COVID – 19 has prompted the Port to adapt its H & S practices and procedures so as to ensure business continuity

Security

- Compliance with ISPS Code
- Vessel Traffic System (VTS) for regulating traffic of vessels and ensure safety and security in the port area
- Centralised CCTV and Access Control System
- Implementation of an Information Security Governance Framework

Challenges

- Policy focus on economic indicators rather than sustainability and resilient indicators for ports and port developments.
- Financial impediments due to the Covid-19 pandemic & Russia-Ukraine have resulted in postponement of short-term and long-term efforts to enhance port sustainability
- Important adjustments to workforce in terms of training & awareness prior to emerging smart port technologies
- Ageing workforce
- Labour unions

Opportunities

- Interestingly though, the pandemic has renewed interest in enhancing port resiliency through the search for effective coping mechanisms to sudden shocks. For example, the health & safety policy has been reviewed & risk assessments at worksites, etc. to deal with, for example, COVID-19
- More emphasis on the need for digital transformation & capacity building on ICT skills
- Migration of the existing Oracle ERP system to Cloud

Energy transition at Port Louis Harbour

The Project

- Feasibility Study for a Shore Power Supply System for Cruise ships at Port Louis Harbour by Royal HaskoningDHV
- Partners Involved
  - Indian Ocean Commission
  - World Bank
  - Central Electricity Board (CEB)

The objective

- Reduction of emissions by ships while berthed

How to go about?

- Power connection to Central Electricity Board (CEB) power grid
- Local renewable power generation > Power delivered by the Shore Power

Our Partners

COMMISSION DE L'OCÉAN INDIEN

SWIOFISH

THE WORLD BANK

CENTRAL ELECTRICITY BOARD

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Project Summary

The Investment

- USD 11. 5 M

Annual reduction in CO2 emissions

- Approximately 3, 000 tons

Impact of Project

- Could be the determining factor for a cruise line decision for homeporting in Mauritius or elsewhere

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Environmental Factors

- CO2 emissions
  - Ships generators typically produce 675 Kg per MWh of electricity
  - 2019 CEB power grid produced 1027 Kg per MWh of electricity
  - 2025 CEB emissions planned to be 667 Kg per MWh of electricity
  - 2030 CEB emissions planned to be 320 Kg per MWh of electricity
- If MPA installs sufficient solar panels to produce the total electricity required by the cruise berth each year, CO2 emissions effectively become zero. Investment: **USD 3.5 M**
- CEB emissions of other greenhouse gases and particulates are not known.
- Noise from ship's generators is not a significant problem at this location.

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Shore Power from Renewable Solar PV

- Install Solar PV panels on rooftops in the port buildings, sheds, etc.
- Total generation > Total Shore Power Demand
  - ❖ OPS is carbon emission free
- Annual energy demand ~ 4200 MWh/year
- Required solar capacity ~ 2.7 MW_p
- Number of solar panels ~ 5400 panels
- Required rooftop space ~ 27000 m^2
  (coverage rate 40%)
- Current Solar PV under development
  - ❖ Will meet **21%** of shore power requirement
  - ❖ Reduce **866 tons of CO_2**

Solar PV Installations at Oil Jetty
Port Louis Harbour, Mauritius

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UNCTAD Support for Sustainable Smart Port

- UNCTAD is collaborating with the Mauritius Ports Authority on the Sustainable Smart Project(SSP).
- This collaboration could support in the implementation of the port energy transition strategy through:-

a) technical assistance in developing a Net Zero (CO_2) port roadmap;

b) assistance in training and capacity building; and

c) enhancement of port operational efficiency, improvement of shipping services, etc.

Questions?