MTCC AFRICA
Maritime Technology Cooperation Centre

CAPACITY BUILDING FOR CLIMATE CHANGE MITIGATION IN THE MARITIME SHIPPING INDUSTRY

PRESENTATION ON TECHNICAL PORTSIDE ELEMENTS

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INTRODUCTION

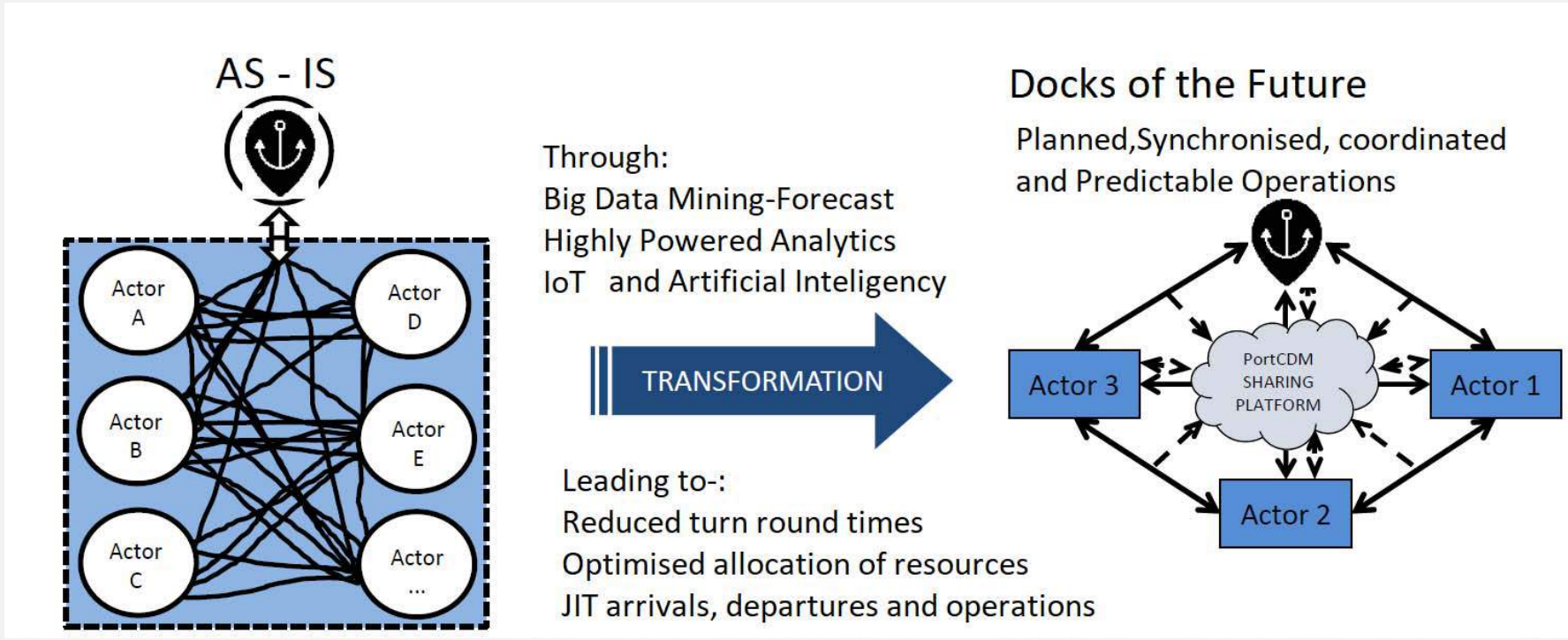
LAMU PORT

Africa: Massive infrastructural Projects; Ports, Roads/Rail and Airports

Global recognition of Ports: not measured by yard size; but throughput and sustainability of operations.

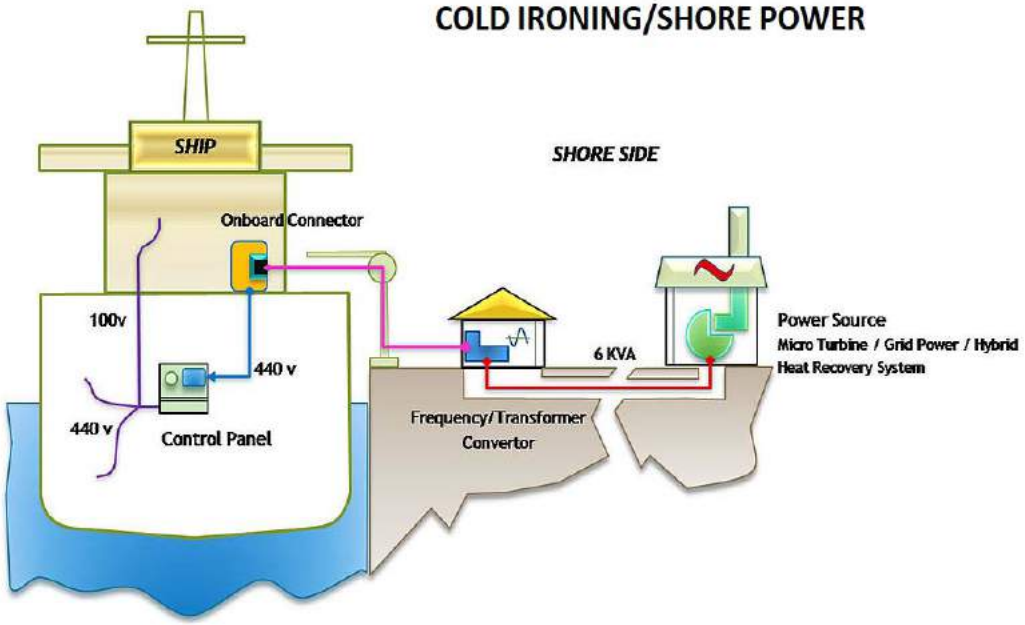
Several Ports doing their masterplans: Time to ensure backbone infrastructure Installed

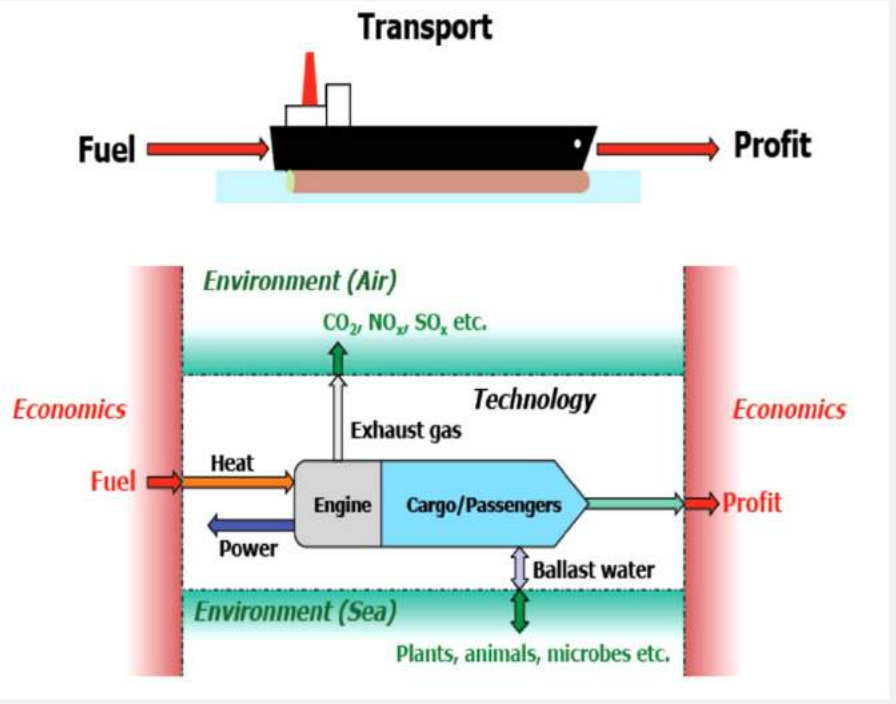
African Port Transformation



Sustainability Related Issues during this Master planning era through eye of Marpol Annex VI

Energy Efficiency in Port Operations





Issues to consider-:

- Installation of supporting Infrastructure
- Power Supply Capacity: 30kw-12MW
- Frequency of Grid
- Source of Grid
- Cost: USD 0.5m-6m

Energy Efficiency in Port Operations

All these tugs have shore power facilities

Energy Efficiency in Port Operations: Energy Audits

Helps in establishing and remedying energy wastages-:

- Energy Saving opportunities to Ports include-:

1. Power Factor Correction Banks: 0.95
2. Retrofit (Use Of Premium Efficiency Motors) motors Up to 91% efficiency. Standard Efficiency : 81%
3. Lighting Improvements through-:
   - Installation of LED lamps as a replacement of all the existing less efficient lamps
   - Replace electromagnetic ballasts with electronic type.
   - Use of skylights to facilitate use of natural lights during the day in workshops
4. Use Of Occupancy Sensors: ACs and Lights (corridors/Indoors)
5. Installation Of Energy Management System. Monitor individual consumption
   - Install smart meters and energy management software to monitor energy
6. Use of RIS-GA system on RTG and MHC: Optimizes diesel generator speeds during the crane's stand-by mode and typically reduces total fuel consumption by 20%.
7. Electrification of equipment: e RTG and power supply to HMC

Energy Efficiency in Port Operations: Energy Audits

8. Energy Savings on Computers :Use of LED instead of LCD (30-50% less)

9. Lift Controls Upgrade:

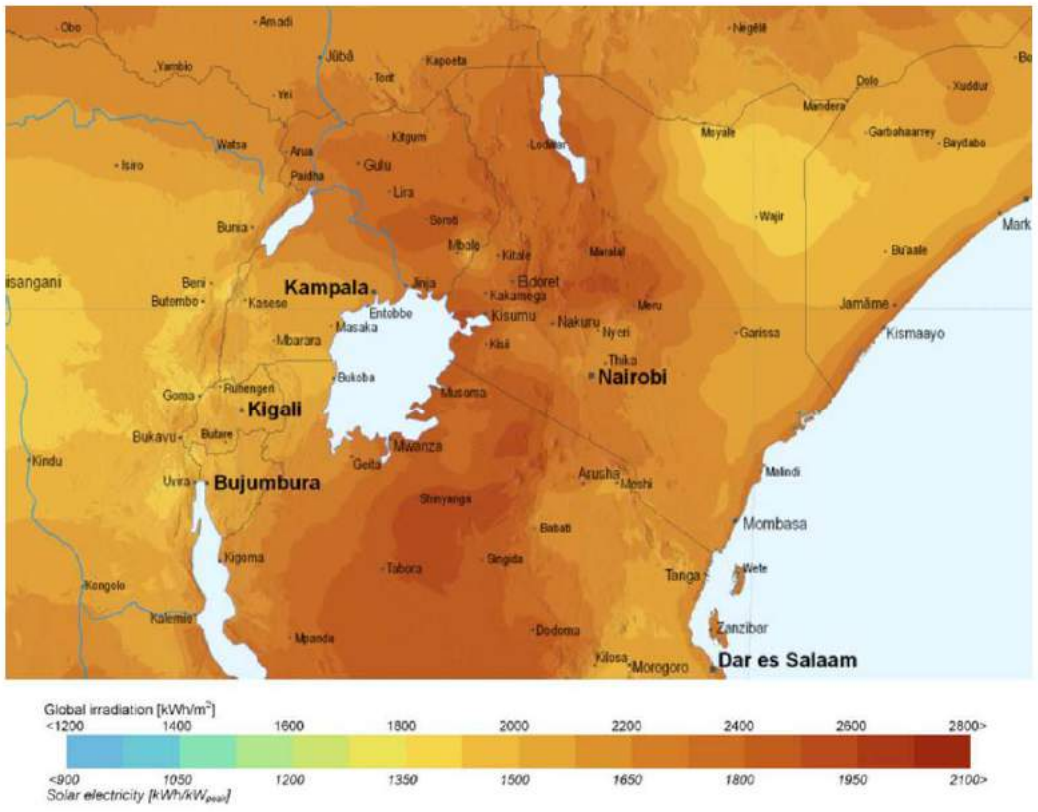
- Install VFD (VSD) in lieu of Thyristors to control operation of lifts
- Install machine room-less type lifts-More efficient
- Replace geared motors with high efficiency gearless type

10. Chillers and Acs Improvements:

- Replace all machines with R22 refrigerant (not environmentally friendly) with R410A
- Install Aircosavers on the air conditioning units
- Use of air Curtains in frequently used doors

Energy Efficiency in Port Operations: Renewable Energy

The solar power generation potential in Kenya(Africa) is quite high



Mombasa
2200kWh per m2 per year

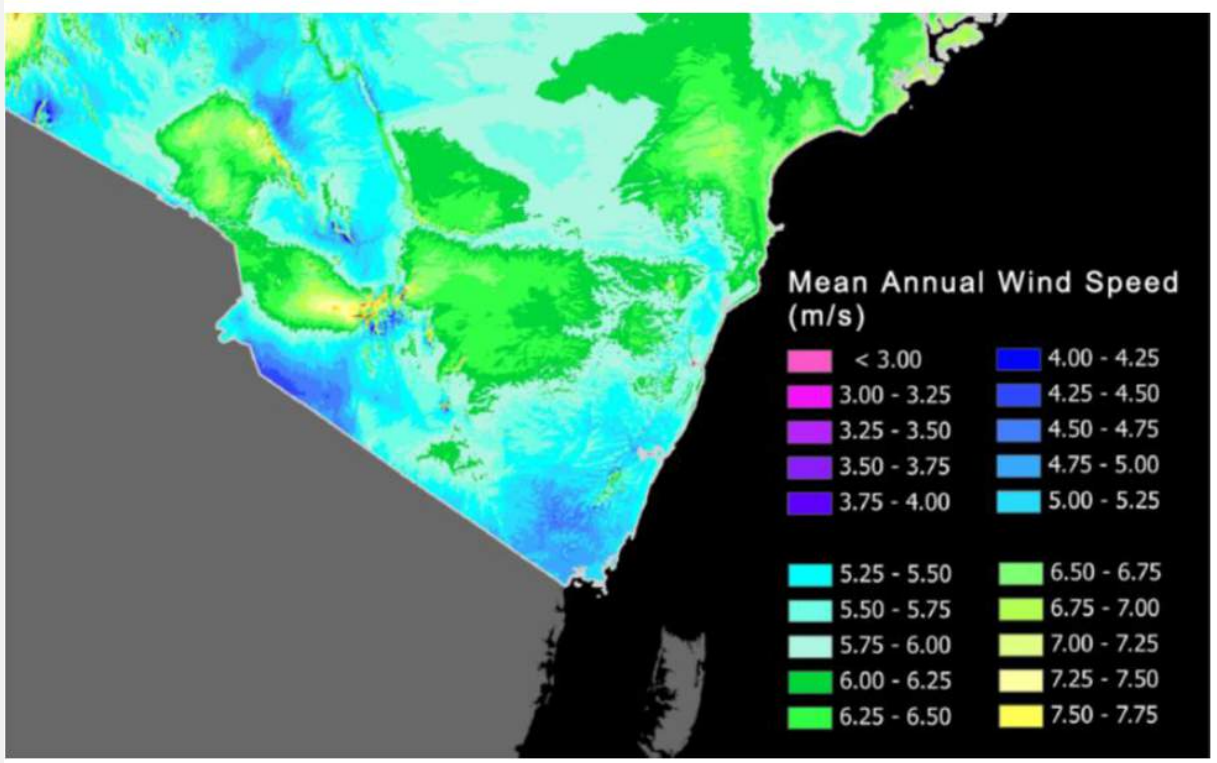
Germany: Largest Solar Producer

1100kWh per m2 per year

Installations on -:
Sheds- General Cargo
Open Fields
Workshops Roof tops
Office Block rooftops

Energy Efficiency in Port Operations: Renewable Energy

The Wind power generation potential specific to areas of application



Wind Data speeds for different areas need to be considered

Wind speeds for POM is 5.5m/s (Not feasible for large wind turbines)

Most turbines reach their rated power at minimum wind speeds in the range from 10 – 15 m/sec

At 5.5m/s, turbine outputs would vary varies between approximately 10 and 20% of the rated power.

Energy Efficiency in Port Operations: Power reticulation network

High Level Tapping:

- improved tariffs(Large Consumers)
- Stability of supply
- Ohmic Loses(LV distribution)

Redundancy in supply

- Loops
- Alternate Feeders

GMN | The Global MTCC Network

A global network for energy-efficient shipping

THANK YOU!

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MTCC-Africa Consortium Members

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

Host Institution

Kenya Maritime Authority (KMA)

KMA

Kenya Ports Authority (KPA)

KPA