



MTCC AFRICA
Maritime Technology Cooperation Centre

Sustainable Port Initiatives-Understanding MARPOL Annex VI
Environment and Logistics
30th June 2020
Michael Mbaru



This project is financed by the
European Union
and implemented by the
International Maritime Organization

Presentation outline

1. MARPOL Annex VI Requirements
2. Sustainable Ship/Port Initiatives for Implementation of MARPOL Annex VI
3. Case Studies on Sustainable Port Initiatives
3. Maritime Logistics
4. Challenges, recommendations and conclusion.

1. MARPOL Annex VI-Prevention of Air Pollution from Ships

Objective-control emission from ships through ship design, technologies, energy use and operational efficiencies;

Emissions include;

SO_x- burning of sulphur present in fuel oils

PM-unburned fuel/incombustible elements in the fuel

NO_x-produced when fuel is burned at high temperatures

VOCs-generated when fuel is burned in combustion process

CO-forms during incomplete combustion of fuels

CO₂-inevitable product when we get energy from burning the carbon in fuel

All these gases presents both human health and environmental risks

Requirements to control emissions

Reg. 12: Ozone depleting substances-from refrigerating plants and fire fighting equipment

Reg. 13: Nitrogen Oxides-prevention of emission of NO_x from marine diesel engines-set limits for emission of NO_x based on the year of construction of the ship (Tier system)

Reg. 14: Sulphur Oxides and Particulate Matter: Sulphur content in fuel oil capped at 0.50% m/m

Reg. 15: Volatile Organic Compounds: regulates emissions of VOCs from tankers in a port or a

Reg. 16: Shipboard Incineration: prohibited for some substances e.g. residues of cargoes from Annex I-V

Reg. 17: Reception Facilities-ODS and exhaust gas cleaning residues

Reg. 18: promote availability of compliant fuel

Others; EEDI, EEOI, SEEMP, Fuel oil consumption reporting

2. Sustainable Port Initiatives for Implementation of MARPOL Annex VI

Enforcement measures-

- Port state inspections on statutory and operational requirements
- Administration-appropriate measures for detection of violations and enforcement

Port operations are a significant source of emissions from visiting marine vessels and cargo handling equipment-affecting both the port workers and surrounding communities health.

Control of emissions from port operations is merely regulated at the international level-responsibilities rests with national authorities

At regional level-EU seaports implement several directives on emission reduction under the EU auspices

African ports lack regional regulatory approaches for regulating emission in ports

In response to the health and environmental impacts-ports in various parts of the world continue to develop and implement policies, programmes and strategies to enhance their port green status.

Existing Emission Control and Energy Efficiency Measures for Ships in the Port Area;

Three major categories: equipment, energy and operational measures.

Equipment: Engine Technologies

Boiler Technologies

After-treatment Technologies

Energy Measures:

Clean fuels

Alternative power supply

Operational Measures

Ship operational efficiencies

port/terminal operational efficiencies

VOC working losses

NOTE: Port emission inventories are the basic building blocks to the development of emission reduction measures and the means to monitor the effectiveness of the measures that are being implemented within port area.

3. Case studies on Sustainable Port Initiatives

Stakeholder	Examples of instruments
Regulators	
Rulemaking	EU Fuel Sulphur Directive, IMO MARPOL Annex VI, CARB At-Berth (Shore Power) Regulation, CARB LSF Regulation, CARB Ship Onboard Incineration Regulation
Financial/grant incentives	Finnish investment aid, differentiation of fairway dues, TEN-T subsidies, NO _x tax, US EPA–DERA funding, Incentive programmes – Carl Moyer (CARB) , prop 1b goods movement funding programme
Recognition	US EPA Clean Air Act Award
Ports/Terminals	
Incentive/grant programmes	ESI incentives/VSR (POLA, POLB, PANYNJ CVI), POS At-Berth Clean Fuels Programme; PMV Blue Circle (fuel switch, low-sulphur fuel, shore power, vapour recovery, ESI), Maritime Singapore Green Initiative, Shenzhen incentive scheme
Lease/tariff conditions	POLA, POLB
Voluntary programmes	VSR-POSD
Recognition	Maritime Singapore Green Initiative, POLB Green Flag, POLB/POLA CAAP Awards
Ship owners	
Self implementation	CSR programme (business case), NO _x business fund
Voluntary programmes	Hong Kong FWC
Equipment Manufacturers	
Demonstration projects (team with early adopters to demonstrate technologies)	CSR (business case)

3. Maritime Logistics

- Maritime Logistics-concerned with planning, implementing and managing the movement of goods and information involved in the ocean carriage. The main important actors in maritime logistics system include; shipping, port/terminal operating, and freight forwarding.

Shipping-moves cargoes between ports

Port/terminal—receives ships, loading/unloading cargo, stevedoring, connection to inland transportation, warehousing, berthing, cargo handling etc

Freight forwarding-booking vessels and preparing requisite documents for ocean carriage and trade on behalf of shippers, inventory management, packaging, contracting, warehousing etc.

- Generally accepted that maritime logistics activities create undesirable effects including emissions, hazardous substances, oil pollution, ballast water, dust, residues, garbage
- Sustainable Maritime Logistics/Green Maritime Logistics-attempt to attain an acceptable environmental performance in the maritime transport supply chain, while at the same time respecting traditional economic performance criteria i.e. combines acceptable economic, environmental and social performances;
- Achieving such a goal involves several trade-offs, and win-win solutions;
- Logistics-based measures for green maritime transport-focus on emissions-include;

Technological measures include more efficient (energy-saving) engines, more efficient ship hulls and designs, more efficient propellers, cleaner fuels (low carbon content, LNG), alternative fuels (fuel cells, biofuels, etc.), devices to trap exhaust emissions (scrubbers, etc), energy recuperation devices (exhaust heat recovery systems).

Logistics-based (tactical and operational) measures include speed optimisation, optimised weather routing, optimal fleet management and deployment, network design, efficient supply chain management, and others that may impact the logistical operation.

Market-based measures or MBMs. These include Emissions Trading Schemes (ETS), a possible tax imposed on fuel, and a variety of others.

There are ship owners implementing voluntary emission control and energy efficiency measures and participating in voluntary and incentive-based programmes set up mainly by port authorities. CSR and sustainability ethos have also played a role for some ship owners to go beyond regulation.

3. Challenges, recommendations and conclusion

• **Challenges;**

- inadequate awareness of the impacts of marine pollution caused by ship sources as regulated by MARPOL Annex VI, and the importance of ratifying and implementing the Annex to reduce emissions;
- inadequate resources including financial, human, and technical/material, required to effectively implement and enforce MARPOL Annex VI provisions at national and regional level;
- gaps in national legislation due to lack of transposition of MARPOL
- inadequate capacity (legal, material, financial burden) to fully enforce, prosecute and penalize violations of MARPOL requirements.
- Arriving at trad-offs or win-win solution for maritime logistics operators to integrate acceptable economic, environmental and social performances

Recommendations;

- Allocating adequate resources including financial, human, and technical/material, required to effectively implement and enforce MARPOL Annex VI provisions at national and regional level is key to implementation of sustainable port initiatives
- A wide variety of drivers play a role in reducing emissions at the ship-port interface, ranging from government regulation to developing private initiatives, its important to identify priority drivers before implementing sustainable port initiatives
- Numerous measures are available to effectively reduce emissions and increase energy efficiency and experience within the port area
- Before implementing sustainable port emission reduction policies, port emission inventories are important as the first step to the development of emission reduction measures and the means to monitor the effectiveness of the measures that are being implemented within port area.
- Regional approaches and frameworks for control of emissions in ports are key towards improving the green status of ports as in EU seaports.

Conclusion;

- Providing for industry and community stakeholder involvement in development of the control measures, programmes and initiatives will help the port identify issues important to both stakeholder groups and allow the port to acknowledge and potentially address these issues.

Question & Answer Session



IMO



INTERNATIONAL
MARITIME
ORGANIZATION

This project is financed by the
European Union
and implemented by the
International Maritime Organization



GMN | The Global
MTCC Network
A global network for energy-efficient shipping



THANK YOU!



This project is financed by the
European Union
and implemented by the
International Maritime Organization

MTCC-Africa Consortium Members



Jomo Kenyatta
University of
Agriculture and
Technology (JKUAT)

Host Institution



Kenya Maritime
Authority (KMA)

KMA



Kenya Ports Authority
(KPA)

KPA