



# IMO CARES REPORT ON DECARBONIZATION OF DOMESTIC SHIPPING

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# Domestic Shipping Contribution to GHG Emissions

In this study, which centers on African and Caribbean SIDS and LDCs, the following considerations have been made:

- i) Domestic shipping: Trade or services carried out by vessels operating exclusively within a single country.
- ii) Regional shipping: Trade or services conducted by vessels operating across multiple countries within the same region.

- There are two models for calculating domestic emissions:
  - i) **Vessel-based allocation:** Only domestic sectors is responsible from 31.25 million tonnes of fuel consumption, contributing **9.2%** to global shipping emissions.
  - ii) **Voyage-based allocation:** Based on individual voyages is responsible from 88.8 million tonnes of fuel consumption, accounts for approximately **26.2%** of emissions. It includes ships solely navigating between **internal ports** (9.2%), as well as **international ships** making occasional visits between two ports within the same country. The contribution of international ships engaged in domestic voyages is **17%**.

# Measures to Decarbonize the Domestic Shipping



## Operational measures

- Appropriate passage planning, power demand and weather routing
- Speed reduction
- Just In Time Arrival
- Ships' handling optimization
- Hull and propeller cleaning
- Machinery maintenance
- Economies of scale (Construction of larger vessels)

## Technical measures

- Alternative fuels and sources of energy for shipping:
- Hydrogen, Methanol, LNG, Ammonia
  - Renewable Energy: Wind, Solar, Biofuel
  - Other source of energy: Electric (Battery and supercapacitor) and hybrid propulsion
  - Fuel cell

### Hydrodynamics:

- Optimized hull designs-material
- Propeller and propulsion design
- Frictional resistance reduction
- Air bubble
- Wake flow improvement
- Propulsion Improving Devices & Energy Saving Devices

### Waste heat recovery

## Ports

- Bunker fuel infrastructure
- Onshore Power System (OPS)
- Renewable energy
- Micro and smart grid
- Equipment: Elect/Digitalization/Automation
- Incentive scheme
- Speed reduction

5-15%	0-100%	>20%	5-15%
Machinery	Alt. Fuel & R. Energy	Voyage optimization	Vessel design & hydrodynamic
Machinery efficiency improvements	LNG, LPG	Speed reduction and Just In Time	Optimum ship size and dimension
Waste heat recovery	Hydrogen	Optimise vessel utilisation	Energy Saving Device
Engine de rating	Ammonia	Power demand optimisation	Air lubrication system
Battery hybridisation	Methanol	Advance port logistic	Hull form optimisation
Engine Vs Fuel cell	Electrification		Hull coating
Enhance fuel injection system	Renewable energy (Wind, Solar)		Hull and propeller cleaning
	Biofuels		

# Current Uptake of Energy Efficiency Technologies and Alternative Fuels for Domestic and International Shipping

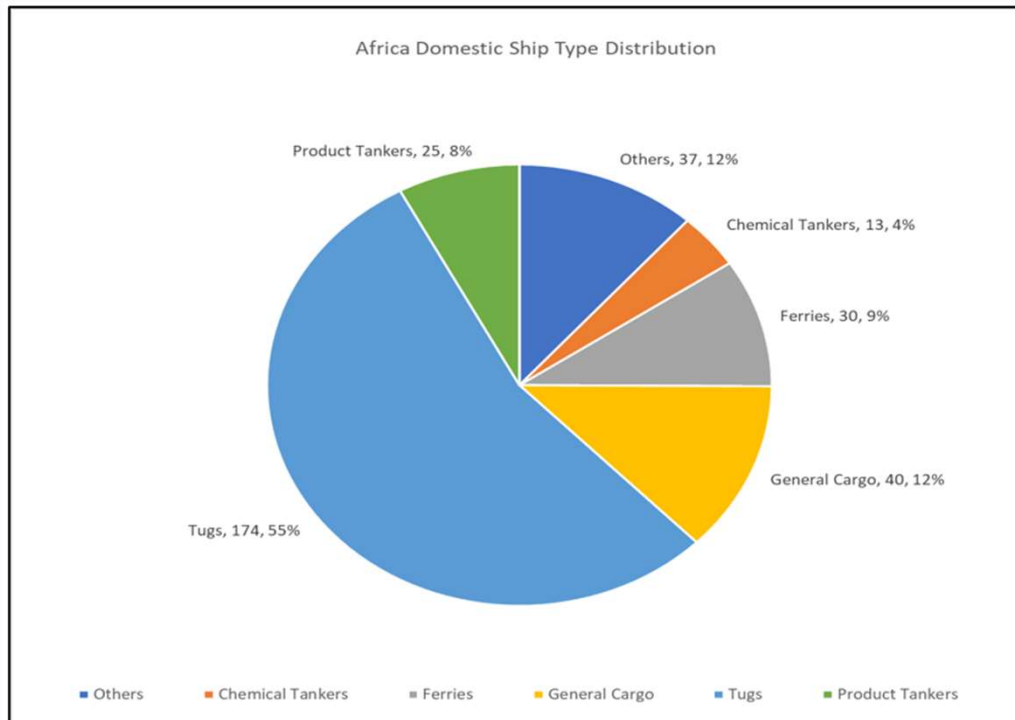


Fleet	Domestic		International		Global	
	Number of ships	%	Number of ships	%	Number of ships	%
<b>Total fleet</b>	<b>28, 627</b>	<b>100.00</b>	<b>73, 469</b>	<b>100</b>	<b>102, 096</b>	<b>100.00</b>
Energy Efficiency Technology	304	1.06	7468	10.16	7772	7.61
LNG	115	0.40	925	1.26	1040	1.02
Alternative fuel	46	0.16	239	0.33	285	0.28
<b>Electric/battery</b>	222	<b>0.78</b>	277	<b>0.38</b>	499	0.49
Total EEM Uptake	626	2.19	8303	11.3	8929	8.75

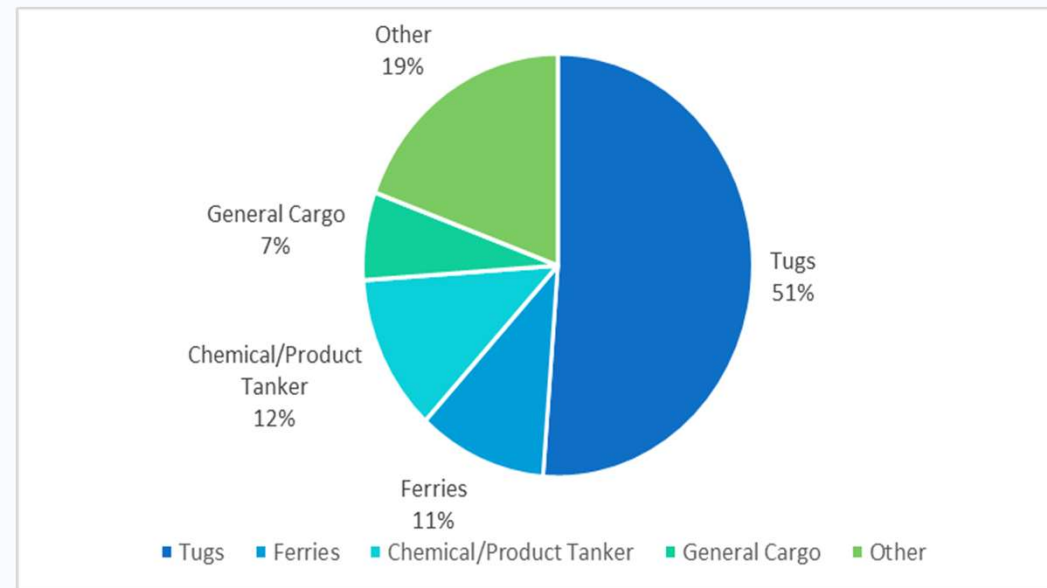
# Africa Region



The fuel consumption of African domestic ship fleet in SIDS and LDCs is found to be 41,044 tones of HFO/IFO, and 113,389 tones of MDO/MGO, resulting in 513, 669 tones of CO<sub>2</sub>e per year.



Africa domestic ship type distribution.

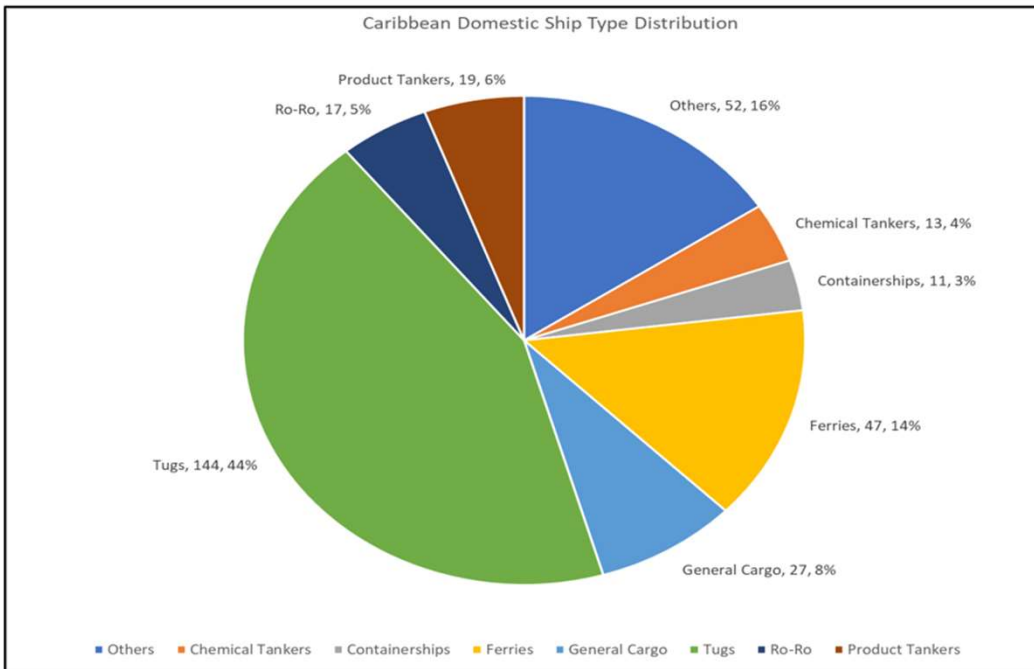


Emission estimation from African SIDS and LDCs for domestic shipping.

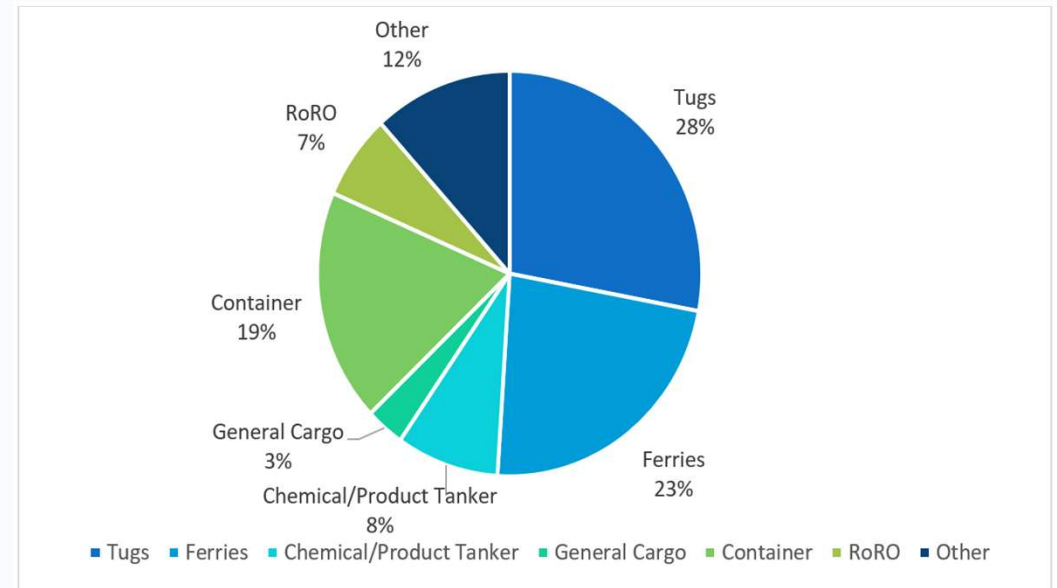
# Caribbean Region



The fuel consumption of Caribbean ship fleet involved in domestic and intra-regional shipping in SIDS and LDCs is found to be 127, 529 tones of HFO/IFO, and 181, 059 tones of MDO/MGO, resulting in 1,007,700 tones of CO<sub>2</sub>e per year.

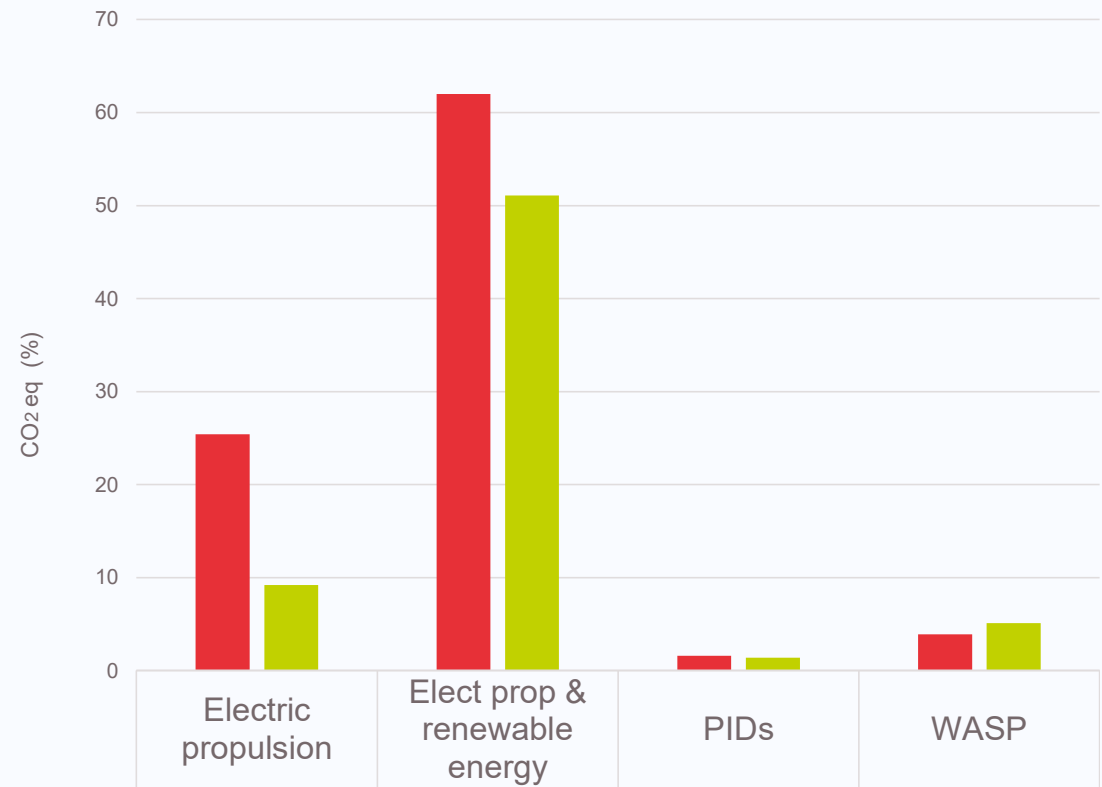


Caribbean domestic ship type distribution.



Emission estimation from Caribbean SIDS and LDCs for domestic shipping

# Decarbonization Potential in Domestic Shipping of SIDS and LDCs (Africa & Caribbean)?



■ Emissions reduction in Africa (%)	25.4	62	1.6	3.9
■ Emissions reduction in Caribbean (%)	9.2	51.1	1.4	5.1

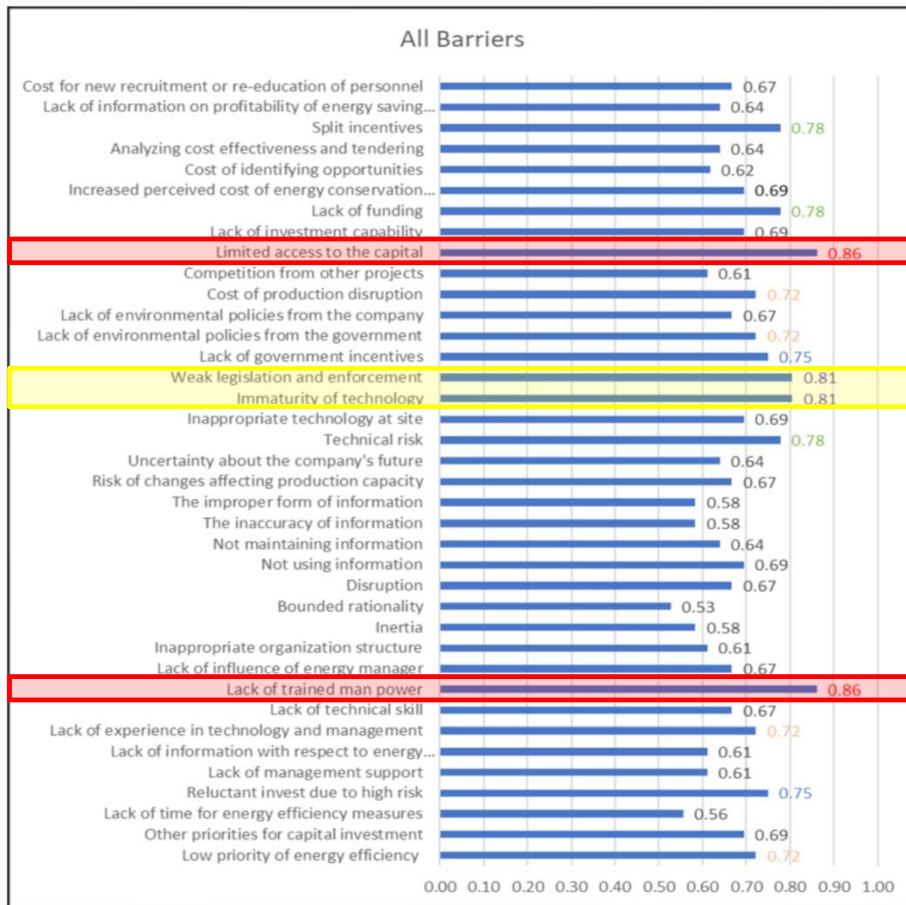




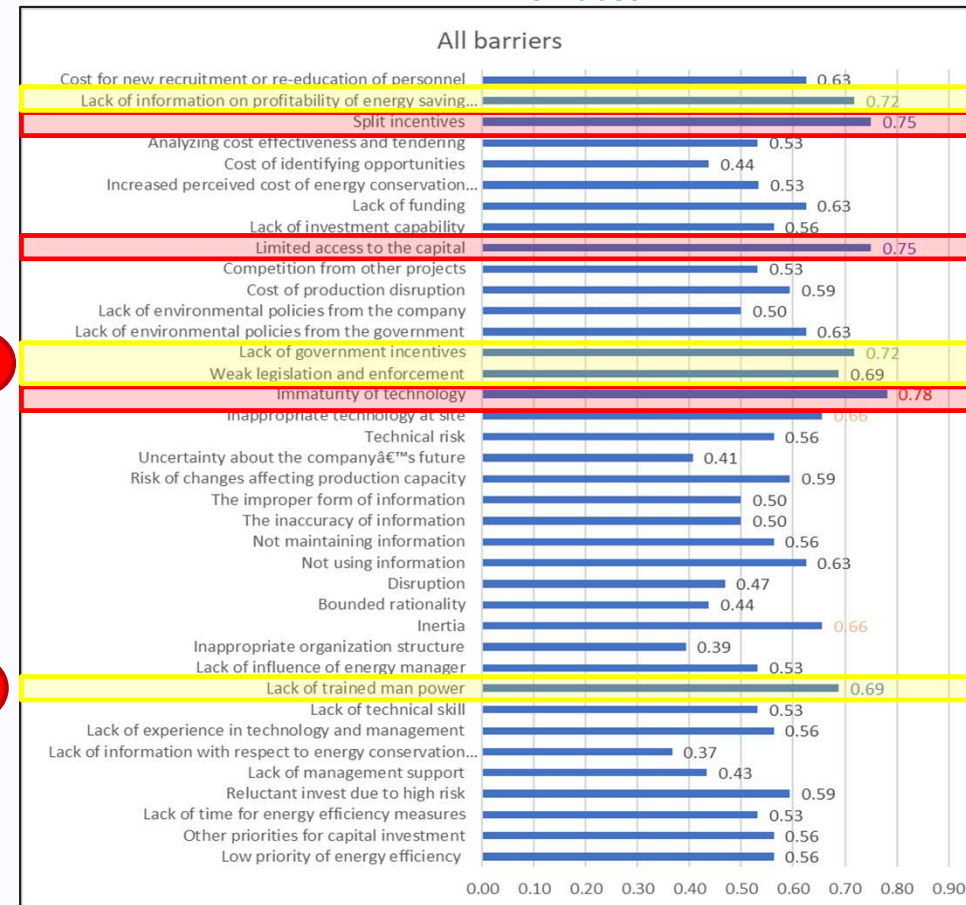
- 1 Limited access to **Capital**
- 2 Immature **Technology**
- 3 Lack of trained **Manpower**
- 4 Weak **Legislation and Enforcement**

# Barriers According to Questionnaire

## Africa



## Caribbean





# Recommendations



- The role of governments in decarbonizing coastal shipping.
- Support the sector by reducing the risk of investment.
- Raising finance for decarbonization of domestic shipping.
- Capacity building and research and development (R&D).
- Enhancing energy efficiency is indispensable to meet zero emission domestic shipping.
- Increasing renewable energy utilization for electrification, alternative fuel production & on shore power supply.
- The role of ports in decarbonizing coastal shipping.
- Establishment of green corridors.





**Thank you for your attention!**

**YOUR QUESTIONS ?**

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**IMO CARES Technology and Decarbonisation Event, (25 June) at IMO HQ, London.**