

SUPPLEMENTARY MATERIAL

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Development of Greenhouse Gas Emissions Baseline and Identification of Carbon Offset Cost for Maritime Vessels of a Developing Country

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Appendix-I: Glossary of Abbreviations

AIS	Automatic Identification System
CH ₄	Methane
CO ₂	Carbon Dioxide
CORINAIR	Core Inventory of Air Emissions
EEA	European Environment Agency
EMEP	European Monitoring and Evaluation Programme
g	Gram
GHG	Greenhouse gas
GT	Gross tonnage
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HSD	High speed diesel
HT	Hundred Tons
IEA	International Energy Agency
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
Kg	Kilogram
KPT	Karachi Port Trust
MGO	Marine Gas Oil
MPV	Maritime Patrol Vessel
N ₂ O	Nitrous Oxide
NDC	Nationally Determined Contributions
OBM	Outboard motor
PFCs	Perfluorocarbons
PMSA	Pakistan Maritime Security Agency
PNSC	Pakistan National Shipping Corporation
Ppb	Parts per billion
Ppm	Parts per million
PQA	Port Qasim Authority
STEAM3	Ship Traffic Emission Assessment Model
TJ	Terajoule
UNFCCC	United Nations Framework Convention on Climate Change
US-EPA	United States Environmental Protection Agency
VLSFO	Very low sulfur fuel oil
WWF	World Wildlife Fund

Appendix-II: PNSC's Fleet (Seagoing Vessels Photos)

Tankers



Figure 1: Khairpur (220.89m in Size)



Figure 2: Bolan (220.89m in Size)



Figure 3: Quetta (246.80m in Size)



Figure 4: Lahore (246.80m in Size)



Figure 5: Karachi (246.80m in Size)



Figure 6: Shalamar (228.6m in Size)



Figure 7: Mardan (246.80m in Size)



Figure 8: Sargodha (246.80m in Size)

Bulk Carriers



Figure 9: Chitral (185.73m in Size)



Figure 10: Malakand (225m in Size)



Figure 11: Hyderabad (188.50m in Size)



Figure 12: Sibi (169.37m in Size)



Figure 13: Multan (189.80m in Size)

PMSA's Fleet



Figure 14: 15HT Maritime Patrol Vessel

(Source: <https://www.arabnews.com/node/1501131/press-review>)



Figure 15: 6HT Maritime Patrol Vessel

(Source: <https://twitter.com/sohailahmedsa/status/1493879071456985088/photo/1>)



Figure 16: Corvette (397 Tons)

(Source: https://pmsa.gov.pk/pmss_ship/osron22)



Figure 17: Island Class

(Source: <https://www.pakistanpoint.com/en/story/189827/island-class-ships-inducted-to-fleet-of-pmsa.html>)

Harbour Crafts



Figure 18: Dredgers

(Source: <https://kpt.gov.pk/news/87/kpt-invites-bids-for-capital-dredging>)



Figure 19: Tugs

(Source: <https://www.pinterest.com/pin/shanawar-one-of-karachi-ports-powerful-harbor-tugs--323625923192980324/>)



Figure 20: Barges

(Source: <https://kpt.gov.pk/pages/21/port-statistics>)



Figure 21: Floating Cranes
(Source: https://en.wikipedia.org/wiki/Gwadar_Port)



Figure 22: Ferry Boats
(Source: <https://awamiweb.com/free-ferryboat-service-bw-manora-kemari-at-karachi-port-39532.html>)

Fishing and other crafts



Figure 23: Fishing Vessels



Figure 24: Skiff Boat