

## Focus Area: SUSTAINABLE DEVELOPMENT AND INFRASTRUCTURE

### Market Segments: GREEN PORTS & SHIPPING

#### Segments & ISIC Codes:

- **Shipping:** 5229 (Transport Support), 336611 (ShipBuilding & Repair)
- **Ports:** 4290 (port construction), 3510 (electric power generation), 5222 (water transport services), 517229 (Fuels-Renewable)
- **Navigation & Data Systems:** 2651 (navigation systems manufacturing), 6202 (software data/servicing)
- **Automated Vessels & Drones:** 5011 (Sea and Coastal Water Passenger Transport), 5012 (Sea and Coastal Freight Water Transport)

Sector Score: 22

#### Sample Investments:

- *Private:* Retrofit/newbuild regional private fleets with energy efficient & zero-emission tech
- *Private:* Install clean onshore power & clean fuel bunkers at ports
- *Private:* Invest in maritime nav/data systems to meet port demand & fishing controls
- *Public:* Retrofit/newbuild regional public fleets (ferries and cargo) with energy efficient & zero-emission tech
- *Public/Private:* Install waste/recycle facilities at ports
- *Public/Private:* Elevate port docks, yards and warehouses for climate resilience
- *Public/Private:* Invest in drones for undersea research & monitoring

#### 1. Relevance to ADB Healthy Ocean Action Plan? (Score: High=3)

- Shipping* is highly relevant as it drives 80% of global trade, creates jobs across the region, connects islands and drives transport, tourism, trade and fishing within the region - and needs finance to transition to sustainability with clean power and many new technologies.
- Ports* deserve special attention because of their role as gateways for development and hubs for controlling the blue economy. Ports have massive needs and attractions for investment in green infrastructure and climate resilience. China's maritime silk road drives new growth across the South Pacific and Indian Oceans.
- Digitalisation:* When ships enter and leave ports, vital information about cargoes, dangerous goods, crews, vessel details and many other things has to be exchanged with the authorities ashore. Under IMO's FAL Convention, public authorities are now required to set up systems so that all this happens digitally.
- Automation* is transforming shipping, with autonomous vessels and marine drones performing tasks impossible or dangerous for human operations.

#### 2. Positive Social Impacts? (Score: High=3)

- Poverty:* Job opportunities in the maritime sector are both locally-based (ports, local transport) and international (cargo and ship operations). Whilst trade has some cyclicity due to commodity and economic activity, the percentage of global trade by volume (80%) has remained constant. China's Maritime Silk Road strategy gives a long-term commitment to the sector, which should attract more young seafarers and

port workers. Unfair labor practices (including slavery) are more concentrated in the fishing segment than trade, ports and transport. This has become an issue deterring for investors from the sector and for communities struggling to compete against industrial fishing. Employee conditions on ships need to be assured by corporate accountability and compliance with IMO, local regulations and initiatives like [Human Rights at Sea](#).

- b. *Gender*: The maritime sector recognised the importance of gender issues when the IMO declared *Empowering Women in the Maritime Community* as the World Maritime Day theme for 2019, specifically committing to advancing SDG5 (Gender Equality). A variety of organisations serve women in shipping and ports, like [WISTA](#), [IAPH Womens Forum](#) and regional networks. Standards differ between developed and developing countries. Overall, this is a male-dominated sector. Issues of safety and fairness are multiplied for female seafarers. However, support and management roles in ports and shipping logistics are growing with technology - creating new opportunities for women.
- c. *Covid19*: In April 2020, the IMO asked the UN system agencies to support IMO in its [request](#) to governments to declare seafarers, port personnel and other crucial maritime workers as key personnel. This recognises the importance of the maritime sector to economic well-being and provides an assurance of security to employees. Safeguards for seafarer's health are more complex than for many other sectors due to the higher exposure to foreign diseases in general.

### 3. Positive Environmental Impacts? (Score: Medium=2)

- a. Ships are responsible for 3% of global GHG and 18% of air pollutants overall. Regulations and customer demand are starting to move shipping toward sustainability. This requires comprehensive changes to operating procedures and cost assumptions, after decades of heavy pollution of both air and water. Asia is home to 70% of the world's shipping industry and 17 of the 20 largest ports. To achieve the IMO's goal of 50% less GHG from shipping by 2050, Asia must lead the way on putting zero emission vessels (ZEV) on the water by 2030. Progress against water pollution by vessels was helped by the 2017 Global Ballast Water Treaty, requiring all ships to treat and safely discharge ballast water on land. Noise pollution by ships is increasing and harms ocean life. Unlike ballast water and sulfur emissions, however, there is no global treaty to prevent ship noise pollution.
- b. Investing in clean power for shipping (including fishing, tourism, cruise, ferries, local and international cargo) pays off with cleaner seas and air - and ROI via fuel savings within 5 years, depending on the technology. To comply with IMO 2020 sulfur regulations (designed to reduce air not water pollution), many shipowners have installed open fuel scrubbers, dumping toxic waste into the ocean instead of exhaust into the air. Yet the technologies are ready for a cleaner shipping industry with:
  - i. Auxiliary-power technologies (sails, solar, waste-heat), and
  - ii. Core-power fuels: Hydrogen, Ammonia, Methanol and some Biofuels
- c. On the port level, environmental regulations are local and national - therefore both rules and enforcement vary greatly by country. Clean onshore power is needed to protect local communities and global GHG impacts. Infrastructure for clean fuel supply chains is where 85% of investment is needed to advance ZEVs. This is an opportunity for ports and shipyards. The crisis in marine waste needs to be met by

investment in port-side waste and recycling facilities. This can serve local communities as well, with recycled materials and cleaner local environments. Lastly, ports play a role in monitoring fishing by supervising landings. This is an area where investments in data systems and employee training pay off significantly with more sustainable fisheries and certified export products.

#### 4. **Potential for Market Scalability? (Score: High=3)**

- a. For global trade, the shipping industry has been consolidating over the past decade: The top 10 carriers control 70% of the market and own 35% of the world's fleet. Flags are selected for fiscal reasons - including the Republic of Marshall Islands, the world's second largest ship registry - but the majority of shipowners are Asian-based. The shipbuilding industry is dominated by Asia (China, Japan, South Korea). Asian ports have 40% of global market share.
- b. However, the need for regional/local shipping and ports across the Pacific and Indian Oceans has never been greater. Intra-Asian shipping (trade, tourism, fishing, etc) keeps pace with the region's economic growth - and provides a more efficient and environmentally-friendly way to transport goods and people than air transport. This is where scaling a cleaner maritime industry is so important today.
- c. The transition to "green shipping and ports" looks aspirational but key elements have been put in place to make this real and scalable: Regulations, Technology, Finance. We have already covered the first two elements. Finance is now getting behind green shipping with initiatives like the Poseidon Principles (criteria for bank lending to shipowners), Getting to Zero Coalition (100+ signatories to support ZEV), green bond shipping standards and a variety of regional finance programs. The Pacific Blue Shipping Program, for instance, will fund green shipping investments in the Eastern Pacific region.

#### 5. **Capacity for Innovation & Growth? (Score: High=3)**

- a. *Digital disruption* is modernising maritime sectors, making them more efficient, collaborative and sustainable. This will also make it possible for DMCs to control their maritime activity and impacts more effectively, with less capital-intensive investment. According to [Lloyds Maritime Academy](#), key innovations include: Artificial Intelligence, Autonomous Vessels, Big Data, Blockchain, BOT, Cloud Computing, Cybersecurity, Digital Twin, Digitalisation, Drones, IoT, Machine Learning, Robotics, Smart Shipping. In Asia-Pacific, leaders like the Port of Singapore's are supporting innovation with its new [Maritime Cluster Fund](#).
- b. *Clean Energy*, as already noted, is poised to transform the shipping and ports industries. The entire supply chain needs to be adapted to clean power sources that enable shippers and ports to reduce operating costs whilst protecting the environment. Ground transportation has already started this transition and now shipping is beginning to move. This disruption will benefit DMCs by reducing outflows for foreign oil/gas, improving human health and blue natural capital. Vessels sailing on coastal, inter-island and inland waterways are the early adopters of ZEV, for instance, which means opportunity for green growth in local economies.

## 6. Benefit from Regional Governance Frameworks? (Score: High=3)

- a. *Regional initiatives* are underway to support the transition to a sustainable maritime industry, notably:
  - i. [The Pacific Blue Shipping Program](#), a \$500mn initiative launched by five island nations in October 2019, targets a 40% drop in emissions by 2030 and zero emissions by 2050.
  - ii. [Pacific Islands Transport Forum & Expo](#) convenes stakeholders in the region to find common policy, finance and operating approaches to green shipping.
  - iii. *Maritime Clusters in key Asian ports* provide policy and industry interaction, so decisions are informed by regional concerns.
- b. *Global frameworks* - from the IMO to forums in transport, energy and ports - are available to support regional governance with capacity building, education and industry influence. The global nature of the maritime industry lends itself well to regional collaborations. With the scale of investment and regulatory monitoring required, regional governance should make maritime issues a priority.

## 7. Opportunity for SMEs? (Score: Medium=2)

- a. Shipping industry consolidation creates niche opportunities for local, regional and specialty carriers. Drivers of consolidation include excessive capacity (due to overbuilding to meet the previous decades demand from China) and volatile trade patterns (due to commodity cycles and protectionism). Both causes are here to stay. Now we are at the start of the Covid19 recession, with a further retraction in global trade likely to accelerate shipping consolidation. Shipping still carries 80% of global trade volume, but the volume will decrease and it will be carried by fewer companies. This means pain for the SME suppliers and carriers as the shake-out continues.
- b. However, offsetting this consolidation is the rise of opportunities in the many growth trends we have discussed: Green shipping, green ports, digitalisation, efficiency, regional growth and trade among DMCs. The sustainable maritime trends may favor SMEs in developing countries. For each of the segments noted in (5), there are abundant opportunities for regional SMEs. Furthermore, they cause less externalities - environmental and social - than maritime business-as-usual.

## 8. Attract Private Investment? (Score: High=3)

- a. *Shipping*: Bank lending (ship mortgage and corporate debt) is the largest source of financing, with the top 40 banks lending around \$400 bn in 2018. But shipowners have tried to diversify funding sources since most traditional banks stopped direct lending since 2008. Debt capital markets, leasing (especially from China), hedge and institutional funds are a smaller but growing portion of the ship finance market (See Appendix, Figure 2). Some development banks (IFC, EIB) have started green shipping finance programs because catalytic finance is needed to attract private capital and help shipowners cross the ROI gap of the clean energy transition. ADB could do the same to support clean water, air and sustainable shipping that benefits all DMCs. Pacific Blue Shipping Program does this for inter-island ferries/cargo in one region only. A wider approach is needed now.
- b. *Ports*: A multi-level strategy is needed to address the issues and opportunities we have outlined: climate resilience, clean onshore power, clean fuel supply chains,

digitalisation, waste management, regulatory compliance, Maritime Silk Road, community support, blue economy hubs. Most of this is infrastructure finance based on government credits, utility cash flows and real asset valuations. This dynamic is attractive to institutional investors seeking to match long-term liabilities with low but steady returns on sustainability themes. Investment vehicles that offer diversified maritime infrastructure portfolios across the region, with risk mitigation by ADB, will fill a gap in the market and provide a secure base for green ports.

- c. *Marine Technology*: This segment is attractive to private capital seeking growth through innovation and sustainability themes. Private equity and venture capital funds are funding sources. Unlike shipping and port investments, the technology segment is not capital intensive and may have early and high ROI. However, because there is some technology risk and perceived political risk for DMC-based businesses, blended finance approaches are needed to attract private investors who otherwise stay in Silicon Valley and European centers. When impacts can be identified and measured, impact investors will also support technology solutions - especially in port clusters where community benefits are visible. In 2019, impact investors dedicated over 20% of assets under management (Impact AUM) to the Asia-Pacific region.

## REFERENCES

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## APPENDIX

Figure 1

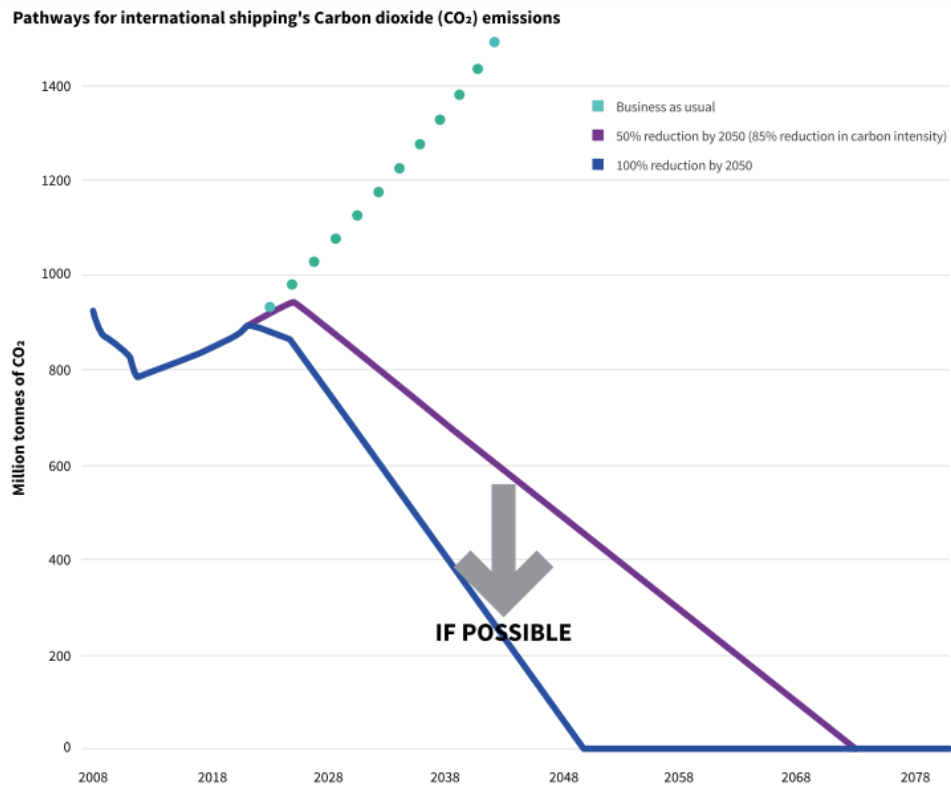


Figure 1: Carbon dioxide (CO<sub>2</sub>) reduction trajectory for international shipping in line with the IMO Initial GHG strategy

Source: Zero Emission Vessels. Lloyds Register.



Figure 2: Shipping Finance - Stakeholders

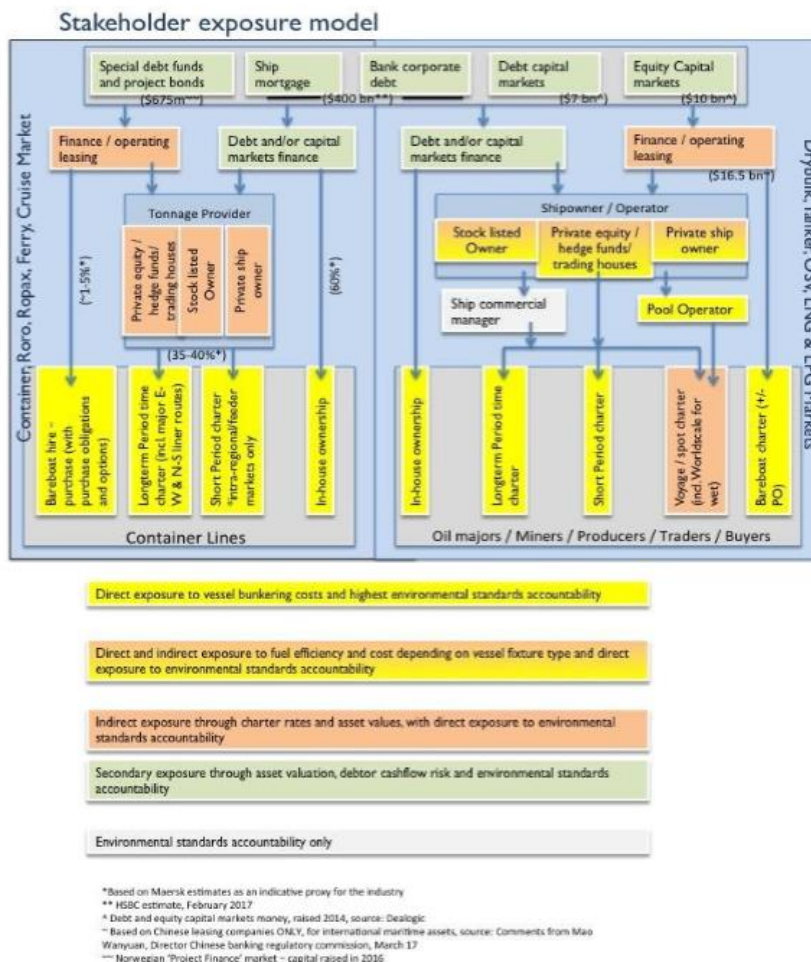


Figure 3: Description of shipping stakeholders and their respective exposure to bunkering cost and asset value risks