Shipping

9th in a series

Eurosif

This Eurosif sector report has been compiled by environmental research company Trucost. It examines some of the major environmental, social and governance (ESG) challenges facing the shipping industry and related risks and opportunities these present to long-term returns.

SHIPPING OVERVIEW

- The shipping industry transports more than 90% of global and European external trade. There are more than 94,000 merchant ships globally, most of which are dry bulk carriers and oil tankers.[1] Sea transport accounts for some €83 billion in annual revenues in the EU27.[2] Companies in 13 European countries control more than one-third of the world's fleet,[3] however, three-quarters of the fleet fly the flags of developing countries.

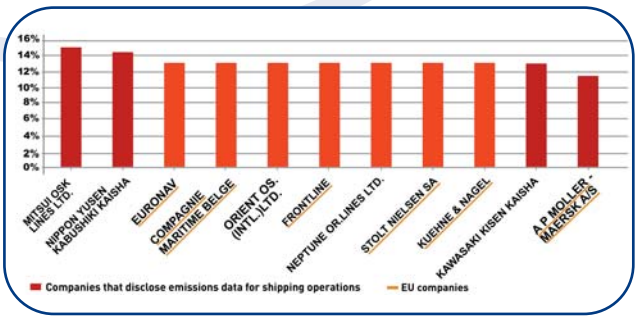
- Some 50,000 cargo ships transported 7.7 billion tonnes of cargo in 2007.[4] Europe is the world's largest dry cargo market, importing over 1.5 billion tonnes of commodities such as coal, iron ore and grain. Some 466,000 officers and 721,000 sailors serve on merchant ships worldwide. The majority of sailors are recruited from developing countries, especially South East Asia (Philippines, Indonesia, China, India).[5]

- Pollution can present a risk to investors largely due to the exposure of merchant shipping companies to potential financial liabilities under regulatory regimes. Treaties including the International Convention for the Prevention of Pollution from ships (Marpol),[6] under the International Maritime Organisation (IMO), aim to control discharges of harmful substances to sea and set limits on air emissions.

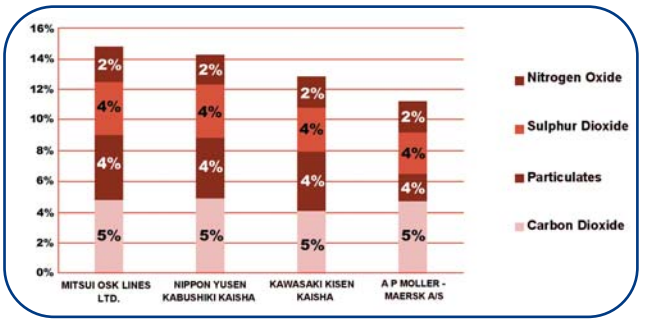
- The European Commission aims to internalise environmental and health-related costs, known as negative externalities or damage costs, into transport pricing to help make the sector more sustainable. The environmental damage costs of air pollution, including CO2 emissions, from the transport sector in Europe could total €210 billion by 2020.[7]

- Trucost has calculated emissions to air from the shipping segments of 11 companies in the MSCI All World Developed (AWD) Index. Just four of the companies, including one of six based in the EU, report their emissions to air, reflecting the industry's general lack of transparency on environmental impacts. To compare the environmental performance of companies of different sizes, Trucost has calculated their "Impact Ratios", by measuring environmental damage costs as a percentage of revenue **(Graph 1)**. For the four companies that report shipping emissions to air, a breakdown of Impact Ratios by each air pollutant is illustrated in **Graph 2**.

1: MSCI AWD shipping companies: air emissions damage costs/revenue



2: Breakdown of direct environmental damage costs for emissions/revenue



SHIPPING TRENDS

- In response to the global economic slowdown and lower demand, some shipping companies are reducing capacity in container services and cancelling orders for new, more fuel-efficient ships.

- Acts of piracy and armed robbery against ships off the coast of Somalia, particularly in the Gulf of Aden - a strategic corridor between the Indian Ocean and the Red Sea, have recently increased dramatically. More than 120 attacks were reported in 2008 and as of November 2008, 14 ships and some 280 seafarers were held hostage off Somalia.[8] Widespread diversions around the Cape of Good Hope would increase fuel consumption, emissions and transport costs. The IMO has issued guidance on measures to prevent piracy and armed robbery, including advice on minimising danger to crews and ships.[9]

- Environmental issues are rising up corporate agendas due to strengthening regulatory controls on environmental impacts from shipping fleets.[10] These could help shift consumption from highly polluting heavy-fuel oil residues from oil refineries (bunker fuel) to lower-emission, more expensive marine distillate fuel. Carbon intensity is a proxy for fuel efficiency, which represents exposure to volatile fuel costs. Companies that operate cleaner, more efficient fleets stand to gain competitive advantage.

1 *International Maritime Organization, Maritime Knowledge Centre, International Shipping and World Trade, Facts and figures, May 2008.*
2 *Data for 2005, Energy and Transport in Figures 2007, European Commission Directorate-General for Energy and Transport.*
3 *Greece, Denmark, Norway, Germany, UK, France, The Netherlands, Italy, Belgium, Spain, Austria, Switzerland and Sweden, UNCTAD, Review of Maritime Transport 2007.*
4,5 *http://www.marisec.org/shippingfacts/worldtrade/*
6 *http://www.imo.org*
7 *European Commission Communication, Strategy for the internalisation of external costs.*
8,9 *http://www.imo.org*
10 *From July 2010, stricter controls on air emissions will apply under the Marpol Convention.*

ENVIRONMENTAL, SOCIAL AND GOVERNANCE ISSUES	KEY CHALLENGES	BUSINESS RISKS & OPPORTUNITIES
• Most commercial vessels are powered by diesel engines. **Diesel exhaust contains harmful** pollutants including over 40 cancer-causing substances that damage health and could contribute to 80,000 premature deaths from heart and lung disease worldwide annually by 2012.[11] • When marine engines burn fuel, they emit dust, soot and small particles measured as **Particulate Matter** (PM). Particulates can be inhaled, penetrate lungs and cause respiratory illness. • Ships emit almost 8% of global sulphur dioxide **(SO_2) emissions** that harm human health and cause environmentally damaging acid rain.[12] • Ship engines emit some 15% of global nitrogen oxide (NOx) emissions annually, contributing to smog and acid rain. **NOx emissions** result from engine design, operation and maintenance rather than fuel quality. • Trucost calculates that the combined **external damage costs** for air pollutants emitted from the shipping segments of 11 companies listed in the MSCI All World Developed (AWD) Index amount to €7,714 million (see Graph 1).[13] A breakdown of these damage costs indicates exposure from different emissions: 37% CO_2, 24.3% particulates, 23.5% SO_2 and 15.3% NOx.	**Air Pollution**	• **The damage costs would reduce the companies'** combined earnings before interest, tax and amortisation **(EBITDA) by 69%**, if internalised. EBITDA at risk ranges from 22% for Euronav to 230% for Kawasaki Kisen. Five other companies would face a loss. • Differences in exposure to environmental damage costs where companies report shipping emissions are due to measures such as energy-efficient technologies (see case studies). • The IMO and European Commission plan to set **new emission caps on particulates, as well as SO_2 and NOx.** • Ships can use seawater scrubbing or switch to cleaner fuels such as lower sulphur marine diesel oil to reduce SO_2 emissions by up to 81%, at a cost of €320-€2,045 per tonne.[14] • NOx emissions could be cut by 20%-90% at a cost of €9-€358 per tonne, although some abatement measures can increase fuel consumption.[15] • Less polluting ships can benefit from lower port charges. For instance, in Sweden, ships with low SO_2 and NOx emissions receive up to 50% reductions in fairway dues.
• CO_2 is the main greenhouse gas (GHG) emitted by maritime transport, largely due to fuel use. Merchant shipping CO_2 emissions are estimated to total 1.12 billion tonnes. This is almost twice the amount emitted by aeroplanes and **equates to 4.5% of global emissions**. Global CO_2 emissions from shipping are projected to rise by 30% to 1.5 billion tonnes by 2020.[16] • An average cargo ship of more than 8,000 deadweight tonnage, emits 14-15 grammes of carbon dioxide (gCO_2) per tonne/km. This is significantly **more carbon efficient than air freight**, which emits up to 1,600 gCO_2 per tonne/km.[17] • The IMO, which must, under the UN Kyoto Protocol, address GHG emissions from shipping, plans to propose measures during UN talks in December 2009 to agree **global GHG reduction targets post-2012**. • In October 2008, the IMO's Marine Environment Protection Committee (MEPC) failed to agree meaningful measures such as emissions trading to reduce GHG emissions from the sector. Progress was limited to voluntary measures to improve fuel efficiency.	**Carbon Dioxide Emissions and Climate Change**	• As shown in Graph 2, **there are varied exposures to potential carbon costs**. Investors can use an understanding of variations in carbon performance within the sector to identify which companies pose the greatest risks to portfolio returns, as well as opportunities presented by those that are carbon-efficient relative to sector peers. • Trucost estimates that the 11 companies analysed are exposed to €2.9 billion in damage costs from CO_2 emissions. The 123.3 million tCO_2emitted by the 11 companies equates to 11% of global shipping CO_2 emissions. • If the IMO fails to agree concrete measures to reduce GHG emissions by 2011, the European Commission (EC) plans to introduce **measures to internalise damage costs** associated with the industry's CO_2 emissions.[18] • Ships that switch to shore-side electricity in ports could cut CO_2 emissions by over 50% and benefit from tax breaks.[19] • Companies which employ **voluntary measures to reduce** CO_2 emissions, such as use of cleaner fuels, more fuel-efficient technologies, development of natural gas engines, use of wind power such as kites, and onshore power supplies will be well positioned in a carbon-constrained economy.
• 90% of oil imports to Europe are transported by sea, and large **accidental oil spills** damage plant and animal life. • **Routine operations are the main source of ship pollution** that threaten marine and coastal environments through ballast water, tank washings and effluent discharges. • When ships unload cargo they take in **ballast water** to maintain stability. When they load cargo, ballast water is released and may include harmful organisms, leading to bio-invasion. This can harm ecosystems, human health and result in economic costs to other industries such as fisheries.[20] • **Tank washings** – waste residues from tanks - can contain oil or harmful chemicals and must be treated as industrial waste. • An international ban on the use of toxic organotin biocide compounds such as tributyl tin (TBT) as anti-fouling coatings to prevent sealife residing on hulls came into force in 2008. Vessels with TBT are forbidden from entering EU ports.	**Marine Pollution**	• The EC is developing a **common framework for liability** for environmental damage across member states, and has criminalised serious environmental offences, including ship pollution releases that lead to substantial environmental damage. Penalties may include prison sentences. • Under an IMO agreement, all ships must implement a **ballast water and sediments management plan**, and stricter controls will come into force over the coming years. Measures to handle ballast water can include chemicals, chloride or ozone with other negative environmental impacts. • Companies which manage their environmental impacts effectively may be less exposed to potential pollution-related liabilities such as fines and clean-up costs..
• Ships have a life span of approximately 20-25 years. 200 to 600 ships are dismantled globally each year, many on beaches in South Asia.[21] **Hazardous materials** in ships and lack of environmental controls result in damage to human health and coastal areas. • Most shipbreaking takes place in Bangladesh, where around 300,000 people including children work in the industry.[22] They can be exposed to **toxic substances** including asbestos, polychlorinated biphenyls (PCBs), waste oils and fuels with little or no protection, leading to death, illness or injury.[23] • A slump in the shipping industry is driving an **increase in ship scrapping**. Steel from ships can be re-melted or re-rolled into new steel products. Shipowners usually sell end-of-life vessels to breakers on the basis of lightweight tonnage (LDT).[24] • EU-owned or operated vessels are expected to account for 40% of some 105 million LDT to be scrapped between 2007-2020, valued at approximately €21.6 billion.[25]	**Ship Recycling**	• In the EU, ships fall under hazardous waste legislation including the Basel Convention to control transboundary movements of hazardous waste. The EC **plans to strengthen measures** to promote more environmentally sound ship recycling and prevent export of hazardous end-of-life ships to developing countries. • Companies can use scrapyards that have achieved ISO 14001 certification to ensure adequate environmental management systems are in place. Using clean and safe recycling facilities could cost ship owners an additional €34-€100/LDT.[26] • Shipyards should follow industry guidelines for dismantling with a "cradle to grave" approach to improving environmental protection.[27] In addition, shipping companies which reduce hazardous materials in new ships will be well-positioned under a lifecycle approach. • Some shipping companies require **"green" facilities** to recycle their scrapped vessels. However, there are currently no international standards for "green" recycling and there is limited capacity in Europe.
• Vessels generate wastes including oil or oily sludge, bilge, rubbish, sewage, and some hazardous waste, with **risks of spillage and leakage**. Plastic litter can be particularly damaging to marine life and birds.[28] Most ships have onboard systems and storage to manage rubbish, and ports and terminals provide reception facilities for waste. • The Marpol Convention to control pollution entering the seas covers waste disposal. Ships are only allowed to dump waste on an approved international list under a Protocol which includes the "polluter pays" principle.[29] It is illegal to incinerate waste at sea. • Two-thirds of ships that would otherwise return empty to Asia transport waste from the EU. Ships are banned from exporting waste for dumping, but can export non-hazardous waste for recovery. The EU has banned exports of hazardous wastes for recovery from developed to developing countries. **Enforcement is set to be strengthened** to tackle rife illegal waste shipments in the EU.[30]	**Waste Management**	• Shipping companies are exposed to **environmental and reputational risks** through companies that charter vessels. For instance, Greek shipping company Prime Marine Corporation leased a vessel to oil trading multinational Trafigura in 2006. Toxic waste discharged from the ship on the Ivory Coast caused eight deaths and led to 77,700 needing medical treatment. The ship was then blockaded by Greenpeace and held by Estonian authorities for criminal investigation. • Over one-third of waste transported to China is scrap metals and plastics, including waste electrical and electronic equipment (WEEE). Europe's Waste Shipment Regulations aim to minimise these hazardous wastes and ensure sound management of their disposal. Shipments without adequate documentation are considered to be illegal, and those responsible for shipments are usually required to return the waste to the country of dispatch at their own expense.[31]
• Seafarers are employed on board vessels that are registered under differing flags and owned and operated by companies in many different countries. As a result there is a wide diversity in their living and working conditions. An International Labour Organization (ILO) survey identified **discrimination against non-national seafarers** such as restrictions on the numbers of foreign seafarers and wage differentials.[32] • **A flag of convenience (FOC)** ship flies the flag of a country other than the country of ownership. Cheap registration fees, tax evasion and freedom to employ cheap labour often drive a shipowner's decision to 'flag out'. FOCs are often registers which exercise little or no control over their owners. The home countries of crews can do little to protect them.[33] • Seafarers who protest against unfair working conditions can be put on a **watchlist** of the Philippine Overseas Employment Administration, or on recruitment agency **blacklists** that aim to prevent "troublemakers" from being rehired. This discriminatory process often leads seafarers to accept poor employment conditions.	**Seafarers' Working Conditions**	• The **ILO's Maritime Labour Convention 2006** provides protection at work for seafarers. The new labour standard sets out seafarers' rights to decent conditions of work, and aims to be globally applicable and uniformly enforced. • As it is impossible to legally protect national seafarers in a foreign jurisdiction, there is a strong reliance on **collective bargaining agreements** and contracts of employment. Shipping companies which negotiate such agreements with trade unions will be less exposed to tense labour relations and better positioned to attract and retain seafarers. • 28 freight carriers, cargo shippers and multinational manufacturers have joined a **Clean Cargo working group** to share information and best practice on the effects of transportation on employees. The Business for Social Responsibility initiative aims to help integrate responsible business principles into transportation management.

[1][2] *Mortality from Ship Emissions: A Global Assessment, Corbett J et al, Environmental Science and Technology, Volume 41, Number 24, pp 8512-8518, 2007.*

[13] *Where data is not provided, Trucost uses its input-output model to calculate average emissions for water transportation, and allocates these in proportion to each company's output in the sector.*

[14][15] *Service Contract on Ship Emissions: Assignment, Abatement and Market-based Instruments, European Commission Directorate Environment, August 2005.*

[16] *True scale of CO_2 emissions from shipping revealed, The Guardian, 13 February 2008.*

[17] *CO_2 emissions from freight transport in the UK, Logistics Research Centre, Heriot-Watt University, 2007.*

[18] *European Commission Communication, Greening Transport, 8 July 2008.*

[19] *Commission Recommendation on the promotion of shore-side electricity for use by ships at berth in Community ports, 8 May 2006.*

[20] *A perspective of marine bio-invasion, A C Anil, National Institute of Oceanography.*

[21] *Ship dismantling, European Commission.*

[22] *Childbreaking yards, International Federation for Human Rights, September 2008.*

[23] *Greenpeace welcomes call for state-of-the-art ship recycling facility in UK, Greenpeace UK; Shipbreaking in Bangladesh.*

[24] *Ship Breaking, A background paper, International Labor Organization.*

[25] *At LDT price US$260, the Compass Weekly Market Report, 21 November 2008, Week 47.*

[26] *Examples include the IMO Convention on the Safe and Environmentally Sound Recycling of Ships.*

[27] *An EU strategy for better ship dismantling, European Commission, 19 November 2008.*

[28] *http://www.ukmarinesac.org.uk/activities/ports/ph6_2.htm*

[29] *Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes.*

[30] *Latest EU enforcement initiative reveals illegal shipments of waste again, Implementation and Enforcement of Environmental Law, 17 July 2008.*

[31] *Revised correspondents' guidelines No 1, European Commission.*

[32] *"Report on an ILO investigation into the living and working conditions of seafarers", 2002.*

[33] *Source: International Transport Worker Federation (ITF)*

AP Moller-Maersk tackles logistics carbon emissions

AP Moller-Maersk's transport operations, including terminals and logistics, emitted over 41 million tonnes of CO_2 in 2007. The Group aims to improve energy and carbon efficiency through measures including **a waste heat recovery system** that allows heat to be used for propulsion on 23 new ships. However, not all of the company's new vessels are equipped with the system due to lack of capacity in shipyards to install the systems "at a cost justifying implementation". The only Maersk vessels with waste heat recovery systems are built on the company's own Lindø shipyard. Maersk says that the technology is not feasible on existing tanker and supply vessels, as the service speed does not provide enough excess exhaust gas.

As well as addressing its direct emissions from operations, the Group is helping customers to reduce carbon emissions in their transport & logistics supply chains. Maersk Logistics has developed a **SupplyChain CarbonCheck to map product emissions** from the factory-gate to delivery at the point of sale, including shipping emissions. It then simulates alternative scenarios to recommend opportunities to reduce emissions and exposure to carbon costs. Recommendations could include a shift in transport modes from air freight to more carbon-efficient shipping, for instance. Strategic issues and supply chain costs are factored in to identify the most appropriate actions to cut emissions, and Maersk helps to implement changes.

Maersk says that up to 15 global clients currently use the tool, which has led to approximately 10% cuts in both carbon emissions and costs.

To find out more visit *http://about.maersk.com*

Nippon Yusen rises to solar challenge

Japan's largest shipping company, Nippon Yusen Kabushiki Kaisha, is positioning itself to grow revenues from companies seeking to reduce their transport & logistics emissions. In a breakthrough in 2008, Nippon Yusen launched the world's first **solar-power-assisted cargo carrier**, in partnership with Nippon Oil. The ship, Auriga Leader, is using solar-powered electricity to help transport up to 6,200 cars for Toyota Motor Corporation. By reducing CO_2 emissions from the ocean transportation of cars, the initiative supports Toyota's strategy to reduce environmental impacts caused by the life cycle of vehicles.

The solar power generator consists of 328 solar panels and can produce 40 kilowatts of power. Although it only generates 0.2% of the 60,213-ton ship's energy needs, it can supply 6.5% of electricity used and reduce carbon emissions by up to 2%. Nippon Yusen aims to develop large solar-powered vessels and plans to install a generator that could contribute up to 2% of a ship's power by 2010.

Nippon Yusen is also developing carriers that would halve energy use and carbon emissions per ton-mile compared with existing vessels. The **new ships** are expected to be ready in 2010. Meanwhile, Nippon Yusen is also **increasing the efficiency of propulsion and fuel injection** using technologies developed together with the company's think tank, the Monohakobi Technology Institute. Nippon Yusen has set a goal to cut carbon dioxide emissions by at least 10% per ton-mile on 2006 levels by 2013. However, fuel consumption and carbon dioxide emissions from the company's fleet increased annually between 2004 and 2007.

To find out more visit *www.nyk.com*

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