

TRENDS TOWARD SUSTAINABLE DEVELOPMENT IN SHIPPING

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**ΑΚΑΔΗΜΙΑ ΕΜΠΟΡΙΚΟΥ ΝΑΥΤΙΚΟΥ
Α.Ε.Ν ΜΑΚΕΔΟΝΙΑΣ**

ΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ

ΕΠΙΒΛΕΠΩΝ ΚΑΘΗΓΗΤΗΣ: ΠΑΠΑΛΕΩΝΙΔΑ ΠΑΡΑΣΚΕΥΗ

ΘΕΜΑ

Τίτλος: Trends Towards Sustainable Development in Shipping

**ΤΟΥ ΣΠΟΥΔΑΣΤΗ: ΚΑΤΣΑΡΟΣ ΘΕΟΔΩΡΟΣ
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<i>1</i>				
<i>2</i>				
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ΤΕΛΙΚΗ ΑΞΙΟΛΟΓΗΣΗ				

Ο ΔΙΕΥΘΥΝΤΗΣ ΣΧΟΛΗΣ :

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ABSTRACT

The maritime industry has been moving into a heightened state of awareness on the protection of the maritime and global environment. We now live in an era where concerns about global warming, environmental protection and the sustainability of natural resources play a key role in our day to day lives and will be important over the next millennium.

Shipping is commonly misunderstood as to its impact to the environment. It is one of the cleanest forms of transportation with a safety and environmental record that exceeds many other forms of transportation. The industry has played a positive role in reducing emissions and promoting environmental awareness.

Nevertheless, it is important for the industry to enhance their awareness and embrace the new regulation, thus creating a safer and more sustainably future.

This dissertation reviews the current issues related to sustainability in shipping. It discusses the idea of a “green ship” and the Sustainable Development Goals set by the IMO as well as how these are implemented by the shipping industry.

Chapter 1

Introduction

Sustainable development is the organizing principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend. The desired result is a state of society where living and conditions and resource use continue to meet human needs without undermining the integrity and stability of the natural systems.

The concept of sustainable development has been, and still is, subject to criticism. What, exactly, is to be sustained in sustainable development? It has been argued that there is no such thing as a sustainable use of a non-renewable resource, since any positive rate of exploitation will eventually lead to the exhaustion of earth's finite stock. This perspective renders the industrial revolution as a whole unsustainable. It has also been argued that the meaning of the concept has opportunistically been stretched from "conservation management" to "economic development."

In September 2015, the UN's 193 Member States unanimously adopted the 2030 Agenda for Sustainable Development, including the 17 **Sustainable Development Goals** (SDGs) and 169 related targets. Hailed as a historic agreement forging a pathway to sustainability, the 2030 Agenda has been called a plan of action for people, planet and prosperity. IMO recognizes that, for its Member States and the UN system to implement the 2030 Agenda, this new framework will have to be translated into national policies and strategies taking into account cross-cutting issues.

International shipping greatly benefits the world by moving food, commodities, raw materials, energy and consumer goods reliably and effectively around the globe at low cost. Working together with ports and other stakeholders in the maritime industry, international shipping is indispensable to the functioning of global trade. By connecting producers, manufacturers and consumers, it provides a way for IMO Member States to enhance trade with one another. Sustainable maritime transportation is a cross-cutting issue and, as such, is an important enabler for most of the SDGs. The connection between IMO's work and the SDGs is outlined in my dissertation.

Chapter 2

Sustainability Trends

2.1 Environment

Protecting the environment is, by far, the biggest sustainability challenge for international shipping companies today. Most of the issues here relate to emissions. Currently, the focus is on greenhouse gas (GHG) emissions. Looking forward, there also are strong signals that sulfur oxide (SO_x), Nitrogen oxide (NO_x), Particulate Matter (PM) and black carbon will receive greater attention due to the significant human health and local environmental impacts. Here are some of the facts:

- The industry's total carbon dioxide (CO₂) emissions comprise between 3 and 4 percent of global emissions--higher than the total emissions of the nation of Germany. No global regulatory scheme exists today, however this must be expected in the coming years.
- By some estimates, annual Particulate Matter (PM) and sulfur oxide (SO_x) emissions from the shipping industry contribute to the premature deaths of more than 60,000 people globally¹. They also contribute to millions of peoples' respiratory problems, specifically those living close to congested ports. Bunker fuel, is the major reason for these emissions. The International Maritime Organization (IMO), the global body that regulates the industry has taken the sulfur content down to 3.5 percent from 4.5 percent since 2012 and further down to 0.5 percent by 2020.
- Nitrogen-oxide (NO_x) contributes to a wide variety of health and environmental problems, including respiratory issues and ground-level ozone or smog. The IMO has also set out to bring down the NO_x from shipping.
- Black carbon is widely considered a particularly harmful substance that potentially may be the second largest contributor to global warming after CO₂.

¹ The United States Environmental Protection Agency (EPA) recently announced that new regulatory SO_x standards that soon will take effect are expected to prevent 12,000-31,000 premature deaths and 1.4 million lost workdays, and result in annual health benefits in 2030 of \$110-270 billion, nearly 90 times the projected costs of \$3.1 billion to achieve those results.

Because problems stemming from black carbon are concentrated in environmentally sensitive areas such as Arctic regions, the opening up of northern shipping routes may have a serious negative impact on climate change. The IMO will have reviewed a proposal on the need for reducing black carbon emissions from shipping in this region at the seventy-second session of the Marine Environment Protection Committee meeting in April 2018.

The impact of **ballast water** is another key area of environmental concern. Ocean carriers and other large ships use significant quantities of ballast water to help with buoyancy. The water is collected in the coastal waters of one region and discharged at the next port of call. Since ballast water contains biological materials, there is a risk that invasive species are introduced in new ecosystems with considerable environmental and economic costs. New IMO regulation will soon enter into force that will reduce the risk significantly.

Noise pollution caused by shipping and other human enterprises has increased in recent history. The noise produced by ships can travel long distances, and marine species who may rely on sound for their orientation, communication, and feeding, can be harmed by this sound pollution

The Convention on the Conservation of Migratory Species has identified ocean noise as a potential threat to marine life. The disruption of whales' ability to communicate with one another is an extreme threat and is affecting their ability to survive. Over the last century, extremely loud noise from commercial ships, oil and gas exploration, naval sonar exercises and other sources has transformed the ocean's delicate acoustic habitat, challenging the ability of whales and other marine life to prosper and ultimately to survive. There's different ways that sounds can affect animals. There's that underlying ambient noise level that's rising, and rising, and rising that interferes with communication and their movement patterns. And then there's the more acute kind of traumatic impact of sound, that's causing physical damage or a really strong behavioral response.

What do we expect to see over the next 5-7 years:

- Industry specific carbon tax

- IMO to consider stricter regulations on SO_x and NO_x, beyond those already adopted.
- New regulations on black carbon, PM and waste.
- Continued patchwork of local regulations, standards and voluntary schemes.
- Asia expected to step up on emissions regulations, motivated by local health concerns.

2.2 Health & Safety

In the next five to seven years, health and safety will remain an area that requires management oversight similar to the focused attention paid by the tanker industry in the previous decades. The need for this oversight is paramount. Evidence suggests that safety performance has stagnated and in some cases worsened. Case in point: Ships now are twice as likely to be involved in collisions or groundings compared to just five years ago.

A number of inter-related factors have been linked to the frequency of serious accidents. Human error is a key issue, and it is on the rise due to an increasing undersupply of skilled crew worldwide—combined with more technical equipment, that has increased the complexity of operations. On top of this, higher commercial pressures resulting in increased workloads compound the problems.

The global economic crisis is also cited as a key factor affecting shipping safety performance, as the agenda shifts to cost cutting initiatives. Stakeholders urge companies to maintain proper risk management and consequence analysis toward safe and secure operations at all times, to ensure that saving money in short term does not result in longer term serious safety impacts, which can cost significantly more to the business in both revenue and reputation terms.

Meanwhile the health agenda is predicted to gain increased attention. In the quest for retaining top talent, of both on and off-shore staff, companies that seek to address the well-being agenda of their employees will be favored. In addition to signs that the skill level of crew is decreasing, there is also evidence that young people at maritime uni-

versities are increasingly choosing to stay land-side, citing well-being and safety as key concerns.

The principal regulatory mechanism driving future health and safety standards is the Maritime Labor Convention (MLC). Regulations stemming from this legal framework focus on a stricter and a more holistic approach to health and safety. These new regulations extend well beyond the requirements of the International Safety Management (ISM) code and will be an auditable certification requirement for vessels to trade. Specific areas of the MLC relevant to health and safety include hours of work or rest, manning levels, on-board accommodations, on board medical care, and on-board complaint procedures.

Over the next 5-7 years we expect:

- Gradual alignment and implementation of the MLC.
- Update of on- and off-shore regulations to higher standards with potentially increased bureaucratic burdens.
- Performance improvements coming from the inside, i.e. implementation of current standards and practices by top management and employees.

2.3 Business Ethics

Anti-corruption programs and other business ethics efforts in the international shipping industry likely are to grow in response to pressure from stakeholders and customers responding to poor performance. We predict customers will expect international shipping lines to put in place and enforce a number of business ethics programs. Such programs eventually must extend to supply chain partners, as well. Regulation is expected to play some role in these developments, notably in relation to corporate disclosure. Still, the most significant initiatives around business ethics and supply chain governance are most likely to remain national than international.

In the next 5-7 years we expect:

- Increased regulatory reporting and whistle blowing.

- FCPA² enforcement, and OECD³ & UN Conventions tightened.
- Local enforcement, e.g. India develops integrity pacts.

2.4 Social Responsibility

International shipping companies must assume greater responsibility for respect and protection of human rights within their spheres of influence, especially in those countries and environments where state responsibility for protection of human rights is weak.

Over the next five to seven years we can expect to see:

- MLC significantly addresses sea farers' employment and social rights and will require the same standards for chartered and owned vessels.
- Accountability increasingly coming from non-traditional sources in places of weak governance

² Foreign Corrupt Practices Act (FCPA)

³ Organization for Economic Co-operation and Development (OECD)

Chapter 3

Future Trends

The sustainability challenges are therefore categorized into four major topic areas: Environment, Health and Safety, Social Responsibility, and Business Ethics. Whilst researches show that these areas bring their own unique set of risks and opportunities for companies to manage.

Four mega-trends will exercise an important influence on the industry:

- Hyper-transparency
- Regulated carbon and resource constraints
- Rise of rights and local governance
- Socio-economic changes

HYPER-TRANSPARENCY

The notion of hyper-transparency takes the idea of transparency and extends it exponentially. It reflects the way consumers, customers, local communities, investors, regulators, and other key stakeholders increasingly expect full visibility into how business operates, how it performs, and the impact of business on people, profit, and the planet as a whole. Developments in information communication technologies are pushing and enabling this trend as they provide us with the means required to receive and to process information.

REGULATED CARBON AND RESOURCE CONSTRAINTS

Present trends in world population, energy demand, food production, and resource depletion will drive new regulations that force companies to measure individual impacts on specific resources such as water and air. What's more, the risk of climate change

will force companies to be required to account for solutions at ecosystem levels (e.g. how business activities affect the water supply). General resource constraints will force companies to develop new business models that emphasize using more with less. These models will embrace increased reuse, remanufacturing and recycling, to name a few.

Similarly, the risk of climate change likely will result in a wide-ranging set of regulations including new markets, emissions tracking, industry process, and product standards and incentive structures.

RISE OF RIGHTS AND LOCAL GOVERNANCE

When governments fail to protect the rights of their citizens and the power of business increases, individual companies increasingly are expected to step in. Over the last few years, this trend has manifested itself in two different ways.

First, there are increased expectations for businesses to protect and respect human rights within their spheres of influence. In particular, businesses must expect to be held accountable for a wider set of rights, including the right to health care and access to clean water, to name a few.

The other manifestation of the changing stance on rights and local governance relates to a dramatic shift in the role of the public in setting government policy. Communities have begun to assert their status as local democracies and make choices that carry the weight of law on a range of sustainability issues, from public health and safety to sustainable business, agricultural practices and quality of life in those communities. This is driven by the perception of legislators and the private sector have preempted local democracy and kept individuals out of important decision-making processes, preempting the rights of citizens to create sustainable communities.

SOCIO-ECONOMIC CHANGES

There will be a shift in the global center of gravity towards Asia resulting in new economic and cultural paradigms competing or complementing existing ones. The rise of

an Asian middle class with more than 1 billion middle-income consumers by 2030 will accelerate planetary resource constraints. Two billion people will be added to the global population by 2050, and three-quarters of them are expected to live in a big city.

The rise of the East will transform supply chains differently. Changes will result in more complex models that blend globalization and localization all at once. This will be compounded by the rapid urbanization that is associating these dramatic shifts (with the expectation that three out of four people will be living in cities by 2050, as opposed to one out of two people today). Because of the available resource pool, these developments will have profound implications for current infrastructures and transportation systems that have not been developed to accommodate major change.

Research indicates that these trends will play an important role in shaping the future business environment in the international shipping industry. We predict similar trends will impact the way important supply-chain partners such as ports and terminal operators will be expected to operate too. We believe that international shipping lines must begin to develop a better understanding of these trends if they wish to capitalize on them to get ahead. Failure to adapt likely will have significant cost implications.

Chapter 4

Sustainably Development Goals

Because international shipping takes place on the world's oceans, and IMO is responsible for measures to improve the safety and security of international shipping and to prevent pollution from ships. IMO's objectives can be summarized as follows: safe, secure and efficient shipping on clean oceans. The work of IMO therefore relates to most, if not all, of the SDG 17 targets, particularly as regards its environmental conventions. IMO is also working with the Food and Agriculture Organization of the United Nations (FAO) to address illegal, unreported and unregulated (IUU) fishing.

While each SDG addresses a different aspect of sustainability, the SDGs are interconnected. Therefore, some IMO activities may contribute to more than one goal.

1. END OF POVERTY IN ALL ITS FORMS EVERYWHERE

As the most cost-effective and fuel-efficient way to transport goods, maritime transport is the backbone of world trade and globalization. All year round, ships carry cargoes to all corners of the globe. World trade and maritime transport are fundamental to sustaining economic growth and spreading prosperity throughout the world. Shipping will continue to grow with the anticipated increase in world trade. Improved access to basic materials, goods and products is expected to lift millions of people out of poverty and, thereby, contribute to achieving SDGs 1 and 2.

2. END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

The continued efficient functioning of the maritime sector enables trade to flow freely and food and energy to be delivered cost-effectively throughout the globe. In this respect, maritime transport plays a central role. Small Island Developing States, in par-

ticular, are completely dependent on it. The predictability of trade flows can be adversely affected by security threats to shipping. The damaging consequences of security-related incidents can affect the poorest people, particularly with regard to food security.

IMO also promotes maritime security coordination and cooperation among States, regions, organizations and industry, as well as assisting Member States to implement the International Ship and Port Facility Security (ISPS) Code on board all ships and ports engaged in international maritime transport. By so doing, IMO contributes to food and energy security and the promotion of peaceful societies. IMO also helps spread the rule of law through its legal capacity building programs.

3. GOOD HEALTH AND WELL-BEING

Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development. Significant strides have been made in increasing life expectancy and reducing some of the common killers associated with child and maternal mortality. Major progress has been made on increasing access to clean water and sanitation, reducing malaria, tuberculosis, polio and the spread of HIV/AIDS. However, many more efforts are needed to fully eradicate a wide range of diseases and address many different persistent and emerging health issues.

4. ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

International shipping and related industries are dependent on qualified seafarers to operate ships and on shore-based personnel to support ship operations. The maritime community contributes to quality of life, particularly in developing countries, by employing 1.5 million seafarers and many more land-based personnel, thereby directly enhancing economic prosperity in local communities. The safety and security of life at

sea, the protection of the marine environment and the efficient movement of global trade depend on the professionalism and competence of seafarers.

The IMO International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) provides universal standards of competence for seafarers and effective mechanisms for enforcing its provisions.

To improve social protection for seafarers and their families, IMO cooperates with the International Labour Organization (ILO) in the form of Joint IMO/ILO to address various issues including health services and social security protection for seafarers.

IMO contributes to inclusive and quality education by providing training activities, in particular through its technical cooperation programmes and its two maritime training institutions - the World Maritime University (WMU) and the International Maritime Law Institute (IMLI), both established by IMO.

The seafaring profession is promoted through the annual Day of the Seafarer, which provides a platform for seafarers and maritime sector personnel to celebrate and share their experiences with the general public and to raise awareness of the value and importance of maritime transport. The Day of the Seafarer (25 June) is recognized in the list of annual United Nations Observances.

5. ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN

While the world has achieved progress towards gender equality and women's empowerment under the Millennium Development Goals (including equal access to primary education between girls and boys), women and girls continue to suffer discrimination and violence in every part of the world. Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world.

Providing women and girls with equal access to education, health care, decent work, and representation in political and economic decision-making processes will fuel sustainable economies and benefit societies and humanity at large.

This is complemented by the IMO Maritime Ambassador Scheme. IMO Ambassadors are selected by Member States or international organizations to promote the maritime and seafaring professions by sharing their experiences with others, in particular young people. IMO has for many years supported gender equality and the empowerment of women through targeted training opportunities for women in the maritime sector. IMO's programme "Integration of women in the maritime sector" empowers women by promoting their key role in the maritime infrastructure of developing countries. Gender equality is enhanced through the IMO network of regional associations for women managers, providing access to specialized training, promoting economic self-reliance, and improving employment opportunities for women at the decision-making levels in the port and maritime sectors.

6. ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

IMO further contributes to these SDGs by helping developing countries strengthen their national capabilities to prevent and manage marine pollution. It also works to enhance technical capacities in wastewater management on board ships and in ports, and to promote recycling, cleaner production technologies and more sustainable consumption patterns.

The LC/LP⁴ contributes to SDG 6 on the sustainable management of water by prohibiting unregulated dumping of wastes and other matter at sea. It encompasses a precautionary and risk-assessment-based approach to waste management, stressing the need to prevent, reduce and, where practicable, eliminate pollution caused by the dumping of wastes at sea. In this regard, IMO provides support to developing countries by helping them strengthen their legislative, scientific and technological capacities.

⁴ London Convention and Protocol (LC/LP)

7. ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL

The maritime sector and IMO have a major role to play in achieving SDG- 7, regarding energy efficiency in particular. IMO has worked extensively to address greenhouse gas emissions from shipping and, in 2011, adopted the first ever mandatory, global, legally-binding GHG control regime for an entire industry sector, based on technical measures for new ships and operational emission reduction measures for all ships. The adopted measures made mandatory the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Management Plan (SEEMP) for all ships. These measures will require ships built in 2025 to be 30% more energy efficient than those built in 2014. The adoption of mandatory reduction measures for all ships from 2013 will lead to significant emission reductions and provide a significant cost saving for the shipping industry.

In addition to these measures, IMO has shown leadership in and commitment to global efforts to support the Paris Agreement on Climate Change. First, IMO adopted a mandatory data collection system for fuel oil consumption. This is the first step in a three-step approach, the second being data analysis, and the third decision-making on whether further measures are needed to enhance energy efficiency and address GHG emissions from international shipping. In a related decision, IMO approved a road map for developing a comprehensive strategy on reduction of GHG emissions from ships. The road map contains a list of activities with relevant timelines foreseeing the adoption of an initial GHG reduction strategy in 2018 and a revised strategy in 2023 to include short-, mid-, and long-term further measures, as required. Finally, a decision to confirm the implementation date for a significant reduction in the sulphur content of the fuel oil used by ships globally on 1 January 2020 is expected to contribute further to the reduction of GHG emissions from ships through the anticipated resulting uptake of cleaner alternative fuels.

IMO contributes to international cooperation to facilitate access to clean energy research and technology, in particular energy efficiency and advanced, cleaner fossil-fuel technology, and technology, in particular energy efficiency and advanced, cleaner fossil-fuel technology, and promotes investment in energy infrastructure and clean energy technology. To ensure the new energy efficiency regulations and other IMO provisions

are smoothly and effectively implemented and enforced worldwide, IMO has also been focusing efforts on technical cooperation and capacity-building. It has held a series of regional and national workshops to help countries build their human, institutional and technical capabilities to uniformly and effectively implement measures to address emissions from international shipping.

IMO, with funding from the Global Environment Facility (GEF), is cooperating with the UNDP⁵ in a global effort to help the shipping industry move towards a lower carbon future, through a project entitled “Transforming the global maritime transport industry towards a low carbon future through improved energy efficiency” (the GloMEEP⁶ project). This global project assists developing countries in implementing the energy efficiency measures adopted by IMO.

8. DECENT WORK AND ECONOMIC GROWTH

Roughly half the world’s population still lives on the equivalent of about US\$2 a day. And in too many places, having a job doesn’t guarantee the ability to escape from poverty. This slow and uneven progress requires us to rethink and retool our economic and social policies aimed at eradicating poverty.

A continued lack of decent work opportunities, insufficient investments and under-consumption lead to an erosion of the basic social contract underlying democratic societies: that all must share in progress. The creation of quality jobs will remain a major challenge for almost all economies well beyond 2015.

Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs that stimulate the economy while not harming the environment. Job opportunities and decent working conditions are also required for the whole working age population.

⁵ United Nation Development Programme

⁶ **GloMEEP** is a GEF-UNDP-IMO project aimed at supporting the uptake and implementation of energy efficiency measures for shipping, thereby reducing greenhouse gas emissions from shipping. The GloMEEP Project is being executed by a dedicated Project Coordination Unit (PCU) established within the Marine Environment Division of IMO.

9. INDUSTRY INNOVATION AND INFRASTRUCTURE

IMO contributes to SDG 9 by providing a legal and regulatory framework, capacity-building initiatives and a forum for Member States to exchange knowledge and experience. Building resilient infrastructure is central to the effective functioning of the whole transportation sector and, therefore, a major driver for the delivery of many SDGs. With a view to providing a platform for cooperation between the shipping sector and national transport administrations, and to improving maritime infrastructure through implementing a national maritime transportation policy, IMO has created the Country Maritime Profile (CMP) as an enhanced capacity-building assessment mechanism.

Economic development and human well-being are built on high-quality, reliable, sustainable and resilient infrastructure, including at regional and transborder levels. IMO contributes to this principally through its Convention on Facilitation of International Maritime Traffic (FAL). The main objective of the FAL Convention is to achieve maximum efficiency in maritime transport. By reducing paperwork and simplifying formalities, documentary requirements and procedures associated with the arrival, stay and departure of ships on international voyages, it enables ships, cargo and passengers to transit smoothly from port to port. It also encourages the use of modern information and communication technology and electronic information exchange between ships and ports. This efficiency has a clear beneficial impact on trade facilitation and, therefore, on the economy.

10. REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES

The international community has made significant strides towards lifting people out of poverty. The most vulnerable nations – the least developed countries, the landlocked developing countries and the small island developing states – continue to make inroads

into poverty reduction. However, inequality still persists and large disparities remain in access to health and education services and other assets.

Additionally, while income inequality between countries may have been reduced, inequality within countries has risen. There is growing consensus that economic growth is not sufficient to reduce poverty if it is not inclusive and if it does not involve the three dimensions of sustainable development – economic, social and environmental.

To reduce inequality, policies should be universal in principle paying attention to the needs of disadvantaged and marginalized populations.

As part of the UN system, IMO contributes to SDG 10 by providing Member States, **IGOs**⁷ and **NGOs**⁸ with a platform for discussion and exchange of views in its various committees and meetings, as well as providing extensive technical cooperation assistance.

At present, IMO has such partnership arrangements with 65 IGOs and 74 NGOs. These partnerships provide valuable support for the delivery of capacity-building activities. They have also promoted the effectiveness of technical cooperation by increasing general awareness of IMO's mandate. IMO partnership arrangements will be strengthened by implementing the 2030 Agenda, taking into account the Addis Ababa Action Agenda.

11. SUSTAINABLY CITIES AND COMMUNITIES

Cities are hubs for ideas, commerce, culture, science, productivity, social development and much more. At their best, cities have enabled people to advance socially and economically. However, many challenges exist to maintaining cities in a way that continues to create jobs and prosperity while not straining land and resources. Common urban challenges include congestion, lack of funds to provide basic services, a shortage of adequate housing and declining infrastructure.

The challenges cities face can be overcome in ways that allow them to continue to thrive and grow, while improving resource use and reducing pollution and poverty.

⁷ Intergovernmental Organization

⁸ Non-Governmental Organization

The future we want includes cities of opportunities for all, with access to basic services, energy, housing, transportation and more.

IMO has developed a number of important regulations relevant to this cluster of SDGs, in particular the London Convention and Protocol on the prevention of marine pollution by dumping of wastes and other matter at sea (LC/LP), the Hong Kong Ship Recycling Convention, and the International Convention for the Prevention of Pollution from Ships (MARPOL).

12. ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

The Hong Kong Ship Recycling Convention contributes to SDG 12 by reducing waste generation and promoting sustainable consumption. The convention is aimed at ensuring that ships do not pose any unnecessary risk to human health, safety and the environment when they are recycled at the end of their operational lives. Embracing a ‘cradle to grave’ approach, the convention requires ships to have a recycling plan and an inventory of hazardous materials. Once the convention enters into force, Parties will be required to take effective measures to ensure that ship-recycling facilities under their jurisdiction comply with its provisions.

In addition, IMO contributes to SDG 12 through the reduction of waste generation, both operational waste from ships (MARPOL) and dumping of wastes under the LC/LP. Under MARPOL Annex V, on the prevention of pollution by garbage from ships, discharging garbage into the sea is generally prohibited, with only a limited number of exceptions. For garbage, and several other types of waste generated on board ships, MARPOL requires port States to provide adequate reception facilities for the safe and sound management of wastes.

13.TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

Climate change is now affecting every country on every continent. It is disrupting national economies and affecting lives, costing people, communities and countries dearly today and even more tomorrow.

People are experiencing the significant impacts of climate change, which include changing weather patterns, rising sea level, and more extreme weather events. The greenhouse gas emissions from human activities are driving climate change and continue to rise. They are now at their highest levels in history. Without action, the world's average surface temperature is projected to rise over the 21st century and is likely to surpass 3 degrees Celsius this century—with some areas of the world expected to warm even more. The poorest and most vulnerable people are being affected the most.

Affordable, scalable solutions are now available to enable countries to leapfrog to cleaner, more resilient economies. The pace of change is quickening as more people are turning to renewable energy and a range of other measures that will reduce emissions and increase adaptation efforts.

But climate change is a global challenge that does not respect national borders. Emissions anywhere affect people everywhere. It is an issue that requires solutions that need to be coordinated at the international level and it requires international cooperation to help developing countries move toward a low-carbon economy.

To address climate change, countries adopted the Paris Agreement at the COP21⁹ in Paris on 12 December 2015. The Agreement entered into force shortly thereafter, on 4 November 2016. In the agreement, all countries agreed to work to limit global temperature rise to well below 2 degrees Celsius, and given the grave risks, to strive for 1.5 degrees Celsius.

Implementation of the Paris Agreement is essential for the achievement of the Sustainable Development Goals, and provides a roadmap for climate actions that will reduce emissions and build climate resilience.

⁹ 21st Conference of the Parties (COP21), to agree on a new global climate change agreement.

14. CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

Because international shipping takes place on the world's oceans, and IMO is responsible for measures to improve the safety and security of international shipping and to prevent pollution from ships, IMO's work is integral to SDG 14. IMO's objectives can be summarized as follows: safe, secure and efficient shipping on clean oceans.

The work of IMO therefore relates to most, if not all, of the SDG 14 targets, particularly as regards its environmental conventions. Implementing and enforcing the main conventions and regulations adopted by IMO Member States actively addresses marine pollution, mainly that from sea-based sources but also, at least indirectly, from land-based sources, for example through the London Convention and Protocol (LC/LP) on dumping wastes and other matter at sea. IMO also supports the targets for managing and protecting marine and coastal ecosystems, not least through the establishment of Special Areas under MARPOL and Particularly Sensitive Sea Areas (PSSAs).

The fundamental purpose of IMO, as described in the IMO Convention, is rooted in the conservation and sustainable use of oceans and their resources.

15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS.

Preserving diverse forms of life on land requires targeted efforts to protect, restore and promote the conservation and sustainable use of terrestrial and other ecosystems. Goal 15 focuses specifically on managing forests sustainably, halting and reversing land and natural habitat degradation, successfully combating desertification and stopping biodiversity loss. All these efforts combined aim to ensure that the benefits of land-based ecosystems, including sustainable livelihoods, will be enjoyed for generations to come.

16. PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT AND PROVIDE ACCESS TO JUSTICE FOR ALL.

Central to the 2030 Agenda for Sustainable Development is the need to promote peaceful and inclusive societies based on respect for human rights, the rule of law and transparent, effective and accountable institutions. A number of regions have enjoyed increased and sustained levels of peace and security in recent decades. But many countries still face protracted violence and armed conflict, and far too many people are poorly supported by weak institutions and lack access to justice, information and other fundamental freedoms. Efforts are under way to make national and international institutions more effective, inclusive and transparent. Today, more than half the world has internationally recognized human rights institutions. However, significant challenges remain, including lack of data on various forms of violence against children and other vulnerable groups, access to justice and public access to information.

17. STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT.

Achieving the ambitious targets of the 2030 Agenda requires a revitalized and enhanced global partnership that brings together Governments, civil society, the private sector, the United Nations system and other actors, mobilizing all available resources. Meeting implementation targets, including the raising of necessary funds, is key to realizing the Agenda, as is the full implementation of the Addis Ababa Action Agenda. Increasing support to developing countries, in particular the least developed countries, landlocked developing countries and small island developing States, is fundamental to equitable progress for all.

Chapter 5

Green Ship

The Shipping Industry is leaving no stones unturned in order to contribute towards a greener marine environment. At both manufacturing and administrative levels, the maritime industry is taking advantage of the latest technologies to ensure that new ships contribute as low as possible to the global pollution.

Designing a Ship in present times has become a challenging task for now a ship has to be fully complied with new environmental rules and regulations. A few benchmark technologies have already been developed to reach the ultimate goal of building a “Green ship” which would not only comply with the new environmental rules and regulations but would also leave least possible carbon foot-prints.

For example a recent technological breakthrough is the Nichioh Maru car carrier represents a major stride forward in the concept of eco-friendly ships. The green ship boasts of the unique distinction of being the first car carrier to be equipped with the solar-energy power generation systems. Operating internally within Japan, the green ship has been in commercial service since 2012. This unique engineering system helps the vessel to reduce nearly 1,400 tonnes of exhaust discharges. This accounts for an estimated reduction in carbon dioxide discharges by over 4,000 tonnes, yearly. The car carrier is equipped with over 28 solar panels. These solar panels help to generate power to light the ship’s LED-based lighting systems. The tremendous success of the Nichioh Maru car carrier has led to additional expectations of marine ecology preservation being placed on leading maritime companies of the world. The launching of the Nichioh Maru solar ship is thus yet another step towards achieving this objective.

China also came up with an all new electric cargo ship with a massive 2.4 MWh battery pack. The ship is 70.5 meters long, 13.9 meters wide, 4.5 meters deep, 3.3 meters draft design, and it has a cargo capacity of 2,000 tons. The powertrain is equipped with two 160 kW electric propellers and a mix of supercapacitors and lithium batteries for a total energy capacity of 2.4 MWh. For comparison, that’s like 24 batteries from Tesla’s most high-powered vehicle: the Tesla Model S P100D. The powertrain reportedly enables a range of approximately 50 miles (80 km) on a single charge. It is designed for

short distances and it is currently configured to carry coal down the Pearl River in Guangdong Province.

All this new technological breakthroughs are just the beginning of a new era for a more green and sustainable shipping environment with less pollution and a better performance.

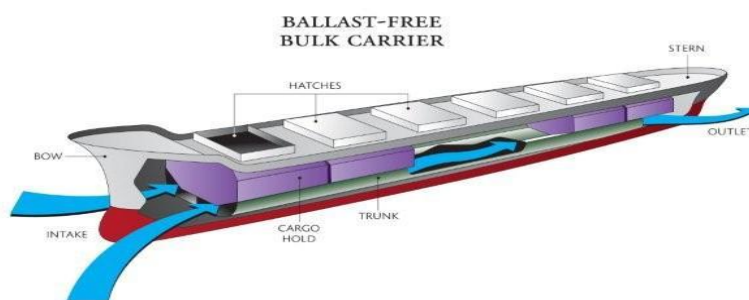
5.1 Green Ship of The Future

We will look at a list of twelve new technologies which if used together would result in the ultimate Green Ship of the Future. They are as follows:

1. No Ballast System

Ballast water convention by IMO focuses on reducing the transit of sediments and microorganisms of one territory to another through the ballast of ships. In order to prevent this condition, plans of making a “No Ballast Ships” is under progress. A no ballast ship or similar system can drastically reduce this problem.

This is one promising design to block hitchhiking organisms and terminate the entire requirements for expensive sterilization equipment like costly filters, ultraviolet irradiation, chemical biocides and other technologies. It creates a constant flow of local sea-water through a network of trunks, running from the bow to the stern, below the water-line, thus reducing the potential hauling of contaminated water across the ocean. Plus it could be one giant economic winner by affirming a saving of net capital-cost of about \$540,000 per ship.



[www.marineinsight.com/environment/what-are-non-ballast-or-ballast-free-ships/]

2. LNG Fuel for Propulsion

It is said that LNG fuel is the future of the Shipping industry. LNG fuel helps in reduction of air pollution from ships, and a combination of LNG fuel with diesel oil will lead to efficient engine performance, resulting in fuel saving.

3. Sulphur Scrubber System

It's not practically possible to phase-out usage of conventional fuels in ships and hence reducing Sulphur or SO_x emission from the exhaust is a solution that would be used extensively in the future. This can be achieved by installing an exhaust gas scrubber system wherein the Sulphur is washed out from the exhaust gas of the engine resulting in reduction of SO_x up to 98 % along with other harmful particles.

4. Advanced Rudder and Propeller System

A well designed Propeller and streamlined rudder system can reduce the fuel consumption up to 4 % resulting in less emission. Advanced designs of propeller and rudder systems have been developed to not only reduce the fuel consumption but also improve the speed of the vessel.

A propeller is a rotating fan like structure which is used to propel the ship by using the power generated and transmitted by the main engine of the ship. The transmitted power is converted from rotational motion to generate a thrust which imparts momentum to the water, resulting in a force that acts on the ship and pushes it forward. Ship propels on the basis of Bernoulli's principle and Newton's third law. A pressure difference is created on the forward and aft side of the blade and water is accelerated behind the blades.

The thrust from the propeller is transmitted to move the ship through a transmission system which consists of a rotational motion generated by the main engine crank shaft, intermediate shaft and its bearings, stern tube shaft and its bearing and finally by the propeller itself.

A ship can be fitted with one, two and rarely three propellers depending upon the speed and maneuvering requirements of the vessel.

Marine propellers are made from corrosion resistant materials as they are made operational directly in sea water which is a corrosion accelerator. The materials used for making marine propeller are alloy of aluminum and stainless steel. Other popular materials used are alloys of nickel, aluminum and bronze which are 10~15 % lighter than other materials and have higher strength.

The construction process of the propeller includes attaching a number of blades to the hub or boss by welding or forging in one piece. Forged blades are highly reliable and have greater strength but are expensive as compared to welded ones. A marine propeller is constructed by sections of helicoidal surfaces acting together to rotate through water with a screw effect.

5. Speed Nozzle

Speed Nozzles are generally used in small supply vessels and tugs to provide power to the ships. Along with new design features of merchant vessels, they can improve the propulsion efficiency of the ship by saving power up to approx 5 %.



[<http://www.seagearmarine.com/rice-speed-nozzle.html>]

6. Hull Paint

Another important factor that can increase the fuel consumption of a ship and hence emissions is improving hull properties. Applying correct paint at correct hull area can reduce the frictional resistance of the ship resulting in 3-8% of fuel savings.

Hull condition for merchant ship is a key factor in deciding the fuel efficiency of the ship. The application of protective coating of anti-fouling paints results in a smooth hull devoid of any marine fouling, which decreases the frictional resistance caused by the water flow. The anti-fouling paints decrease the load on the engine and increase fuel efficiency. With time, marine fouling and sea condition roughens the hull surface of the ship. As the frictional resistance caused by the water flow over the hull increases, the engine has to consume more fuel to overcome this resistance which adds on to the normal fuel consumption of the ship.

7. Waste Heat Recovery System

This system is already in use for quite some time now, but making it more efficient can reduce the fuel consumption of the ship drastically up to 14% of the total consumption. The waste heat from the exhaust gases can be utilised to heat and generate steam which in turn can be used for heating cargo area, accommodation, fuel oil etc.

8. Exhaust Gas Re-circulation

In this system, NO_x emissions from the engine are reduced by recirculation of exhaust gas from engine cylinder with scavenge air which lowers the temperature of the combustion chamber. Some part of the exhaust air is re-circulated and added to scavenge air of the engine which reduces the oxygen content of the scavenge air along with temperature of combustion cylinder. With this method NO_x reduction of up to 80% can be achieved

9. Water in Fuel

The addition of water in fuel just before its injection into the combustion chamber can reduce the temperature inside the cylinder liner. An efficient system for this can result in NO_x reduction of up to 30-35%.

10.Improved Pump and Cooling Water System

An optimized cooling water system of pipes, coolers and pumps can result in decreased resistance to the flow. This will lead to savings of up to 20% of electric power of the ship and fuel consumption up to 1.5 %.

The machinery systems fitted on board ships are designed to work with maximum efficiency and run for long hours. The most common and maximum energy loss from machinery is in the form of heat energy. This loss of heat energy has to be reduced or carried away by a cooling media, such as central cooling water system, to avoid malfunctioning or breakdown of the machinery.

11.Green Propulsion System

Green propulsion system when used along with the conventional propulsion system can reduce the fuel as well as NO_x, SO_x and CO₂ emissions by 35%.

Using propulsion forces, ships are able to maneuver themselves in the water. Initially while there were limited number of ship propulsion systems, in the present era there are several innovative ones with which a vessel can be fitted with.

Today ship propulsion is not just about successful movement of the ship in the water. It also includes using the best mode of propulsion to ensure a better safety standard for the marine ecosystem along with cost efficiency. Some of the various types of green propulsion systems used in ships can be enumerated as follows:

- **Wind Propulsion:**

Wind propulsion emerged as an alternative to those systems which emit huge quantities of CO₂ gases in the marine atmosphere. However, the usage of wind turbine marine propulsion has not started extensively in large commercial ships because of a requirement of constant windiness. Two wind propulsion systems for ships that have become lately are- kite propulsion and sail propulsion for merchant ships.



[\[www.marineinsight.com/main-engine/different-types-of-marine-propulsion-systems-used-in-the-shipping-world/ \]](http://www.marineinsight.com/main-engine/different-types-of-marine-propulsion-systems-used-in-the-shipping-world/)

- **Fuel Cell Propulsion:**

Fuel cell propulsion systems use hydrogen as the main fuel component. Electricity is created in the fuel cell without any combustion whatsoever. The process is clean and therefore has been regarded as a very important alternative marine propulsion system. There are various types of propulsion under the fuel cell propulsion head like PEM (Photon-Exchange-Membrane) and the molten-carbonate systems.

- **Biodiesel Fuel Propulsion:**

Biodiesel propulsion has been deemed as a potential marine propulsion system for the future. Currently tests are being carried out to find out about the viability of this propulsion system which is expected to be in full operation by the year 2019.

- **Solar Propulsion:**

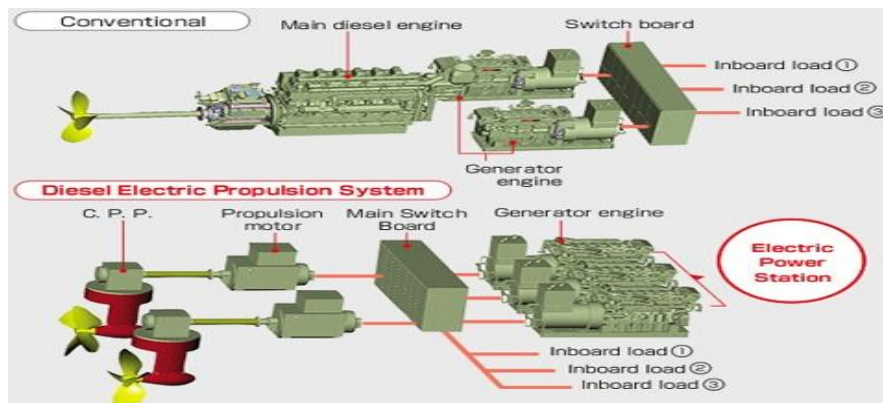
Solar propulsion for ships was utilized for the first time in the year 2008. Solar propulsion benefits include a high reduction in the poisonous carbon dioxide emissions. Solar propulsions are capable of generating a capacitance as high as 40 kilowatts (kW).



[<https://daryanenergyblog.wordpress.com/2014/08/20/shipping-and-carbon-emissions/>]

12. Electrical Propulsion System (EPS)

The conventional propulsion system of the ship is efficient but requires high operating costs and increases the marine pollution. Among all the prospective alternate power sources, electrical propulsion system is one of the best tried out alternative in today's time. At this system the propeller shaft of the ship is connected to large motors, which can be D.C or A.C driven and are known as propulsion motors. Power for propulsion motor is supplied by the ship's generator and prime mover assembly.



[www.marineinsight.com/marine-electrical/electrical-propulsion-system-in-ships/]

13. Sandwich Plate System (SPS)

It is a process of composting two metals plates by bonding it with polyurethane elastomer core. This avoids usage of steel which requires additional stiffening hence

makes the structure light weight and less prone to corrosion. This technology can definitely play a good role in green ship recycling process as SPS feature includes superior in service performance and reduced through life maintenance.

5.2 Green Ship Recycling

The increasing waste and its improper management are one of the crises that countries across the world face these days. Be it an agricultural waste or industrial waste, the rise in the disposal of waste materials is at an alarming rate, polluting the land, air and water as never before. Studies have stated that 40 percent of the waste worldwide ends up in huge rubbish tips, and also the oceans will see more plastic in it than fish by 2050. However, the concrete efforts in the past few decades have made remarkable changes in our disposable culture and also opened doors for a number of alternatives to waste disposal. Among them, recycling has been widely accepted as one of the fruitful methods for waste management.

Like any other industry, the shipping industry, indeed world's biggest polluters, also creates a huge amount of waste every day. While ships dispose hundreds of tonnes of garbage from day to day operations, the disposing of a ship after it reaches the end of its service life also leaves a huge amount of waste, posing a potential hazard to the environment. The improper disposal of the ships in earlier days, especially when they were left unattended after discontinuation from the service, has created several graves of abandoned ships around the world. And, in the past decades, ship owners have also tried several other techniques; including Scuttling-the deliberate sinking of a ship, deep water sinking and shipbreaking, to get rid of their old vessels.

While shipbreaking has emerged as the most common method of ship disposal among them, the dirty shipbreaking practices have resulted in the dumping of dangerous toxic materials such as asbestos and PCBs¹⁰ on beaches and other open spaces. Sometimes, companies offload their vessels onto beaches in third world countries such as Bangla-

¹⁰ Polychlorinated Biphenyl (PCB)

desh, India, and Pakistan, allowing locals to dismantle the vessel without taking any proper measures.

However, when recycling and re-using goods and products has become an important requirement now, the shipbreaking method has also witnessed the recycling of the parts of the vessel.

Moreover, with the rise in awareness towards the maritime environment, there have been several changes in the process, which have given rise to a new term – green ship recycling. IMO's Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 also strictly directed that vessels that are being recycled after their service lives should not pose any unnecessary risks to human health, safety and to the environment. As a viable alternative to other methods of shipbreaking that makes negative effects on the environment, green ship recycling has been introduced across the world. As a way of responsible ship recycling, this method reduces the amount of waste and also keeps the waste materials from shipbreaking out of the beaches, reducing its impact on the environment.

There are several reasons which have made the concept of green ship recycling popular and meaningful. But, the most relevant benefits among them are:

- Isolate those parts of the ship which are harmful and dangerous to both marine and human lives
- Conserve marine ecosystem by proper discarding of ship breaking waste
- Reusing those parts of the ship that are important and can be re-used successfully while making new ships, thus saving resources
- Help the ship-owner benefit from the process by optimum utility of the ship's parts

The valuable components of a ship that are reused include steel, aluminum, silver and brass, among others. Since a major part of a ship's weight is in steel, the steel scrap from the vessel is being converted into bars and rods for several other uses. However, in addition to the metal that can be recycled, there are a number of the toxic components inside a vessel. These harmful substances include lead, asbestos, mercury and oil sludge etc. The inefficient shipbreaking methods, especially those carried out on

beaches than the dry-dock ship recycling facilities, allow these toxic and hazardous waste to be disposed of unsafely.

The green ship recycling, which carries great responsibility of saving the environment, offers a better recycling standard. One of the major harmful materials that are safely disposed off with the help of green ship recycling process is **asbestos**. Any great informational site about asbestos will tell you that asbestos has been banned from being used in ships from the past two decades. But the ships in which asbestos had been used initially need to be recycled now. Since continuous exposure to asbestos can cause problems not just to the marine life forms but also to the people aboard the ship, this toxic component is being recycled with greater caution under this process.

Unlike the unhealthy process in which the dismantling of the vessel occurs on beaches, the green recycling centers with dry-dock facilities capture the toxic waste properly and dispose it without allowing them to flow out to waterways. Many green ship recycling labs are so well equipped that the success rate for the disposal of the harmful materials is nearly around 99%. In addition to protecting the environment, these green recycling centers are also offering more green recycling jobs, offering a safe workplace for the laborers.

On the other hand, this environmentally sound and safe recycling of a ship also offers the owner optimum utility of the ship's parts. With the methodical dismantling of the vessel, the components that can be reused are saved with better care. The steel, along with other metal components, turns into rods for use in the construction industry and also corner castings and hinges. The generators and batteries which were part of the scrapped vessel will be reused for several other purposes. The appropriate recycling of the hydrocarbons on board transformed into oil products, while light fittings also reused on another vessel or even on land.

Chapter 6

The Union of Greek ship-owners Future View

Maritime safety and the protection of the marine environment depends on a chain of collective responsibility, namely, flag states, port states, ship-owners, ship operators, shipbuilders, seafarers, classification societies, insurers and charterers. The UGS welcomes and fully supports efforts which safeguard safety at sea and promote a sustainable future for both the environment and the shipping sector. Indeed the UGS has itself led a number of initiatives towards accomplishment of these aims with global recognition and application. The UGS advocates adherence to internationally adopted standards and procedures and opposes unilateral and regional measures. This is so, as shipping is an international activity which is in need of international solutions and regulations. Shipping offers an irreplaceable service to global trade and the world and, as such, environmental concerns, which the whole humanity shares, should be considered in the context of technological capability and sustainability of shipping. Regulations need to be workable and enforceable rather than merely aspirational and mandating, inter alia, equipment or specifications not yet available, or setting unrealistic goals.

In the context of the above principles, the UGS follows with special interest and contributes to the formation of the collective industry's positions on a number of issues, such as CO₂ emissions from ships, the reduction of the sulphur content of bunker fuel, Ballast Water Management, the International Maritime Organization's (IMO) Goal-based Standards and the International Association of Classification Societies' (IACS), Common Structural Rules (CSR).

Chapter 7

Customers Trends

Customers are as much a part of the wider trends forcing change on the industry as they represent a force on their own. As key stakeholders to the industry, it is increasingly important to understand the value proposition that major customers will be seeking from shipping lines:

- Reduced costs stemming from operational efficiencies.
- Reduced reputation and operational risk exposure throughout the supply chain for everything from poor sustainability management to mishandled security.
- Reduced sustainability footprint throughout the supply chain, driven by consumers and stakeholders.
- Increased efficiency and reliability resulting from good management of environmental, social and financial activities.
- Sustainability innovations and solutions in supply chain management.

The vast majority of customers we interviewed currently are seeking a mix of reduced costs, reduced sustainability risk and increased efficiency and reliability. The research suggests that this applies more or less across the sustainability topic categories, where customers view sustainability as an entry requirement and increasingly as an equal level playing field. This need can be addressed through robust sustainability performance.

However, in the coming years a growing number of customers, including the largest customers, will likely seek a value proposition that also includes a reduced logistics sustainability mark and, more importantly, logistics services and solutions that help customers optimize their wider sustainability footprint throughout their own supply chains. Customers will seek for a better and more efficient partnership. Environment will be the primary topic although some customers will raise the bar on the social responsibility performance as well.

Chapter 8

Conclusion

As we look across the regulatory in the international shipping industry, and through the future trends lens, a number of key points are emerging.

First and foremost, the international shipping industry is entering more choppy waters. The bar will be raised across the board, notably as a number of regulatory changes take effect over the coming years. The industry is no longer hidden. Regulators, stakeholders, and customers all realize the impacts and the potential for change that the industry holds. Some companies will find this as an unwelcome development. Others will find a way to benefit.

Furthermore, changes in the business environment will contribute to the emergence of more distinct business strategies. In the past, most major shipping lines have pursued a low-cost strategy coupled with acceptable lead times, reliability, and operational standards. We are likely to see that some major carriers will seize upon the significant ‘sustainability changes’ to develop strategies based on real differentiation while others will continue to resist the changing tide.

The spotlight is shining on an industry that has inherently deep bonds with global societies, trade and the environment. My research implies that sustainability challenges facing the industry will increase in significance over the next five to seven years, whilst socio-economic changes will continue to result in more complex supply chain networks. Shipping companies have an opportunity to respond strategically to these signals and create business benefit and value. Value that also benefits the environment and the communities global supply chains serve.

Taking everything into consideration, it is of the utmost importance for the shipping industry to embrace the new regulations and try to propagate them to the new generations so that we can secure our forthcoming future. The IMO SDG’s must not only be taken under consideration, but also be achieved at the highest possible level. Achieving this goal’s is just a start as the future hides many challenges for us to face.

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