



**SUSTAINABLE
DEVELOPMENT GOALS:
EXPLORING MARITIME
OPPORTUNITIES**

Report commissioned by:



Norges
Rederiforbund
Norwegian
Shipowners'
Association

SUSTAINABLE DEVELOPMENT GOALS: EXPLORING MARITIME OPPORTUNITIES

Authors

DNV GL

Core team: Maria Gjørberg, Tore Longva, Kjersti Aalbu
Extended team: Magnus Strandmyr Eide, Asun Lera St.Clair, Lars Erik Mangset, Sverre Alvik

NORWEGIAN SHIPOWNERS' ASSOCIATION

Erik Giercksky, Helene Tofte, Tor Christian Sletner, Karoline L. Böhler, Karin Gjerløw Høidahl

Contents

CHAPTER



TAKING STOCK

- 12 The Sustainable Development Goals (SDGs)
- 13 Shipping and the maritime industry
- 14 Current status

CHAPTER



MAPPING

- 17 Identifying opportunity areas
- 18 Biosphere
- 24 Society
- 35 Economy

CHAPTER



OPPORTUNITIES

- 43 Five opportunity areas:
- 44 1) Act on the Paris Agreement
- 46 2) Build sustainable communities...
- 48 3) Protect life in the oceans
- 50 4) Create a sustainable future...
- 52 5) Promote responsible practices

STURLA HENRIKSEN

THE CENTURY OF THE OCEANS



Sometimes, when looking at my little crowd of twins playing in the garden, I get a deeper sense of mission in my own work as a maritime executive. I am encouraged by the potential of the shipping industry to contribute to solving the generational challenge of increasing global living standards, while at the same time reducing environmental degradation. I am intrigued by the prospects for maritime activities to contribute to solving the dilemma of inducing economic growth, while concurrently reducing global warming.

In this report, you will find some of the answers to these challenges. A first of its kind, this report commissioned by the NSA addresses how the shipping industry can contribute to achieving the UN's Sustainable Development Goals.

Oceans represent our most important global commons. Healthy and productive oceans are essential to the prosperity and well-being of mankind.

The oceans can provide healthy food for billions of people. The ocean floor contains vast amounts of minerals and metals. The deep seas are the frontier of advanced medical research. Offshore oil and gas today supplies a third of the world's demand for oil and gas. New technology now allows for tapping the enormous potential for renewable, emission-free energy from offshore wind, waves, currents and tidal waters.

A worldwide web of logistics, shipping is carrying 90 per cent of world trade. Already today, shipping is the most energy efficient mode of transportation. Going

forward, we will be seeing more green ships travelling the blue oceans. More energy efficient ships is a precondition for the world to enjoy sustainable economic growth to the benefit of an increasing world population.

These perspectives offer inspiration and guidance for the demanding restructuring facing many key segments of our maritime industry. They also hold the promise of a host of prosperous opportunities for a better and more sustainable world.

I am convinced that we are standing on the threshold of the "Century of the Oceans".

Considering these perspectives, I feel a deeper sense of both mission and responsibility in my daily work. And, I feel an optimistic sense of hope and confidence in the future of my little crowd of twins playing in the garden.

Sturla Henriksen
CEO, Norwegian Shipowners' Association

ERNA SOLBERG

A SEA CHANGE APPROACH TO GLOBAL DEVELOPMENT



In September 2015, world leaders gathered at the United Nations to adopt a roadmap for global development. The 17 Sustainable Development Goals (SDGs) are universal, and they take a holistic approach to development, combining its economic, social and environmental aspects. By working together, we can end poverty and put the planet on a sustainable path – while leaving no one behind.

As Co-chair of the UN Secretary-General's group of SDG Advocates, I tend to emphasise that achieving the SDGs at all levels, is the best way we can address the challenges and threats we face. Many of the challenges are common to all countries, and they require joint global responses. Likewise, the threats to our climate and the health of our oceans can only be addressed through innovation and global cooperation.

Sustainable use of the oceans laid the foundation for Norway's prosperity and the welfare of our population. For decades, we have pursued an integrated ecosystem-based approach to the management of our oceans. Today, two thirds of the value of Norway's exports comes from ocean-related activities.

Needless to say, the maritime sector is a major economic player in Norway. Several SDGs are relevant to this sector, not least SDG14. These goals can only be reached through international and multidisciplinary cooperation.

The OECD has predicted that by 2030, ocean-based industries can outperform the growth of the global economy both in terms of value added and employment. My Government therefore has high ambitions for Norway's ocean-based industries, and attaches importance to the transfer of expertise and technology across the various industrial sectors.

To this end, we recently launched an ambitious strategy for our ocean industries, with a view to paving the way for sustainable growth for years to come. Moreover, my Government will soon launch its first white paper on the role of the oceans in our foreign policy. Key points in the white paper include a firm commitment to the sustainable use of resources, and concrete measures to combat the threats facing our oceans.

And there is indeed cause for concern: many sea areas are under threat from pollution, including marine plastic litter and microplastics, and from a loss of biodiversity and the over-harvesting of marine resources. Addressing these issues are at the heart of the 2030 Agenda and the SDGs, and I can assure you that Norway will shoulder its share of the responsibility.

For decades, the competitive advantage of the Norwegian shipping industry has been its high quality services and responsible conduct throughout the value chain. I am pleased to note that the Norwegian Shipowners' Association remains fully committed to safeguarding this heritage. There are huge challenges facing the shipping industry, but also great opportunities. This report shows that the Association's commitment to maintaining the highest possible standards for value creation, remains as firm as ever.

Erna Solberg
Prime Minister of Norway

LISE KINGO

COORDINATE FOR A BETTER WORLD



In 2015, world leaders adopted the 2030 Agenda for Sustainable Development of the United Nations including the 17 Sustainable Development Goals. It sets an ambitious vision for the world that we want, and charts the course for how to get there. Most importantly, it recognizes that global cooperation – within and between sectors, across borders, public with private – is the only way we will get there in time.

For me, the 2030 Agenda signifies a sea change in the way we think, act and lead. This is the decade where a new social contract is written with the Global Goals as our challenge and our opportunity. Where business leadership is defined by our actions, and success is measured by how well we do by doing good. Where policy makers, business partners, employees and consumers are much less forgiving with those who are late to respond and ignore the basic principles as set out by the United Nations for responsible business conduct.

That is also why the United Nations Global Compact wholeheartedly welcomes this new Maritime Opportunities Report that lays out opportunities for the Maritime Industry in delivering on the Sustainable Development Goals through cooperation, innovation and new technologies. We need businesses that are ready to lead their sectors into the 2030 Agenda and who understand that united and through cooperation we can go all the way.

Throughout the ages, our oceans, seas and waterways have made economic, social and human development possible, serving as conduits for trade and commerce, adventure and discovery. Indeed, life itself arose from the oceans, and life on earth still very much relies on the

oceans - from being a prime source of nourishment for billions of people, to impacting our climate and weather, even the air that we breathe, thanks to the delicate interplay between the oceans and the atmosphere.

The Oceans are a global common and a resource for the world to meet the Sustainable Development Goals. It is also a resource we have to treat with care. Counting down to 2030, there will never be a better moment to align your business objectives with creating a better world. I invite the maritime industry to be stewards of our oceans, seas and waterways, creating opportunities for a better world.

Lise Kingo
CEO & Executive Director
United Nations Global Compact

EXECUTIVE SUMMARY



The Sustainable Development Goals (SDGs) are a global call for action to protect the planet, ensure dignified lives for all people, and achieve inclusive economic growth, peace and prosperity. Adopted by the United Nations on 25 September 2015, the 2030 Agenda for Sustainable Development is structured into 17 interconnected and complementary Sustainable Development Goals, including a total of 169 targets. The goals and targets provide global guidance to all governments, enabling the setting of relevant national targets.

However, the SDGs extend beyond the realm of the public sector. They are a call for action to all societal actors, giving particular importance to the role of non-state actors, including business. The SDGs present an extraordinary opportunity for companies to align their strategies and business models with

global sustainable development needs. As a global industry, shipping has a critical role to play in meeting many of the goals, and indeed is already contributing to several of the main targets.

This report explores shipping's potential contributions to the Sustainable Development Goals and identifies five main opportunity areas where the shipping industry can contribute. The report takes how the industry is already contributing to achieving the goals as its point of departure, and looks forward towards emerging opportunities. We examine how shipping can contribute to achieving the SDGs through:

- » managing its own operations sustainably;
- » influencing and setting requirements for suppliers in the maritime industry;
- » enabling other industries in the ocean space to generate economic growth and work, while protecting natural resources for the future.

“ As a global industry, shipping has a critical role to play in meeting many of the goals.”

The analysis of the Sustainable Development Goals and their relevance for the shipping industry is structured into three interconnected categories: goals related to the biosphere, goals related to society, and goals related to the economy.

BIOSPHERE

Protecting the biosphere is an essential precondition for social justice and economic development. If we do not achieve the goals related to clean water and sanitation, life below water, life on land, and climate action, the world will fail to achieve the remaining goals.

» The shipping industry has a direct impact on the biosphere through emissions to air and discharges to sea.

SOCIETY

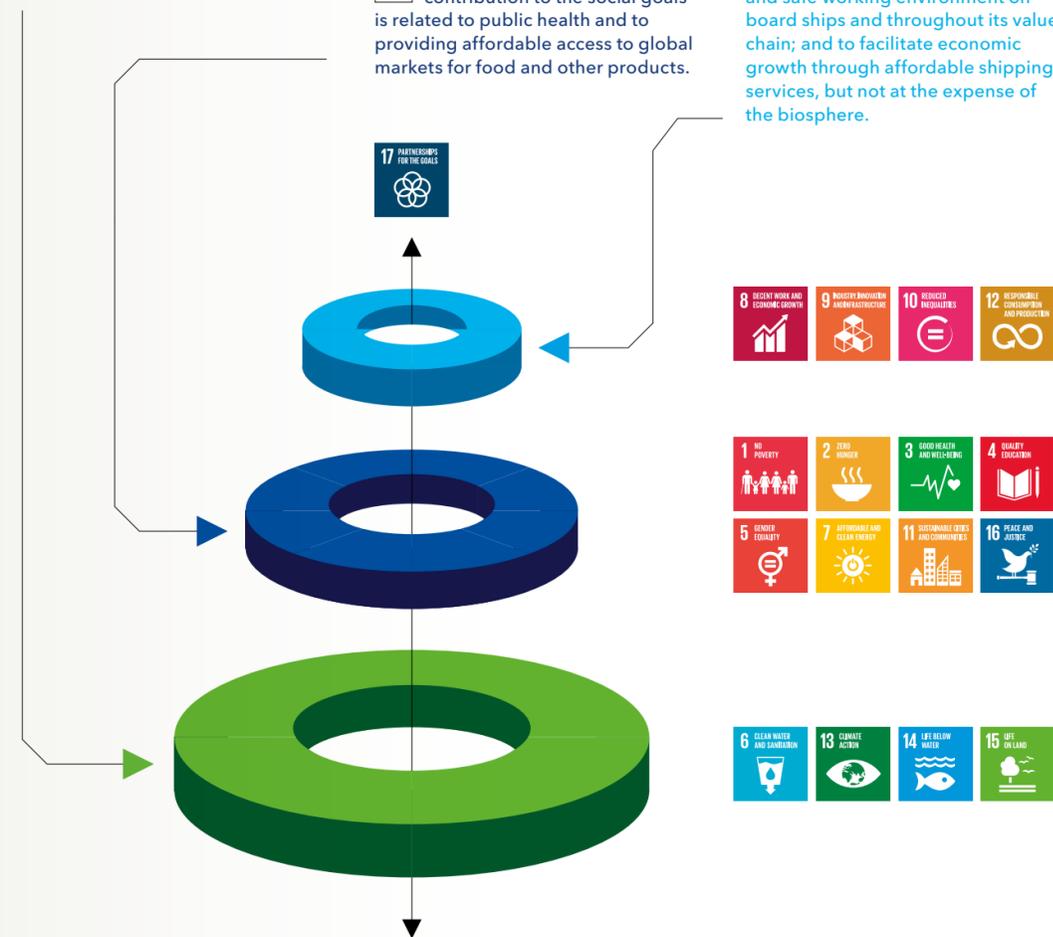
The next level of the SDGs addresses societal issues and calls for the eradication of poverty, and the improvement of social justice, peace and good health. Social development depends upon a protected biosphere. In addition, the goals on clean energy, no poverty, zero hunger, peace and justice, sustainable cities, education, gender equality, and good health are the foundation for the goals related to the economy.

» The shipping industry's main contribution to the social goals is related to public health and to providing affordable access to global markets for food and other products.

ECONOMY

The final layer of goals relates to economic development. Building on the biosphere and society, the economic goals direct attention towards industry, innovation and infrastructure; reduced inequalities; responsible consumption and production; and decent work and economic growth that is decoupled from environmental degradation.

» For shipping the challenge is twofold: to provide a decent and safe working environment on board ships and throughout its value chain; and to facilitate economic growth through affordable shipping services, but not at the expense of the biosphere.



HIGHLIGHTS

The shipping industry has the greatest potential to contribute to the goals on climate action, affordable and clean energy, sustainable cities and communities, life below water, good health and well-being, decent work and economic growth, and life on land.



Given the interdependence across all the SDGs, specific contributions related to these goals can also positively contribute to other goals.

We have summarised the potential for the shipping industry to contribute to the SDGs into five main opportunity areas, each with specific examples.

FIVE OPPORTUNITY AREAS



1

Act on the Paris Agreement



- » Support strategies for the reduction of GHG emissions from international shipping through the IMO
- » Develop and implement low-carbon solutions on board ships
- » Develop international industry standards to scale up low-carbon solutions
- » Support the development of financial incentives to install low-carbon solutions on board ships
- » Work with stakeholders in the value chain to enable slow steaming
- » Understand risks and opportunities related to a changing climate and a low-carbon economy
- » Facilitate the transition to an equitable and resilient low-carbon economy

[More on page 44](#)



2

Build sustainable communities & infrastructure



- » Develop and implement zero-emission transport concepts in cities and other populated coastal areas
- » Research and develop methods to measure and control particulate matter (PM)
- » Develop transport solutions for moving goods by sea instead of on land
- » Support sustainable energy infrastructure
- » Alleviate pressure from land-based activities
- » Develop and implement solutions for producing and transporting clean drinking water

[More on page 46](#)



3

Protect life in the oceans



- » Develop and implement solutions for collecting plastic waste in the oceans
- » Prevent transfer of alien species across geographies
- » Use ships to collect ocean research data

[More on page 48](#)



4

Create a sustainable future for the ocean economy



- » Facilitate resource harvesting in the ocean space, including food, minerals and energy
- » Create global governance for resource harvesting in the ocean space

[More on page 50](#)



5

Promote responsible practices



- » Ensure decent work, living wages and responsible practices in the maritime industry
- » Increase transparency and accountability
- » Combat corruption and bribery

[More on page 52](#)



ABOUT THE REPORT

» DNV GL has assisted the Norwegian Shipowners' Association (NSA) with assessing the potential contributions of the shipping industry to the Sustainable Development Goals.

» DNV GL has provided the framework for assessment and has facilitated a mapping process, including two workshops with experts from the NSA. The results are not the product of a DNV GL analysis, but rather reflect the input from both parties contributing to the mapping process.

» The report presents specific examples of how the shipping industry can contribute to the SDGs but the overview is not exhaustive.

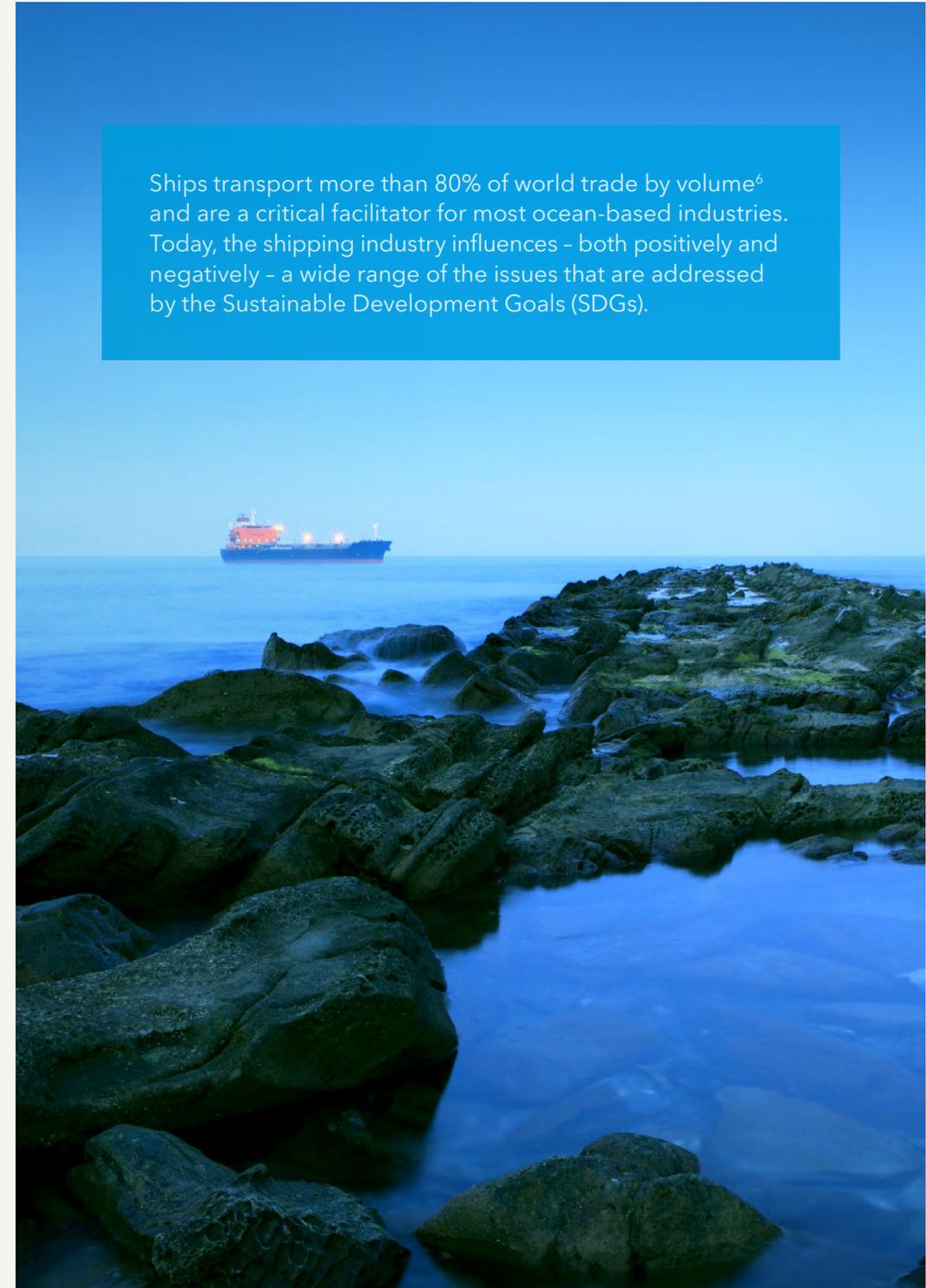
» This report is a first analysis of the opportunities for shipping, and may serve as a foundation for future research to provide more detailed knowledge.



TAKING STOCK

SHIPPING AND THE SUSTAINABLE DEVELOPMENT GOALS

Shipping is an integral part of the global economy. It was one of the first globalizing forces, and has been furthering social and economic interaction for centuries.



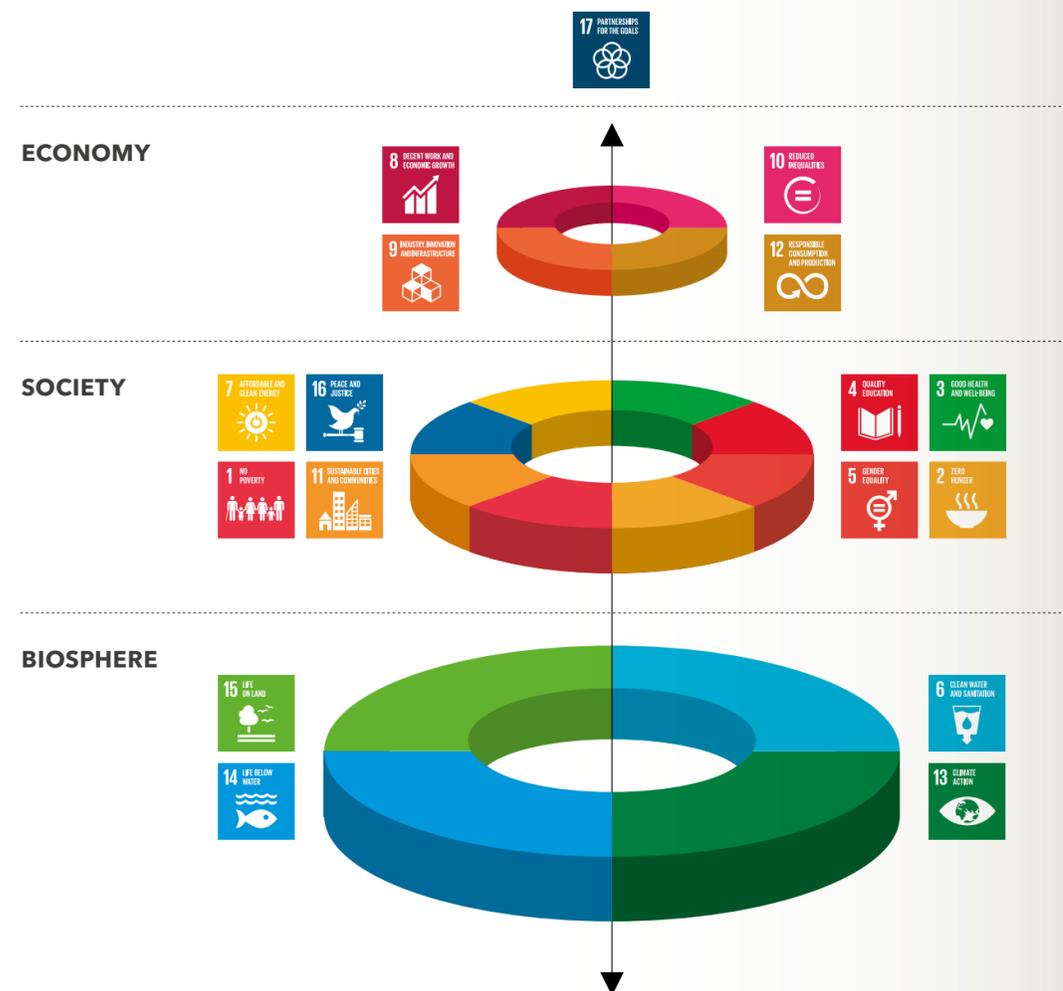
Ships transport more than 80% of world trade by volume⁶ and are a critical facilitator for most ocean-based industries. Today, the shipping industry influences - both positively and negatively - a wide range of the issues that are addressed by the Sustainable Development Goals (SDGs).

THE SUSTAINABLE DEVELOPMENT GOALS

The 17 Sustainable Development Goals present global goals related to the biosphere, society and the economy. As shown in Figure 1, the goals are integrated and inseparable. Society and the economy are embedded within the biosphere. Not only do society and the economy depend

on the biosphere, they also shape it at both local and global levels. As we approach the third decade of the 21st century, the environment can no longer be treated as an externality but rather must be treated as essential for human well-being and sustained economic growth.

FIGURE 1 The Sustainable Development Goals structured into three categories: biosphere, society and the economy



Redrawn from Stockholm Resilience Centre; Folke et al., 2016; SRC & IIASA, 2016; Rockström, J. and Sukhdev, P., 2016).

Shipping and the maritime industry - a vital part of the ocean economy

The primary tasks of shipping are transportation of goods and passengers and facilitation of a range of ocean-based industries such as fishing, aquaculture, offshore oil and gas, offshore wind energy, ocean renewable energy, marine and seabed mining, marine biotechnology and tourism. Shipping is the centre point of the maritime industry, which includes all stakeholders in the value chain such as yards, designers, manufacturers, and service providers. Together, shipping and the maritime industry are a vital part and enabler of other industries in the ocean economy.

The ocean economy contributed around 1.5 trillion USD, or 2.5%, to the global gross value added (GVA) in 2010, providing around 31 million full-time jobs. Most workers are employed within industrial fisheries and tourism. The OECD projects GVA from the ocean economy will grow to more than 3 trillion USD in 2030. The output of the maritime industry in 2030 is estimated at 510 billion USD GVA and 6.5 million full-time jobs. As such, the ocean space will be a significant contributor to the SDGs related to social and economic development.

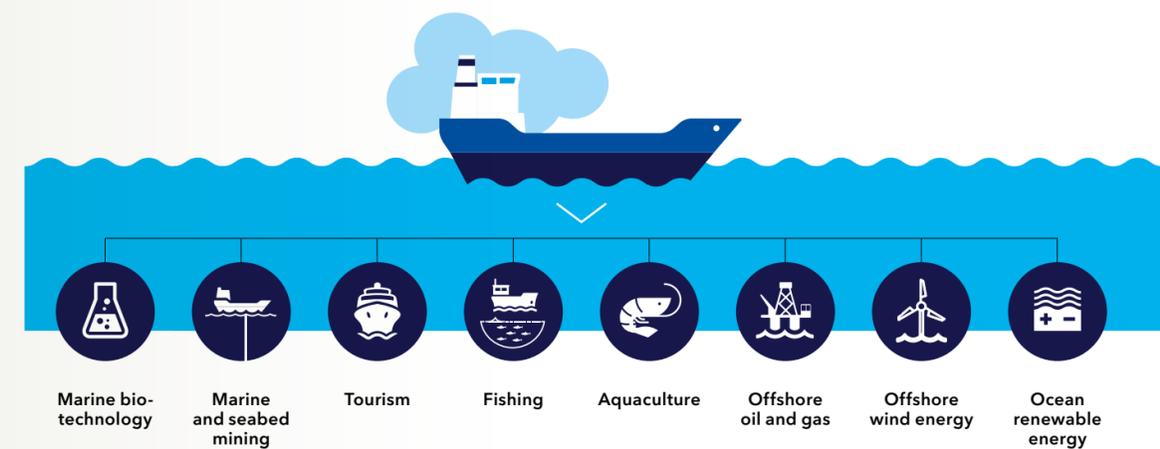
However, the ocean space is vulnerable and marine resources are limited. Many of these resources are non-renewable and already reaching critical limits. Careful management and governance of marine ecosystems and oceans are needed to use and protect resources sustainably. The shipping industry must manage the difficult balance of providing sustainable yet affordable services, while contributing to governing common resources.

From the perspective of the shipping industry, this report examines how it can contribute to achieving the SDGs through:

- » managing its own operations sustainably;
- » influencing and setting requirements for suppliers in the maritime industry;
- » enabling other industries in the ocean space to generate economic growth and work, while protecting natural resources for the future.



FIGURE 2 Opportunities with other industries in the ocean economy



CURRENT STATUS

To identify the opportunities for shipping to contribute to the SDGs, we first need to look at the industry's positive and negative contributions today and the existing regulatory frameworks that aim to reduce future negative impacts.



BIOSPHERE

Protecting the biosphere is an essential precondition for social justice and economic development. If we do not achieve the goals related to clean water and sanitation, life below water, life on land, and climate action, the world will fail to achieve the remaining goals.

The shipping industry has a direct impact on the biosphere through emissions to air and discharges to sea. Most scenarios for shipping towards 2050 predict significant growth in the demand for seaborne trade and a corresponding growth in the world fleet.

EXAMPLES

- » Shipping is responsible for approximately 3% of total anthropogenic CO₂ emissions, or about 900 million tonnes per year. Current regulations address energy efficiency on new ships. The IMO has agreed on a roadmap for developing a GHG reduction strategy.
- » Accidental oil spills have been reduced from 300 000 tonnes per year in the 1970s to 5 000 tonnes per year in the period 2010 to 2015.²
- » Ships emit around 18 million tonnes NO_x (15% of world total) and 10 million tonnes SO_x (5-8% of world total) annually.³ New regulations are expected to reduce emissions.
- » Shipping is a major contributor to introducing alien species across ecosystems.⁴ The newly ratified Ballast Water Management Convention will reduce the transfer of species. However, biofouling, which also contributes to the movement of alien species, remains unregulated.



SOCIETY

The next level of the SDGs addresses societal issues and calls for the eradication of poverty, and the improvement of social justice, peace and good health. Social development depends upon a protected biosphere. In addition, the goals on clean energy, no poverty, zero hunger, peace and justice, sustainable cities, education, gender equality, and good health are the foundation for the goals related to the economy.

The shipping industry's main contribution to achieving the social goals is related to public health and to providing affordable access to global markets for food and other products. Shipping also contributes to increased interaction across cultures, through travel and tourism. But the provision of these services comes at the expense of environmental degradation, which undermines those same societal benefits.

EXAMPLES

- » More than 80% of all goods (by volume) are transported by ships, providing access to global markets for food, energy and other products. Shipping is a very efficient mode of transport, with current freight costs calculated to be 7% relative to the value of goods for developed countries and to be 8 to 11% for developing countries.⁵
- » NO_x, SO_x and PM emissions from ships are a source for pollution in coastal areas and cities. Emissions of particulate matter from shipping are estimated to cause 60 000 cardiopulmonary and lung cancer deaths per year.⁶
- » Shipping is a major transporter of goods, which may include illicit cargo. It operates worldwide and is vulnerable to corruption.



ECONOMY

The final layer of goals relates to economic development. Building on the biosphere and society, the economic goals direct attention towards industry, innovation and infrastructure; reduced inequalities; responsible consumption and production; and decent work and inclusive economic growth that is decoupled from environmental degradation.

For shipping the challenge is twofold: to provide a decent and safe working environment on board ships and throughout its value chain; and to facilitate economic growth through affordable shipping services, but not at the expense of the biosphere.

EXAMPLES

- » The economic output of the maritime industry is estimated to 300 billion USD gross value added (GVA) and 5 million full-time jobs. The total output for all ocean industries is around 1.5 trillion USD GVA and 31 million full-time jobs.⁷
- » SOLAS and the Maritime Labour Convention regulate safety and working conditions in international shipping. There are about 6 fatalities per 100 million work hours on board ships per year (excluding fishing), which is ten times the OECD average for all industries.⁷
- » 90% of all ships are recycled, but many ships are still recycled on beaches in developing countries without decent and safe working conditions.

B

MAPPING

THE SHIPPING INDUSTRY'S POTENTIAL CONTRIBUTION TO EACH OF THE GOALS

In this chapter, we present the shipping industry's potential to contribute to each goal, based on the relevant targets identified for shipping and the contribution of the industry today. This mapping provides the basis for the main opportunity areas presented in Chapter C.

Effect of contribution

For each goal, we assess the contribution of shipping according to the type of effect and magnitude of effect.

TYPE OF EFFECT

refers to whether the shipping industry has a direct vs. indirect effect on the relevant SDG targets. Indirect effects refer to situations where shipping influences other activities necessary for the achievement of the SDGs, such as providing market access and distributing food.

- Indirect
- Moderately direct
- Very direct

MAGNITUDE OF EFFECT

refers to the size of effect on the relevant targets. The magnitude of effect will depend on the current impact of shipping and whether additional actions will have a significant effect.

- Low effect
- Medium effect
- High effect

IDENTIFYING OPPORTUNITY AREAS

To identify opportunities for the shipping industry to contribute to the SDGs, we have developed a three-step approach.



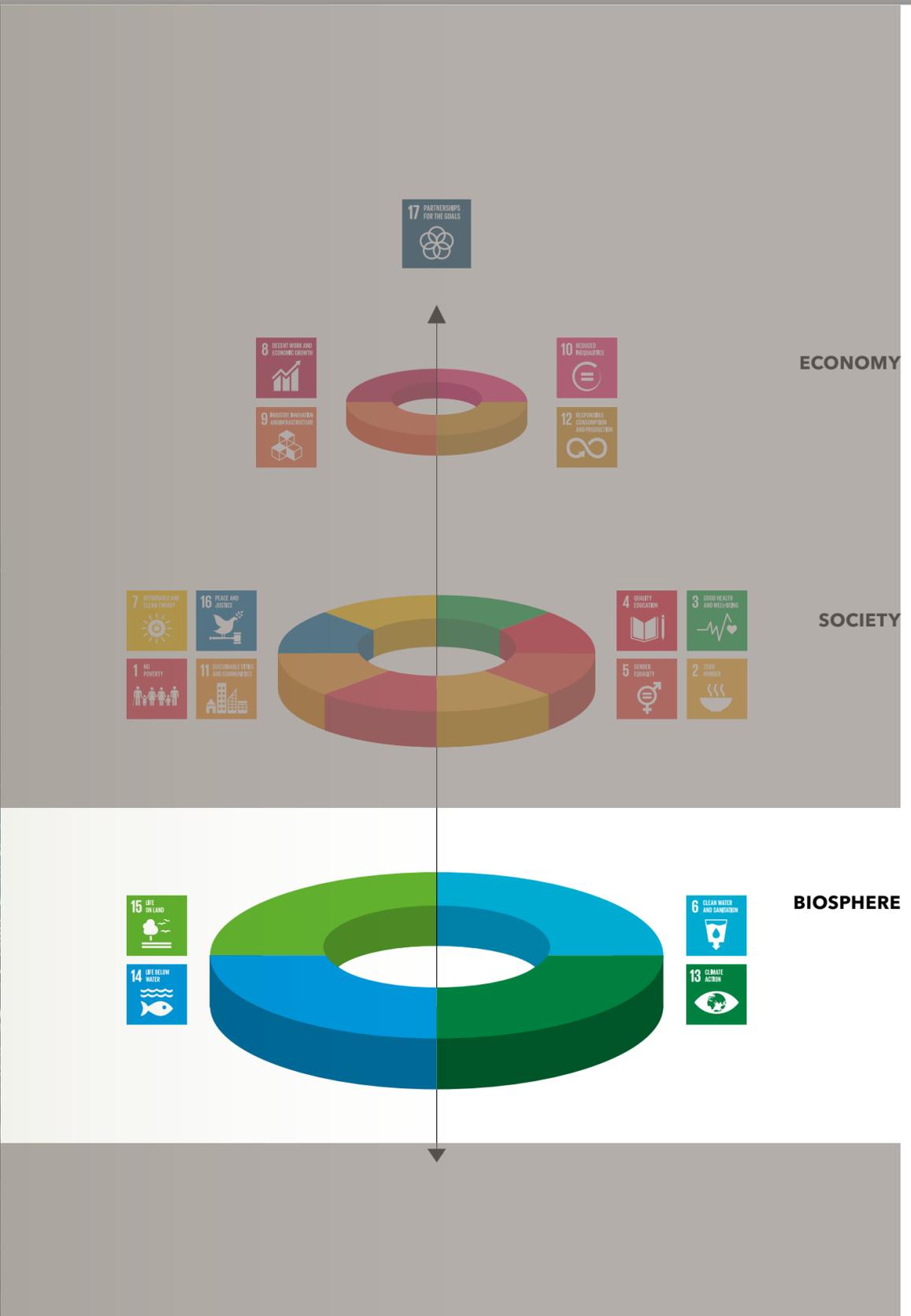
Each of the 17 SDGs has a series of targets. There are 169 targets in total. Several of these targets have low or no relevance to the shipping industry. We have reviewed all targets for each of the 17 goals and have selected those relevant for the shipping industry. For each goal, we present a summary of the relevant targets.

We have mapped the shipping industry's potential to contribute to each goal, based on the relevant targets and the contribution shipping is already making today.

Based on the mapping, we present the most business-relevant, effective and significant future opportunities for the shipping industry to contribute to the SDGs - five opportunity areas. Given the interdependence across all the SDGs, we highlight that actions in one area can directly or indirectly contribute to several goals.



BIOSPHERE





SDG 6: Clean water and sanitation

The goal aims to ensure availability and sustainable management of water and sanitation for all.

RELEVANT TARGETS FOR SHIPPING

Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally **(Target 6.3)**

Substantially increase water-use efficiency and ensure sustainable withdrawals and supply of freshwater. Expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies **(Targets 6.4, 6.a)**

How can shipping contribute?

- » Continue to reduce harmful discharges to sea from its own operations, particularly in fresh-water areas.
- » Continue to reduce the use of hazardous chemicals in its own operations, particularly in fresh-water.
- » Improve water efficiency directly in its own operations.
- » Set requirements related to water protection and freshwater use for suppliers within ship design, construction and scrapping.
- » Share knowledge and technology within and across industries for desalination of saltwater for drinking water purposes.
- » Share know-how for sanitation solutions and enable technology transfer from maritime industries for use in urban and rural settlements.
- » Facilitate offshore production and distribution of clean water.
- » Develop cost-efficient solutions to transport water from areas with abundant supply to areas with water scarcity.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping can directly influence the use of chemicals and water in its own operations, and is also able to influence the design, construction and scrapping of ships.

MAGNITUDE OF EFFECT



Low effect: Chemicals emitted from ships have a limited impact on clean water. Further, the technology and know-how regarding sanitation are not specific to shipping.



SDG 13: Climate action

The goal calls for urgent action to combat climate change and its impacts. It acknowledges the UNFCCC as the main international intergovernmental forum for negotiating the global response to climate change. Shipping emissions are currently not included under the UNFCCC negotiations. However, the IMO has been tasked with developing measures to reduce GHG emissions from international shipping.

RELEVANT TARGETS FOR SHIPPING

Strengthen resilience and adaptive capacity to climate-related hazards, and integrate climate change measures into policy, strategy and planning **(Targets 13.1, 13.2)**

Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning **(Target 13.3)**

How can shipping contribute?

- » Promote understanding and create awareness in the maritime industry of possible climate risks (physical, policy and legal, technology, market and reputation-related) and their financial impacts in the shipping value chain.
- » Reduce GHG emissions from its own operations, for example through use of alternative fuels, increased energy efficiency and improved logistics.
- » Enhance adaptive capacity to enable actors in the shipping value chain to adapt and respond to climate change and related risks.
- » Set requirements for suppliers within ship design and construction for low- or zero-carbon ships and for improving the carbon footprint of shipbuilding.
- » Develop shipping-specific global GHG reduction policies and mechanisms through the IMO and collaborative industry initiatives. Shipping policies should be linked to cross-sectoral efforts.
- » Contribute to GHG emission reductions in other transport sectors by transferring transport work from road to sea.
- » Assess and disclose climate-related risks based on the recommendations from the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures.

Effect of contribution

TYPE OF EFFECT



Very direct: Shipping can directly influence GHG emissions in its own operations, and has a dedicated international organization (IMO) for developing international policies and regulations.

MAGNITUDE OF EFFECT



High effect: The shipping industry emits 2-3% of global GHG emissions and needs to contribute its share of reduction efforts. Shipping can also contribute to emission reductions in other sectors.



SDG 14: Life below water

The goal aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

RELEVANT TARGETS FOR SHIPPING

Prevent and significantly reduce marine pollution, sustainably manage and protect marine and coastal ecosystems and minimize and address the impacts of ocean acidification **(Targets 14.1, 14.2, 14.3)**

How can shipping contribute?

- » Continue to reduce discharges to sea from its own operations, such as ballast water, chemicals, waste, oil and sewage.
- » Set requirements for suppliers within ship design, construction and scrapping.
- » Continue to reduce emissions to air from its own operations, such as NO_x, SO_x, and CO₂. Reduced emissions will lower the contribution to ocean acidification and eutrophication.
- » Introduce regulations on biofouling to prevent transfer of alien species.
- » Use maritime regulatory institutions to effectively implement policies and to foster innovation.
- » Contribute to clean-up activities in the ocean space, for example, collection of plastic and other waste.
- » Advance knowledge about the ocean and marine life by compiling and sharing operational data about ocean conditions. Such increased knowledge can inform more effective governance of the oceans.
- » Reduce disturbance of marine life by minimizing acoustic noise and by identifying appropriate operational measures when sailing in the most environmentally sensitive areas.

Effect of contribution

TYPE OF EFFECT



Very direct: Shipping can directly reduce emissions to air and sea, and can reduce other marine disturbances from its own operations. Shipping can also influence the design, construction and scrapping of ships.

MAGNITUDE OF EFFECT



Medium effect: The shipping industry contributes to 20% of marine pollution. Shipping is the biggest contributor to the transfer of alien species. Emissions to air contribute to acidification and eutrophication of oceans.



SDG 15: Life on land

The goal aims to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.

RELEVANT TARGETS FOR SHIPPING

Ensure the conservation, restoration and sustainable use of terrestrial ecosystems and inland freshwater ecosystems and their services **(Target 15.1)**

Introduce measures to prevent the introduction of and significantly reduce the impact of invasive alien species **(Target 15.8)**

How can shipping contribute?

- » Improve its own operations through management and treatment of ballast water. Alien species transferred by ships can affect terrestrial ecosystems.
- » Introduce regulations on biofouling to prevent transfer of alien species.
- » Support production of food and energy in the oceans to alleviate pressure on ecosystems on land.

Effect of contribution

TYPE OF EFFECT



Very direct: Shipping can directly influence the transport and discharge of invasive alien species through modern ballast water management systems.

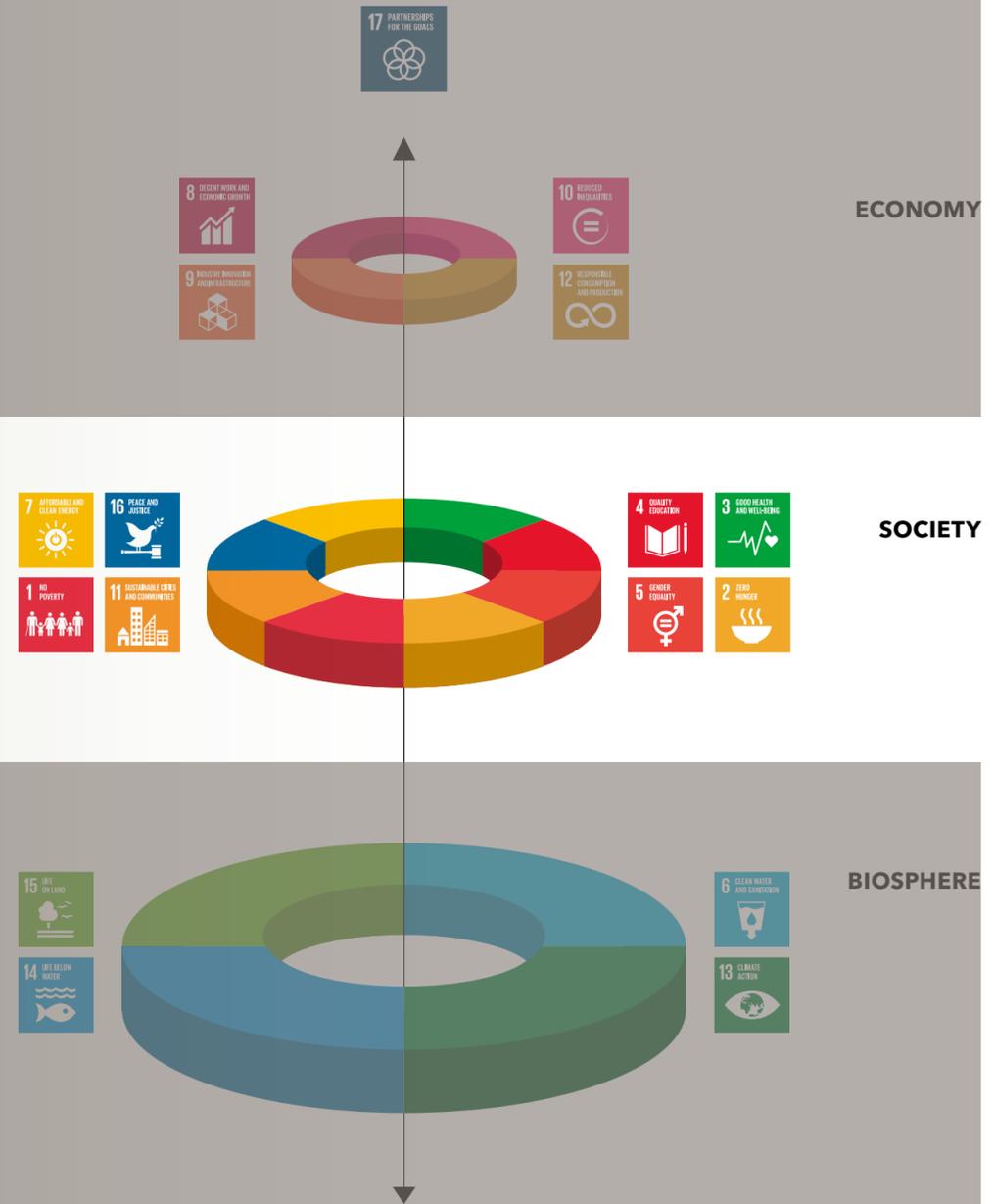
MAGNITUDE OF EFFECT



Medium effect: Invasive alien species is an important aspect of this goal. Food and energy production in the oceans will alleviate pressure on terrestrial ecosystems.



SOCIETY





SDG 1: No poverty

The goal aims to end poverty in all its forms everywhere.

RELEVANT TARGETS FOR SHIPPING

Eradicate extreme poverty, reduce by half the proportion of people living in relative poverty, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related risks (Targets 1.1, 1.2, 1.5)

How can shipping contribute?

- » Provide affordable and sustainable transportation of goods and people.
- » Provide affordable access to markets.
- » Provide access to basic goods for vulnerable groups to build resilience and in cases of emergencies.
- » Create jobs both within its own operations and within ship design, construction and scrapping.
- » Facilitate job creation and growth within the ocean economy.
- » Contribute to affordable energy and access to food through facilitating energy and food production in the ocean space.

Effect of contribution

TYPE OF EFFECT



Indirect: Through facilitating trade, access to goods and efficient functioning of markets.

MAGNITUDE OF EFFECT



Medium effect: The shipping industry is a critical facilitator of activities within the ocean space and provides access to markets.



SDG 2: Zero hunger

The goal aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture.

RELEVANT TARGETS FOR SHIPPING

End hunger and ensure access to safe, nutritious and sufficient food, and adopt measures to ensure the proper functioning of food commodity markets, facilitate timely access to market information and limit extreme food price volatility (Targets 2.1, 2.c)

How can shipping contribute?

- » Facilitate harvesting and production of sustainable food from the ocean space by supporting installation and operation of production assets.
- » Provide affordable and sustainable transportation of food.
- » Provide access to food markets and thereby reduce food price volatility.
- » Provide access to food for vulnerable groups to build resilience, and provide assistance in cases of emergencies.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Through facilitating trade, production of and access to food, and efficient functioning of food commodity markets.

MAGNITUDE OF EFFECT



Medium effect: The shipping industry is a critical facilitator of activities within the ocean space and provides access to markets.



SDG 3: Good health and well-being

The goal aims to ensure healthy lives and promote well-being for all at all ages.

RELEVANT TARGETS FOR SHIPPING

Prevent and treat substance abuse, including narcotic drug abuse and harmful use of alcohol
(Target 3.5)

Halve the number of global deaths and injuries from road traffic accidents
(Target 3.6)

Substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
(Target 3.9)

How can shipping contribute?

- » Support its own employees who experience substance abuse.
- » Provide alternative, maritime transport services to reduce road transport, thereby reducing traffic accidents.
- » Continue to reduce discharges to sea from its own operations, such as chemicals, oil, sewage and grey water.
- » Continue to reduce emissions from air from its own operations, such as NO_x, SO_x and PM.
- » Continue to reduce the use of hazardous chemicals in its own operations.
- » Set requirements for suppliers within ship design, construction and scrapping with regard to chemical use, and emissions to air, water and soil.
- » Use maritime regulatory institutions to effectively implement policies.

Effect of contribution

TYPE OF EFFECT



Very direct: Shipping can directly influence the emissions to air and sea from its own operations, and is also positioned to influence the design, construction and scrapping of ships.

MAGNITUDE OF EFFECT



Medium effect: Shipping emissions are significant, but only one of many sources of emissions to air and discharges to sea. However, shipping has a limited impact on global substance abuse and traffic accidents.



SDG 4: Quality education

The goal aims to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all.

RELEVANT TARGETS FOR SHIPPING

Ensure equal access to technical, vocational and tertiary education, and substantially increase the number of people who have relevant skills
(Targets 4.3, 4.4)

How can shipping contribute?

- » Continue to provide vocational education, training and traineeships in its own operations.
- » Continue to support maritime academies to ensure a skilled future workforce.
- » Develop global standards for skills and education to help accelerate education and training globally in the sector.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping can provide vocational education and training within its own operations, and by supporting maritime academies and global maritime educational standards.

MAGNITUDE OF EFFECT



Low effect: Shipping employs only around 1 million persons.



SDG 5: Gender equality

The goal aims to achieve gender equality and empower all women and girls.

RELEVANT TARGETS FOR SHIPPING

End all forms of discrimination against women and ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making (Targets 5.1, 5.2)

How can shipping contribute?

- » Improve gender equality in its own operations.
- » Targeted recruitment and mentoring of women in leadership positions.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping can directly influence gender equality and women's empowerment in its own operations.

MAGNITUDE OF EFFECT



Low effect: Shipping has limited influence beyond its own operations.



SDG 7: Affordable and clean energy

The goal aims to ensure access to affordable, reliable, sustainable and modern energy for all.

RELEVANT TARGETS FOR SHIPPING

Ensure universal access to affordable, reliable and modern energy services, increase the share of renewable energy and double the rate of improvement in energy efficiency (Targets 7.1, 7.2, 7.3)

How can shipping contribute?

- » Provide shipping services for distributing renewable energy - dependent on the type of energy and location of production.
- » Provide shipping services and technology related to harvesting offshore energy, for example solar, tidal, wind, wave and biomass energy.
- » Increase the use of renewable energy solutions in its own operations, such as biofuels, hydrogen, solar and wind.
- » Improve energy efficiency of all parts of its own operations.
- » Continue to develop and implement zero-emission solutions.

Effect of contribution

TYPE OF EFFECT



Very direct: Shipping can directly influence the use of energy in its own operations, and can provide shipping services for energy harvesting in the ocean space.

MAGNITUDE OF EFFECT



High effect: Shipping can facilitate energy distribution and energy harvesting in the ocean space.



SDG 11: Sustainable cities and communities

The goal aims to make cities and human settlements inclusive, safe, resilient and sustainable.

RELEVANT TARGETS FOR SHIPPING

Provide access to safe and sustainable transport systems for all and reduce adverse environmental impacts of cities, including adverse impacts on air quality (Targets 11.2, 11.6)

How can shipping contribute?

- » Provide safe, affordable, accessible and sustainable transport services in cities, such as zero-emission ferries and passenger ships.
- » Continue to develop and implement zero-emission solutions for urban transport.
- » Promote and use shore-based electricity when in port to reduce emissions.

Effect of contribution

| TYPE OF EFFECT | MAGNITUDE OF EFFECT |
|--|--|
| <p>Very direct: Shipping can provide low-emission transport services in cities.</p> | <p>Medium effect: Sea-based transportation is not possible for all cities, and ships will be able to substitute only parts of traffic on land. Still, the emission reductions can be significant.</p> |



SDG 16: Peace, justice and strong institutions

The goal aims to promote peaceful and inclusive societies, to provide access to justice for all and to build effective, accountable and inclusive institutions at all levels.

RELEVANT TARGETS FOR SHIPPING

- Significantly reduce illicit financial and arms flows, and combat all forms of organized crime (Target 16.4)
- Substantially reduce corruption and bribery (Target 16.5)
- Develop effective, accountable and transparent institutions at all levels (Target 16.6)

How can shipping contribute?

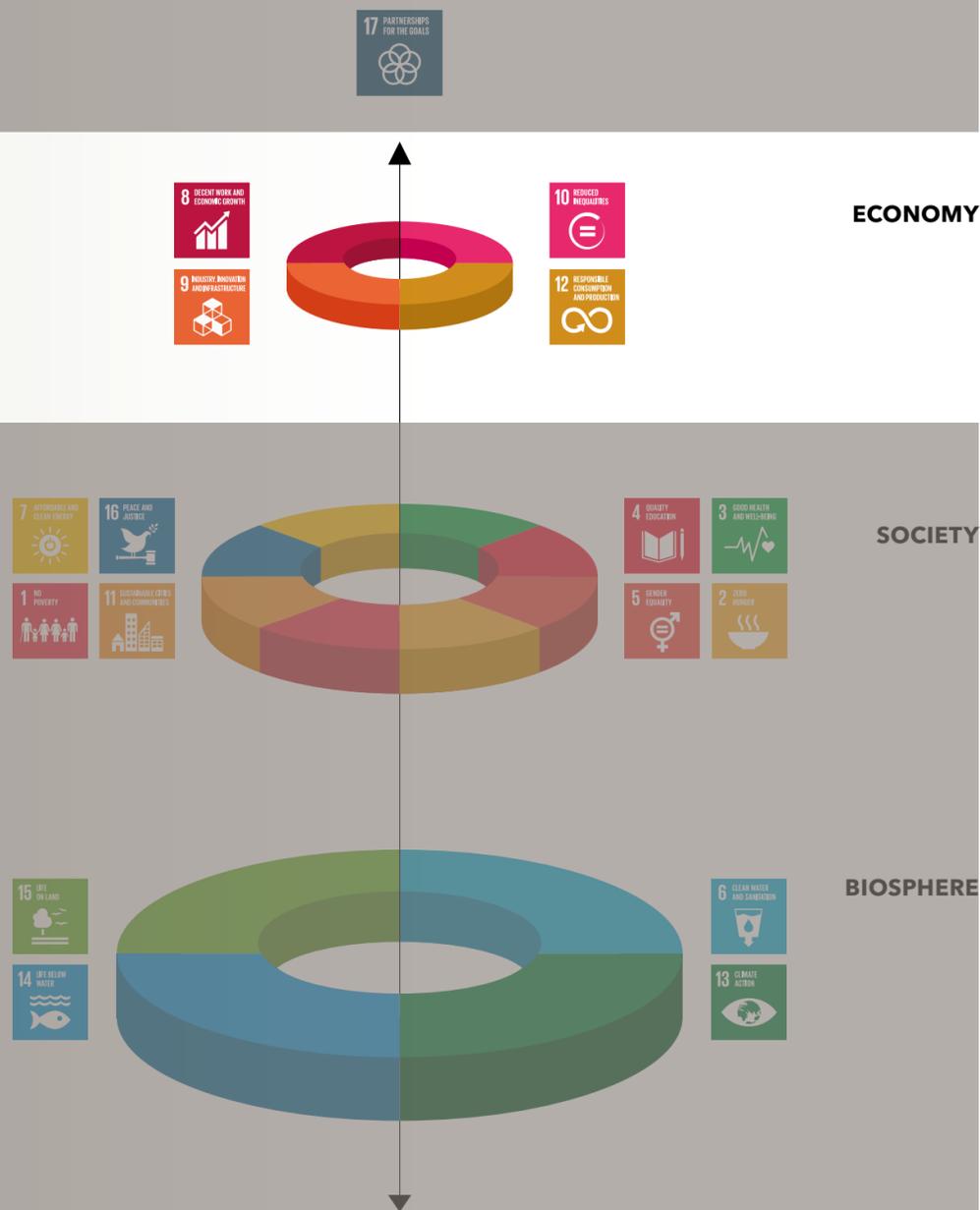
- » Increase transparency on cargoes, destinations, financial transactions and on the use of agents and intermediaries.
- » Reduce corruption and bribery through effective compliance systems and proper training.
- » Implement mechanisms for internal reporting and safeguards for whistle-blowers.
- » Strengthen global and national maritime regulatory institutions to reduce opportunities for corruption, bribery and illicit cargo flows.

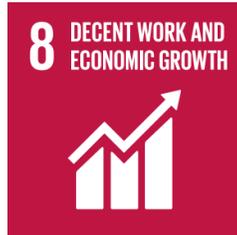
Effect of contribution

| TYPE OF EFFECT | MAGNITUDE OF EFFECT |
|--|--|
| <p>Moderately direct: Shipping is a major transporter of goods, which may include illicit cargo. It operates worldwide and is exposed to and can react to corruption.</p> | <p>Medium effect: There are limits to what the shipping industry can do beyond its own operations, but the effects of reducing illicit arms flows and corruption are significant.</p> |



ECONOMY





SDG 8: Decent work and economic growth

The goal aims to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

RELEVANT TARGETS FOR SHIPPING

Achieve higher levels of economic productivity, improve global resource efficiency and decouple economic growth from environmental degradation **(Targets 8.2, 8.4)**

Achieve full and productive employment and decent work, eradicate forced labour, modern slavery, human trafficking and child labour, protect labour rights and promote safe working environments **(Targets 8.5, 8.7, 8.8)**

Promote sustainable tourism **(Target 8.9)**

How can shipping contribute?

- » Provide affordable and sustainable shipping services facilitating economic growth and job creation across industries.
- » Continue to improve labour rights and safety practices in its own operations, by implementing ILO, SOLAS and other relevant conventions, and by setting requirements for suppliers within ship design, construction and scrapping.
- » Continue to use maritime regulatory institutions to develop and implement common safety regulations.
- » Provide access to training and development in all segments.
- » Provide sustainable cruises to support sustainable tourism.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping can directly influence employment conditions in its own operations and for direct suppliers, and can facilitate growth in the ocean economy.

MAGNITUDE OF EFFECT



High effect: The shipping industry is a critical facilitator of activities within the ocean space and provides access to markets. It also has potential to improve working conditions and labour rights within its own operations and in the supply chain.



SDG 9: Industry, innovation and infrastructure

The goal aims to build resilient infrastructure, to promote inclusive and sustainable industrialization and to foster innovation.

RELEVANT TARGETS FOR SHIPPING

Develop sustainable and resilient infrastructure to support economic development and human well-being, with a focus on affordable and equitable access for all **(Target 9.1)**

Upgrade infrastructure and retrofit industries to make them sustainable **(Target 9.4)**

Enhance scientific research and technological capabilities, and encourage innovation and substantially increase the number of R&D workers and private R&D spending **(Target 9.5)**

How can shipping contribute?

- » Retrofit and upgrade its own vessels with new, environmentally friendly technologies.
- » Improve shipping services in geographical areas where there is a further need for affordable and equitable access to shipping services.
- » Enhance adaptive capacity, to enable stakeholders in the shipping value chain to adapt and respond to climate change and related risks.
- » Increase spending on R&D in the ocean space and in related industries and join public and/or private partnerships to develop infrastructure to support sustainable resource exploitation.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping is a part of the international trade infrastructure and can contribute to developing a resilient transport infrastructure.

MAGNITUDE OF EFFECT



Low effect: Shipping already has an extensive network and infrastructure and there is a limited impact from shipping on other types of industries and infrastructure.



SDG 10: Reduced inequalities

The goal aims to reduce inequality within and among countries.

RELEVANT TARGETS FOR SHIPPING

Empower and promote social, economic and political inclusion of all **(Target 10.2)**

Facilitate orderly, safe, regular and responsible migration and mobility of people **(Target 10.7)**

How can shipping contribute?

- » Ensure diversity and living wages within its own operations and for suppliers.
- » Ensure that all sea transport is orderly and safe.
- » Work with governments to enhance search and rescue activities in relevant areas.

Effect of contribution

TYPE OF EFFECT



Indirect: Shipping has limited direct impact on inequality within and among countries. Coastal states are responsible for organizing search and rescue activities.

MAGNITUDE OF EFFECT



Low effect: There is a limited impact from shipping beyond its own operations.



SDG 12: Responsible consumption and production

The goal aims to ensure sustainable consumption and production patterns.

RELEVANT TARGETS FOR SHIPPING

By 2030, achieve the sustainable management and efficient use of natural resources **(Target 12.2)**

Halve global food waste and reduce food losses along production and supply chains **(Target 12.3)**

Achieve environmentally sound management of chemicals and all their wastes throughout their lifecycles, and significantly reduce their release to air, water and soil **(Target 12.4)**

Substantially reduce waste generation **(Target 12.5)**

Encourage companies to adopt sustainable practices and integrate sustainability information into their reporting cycles **(Target 12.6)**

How can shipping contribute?

- » Facilitate harvesting and production of sustainable food from the ocean space.
- » Continue to reduce waste generation, including food waste, from its own operations.
- » Prevent food losses in the value chain by providing efficient and reliable transportation of food.
- » Continue to improve management of the use of chemicals in its own operations.
- » Continue to reduce discharges of chemicals from its own operations.
- » Implement reporting on sustainability performance based on recognised standards such as the Global Reporting Initiative (GRI) or the International Integrated Reporting Framework.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping can directly influence waste generation and use of chemicals, and can also facilitate sustainable food production.

MAGNITUDE OF EFFECT



Medium effect: Shipping is mainly a facilitator of activities related to food within the ocean space.

IMPLEMENTATION



17 PARTNERSHIPS FOR THE GOALS



SDG 17: Partnerships for the goals

The goal aims to revitalize the global partnership for sustainable development.

RELEVANT TARGETS FOR SHIPPING

Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries and encourage and promote effective public, public-private and civil society partnerships (Targets 17.7, 17.17)

Enhance policy coherence for sustainable development (Target 17.14)

How can shipping contribute?

» Participate in partnerships with industry, NGOs and public bodies to promote sustainable practices, technology transfer and experience sharing.

» Develop shipping-specific sustainability policies and mechanisms through the IMO and industry-specific collaborative initiatives.

» Contribute in making international governance of the ocean space more effective, and in improving coordination with other international bodies.

Effect of contribution

TYPE OF EFFECT



Moderately direct: Shipping can be an important contributor in partnerships, and has a dedicated international organization (IMO) for developing international policies and regulations.

MAGNITUDE OF EFFECT



Medium effect: Shipping is a global industry operating in both developed and developing countries, and can create powerful partnerships across national and regional boundaries.

Summary: The potential for shipping to contribute to each goal

FIGURE 3

Summary of the potential for shipping to contribute to each goal based on the relevant targets and the status today

MAGNITUDE OF EFFECT refers to the size of effect on the relevant targets. The magnitude of effect will depend on the current impact of shipping and whether additional actions will have a significant effect.

TYPE OF EFFECT refers to whether the shipping industry has a direct vs. indirect effect on the relevant SDG targets. Indirect effects refer to situations where shipping influences other activities necessary for the achievement of the SDGs, such as providing market access and distributing food.





OPPORTUNITIES

THE SUSTAINABLE DEVELOPMENT GOALS ARE A CALL FOR ACTION TO ALL SOCIETAL ACTORS.

The SDGs present an extraordinary opportunity for businesses to align their strategies and business models with global sustainable development needs. Critically, many of the goals are unlikely to be met without significant private sector investment in technology development and innovation.

Here we present five main opportunity areas for the shipping industry to contribute to the SDGs. These contributions cut across the three types of SDGs: related to the biosphere, society and the economy.



FIVE OPPORTUNITY AREAS

The shipping industry has the greatest potential to contribute to the goals on climate action, affordable and clean energy, sustainable cities and communities, life below water, good health and well-being, decent work and economic growth, and life on land. Opportunities related to these goals can also positively contribute to other goals.



1 OPPORTUNITY AREA

Act on the Paris Agreement



Shipping introduced the first global CO₂ regulation with Chapter 4 in MARPOL Annex VI in 2011. However, with an estimated annual emission of 900 million tonnes CO₂ from international shipping, the industry will need to do more to reach the ambitious commitments in the Paris Agreement.⁹ Shipping emissions are currently not included under the UNFCCC negotiations.

Global GHG reduction policies and mechanisms for shipping should be developed through the IMO and industry-specific collaborative initiatives. Shipping policies should be linked to cross-sectorial efforts. For example, shifting the transport of cargo from road to sea will increase shipping emissions, but will reduce overall emissions.

Shipping can contribute directly through increased energy efficiency and implementing low-carbon solutions. Indirectly, moving goods by sea instead of by land can reduce total emissions.

POTENTIAL SOLUTIONS



Support strategies for the reduction of GHG emissions from international shipping through the IMO

Shipping is an international industry; therefore, regional emission regulations alone will be insufficient. One option could be to introduce an international levy on CO₂ emissions, or to enforce a speed limit for ships.



Develop and implement low-carbon solutions on board ships

New technologies and solutions within energy efficiency, logistics and alternative fuels can significantly reduce GHG emissions from ships.



Develop international industry standards to scale up low-carbon solutions

Global standards developed by the industry will enable scaling up of solutions. Examples of standards include those involving the use of electricity and shore connections for charging batteries and cold ironing.



Facilitate the transition to an equitable and resilient low-carbon economy

In addition to actions related to its own operations, shipping can contribute to enhancing resilience and meeting adaptation goals. It can also contribute to reducing emissions from other industries. For example, the maritime industry is a critical facilitator of offshore renewable energy production and production of lower-carbon foods from the aquaculture industry. In addition, moving goods by sea instead of by land can reduce total emissions from transportation.



Understand risks and opportunities related to a changing climate and a low-carbon economy

Assess and disclose climate-related risks and opportunities based on the recommendations from the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures.



Support the development of financial incentives to install low-carbon solutions on board ships

Examples of incentives are low-emission requirements in public procurement projects, direct public support and a support fund such as the Norwegian NO_x fund.



Work with stakeholders in the value chain to enable slow steaming

Slow steaming is the most effective energy efficiency measure, and slowing down ships can significantly reduce energy use and emissions. However, to implement slow steaming would require acceptance that sea transport would be slower.



Research and develop methods to measure and control black carbon

Black carbon contributes to climate change; therefore, emissions should be controlled and reduced.

2

OPPORTUNITY AREA

Build sustainable communities & infrastructure



Shipping already provides a global infrastructure for the movement of goods and people, connecting and supporting communities worldwide. Going forward, shipping can develop and implement a series of solutions to build sustainable communities and infrastructure.

The main challenge for shipping will be to provide affordable shipping services, while reducing the impact from its own operations on the environment and on public health. Regulatory control of emissions to air currently addresses NO_x, SO_x and CO₂, but additional efforts are needed. In the shorter term, this entails a global sulphur limit and phase in of NO_x Tier II/III-compliant engines. Regulatory control of particles and black carbon and further regulation of CO₂ emissions are also needed.⁵

With population growth and increasing urbanization, the need for efficient and environmentally friendly infrastructure will increase. Shipping can play a critical role in the transition towards more sustainable communities and infrastructure. The shipping industry can offer low-emission alternatives to land-based transport of goods and passengers, and can also alleviate pressure on land-based resources, by moving some production of food, water and energy offshore.



POTENTIAL SOLUTIONS



Develop transport solutions for moving goods by sea instead of on land

Sea transport is the most efficient mode of transportation, but short-distance sea transport is less flexible than land transport. Shipping solutions must overcome this disadvantage to become competitive over shorter distances. Overcoming this disadvantage will require cooperation across sectors and between actors in the value chain. Sea transport can boost economic growth, laying foundations for societal benefits in countries with poor land transport infrastructure.



Support sustainable energy infrastructure

Shipping can develop effective solutions for installation and operation of offshore solar, wind, biomass, tidal and other renewable energy production assets.



Alleviate pressure from land-based activities

Road transport, agriculture and energy production on land are major sources of local emissions and noise, and require vast land areas. By moving transportation and production of food and energy to the oceans, pressure on communities and ecosystems on land can be reduced.



Develop and implement zero-emission transport concepts in cities and other populated coastal areas

Local emissions of SO_x, NO_x and PM are a major health problem, but solutions exist to develop zero-emission ships and transport systems, such as ferries running on batteries.



Develop and implement solutions for producing and transporting clean drinking water

The cruise industry has competence on producing clean drinking water on board ships. This competence can be used to develop land-based and offshore solutions and can contribute to providing clean drinking water to populations in need.



Research and develop methods to measure and control particulate matter

PM has a serious negative impact on public health in coastal areas and cities, but is largely unregulated.

3 OPPORTUNITY AREA

Protect life in the oceans



Since 1977, shipping has significantly reduced accidental and operational discharges to sea and increased its control of hazardous chemicals. The main drivers have been stricter regulations through the MARPOL Convention, the IBC (International Bulk Chemical) Code and the IMDG (International Maritime Dangerous Goods) Code.⁷ The IMO also allows for the introduction of special measures in Particularly Sensitive Sea Areas (PSSAs).

Moving forward, the most significant contribution toward the SDGs will be to reduce the transfer of alien species through ballast water, as per the Ballast Water Management Convention.⁸ Better understanding of the impact shipping has on wildlife will help identify appropriate measures for the co-existence of marine life and economic activities in the ocean space.

Shipping can also contribute by cleaning up ocean plastic waste and providing researchers and decision makers with information on the state of the oceans.



POTENTIAL SOLUTIONS



Develop and implement solutions for collecting plastic waste in the oceans

Plastic waste has a serious negative impact on life in the oceans and harms the livelihoods of many communities. Plastic also transports alien species across oceans. Shipping can provide solutions for clean-up activities in the ocean space, for example through the collection of microplastic.



Prevent transfer of alien species across geographies

Shipping can contribute by implementing the recently ratified Ballast Water Management Convention and by developing new solutions and regulations for biofouling. The introduction of alien species has serious consequences for ecosystems and local economies.



Use ships to collect research data on the oceans

Using digital technologies and sensors, ships can collect and share data with the international research community. Such collection and sharing will increase understanding of the ocean space, of acidification, and of marine ecosystems.

4

OPPORTUNITY AREA

Create a sustainable future for the ocean economy



The OECD estimates that ocean-based industries contributed 1.5 trillion USD, or 2.5%, to the global gross value added (GVA) in 2010, providing around 31 million full-time jobs. Most workers are employed within industrial fisheries and tourism. The OECD projects GVA to grow to more than 3 trillion USD in 2030 in a business-as-usual scenario.¹

Shipping has a critical role in facilitating harvesting of resources in the ocean space such as food, energy and raw materials, as well as facilitating economic growth and job creation. The exploitation of ocean resources must be sustainable and managed through global frameworks.



POTENTIAL SOLUTIONS



Facilitate resource harvesting in the ocean space

The ocean space contains vast resources that can be used to produce food and medicines, and to harvest energy and minerals.

For example:

- » organisms with different enzymes and components can be used in biotechnology and production of medicines;
- » wind and waves can be exploited to harvest energy;
- » food production in the oceans will increase access to food while reducing the impact from agriculture on land.

Shipping services will be essential for harvesting and transporting these resources. For example, shipping competence, especially from the offshore oil and gas industry, can be used to develop and maintain production assets related to offshore mining and energy production.



Support the creation of global governance institutions for resource harvesting in the ocean space

The ocean is a vulnerable space and resources are limited. Careful ecosystem-based management allowing for sustainable resource harvesting in the ocean space is needed to use the resources sustainably. Shipping is well governed through the IMO, and the institution's processes can be used as a template for other organisations that regulate activities in the ocean space.

5

OPPORTUNITY AREA

Promote responsible practices



The shipping industry has well-established frameworks for safety and working conditions through SOLAS and the Maritime Labour Convention. However, the fatality rates on board ships are about ten times higher than the OECD average for all industries. The industry needs to focus on implementing and continuously improving regulatory frameworks and requirements.

While there are 1 million people employed in shipping, 5 million people are employed in the wider maritime industry.¹ Because shipping is a major purchaser of services from the wider industry, it has a significant opportunity to influence and set requirements in the supply chain. Many ships are still built in yards where safety and workers' rights are not respected, or are recycled on beaches in developing countries without decent working conditions.

The shipping industry is also vulnerable to corruption. Bribery is estimated at 1 trillion USD annually by the World Bank,¹⁰ and is a major obstacle to democracy, rule of law and equitable development. Private sector corruption alone in developing countries is estimated at 500 billion each year.¹¹ Corruption raises the cost of doing business, thereby hindering growth, investment and job creation.

POTENTIAL SOLUTIONS



Ensure decent work, living wages and responsible practices in the maritime industry

Continue to improve labour rights, working conditions and safety practices in its own operations by:

- » implementing the eight fundamental ILO conventions, SOLAS and other relevant conventions;
- » setting requirements for suppliers within ship design, construction and recycling.



Increase transparency and accountability

Increase transparency on cargoes, destinations, financial transactions and the use of agents and intermediaries. Strengthen global and national maritime regulatory institutions to reduce opportunities for corruption, bribery and illicit cargo flows.



Combat corruption and bribery

through effective compliance systems, proper training, mechanisms for internal reporting and safeguards for whistle-blowers.

APPENDIX

STUDY SCOPE

In 2016, the OECD issued the report *The Ocean Economy in 2030*¹, providing a thorough analysis of the ocean economy and projections towards 2030.

Table 1 lists the established and emerging industries defined by the OECD as part of the ocean economy, and how these industries relate to shipping in the scope of this study.

TABLE 1 INDUSTRIES IN THE OCEAN ECONOMY AS DEFINED BY OECD, AND HOW THEY RELATE TO SHIPPING IN THE SCOPE OF THIS STUDY.¹

ESTABLISHED

| INDUSTRY | RELATION TO SHIPPING |
|---------------------------------------|----------------------|
| Capture fisheries | Facilitator |
| Seafood processing | Facilitator |
| Shipping | Core |
| Ports | Infrastructure |
| Shipbuilding and repair | Supplier |
| Offshore oil and gas (shallow water) | Facilitator |
| Marine manufacturing and construction | Facilitator |
| Maritime and coastal tourism | Facilitator |
| Marine business services | Supplier |
| Marine R&D and education | R&D |
| Dredging | Infrastructure |

When evaluating the opportunities for shipping to contribute to the SDGs we have looked at:

- core shipping activities such as goods and passenger transportation;
- direct service suppliers in the maritime industry, in particular ship construction, maintenance and scrapping (listed as "Supplier" in Table 1);
- industries where shipping and the maritime industry are essential service providers (listed as "Facilitator" in Table 1) and how shipping companies can impact these industries in relation to the SDGs. One example is the support of marine aquaculture which is projected to be an important producer of food supporting a growing population.

EMERGING

| INDUSTRY | RELATION TO SHIPPING |
|--|----------------------|
| Marine aquaculture | Facilitator |
| Deep- and ultra-deep water oil and gas | Facilitator |
| Offshore wind energy | Facilitator |
| Ocean renewable energy | Facilitator |
| Marine and seabed mining | Facilitator |
| Maritime safety and surveillance | Infrastructure |
| Marine biotechnology | Facilitator |
| High-tech marine products and services | R&D |
| Others | Facilitator |

The maritime industry includes all stakeholders in the shipping value chain such as shipping companies, yards, designers, manufacturers, and service providers. To contribute to the SDGs, shipping needs to take responsibility for its direct impact from its own operations, as well as influencing its suppliers, where possible. In addition, it needs to facilitate sustainable activities in the wider ocean space.

The evaluation takes the current situation as a starting point and looks only at additional contributions and opportunities for shipping as part of the maritime industry and the ocean economy. It does not include assumptions regarding what would happen if shipping services would cease to exist. Philanthropic contributions by individual companies and associations are not included.

FURTHER READING



REFERENCES

- 1 OECD (2016). *The Ocean Economy in 2030*. Paris: OECD Publishing. Retrieved from <http://dx.doi.org/10.1787/9789264251724-en>.
- 2 ITOPF (2016). *Oil tanker spill statistics 2015*. Retrieved from http://www.itopf.com/fileadmin/data/Documents/Company_Lit/Oil_Spill_Stats_2016.pdf.
- 3 Smith et al. (2014). *Third IMO GHG Study 2014*. London: International Maritime Organization.
- 4 The International Maritime Organization (2016). *Ballast Water Management*. Retrieved from <http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Pages/Default.aspx>.
- 5 UNCTAD (2012). *Review of Maritime Transport 2012*. Retrieved from http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf.
- 6 Corbett et al. (2007). *Mortality from Ship Emissions: A Global Assessment*. *Environmental Science and Technology*, 41(24):8512-8. <http://earthjustice.org/sites/default/files/black-carbon/corbett-2007.pdf>.
- 7 IHS Fairplay World Casualty Statistics: Includes all vessels excluding fishing and miscellaneous ships; OECD (2011). "How's Life? Measuring Well-being", *Work accidents in selected OECD countries: Fatal and non-fatal accidents in 2003 per 100 000 workers, and lost workdays per worker involved in 2001*.
- 8 The International Maritime Organization (2016). *Air Pollution, Energy Efficiency and Greenhouse Gas Emissions*, Retrieved from <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Default.aspx>.
- 9 The International Maritime Organisation (2016). *Carriage of chemicals by ship*. Retrieved from <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/ChemicalPollution/Pages/Default.aspx>.
- 10 The World Bank. *The Global Competitiveness Report 2005-2006*, Kaufman, D.: *Myths and Realities of Governance and Corruption*. http://siteresources.worldbank.org/INTWBIGOVANTCOR/Resources/2-1_Governance_and_Corruption_Kaufmann.pdf.
- 11 Center for Strategic and International Studies (CSIS) (2014). *The Costs of Corruption: Strategies for Ending a Tax on Private-sector-led Growth*. Retrieved from https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/140204_Hameed_CostsOfCorruption_Web.pdf.

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas and energy industries. We also provide certification services to customers across a wide range of industries.

Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, we empower our customers' decisions and actions with trust and confidence. We continuously invest in research and collaborative innovation to provide customers and society with operational and technological foresight. With origins stretching back to 1864, DNV GL's reach today is global. Operating in more than 100 countries, our professionals are dedicated to helping customers make the world safer, smarter and greener.

HEADQUARTERS:

DNV GL AS
NO-1322 Høvik, Norway
Tel: +47 67 57 99 00
www.dnvgl.com

DNV GL SUSTAINABLE DEVELOPMENT GOALS: EXPLORING MARITIME OPPORTUNITIES



SUSTAINABLE DEVELOPMENT GOALS: EXPLORING MARITIME OPPORTUNITIES

Report commissioned by:



Norges
Rederiforbund
Norwegian
Shipowners'
Association



The trademarks DNV GL and the Horizon Graphic are the property of DNV GL AS. All rights reserved.
©DNV GL 03/2017 **Images:** iStock (p.24, 50). Offset by Shutterstock (front page, p.14, 52).
Shutterstock (p.6, 18, 48). Gettyimages (p.11, 44, 46). DNV GL / Simon Mockler (p.34).
Design: Fasett **Paper:** Arctic Volume (150/250g) **Print run:** 1000 **Print:** Erik Tanche Nilssen AS