



University of the Aegean
School of Business
Department of Shipping, Trade and Transport

“Green Financing in Shipping Industry”

Thesis for Undergraduate Studies Program

Agallou Stamatia

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Ευχαριστίες

Θα ήθελα να ευχαριστήσω τον επιβλέποντα καθηγητή μου Γαβαλά Δημήτριο, για την καθοδήγηση που μου προσέφερε και το χρόνο που διέθεσε δίνοντάς μου χρήσιμες συμβουλές και οδηγίες για την ολοκλήρωση της πτυχιακής μου εργασίας.

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Abstract

In this project is being investigated the role and the importance of green financing in shipping industry. First of all, climate change is being defined, causes, consequences and the way of people contributing to climate change is being presented, and Paris Agreement as well. This way, the importance of climate change is being proved. Furthermore, emissions coming from shipping industry are being presented proving how is shipping industry contributing to climate change. Later on, the International Maritime Organization's Greenhouse Gas Strategy is being presented, such as prospects of Zero-Carbon Bunker Fuels for Decarbonizing Shipping Industry. Also, Thetis Monitoring Reporting Verification (MRV) and IMO Data Collection System (DCS) are described, as a helpful way in controlling emissions is shipping industry. What is more, sustainable development is being defined and 2030 Agenda for Sustainable Development is presented. Later on, the International's Maritime Organization's contribution in this effort is being presented for each sustainable development goal (SDG). Moreover, some regulations and conventions which aim in greening shipping industry are being presented (MARPOL, IMO 2020, BWM, AFS). Also, green financing is being defined and the market mechanism of green finance is being described proving the connection between green financing and greening efforts. Also, are being defined green loans, green bonds, and the economic performance of these in period 2013-2019 is being performed. What is more, types of green financial products are describes, as well as European Green Deal by 2050, given some sources of green financing. Also, literature referred to green financing in shipping industry up to now is being reviewed. Moreover, a study case in Hapag Lloyd is being done, given reasons why Hapag Lloyd is being chosen, given ways of Hapag Lloyd's contributing to sustainability effort and green bonds and loans of this company are being presented. For whoever is more interested, there is information for other green loans and green bonds in shipping industry (in Appendixes 1 and 2).

There has been lack in some information about these exchanges. A propose for further investigation could be the investigation of green financing in ports.

What gives value in this project is the updated data and the updated literature in this challenge named "green financing in shipping industry".

Keywords

Green financing, green shipping, sources of green financing, green exchanges in shipping industry



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CHAPTER 1: Introduction

Since the Industrial Revolution there has been an increase in carbon-intensive activities. As a result, the temperature of our planet has been increasing. Over the last years climate change and sustainability has been focusing attention globally. It has been recognized that financing is connected with business operations that harm the Earth through their lending practices. ¹Green finance amalgamates financing and enterprises with green activities. Many participants could be interested. Anyone might have his own incentives. Others may be financial incentives, others may have a willness to protect the planet, and others might have a combination of both.² While the green sector has taken much voluntary action, there has to be proved that green financing has already taken place and is existing in our economy.

Based on a research of International Maritime Organization it has been counted about 2-3% of air pollutant emissions from shipping activation. ³ Shipping affects sustainable financing because it is a way of transporting goods closest to green practices.

The research of financing for the green side of shipping industry could be interesting for further investigation.

This project is separated in seven (7) main chapters. The first one deals with climate change. The second one presents the emissions coming from shipping industry. The third chapter deals with sustainability in shipping industry. The fourth one presents some conventions and regulations for “greening” shipping industry. The fifth one deals with green financing and green financing in shipping industry. After the bibliography being reviewed, the research objectives and the research method is being presented. The seventh chapter is a study case in shipping company Hapag Lloyd and green financing. The conclusions are followed. Last but not least, appendix one presents green bonds in shipping industry and appendix two green loans in shipping industry.

¹ Finance Research Letters 29 (2019) pages 425-430, (Sarokin & Schulkin, 1991; Smith,1994; Gray & Bebbington, 2001)., A bibliometric analysis on green finance: Current status, development, and future directions, journal homepage: www.elsevier.com/locate/frl

² Energy Procedia 104 (2016) pages 311 – 316, The role of green finance in environmental protection: Two aspects of market mechanism and policies Yao Wang, Qiang Zhia, Available online at www.sciencedirect.com

³ IMO 2020 - cleaner shipping for cleaner air, Briefing: 35 20/12/2019, <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/34-IMO-2020-sulphur-limit.aspx>



CHAPTER 2: Literature Review

1. Climate Change

This part of the chapter deals with a definition of the IPCC of climate change. Also, confirmation by scientists that the problem of climate change is getting worse is described. Later, the causes of climate change are defined. What is more, are described the role of human activities in climate change and the consequences of climate change in economy, in the environment and in society. Last but not least, the Paris Agreement is described as a national effort against climate change. This part of the project proves the importance of adopting green practices and the need of sustainability globally.

1.1 Facts about Climate Change

1.1.1 Definition of Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is responsible for evaluating climate change. ⁴ Their Framework Convention on Climate Change (UNFCCC), describes: ‘a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods’. ⁵

1.1.2 Evidence of Climate Change

The climate globally is always changing. Scientists who are specified on Earth see that the temperature is getting decreased. Our planet has become warmer about one degree Fahrenheit over the last century. As it does not seem like much, temperature can have big effects on Earth. Some effects are already happening. ⁶ The Intergovernmental Panel on Climate Change describes “Scientific evidence for warming of the climate system is unequivocal”. The first evidence is that the earth is getting warmer, the amount of the ice sheets and arctic sea ice is becoming smaller, as well as snow ’s, the level of the sea has been rising, extreme weather affairs and ocean becoming more acid. ⁷

1.1.3 Causes of Climate Change

Seeing the results, it seems interesting to know what the causes of climate change are. Some gases do not let heat escape described as “forcing”. Others respond to alterations in temperature known as “feedbacks.” Gases which affect climate change are: water vapor, carbon dioxide (CO₂), methane, nitrous oxide, chlorofluorocarbons (CFC). ⁸

⁴ About IPCC, link: <https://www.ipcc.ch/> accessed in 20/04/2021.

⁵ IPCC, Glossary, link: <https://www.ipcc.ch/sr15/chapter/glossary/> accessed in 20/04/2021.

⁶ Nasa, “What is climate change?”, link: <https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html> accessed in 14/04/2021

⁷ Nasa, Evidence, “Climate Change: How Do We Know?”, link: <https://climate.nasa.gov/evidence/> accessed 20/04/2021

⁸ Climate.nasa, Causes, link: <https://climate.nasa.gov/causes/> accessed in 20/04/2021.



1.1.4 Human Activities in Climate Change

In the Fifth Assessment Report of the Intergovernmental Panel on Climate Change 1,300 scientists came to the conclusion that probably over the last 50 years more than 95 percent activities by people have decreased the Earth's temperature. The activities by industries in which our nowadays civilization rely on have increased carbon dioxide in the atmosphere and greenhouse gases produced by people is one of the causes of the rise in temperature over the last 50 years.⁹

1.1.5 Consequences of Climate Change

All over the earth human activities result in increase of concentrations of natural greenhouse, causing bigger problems. The climate change has environmental, social, and economic consequences. First of all, the temperature of the earth will increase. As a result, there will be evaporation and precipitation with some regions becoming wetter or dryer. Moreover, sea level will rise because of the melt of ice (Nasa)¹⁰. Sea level has increased by approximately eight inches since 1880. It is forecasted to rise 1 to 8 feet more until 2100. Moreover, there will be more droughts and heat waves(Nasa).¹¹ What is more, there have been more and more heat and cold related deaths. Also, there are differences in the distribution of some water-borne illnesses. Furthermore, harm in human health is costly in social, environmental, and global level. In detail, in period of 1980 to 2011 floods had an affected more than 5.5 million costing more than €90 billion (Europa.eu). Last but not least, sectors of the economy that are based on the Earth's temperature like agriculture, energy and tourism are mainly touched.¹²

1.2 The Paris Agreement

The Paris Agreement is a legally binding on climate change, adopted by 196 Parties on 12 December 2015 and entered into force on 4 November 2016.

It aims in the limitation of global warming to well below 2, preferably to 1.5 degrees Celsius.

The Paris Agreement is very important in the idea of sustainability because there was no other time in the history that a binding agreement brought all nations into a common cause to give importance and activities for climate change and take care of its effect.

⁹ Climate.nasa, Causes, link: <https://climate.nasa.gov/causes/> accessed in 20/04/2021.

¹⁰ Climate.nasa, Causes, link: <https://climate.nasa.gov/causes/> accessed in 07/04/2021.

¹¹ Climate.nasa, Causes, link: <https://climate.nasa.gov/effects/> accessed in 07/04/2021.

¹²Europa.Eu, Climate change consequences, link: https://ec.europa.eu/clima/change/consequences_en accessed in 07/04/2021.



2. Emissions from Shipping

This part of the chapter deals with the description of the exhaust gases from shipping industry. Also, greenhouse gas (GHG) emission in the period of 2012-2018 are appeared. Later, IMO GHG strategy is described. Last but not least, the two available emission control systems in shipping industry, THETIS-MRV and IMO DCS are explained. This part of the project offers a sum of the emissions in shipping industry, national targets, and ways to control them, in order to prove why there is need for green practices, which demands green financing in shipping industry.

2.1.1 Exhaust Gases from Shipping

In a marine engine the marine fuel is burned with the oxygen of the air and the necessary mechanical energy is produced for the movement of the ship, thermal energy is released, and exhaust gases are emitted. ¹³Exhaust emissions that origin from the operation of ships which have diesel machines emit mainly nitrogen (N₂), oxygen (O₂), water vapour and carbon dioxide (CO₂). In extent, contain emit carbon monoxide (CO), sulphur oxides (Sox), oxides of nitrogen (NO_x), unburned hydrocarbons (C_xH_y) and airborne particles (PM₁₀ and PM_{2,5}). ¹⁴

2.1.2 GHG Emissions from Shipping 2012-2018

Table 1: Shipping CO₂ Emissions Globally in period of 2012-2018 / in million tonnes - (Resource: Fourth IMO GHG Study 2020)

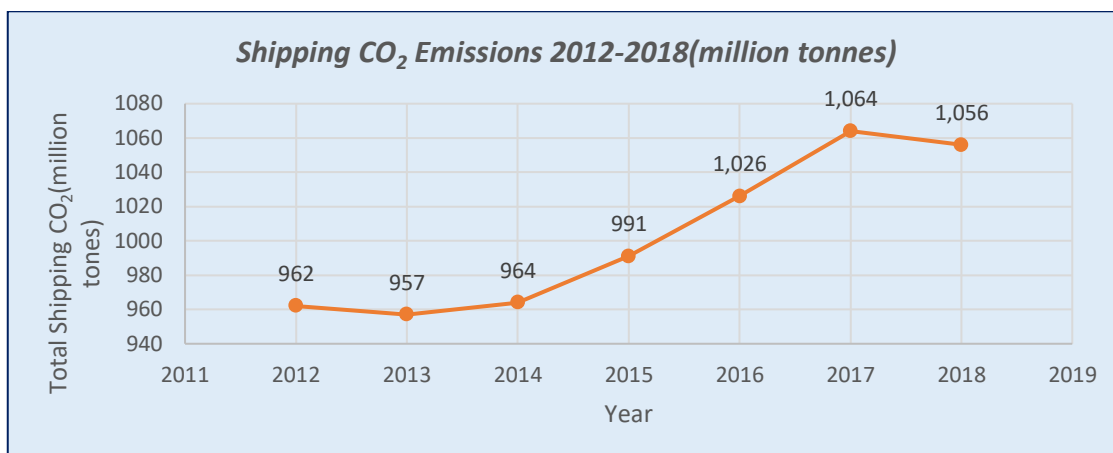
Years	International CO ₂ Emissions	International Shipping CO ₂ Emissions	International Shipping as a Percentage of International Emissions	Decrease (-)/ Increase (+)
2012	34,793	962	2.76%	
2013	34,959	957	2.74%	-
2014	35,225	964	2.74%	+
2015	35,239	991	2.81%	+
2016	35,380	1,026	2.90%	+
2017	35,810	1,064	2.97%	+

¹³ ANNA ΜΑΡΙΑ ΚΟΤΡΙΚΛΑ , Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα (2015), «Ναυτιλία και περιβάλλον», page 143

¹⁴ ΒΑΣΙΛΗΣ ΤΣΕΛΕΝΤΗΣ, εκδόσεις ΑΘ. ΣΤΑΜΟΥΛΗΣ(2008), «Διαχείριση Θαλάσσιου Περιβάλλοντος και Ναυτιλία», page 350



2018	36,573	1,056	2.89%	-
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Graph 1: Shipping CO₂ Emissions 2012-2018(million tonnes)

Based on the graph and table above, total shipping CO₂ emissions seem to have changes (increase/ decrease). In detail, from 2012 to 2013 there has been a decrease. From 2013 to 2017 the emissions have an increase every year. In period 2017 to 2018 there has been a decrease in CO₂ shipping emissions.

2.2 IMO GHG Strategy

Global Shipping is not involved in Paris Agreement. However, International Maritime Organization as being responsible for shipping industry, perpetrates to decrease emissions origin from practices of the shipping industry.

The Green House Gas (GHG) strategy promises the reduction of CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030 and 50% by 2050, in comparison with 2008.¹⁵

2.3 The Prospects of Zero-Carbon Bunker Fuels for Decarbonizing Shipping Industry

- Biofuels: Biofuels, such as bio methanol, bioethanol, and liquefied biomethane (LBM), are produced from biomass and waste streams of biogenic origin. Biofuels produced from feedstock like solid waste and lignocellulose in order to avoid any unintentional competition with food crops like starch or sugar and the conversion of forest or natural vegetation to cropland.
- Hydrogen: Hydrogen is produced by separating hydrogen and oxygen through the electrolysis of water powered by renewable electricity (“green hydrogen”), or through steam methane reforming using fossil fuels like natural gas, in association with carbon capture and storage (CCS) (“blue hydrogen”).

¹⁵ IMO, Media Centre, HotTopics, “Initial IMO GHG Strategy” link:

<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Reducing-greenhouse-gas-emissions-from-ships.aspx> accessed in 29/05/2021



- Ammonia: The Haber-Bosch process is the most seen way of producing ammonia. It works by the combination of a supply of hydrogen with nitrogen from the air. It is technically straightforward but needs energy input from renewable energy or fossil fuels. Ammonia is also usually named as “green” or “blue” ammonia, depending on the feedstock used to produce the hydrogen input.
- Synthetic carbon-based fuels: Synthetic carbon-based fuels are hydrocarbons (for example, methanol) made by human and are produced by combining carbon and hydrogen in a chemical reaction. The carbon is captured from the atmosphere in the form of carbon dioxide (CO₂) using direct air capture technology supported by renewable energy.

Green ammonia and hydrogen appear to be the most promising zero-carbon bunker fuel for shipping to date. Also, LNG is not very important in the transition toward low- and zero-carbon shipping, being mostly used in niche applications. Furthermore, Natural gas could play an important enabling role for zero-carbon bunker fuel production. Last but not least, many countries that have not been traditional energy exporters, including many developing countries, could enter the future market for zero-carbon bunker fuels from 2030.¹⁶

2.4 Emission Control Systems

2.4.1 THETIS- MRV (Monitoring Reporting Verification)

EMSA (European Maritime Safety Agency) is responsible for forcing shipping companies report their CO₂ emissions for their operation of large ships using European ports under the Regulation (EU) 2015/757 on a module named THETIS-MRV.

2.4.2 IMO DCS (Data Collecting System)

Regarding to Data Collecting System all ships of 5,000 gross tonnage and above have to collect the amount of the consumption for every type of fuel oil make a use and other data data including proxies for transport work. All these are reported to the flag State after the end of each calendar year and the flag State, if the company complies with regulations and conventions, issues a Statement of Compliance to the ship. Flag States offer these information in an IMO Ship Fuel Oil Consumption Database. IMO has to make report every year to MEPC, publishing in a sum up all these information.

In addition, on or before 31 December 2018, if a ship of 5,000 gross tonnage and above, the Ship Energy Efficiency Management Plan (SEEMP) ought to contain the way of the collection of the information and the processes that were done in order to give the data to the ship’s flag State.¹⁷

¹⁶ The World Bank, Problue, “Charting a Course for Decarbonizing Maritime Transport”

¹⁷IMO, Data collection system for fuel oil consumption of ships, link:

<https://www.imo.org/en/OurWork/Environment/Pages/Data-Collection-System.aspx> accessed in 28/05/2021.



3. Sustainable Shipping

This part of the chapter defines the term of sustainable development. Then, the 2030 Agenda for Sustainable Development is described and how IMO takes actions towards these 17 goals is analyzed. Through this part of the project are proved the existing actions for sustainability. Some actions in order to be adopted need to be changes in practices and preventing need for financing.

3.1 Definition of Sustainable Development

Sustainable development was described in the World Commission on Environment and Development's in 1987 at report of Brundtland named as 'Our Common Future' as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.¹⁸ Sustainable development promises a better quality of life for all, now and for the future. It means setting short-term and longer-term goals, locally and globally. It demands big political and economic decisions as well as each citizen's personal decisions.¹⁹

3.2 2030 Agenda for Sustainable Development and IMO

3.2.1 2030 Agenda for Sustainable Development

The value of sustainability has fairly been given recognition. In 2015 all United Nations Member States adopted the "2030 Agenda for Sustainable Development", revolving 193 countries. The agenda gives attention in the necessity of consideration of the three dimensions of sustainable development: social, economic, and environmental.

Sustainable development goals seem to be a challenge. These seventeen goals are the following:²⁰

Table 2: Goals Addressed by 2030 Agenda for Sustainable Development (Data Source: United Nations-Sustainable Development)

No poverty: No other poverty anyway and anywhere.

Zero Hunger: No other hunger, no lack of food security, richer nutrition and promotion of agriculture related to sustainability.

Good Health and Well-being: Make sure of achieving health and promotion of well- being for all people.

¹⁸ Europa.Eu, Glossary of Summaries, Sustainable Development, link: https://eur-lex.europa.eu/summary/glossary/sustainable_development.html accessed in 14/04/2021.

¹⁹ Europa. Eu, Sustainable Development, link: <https://ec.europa.eu/environment/eussd/> accessed in 14/04/2021.

²⁰United Nations, Department of Economic and SOCIAL Affairs/ Sustainable Development, the 17 Goals, link: <https://sdgs.un.org/goals> accessed in 09/04/2021.



Quality Education: Make sure of comprehensive and fair education and promotion of long-last learning opportunities for all.

Gender Equality: No other gender inequality and empower all women.

Clean Water and Sanitation: Make sure of access in clean water for all people and management in order to achieve sustainability.

Affordable and Clean Energy: Make sure of everyone's opportunity to have affordable, reliable, sustainable, and modern energy.

Decent Work and Economic Growth: Promotion of long-last, sustainable economic work, being fully and productive employers and fair work for all.

Industry, Innovation, and Infrastructure: New non-resistant infrastructure, promotion of comprehensive and sustainable industrialization and adopt innovation.

. Reduced Inequalities: Less inequalities within and among countries.

. Sustainable Cities and Communities: Make cities and human settlements comprehensive, safe, non-resistant, and sustainable.

. Responsible Consumption and Production: Make sure of sustainable consumption and production patterns.

. Climate Action: Take aware of and act against climate change and its impacts.

. Life Below Water: Keep and sustainably use the oceans, seas, and marine resources for sustainable development.

. Life on Land: Take care of, store again and make promotion of sustainable Earth, sustainable management of forests, fight against desertification, and stop and keep land degradation and stop biodiversity loss.

. Peace, Justice, and Strong Institutions: Promotion of peace for sustainable development, accessible justice for people and build effective, accountable, and inclusive institutions at all levels.

. Partnerships for the Goal: Empower implementation and revitalize partnerships around the world for sustainable development.



3.2.2 IMO and Sustainable Development Goals

International Maritime Organization as member of the United Nations family are taking actions towards these seventeen goals.²¹ IMO does not refuse to acknowledge that new framework will have to be implemented. IMO activities contribute to 17 Goals.

- IMO and Goal 14 (Life Below Water)

The basic conventions and regulations of IMO handle with the protection of marine ecosystems such as the London Convention and Protocol (LC/LP). Furthermore, IMO protects through of Special Areas under MARPOL and particularly Sensitive Sea Areas (PSSAs). What is more, there is control of shipping activities emissions under MARPOL Annex VI. Moreover, IMO is, the UNCLOS “competent organization”. IMO is also cooperating with the Food and Agriculture Organization of the United Nations (FAO) as against to illegal, unreported, and unregulated (IUU) fishing.

- IMO and Goals 1(No Poverty), 2(No hunger), 16 (Peace, Justice, and Strong Institutions)

Ships carry cargoes to all corners and all year round globally improving access to basic materials, goods, and products. Contributing to SDGs 1 and 2. What is more, IMO is responsible for compensating victims of maritime incidents. Furthermore, because of ships Developing regions can be delivered energy and food in low cost with respect. Also, Also, maritime shipping has to deal with international terrorism and modern-day piracy on the oceans. Last but not least, shipping sector promotes a better life focusing in developing countries, by the employment of 1.5 million at sea and offshore personnel. The safety and security of life at oceans based on the professional employers and competence between seafarers.

- IMO and Goals 4(Quality Education), 5(Gender Equality), 8(Decent Work and Economic Growth)

The IMO International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) describes the lowest requirements for personnel at sea. What is more, for improving social protection for personnel at sea and their families, IMO in cooperation with the International Labour Organization (ILO) under Joint IMO/ILO Ad Hoc Working Groups in order to deal with important issues such as health services and social security protection for personnel at sea. Also, IMO provides programmes and established two maritime training institutions – the World Maritime University (WMU) and the International Maritime Law Institute (IMLI). Moreover, this profession is being honored on Day of the Seafarer (25 June) contained in annual United Nations Observances. IMO’s programme “Integration of women in the maritime sector”, programme of IMO, supports women by promoting them. Gender inequality is dealt through the IMO network of regional associations for women managers, giving opportunities for training, supporting self-independence, and giving chances for women in the port and maritime sectors.

- IMO and Goals 6(Clean Water and Sanitation), 11(Sustainable Cities and Communities) and 12 (Responsible Consumption and Production)

²¹ United Nations, Sustainable Development Goals, 17 Goals to Transform Our World, link: <https://www.un.org/sustainabledevelopment/> accessed in 08/04/2021.



IMO has adopted the London Convention and Protocol on the prevention of marine pollution by dumping of wastes and other matter at sea (LC/LP) contributing to SDG 6. Furthermore, has developed the Hong Kong Ship Recycling Convention, and the International Convention for the Prevention of Pollution from Ships (MARPOL), contributing to SDG 12. Also, IMO in target of SDG 12 by reducing waste generation. Last but not least, MARPOL Annex V prevents the pollution by garbage from ships, with only a few exceptions.

- IMO and Goals 7 (Affordable and Clean Energy) and 13 (Climate Action)

IMO deals with emissions origin from shipping industry. The Energy Efficiency Design Index (EEDI) is compulsory for new ships and the Ship Energy Efficiency Management Plan (SEEMP) for all ships. Also, IMO has set a GHG Strategy supporting this way the Paris Agreement on Climate Change as well. Moreover, on 1 January 2020 IMO implemented a new regulation on the sulphur content for reduction of GHG emissions from ships. Moreover, by LC/LP, all parties have done activities in order to decrease CO₂. Last but not least, in order to encourage technology development, IMO, with financing from the European Union, has established Maritime Technology Cooperation Centers (MTCCs) in order to support the adoption of low-carbon technologies and collaborations in shipping industry.

- IMO and Goals 9 (Industry, Innovation, and Infrastructure), 10 (Reduced Inequalities) and 17 (Partnerships for the Goals)

IMO in scope of SDG 9 offers a framework, capacity-building initiatives, and a forum for Member States to discuss. What is more, IMO created the Country Maritime Profile (CMP) as a capacity-building assessment mechanism. Also, IMO helps in scope of these targets under its Convention on Facilitation of International Maritime Traffic (FAL). Last but not least, for many years IMO has been having success in making new partnerships with globally and with many organizations.²²

²² IMO and Sustainable Development, IMO SDG brochure, link: <https://wwwcdn.imo.org/localresources/en/MediaCentre/HotTopics/Documents/IMO%20SDG%20Brochure.pdf> accessed in 09/04/2021



4. Regulations and Conventions in Shipping Industry for Green Shipping

This part of the chapter describes four regulations and conventions of IMO (MARPOL, IMO 2020, BWM, AFS) in order to prevent marine pollution in shipping industry. This part of the project proves that the regulations and conventions prevent the need of green financing.

4.1 International Convention for the Prevention of Pollution from Ships (MARPOL)

MARPOL convention is the global convention which deals with preventing pollution of the marine environment by vessels from accidental and operational reasons. It was adopted on 2 November 1973 at International Maritime Organization. In 1997, a Protocol was adopted to change the Convention and a new Annex VI was added which had to be complied by companies on 19 May 2005. MARPOL has been updated as years pass.

MARPOL includes regulations for the preventing and minimizing pollution from vessels, whether by accidents or routine operations. MARPOL includes six technical Annexes.

The first one is responsible for regulating the Prevention of Pollution by Oil. The second one controls the pollution of Noxious Liquid Substances in Bulk. The third part of the convention is responsible for preventing pollution by Harmful Substances. The fourth part deals with the Prevention of Pollution by Sewage from Ships. The fifth part is the one which deals with preventing pollution by Garbage from Ships. The last one prevents air pollution from ships.²³

4.2 Regulation “IMO 2020”

On 1 January 2020 was the limit on the sulphur content in the fuel oil used on board ships changed in order to protect the environment and take care of well-being of people. The new limit was named “IMO 2020 and required to minimize emission to 0.50% m/m, from the limit of 3.5%. The limits were already stricter (0.10%) at ECAS (the Baltic Sea area, the North Sea area, the North American area, and the United States Caribbean Sea area. This limit was made mandatory after a change to Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL).

“IMO 2020” promises benefits from its application. First of all, the air becomes cleaner. It means a percentage of 77% reduction of Sox emissions, or about 8.5 million metric tonnes of Sox every year. What is more, promises positive effects on human health, which means less deaths, cardiovascular, respiratory and pulmonary diseases. Moreover, “IMO 2020” demands fuels with higher quality and most of ships will change their fuel oil in order to meet the new regulation. Furthermore, ship operators, ship owners and refineries have been guided by International Maritime Organizations and other

²³IMO, Conventions, International Convention for the Prevention of Pollution from Ships (MARPOL), link: [https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx) accessed in 22/04/2021



stakeholders being ready at the time of the enforcement of “IMO 2020”. Last but not least, authorities have been involved by Flag and port State control, ensuring ships are complied with Sulphur 2020.

By the limitation of the sulphur content in fuel oil, vessels have to use fuel oil which complies with the regulation, or adopt a new method, so as to meet the new requirements. Some ships fitted exhaust gas purifiers, known as “scrubbers”. Scrubbers are able to remove sulphur oxides from the ship’s engine and boiler exhaust gases.²⁴ Also, vessels could fit engines which use special fuels, such as VLSFO (very low sulfur fuel oil), liquefied natural gas or biofuels. Last but not least, some companies are thinking of applying alternative sources of energy on their vessels such as solar and wind. These lead the maritime industry to greener solutions and greener vessels.²⁵

4.3 Ballast Water Management Convention (BWM)

The International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 Convention, became mandatory on 8 September 2017. It deals with the prevention of potentially harmful aquatic organisms and pathogens in ships’ ballast water. Vessels have to give importance to their ballast water for removing organisms and pathogens or rendering harmless before the ballast water is falls in water in another place of Earth’s Sea.

The Ballast Water Management Convention refers to vessels registered under contracting Parties to BWM, travel and make use of ballast water globally. When it comes to vessels which are not registered under a flag which does not comply with this convention, then vessels may not be issued with the relevant certificates. Nevertheless, port State’s control will need the vessels to comply with the Convention.

By the time a vessel entry into force, then has to have:

1. A ballast water management plan
2. A ballast water record book
3. An International Ballast Water Management Certificate

The ballast water management standards (D-1 and D-2) are the following:

1. The D-1 standard demands the exchange of ballast water of a vessel at least 200 nautical miles from land and in water at least 200 meters deep.
2. The D-2 standard specifies the maximum amount of viable organisms allowed to be exchanged.
3. The D-3 standard of the Convention refers to what is required for ballast water management systems.

From the date of the enforcement of this convention, all vessels have to comply with the D-1 standard. All new vessels have to comply also with the D-2 standard. In the end, all vessels will have to comply with the D-2 standard. For most vessels, this means installation of special equipment for ballast water processing. The plan for being

²⁴IMO, Media Center, Hot Topics, IMO 2020 – cutting sulphur oxide emissions, link:

<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx> accessed in 22.04.21.

²⁵ Marine Digital, Green tech in Shipping Industry, link: https://marine-digital.com/article_green_ship accessed in 22.04.21.



implemented that has been agreed by the MEPC is followed up by the compliance with the D-2 standard up to 8 September 2024.²⁶

4.4 International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS)

This Convention does not permit the use of harmful organotins in anti-fouling paints used on vessels and enforces a mechanism for the prevention of the potential use of other hazardous substances in anti-fouling systems in the future.

Anti-fouling paints are used in order to cover the bottoms of ships for the prevention of life at sea. As a result, the vessel slows down, and fuel consumption is getting increased. What is more, anti-fouling paints use metallic compounds, which slowly “leach” into the sea water, killing barnacles and other marine life that have attached to the vessel.

The Convention refers that a vessel ought to be entitled to compensation if it is inordinately detained or delayed while undergoing inspection for possible violations of the Convention.²⁷

²⁶ IMO, Conventions, International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM), link: , [https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-\(BWM\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx) accessed in 25/04/2021

²⁷IMO, Conventions, International Convention on the Control of Harmful Anti-fouling Systems on Ships , link: [https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-\(AFS\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-(AFS).aspx) accessed in 25/04/2021



5. Green Financing

This chapter deals with defining green financing, describing the market mechanism of green financing, defining green bonds, green loans as well as presenting the global sustainable debt annual issuance in the period of 2013-2019. Later on, types of green financial products are described and the European Green Deal by 2050 as well. Last but not least, existing literature review in green financing in shipping industry is appeared. This part of the project describes green financing globally and green financing in shipping industry.

5.1 Facts About Green Financing

5.1.1 Approaching Green Financing

Green financing stands for green economy or the green transition. It aims in the increase of financial flows for green investments.

5.1.2 Need for Green Financing

In order to reach set targets for sustainable development there is need for financing their imply. Particularly private finance is required, with public finance leveraging such private capitals.

5.1.3 Definition of G20 Green Finance Study for Green Financing

The G20 Green Finance Study Group (2016) gives a definition for “green finance” as financing of investments that are eco-friendly and contribute to sustainable development. What is more, involves efforts to internalize environmental externalities and controls risk for sustainable investments and reduce those who are not eco-friendly.

However, it is one of the many definitions of green finance existing internationally. Furthermore, this definition offers help such investors who want to make eco- friendly investments.²⁸

5.1.4 The Market Mechanism of Green Finance

The market of green finance contains a mechanism and financial products.²⁹ First of all, green finance market is credit intermediary of environmental protection’s capital movement. Furthermore, it collects and provides funds. What is more, green finance market can improve productivity according to market demands through handling monetary and currency funds. Last but not least, capital supply can control the number, the time of each project and the structure of sustainable investments.³⁰

²⁸ European Commission (2017), “Defining “green” in the context of green finance”, Final Report, page 1.

²⁹ Energy Procedia 104 (2016), pages 312, Yao Wang & Qiang Zhia, “The role of green finance in environmental protection: Two aspects of market mechanism and policies”, link: <https://www.sciencedirect.com/science/article/pii/S1876610216316113>

³⁰ Energy Procedia 104 (2016), page 313, Yao Wang & Qiang Zhia, “The role of green finance in environmental protection: Two aspects of market mechanism and policies”, link: <https://www.sciencedirect.com/science/article/pii/S1876610216316113>



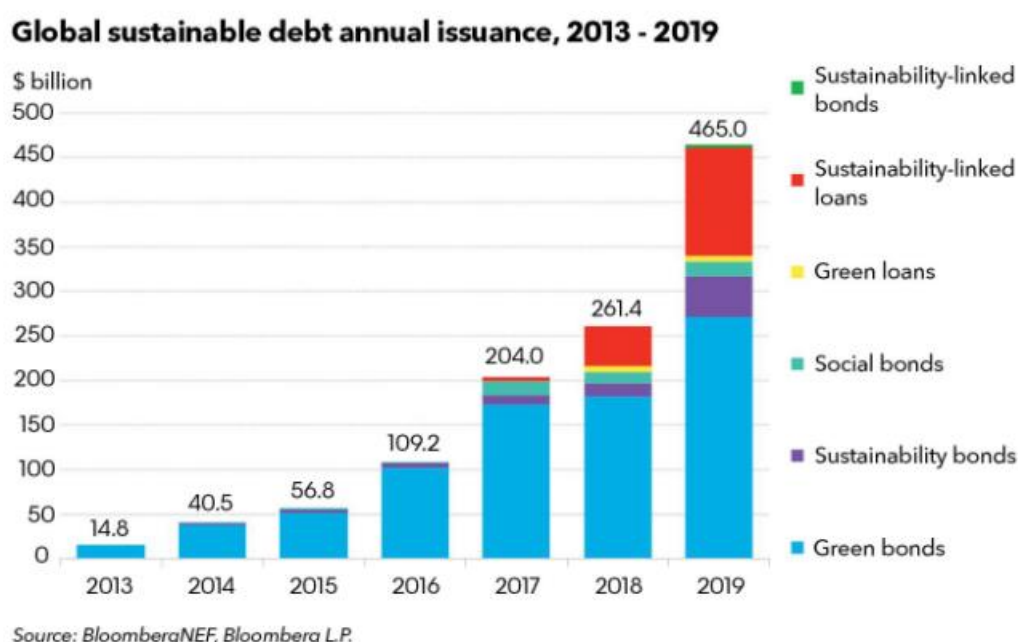
5.1.5 Definition of Green Bonds

According to the Green Bond Principles (GBP), a green bond is a bond which will finance green projects. A bond in order to be described as green has to be specified the purpose of its need.³¹

5.1.6 Definition of Green Loans

According to Loan Market Association a green loan is a loan which will finance or re-finance Green Projects (fully or partly).³²

5.1.7 Global Sustainable Annual Issuance in Period of 2013-2019



Graph 2: Global Bonds and Loans for Sustainability in period of 2013-2019 (Source: BloombergNEF, Bloomberg LP.)³³

As shown in Graph 2, in the period of 2013-2019 green bonds have shown an increase year by year, with 2019 being the year with the top interest with more than 250 billion dollars. When it comes to green loans, these have shown an interest in 2018 and 2019 proving that they have already being introduced in markets. Sustainability shows increase of interest as years pass. For this reason, there has been at the same time necessity for financing towards these investments. In this graph, it is visible that sustainability bonds shown an interest in 2014, sustainability linked loans appeared in 2017 and in 2019 sustainability-linked bonds introduced in markets.

³¹ European Commission (2017), "Defining "green" in the context of green finance", Final Report, page 6.

³² Loan Market Association (2018) "Green Loan Principles", Report, page 1

³³ <https://about.bnef.com/blog/sustainable-debt-sees-record-issuance-at-465bn-in-2019-up-78-from-2018/> accessed in 03.05.2021.



5.2. Green Financial Products

5.2.1 Types of Green Financial Products

- Environmental Funds and Biodiversity Funds

This type of financial product finances projects related to biodiversity or enterprises which protect biodiversity.

- Debt-for environment Swaps

In this case creditor country and the country which is less developed makes an agreement that the debt of the second one has to provide sources in order to protect biodiversity.

- Weather Derivatives

This type of financial product deals with economic losses caused because of climate change. In case of level of climate change exceeds the prescribed standard, the business that has signed a weather derivative contract can ask for a compensation.

- Green investment funds Investment

Based on sustainability standards many do not invest in enterprises that are not eco-friendly.³⁴

5.2.2 European Green Deal by 2050

The European Green Deal is European Commission's plan to make the EU's economy sustainable. The aim of this plan is to exist available financial product for reducing greenhouse gases by 2050.³⁵

The European Green Deal Investment Plan (EGDIP) is the way of financing European Green Deal providing at least €1 trillion for investments that whose purpose is sustainable development over the next ten (10) years.

³⁴ Energy Procedia 104 (2016), page 313, Yao Wang & Qiang Zhia, "The role of green finance in environmental protection: Two aspects of market mechanism and policies", link:

<https://www.sciencedirect.com/science/article/pii/S1876610216316113>

³⁵ https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en accessed in 28.05.2021.



5.3 Green Financing in Shipping Industry

Dimitris Gavalas, Theodoros Syriopoulos & Michael Tsatsaronis indicate that the dimensions of financing, customers, shipbuilding costs and time of delivery time are very important dimensions in shipbuilding industry.³⁶

Jasmi and Fernando (2018) have referred the indicators of an eco-friendly supply chain management in maritime industry in Malaysia. Their main result is that the most important is the support of greening by the top management for adopting green practices in the shipping company and not the stakeholders' support. Although their results refer to one country, they emphasize how important is the top-management support.³⁷

What is more, Yang (2017) has addressed the relationship between institutional pressures and the green performance of a company, in shipping enterprises in Taiwan. He underlines that shipping enterprises ought to give importance in both internal greening practices and external green relations with stakeholders.³⁸ In response, Wu et al. (2018) referred that the integration of sustainable strategic planning could overcome barriers to sustainability practices in shipping.³⁹

Zis (2019) concluded that operators who make use of expensive fuels or install abatement technologies, have seen benefits because of fuel prices since 2014. He concludes that shipping industry has to adopt practices that will give them competitive advantage against road and rail transportation modes when fuel prices increase.⁴⁰

Yuen in (2018) concluded that CSR of a shipping enterprise, that includes sustainable practices, affects the company's financial performance positively.⁴¹

³⁶ Dimitris Gavalas, Theodoros Syriopoulos & Michael Tsatsaronis, *Maritime Policy and Management*, (2021), "Assessing key performance indicators in the shipbuilding industry; an MCDM approach", link: <https://www.tandfonline.com/doi/full/10.1080/03088839.2021.1876939>

³⁷ *Sustainable Cities and Societies*, volume 43 (2018), pages 366-383, Muhamad Fairuz Ahmad Jasmi & Yudi Fernando, "Drivers of maritime green supply chain management", link: <https://www.sciencedirect.com/science/article/pii/S2210670718301288>

³⁸ *Transport. Res. Part D: Transport Environ.*, 61 (Part B) (2017), pages 246-260, Chung-Shan Yang, "An analysis of institutional pressures, green supply chain management, and green performance in the container shipping context", link: https://www.scopus.com/record/display.uri?eid=2-s2.0-85101210337&origin=inward&txGid=315def57d5e86d98a2f8329b45ca6f5a&featureToggles=FEATURE_NEW_MAIN_SECTION:1,FEATURE_NEW_SOURCE_INFO:1,FEATURE_NEW_REAXYS_SECTION:1,FEATURE_NEW_SIVAL_TOPICS:1,FEATURE_VIEWS_COUNT:1

³⁹ Wu Xiaofang, Zhang Luoping, Luo Meifeng, 2018., 22:1729–1747, "Current strategic planning for sustainability in international shipping. *Environment, Development and Sustainability*", link: https://www.researchgate.net/publication/329737285_Current_strategic_planning_for_sustainability_in_international_shipping

⁴⁰ Thalís P.V. Zis, Harilaos N. Psaraftis, George Panagakos and Jacob Kronbak, *Transport. Res. Part D: Transport Environ.*, 70 (2019), pp. 1-17, "Policy measures to avert possible modal shifts caused by sulphur regulation in the European ro-ro sector", link: <https://www.sciencedirect.com/science/article/pii/S1361920918308691>

⁴¹ Kum Fai Yuen, Vinh V. Thai, Yiik Diew Wong and Xueqin Wang, *Transport. Res. Part A: Policy Practice*, 113 (2018), pp. 397-409, "Interaction impacts of corporate social responsibility and service quality on shipping firms' performance", link: <https://www.sciencedirect.com/science/article/pii/S0965856417300162>



Parviainen in (2018) concluded that stakeholders have to be given importance in sustainable targets of a shipping enterprise.⁴²

Kim and Seo (2019) conclude that the investment costs are very important for a shipping enterprise when has to comply with regulations and conventions of shipping industry for eliminating emissions.⁴³

A model with profit maximization and CO₂ emission minimization and sulfur emissions minimization is developed by⁴⁴Cheaitou and Cariou (2019).

⁴² Tuuli Parviainen, Annukka Lehikoinen, Sakari Kuikka and Päivi Haapasaari, *WMU J. Maritime Affairs*, 17 (1) (2018), pp. 49-70, “

How can stakeholders promote environmental and social responsibility in the shipping industry?”, link: <https://link.springer.com/article/10.1007/s13437-017-0134-z>

⁴³ A-Rom Kim and Young-Joon Seo, *Marine Policy*, 100 (2019), pp. 98-106, “The reduction of sox emissions in the shipping industry: The case of korean companies”, link:

<https://www.sciencedirect.com/science/article/pii/S0308597X18307188>

⁴⁴ Ali Cheaitou and Pierre Cariou, *Ann. Oper. Res.*, 273 (1–2) (2019), pp. 501-525, “Greening of maritime transportation: A multi-objective optimization approach”, link:

<https://link.springer.com/article/10.1007%2Fs10479-018-2786-2>



CHAPTER 3: Research Objectives

General Objectives: This project aims to describe the importance of green financing connected with sustainability. Its purpose is also to assess the role of green financing in shipping industry.

Specific Objectives: This project aims to answer the following questions for the objectives above.

1. What is the importance of climate change?
2. How is quantitatively shipping connected with climate change?
3. How can be achieved sustainability globally?
4. How does shipping industry contribute to global effort for sustainability?
5. Which are some regulations and conventions that aim in greening shipping industry?
6. What is green financing (definitions)?
7. How is green financing connected with greening efforts?
8. What is the performance of green financing in numbers?
9. What are some sources for green financing?
10. What is existing in bibliography for green financing in shipping industry?
11. Is green financing in shipping industry existing in numbers?

Table 3: Objectives of the research-project

No.	General Objectives	Specific Objectives- Questions
1	Describe the importance of green financing connected with sustainability.	What is the importance of climate change? How is quantitatively shipping connected with climate change? How can be achieved sustainability globally? How does shipping industry contribute to global effort for sustainability? Which are some regulations and conventions that aim in greening shipping industry? What is green financing (definitions)? How is green financing connected with greening efforts? What is the performance of green financing in numbers? What are some sources for green financing?
2	Explain the role of green financing in shipping industry.	What is existing in bibliography for green financing in shipping industry? Is green financing in shipping industry existing in numbers?



CHAPTER 4: Research Method

For the writing of this project was used mixed method research (quantitative and qualitative). The research was done in sites of Nasa, IMO, Europe.Eu, United Nations, published articles and Hapag-Lloyd AG. The literature review is between 2008-2021. For the data research was used the search engine Google Scholar and Google using keywords: climate change, consequences of climate change, sustainable shipping, IMO and sustainability, shipping and GHG emission, 2017 agenda, MRV, DCS, MARPOL, IMO 2020, AFS, ballast water management, green financing, financing, green bonds, green loans, green listed equity, green financing numbers, sources green financing, types of green financing, European green deal 2050, green financing in shipping industry, green financing and shipping, sustainable shipping companies, Hapag-Lloyd. In addition, Excel was used for the analysis of data and data processing. The data used are secondary. There was lack in literature review referred to green financing in shipping industry. Furthermore, there was lack in information referred to exchanges (green bonds and green loans as presented in appendixes 1 and 2).



CHAPTER 5: Research Data: Hapag-Lloyd AG

1.1 Why Hapag-Lloyd

1.1.1 About Hapag-Lloyd AG

Hapag Lloyd has a fleet of 237 modern container ships and the total transport capacity is 1.7 million TEU. Also, Hapag-Lloyd is one of the biggest liner shipping companies internationally. In the company work 13,100 employees and 388 offices in 129 countries. This enterprise every year transports 11.8 million TEU. What is more, has one of the largest and most modern fleets of reefer containers. Hapag-Lloyd is one of the leaders in the Transatlantic, Middle East, Latin America, and Intra-America trades.⁴⁵

1.1.2 Mission and Strategy

Hapag-Lloyd's strategy is being eco-friendly, being a provider of high service quality, and care for the well-being and safety of employees. In detail some targets of the company are:

- Less carbon emissions
- Eco-friendly
- Develop of state-of-the-art technology.
- More operation purposing in sustainability
- Good relations with stakeholders
- Responsibility

1.1.3 Certificates



In 1994 Hapag-Lloyd was certified because of her compliance with ISO 9001 quality standards. It was the first shipping enterprise who took this certificate. In 2003 was certified with ISO 14001 as well. Until today, the certificate has been renewing. Fleet Management was certified with ISO 9001:2015 and 14001:2015 certification in March 2018.



Hapag-Lloyd calculates carbon emissions for all owned and chartered container vessels by using the methodology developed by Clean Cargo.

⁴⁵ HapagLloyd AG- Sustainability Report 2020





Since 1997 all new ships receive an Environmental Passports for highest environmental standards.



Hapag-Lloyd has qualified its fleet in accordance with IMO’s Energy Efficiency Design Index (EEDI), the Ship Energy Efficiency Management Plan (SEEMP) and the corresponding International Energy Efficiency

Certificate (IEEC). In 2012, Hapag-Lloyd was the first shipping enterprise globally that own-managed fleet certified in accordance with the IMO’s Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP).



Hapag-Lloyd equips all its newbuilds with an inventory of hazardous materials (IHM).



Hapag-Lloyd is the first company that was certified with “DNV GL Excellence Green Star” in recognition of its compliance with the highest standards in ship recycling.



Hapag-Lloyd’s information security management system was certified by Datenschutz cert in 2019 in accordance with ISO 27001 for onshore systems. The certificate is valid until 16.12.2022.



Fleet Management’s safety system was certified in accordance with ISO 45001:2018. This certification represents not just the safety of our employees, but also smooth on-board workflow. The certificate is valid until March 21, 2024.



1.1.4 Economic Development of Hapag-Lloyd

In 2020 Hapag-Lloyd recorded a decrease in the fleet from 239 ships (2019) to 237. Their revenue increased by around 1% to 12,772 million euro. Their operating result (EBIT) increased to 1,315 million euro (in 2019 reached 811 million). The freight rate was USD 1,115/TEU in the 2020 financial year (previous year's level of USD 1,072/TEU).

1.2 Hapag Lloyd and Sustainability

First of all, for the 17th time in a row Hapag Lloyd has been certified according to ISO standards. In particular, meet 9001 and 14001 ISO Standards.

In 2020 Hapag Lloyd implemented some noteworthy measures. First of all, is the first shipping company in the world to retrofit an existing container ship (15,000 TEU) the “Brussels Express” (formerly the “Sajir”) with LNG. This way emissions are being reduced. Hapag Lloyd invested 35 million US dollars in their conversion of their vessels. Furthermore, Hapag Lloyd ordered six new vessels with LNG propulsion. Also, the company has been testing a blend of biofuels to power one of their ships. By the use of biofuels, emissions of CO₂ will be reduced.

When it comes to Sustainable Development Goals (SDG's) Hapag Lloyd contributes to the following goals:

- 4 - Quality Education
- 13 - Climate Action
- 16 - Peace, Justice and Strong Institutions
- 8 - Decent Work and Economic Growth
- 14 - Life Below Water
- 17 Partnerships for the Goal⁴⁶

Hapag Lloyd's “Brussels Express”

“Brussels Express” is the first large container ship of 15,000 TEU globally that have ever been converted to gas propulsion.

Richard von Berlepsch, Managing Director Fleet Management at Hapag-Lloyd. Said that fossil LNG is now the most promising fuel on the path towards zero emissions. The medium-term goal is to have CO₂-neutral shipping operations using synthetic natural gas (SNG).⁴⁷

⁴⁶ HapagLloyd AG- Sustainability Report 2020, <https://website-mig.hlag.cloud/sustainability-report-2020/en/index.html> accessed in 09/06/2021.

⁴⁷ <https://www.hapag-lloyd.com/en/press/releases/2021/06/world-s-first-large-container-ship-converted-to-lng-to-arrive-in.html> accessed in 11/06/2021.



1.3 Hapag Lloyd and Green Financing

1.3.1 Hapag- Lloyd and Green Bond

Table 4: Information About Hapag Lloyd Green Bond

Company	Hapag-Lloyd
Exchange	Frankfurt Stock Exchange
Company Sector	Ship Owner – Container
Type	Bond
Further Details	Green Bond
USD Equiv.	353.355.000
Sustainability Advisors	DNV
Currency	EUR
Amount	300.000.000
Coupon Rate	2.50%
Maturity	2028-March-25
Publish Information	Proceeds are to refinance an existing 5.125% EUR bond.

As shown in Table 4, there was made an exchange between Hapag Lloyd and Frankfurt Stock Exchange. In detail, Frankfurt Stock Exchange issued a bond of 300.000.000 Euro (353.355.000 USD) to Hapag Lloyd. The sustainability advisor was DNV, and the coupon rate was 2.50%. The maturity of the green bond will be in 25/03/2028. The publish information is “Proceeds are to refinance an existing 5.125% EUR bond”.

For more information about green bonds in shipping industry check out Appendix 1.

1.3.2 Hapag- Lloyd and Green Loan

Table 5: Information About Hapag Lloyd Green Loan

Company	Hapag-Lloyd
Exchange	Frankfurt Stock Exchange
Company Sector	Ship Owner – Container
Type	Loan



Further Details	Green Loan
USD Equiv.	417.000.000
Sustainability Advisors	No information
Currency	USD
Amount	417.000.000
Coupon Rate	No information
Maturity	2033-February-08
Publish Information	Proceeds for financing three out of six container ships and fuel-efficient high-pressure dual-fuel engines on order.

As shown in Table 5, there was made an exchange between Hapag Lloyd and Frankfurt Stock Exchange. In detail, Hapag Lloyd got a loan of 417.000.000 USD from Frankfurt Stock Exchange. The maturity of the green loan will be in 08/02/2033. The publish information is “Proceeds will be used to finance three of the six container ships with fuel-efficient high-pressure dual-fuel engines on order”. Mark Frese, Chief Financial Officer of Hapag-Lloyd said: “The transactions will help us to modernize our fleet while further reducing our CO₂ footprint at the same time. In addition to enjoying our constructive collaboration with DNV on this project, it was also very helpful – especially regarding the formal requirements for preparing a secondary opinion and the technical specifications of the vessels.”⁴⁸ These vessels are being built in South Korea and are scheduled to be delivered in 2023.

For more information about green loans in shipping industry check out Appendix 2.

⁴⁸ <https://www.marinebiztv.com/content/newsdetails/Hapag-Lloyd-secures-green-financing-for-six-LNG-powered-newbuilds> accessed in 09/06/2021.



CHAPTER 6: Expected Results- Conclusions

Climate change is catching attention globally as it has affected the economy, society, and the environment. The temperature of the earth will increase, sea level will rise because of the melt of ice, there will be more droughts and heat waves, there have been many cold and heat related deaths, between 1980 to 2011 floods had affected more than 5.5 million people costing more than €90 billion and sectors that rely strongly on weather such as agriculture, energy and tourism are mainly touched. Nowadays is something visible and human activities contribute a lot in getting worse. As a need, Paris Agreement was adopted.

What is more, shipping industry is the most efficient mode of transport because of the economies of scale. For this reason, it must be taken action by these who are engaged in this industry. Shipping industry pollutes the environment through its exhaust gases. Total shipping CO₂ emissions seem to have changes (increase/ decrease). In detail, from 2012 to 2013 there has been a decrease. From 2013 to 2017 the emissions have an increase every year. In period 2017 to 2018 there has been a decrease in CO₂ shipping emissions. In order to help in the effort of climate change International Maritime Organization adopted GHG strategy. Green House Gas (GHG) strategy promises the reduction of CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030 and 50% by 2050, in comparison with 2008. Also, the prospects of Zero-Carbon Bunker Fuels for Decarbonizing Shipping industry are the following: Biofuels, Hydrogen, Ammonia and Synthetic carbon-based fuels. These ways, shipping industry relates to climate change.

In order to be achieved sustainability globally the United Nations adopted the 2030 Agenda for Sustainable Development, containing seventeen (17) Sustainability Goals (SDG's). From the side of shipping industry and IMO as a member of the United Nations contributes to SDGs through its regulations and conventions. When it comes to sustainability of the environment IMO has adopted many of them. Some are International Convention for the Prevention of Pollution from Ships (MARPOL), Regulation "IMO 2020", Ballast Water Management Convention (BWM), International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS).

In order to be achieved all these efforts for sustainability need to be changes in industries. For being implemented, financing is needed. As being presented, in the period of 2013-2019 green bonds have shown an increase year by year, with 2019 being the year with the top interest with more than 250 billion dollars. When it comes to green loans, these have shown an interest in 2018 and 2019 proving that they have already being introduced in markets. Sustainability shows increase of interest as years pass. For this reason, there has been at the same time necessity for financing towards these investments. It is visible that sustainability bonds shown an interest in 2014, sustainability linked loans appeared in 2017 and in 2019 sustainability-linked bonds introduced in markets. All these prove the existence of green financing in industries.

When it comes to green financing in shipping industry seems to be lack in literature review, as it is a challenge for shipping industry. However, because of the regulations and conventions which being adopted there is need for green financing. Based on study case and appendixes, green financing is existing in shipping industry as well. There are



existing sources of green financing, but in order to be implemented there must be help by private shares and be given interest and attention by shareholders.



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APPENDIX 1: Other Green Bonds in Shipping Industry

Company	Seaspan Corporation ⁴⁹
Exchange	No Information
Company Sector	Ship Owner – Container
Type	Bond
Further Details	Sustainability-Linked, Private Placement
USD Equiv.	150.000.000
Sustainability Advisors	No information
Currency	EUR
Amount	150.000.000
Coupon Rate	3.91%
Maturity	2031-May-21
Publish Information	No information

Company	Seaspan Corporation ⁵⁰
Exchange	No Information
Company Sector	Ship Owner – Container
Type	Bond
Further Details	Sustainability-Linked, Private Placement
USD Equiv.	170.000.000
Sustainability Advisors	No information
Currency	EUR

⁴⁹ Seaspan Corporation, Press Release, link: <https://www.seaspancorp.com/> accessed in 15/06/2021.

⁵⁰ Seaspan Corporation, Press Release, link: <https://www.seaspancorp.com/> accessed in 15/06/2021.



Amount	170.000.000
Coupon Rate	4.06%
Maturity	2033-May-21
Publish Information	No information

Company	Seaspan Corporation ⁵¹
Exchange	No Information
Company Sector	Ship Owner – Container
Type	Bond
Further Details	Sustainability-Linked, Private Placement
USD Equiv.	130.000.000
Sustainability Advisors	No information
Currency	EUR
Amount	130.000.000
Coupon Rate	4.26%
Maturity	2036-May-21
Publish Information	No information

Company	SFL Corporation ⁵²
Exchange	New York Stock Exchange (NYSE)
Company Sector	Ship Owner - Diverse
Type	Bond

⁵¹ Seaspan Corporation, Press Release, link: <https://www.seaspancorp.com/> accessed in 15/06/2021.

⁵² SFL- Press Releases, link: <https://www.sflcorp.com/sfl-successful-placement-of-5-year-inaugural-sustainability-linked-bonds/> accessed in 15/06/2021.



Further Details	Sustainability-linked Bonds
USD Equiv.	150.000.000
Sustainability Advisors	No information
Currency	EUR
Amount	150.000.000
Coupon Rate	7.25%
Maturity	2026-May-12
Publish Information	No information

Company	Seaspan Corporation ⁵³
Exchange	No information
Company Sector	Ship Owner - Container
Type	Bond
Further Details	Sustainability-linked Bonds
USD Equiv.	300.000.000
Sustainability Advisors	No information
Currency	EUR
Amount	300.000.000
Coupon Rate	6.5%
Maturity	2026-April-1
Publish Information	No information

⁵³ Seaspan Corporation, Press Release, link: <https://www.seaspancorp.com/> accessed in 15/06/2021



Company	Seaspan Corporation ⁵⁴
Exchange	No information
Company Sector	Ship Owner - Container
Type	Bond
Further Details	Sustainability-linked Bonds
USD Equiv.	200.000.000
Sustainability Advisors	Sustainalytics
Currency	EUR
Amount	200.000.000
Coupon Rate	6.5%
Maturity	2024-February-5
Publish Information	Proceeds from the bond issue will be used for general corporate purposes, which may include repayment of debt. Issuances is linked to the company's sustainability performance.

Company	Odfjell ASA ⁵⁵
Exchange	Oslo Bors
Company Sector	Ship Owner - Tanker
Type	Bond
Further Details	Sustainability-linked Senior Unsecured Bond
USD Equiv.	100.459.801

⁵⁴ Seaspan Corporation, Press Release, link: <https://www.seaspancorp.com/> accessed in 15/06/2021

⁵⁵ Odfjell ASA, Our Stories, link: <https://www.odfjell.com/about/our-stories/odfjell-se-successfully-places-shippings-first-sustainability-linked-bond/> accessed in 15/06/2021



Sustainability Advisors	DNV
Currency	NOK
Amount	850.000.000
Coupon Rate	NIBOR3M+5.75%
Maturity	2025-January-21
Publish Information	Proceeds to be used for refinancing and general corporate purposes.

Company	Altera Shuttle ⁵⁶
Exchange	No information
Company Sector	Offshore
Type	Bond
Further Details	Green Bonds
USD Equiv.	75.000.000
Sustainability Advisors	Cicero
Currency	USD
Amount	75.000.000
Coupon Rate	LIBOR3M+6.50%
Maturity	2024-October-09
Publish Information	Proceeds to be used for projects defined by their Green Bond Framework, including four 130,000-dwt E-Shuttle tankers being built at Samsung in South Korea.

⁵⁶ IFR, "DEAL: Altera Shuttle Tankers prices USD75m Oct 2024 green FRN tap – UPDATE", link: <https://www.ifre.com/story/2494980/deal-altera-shuttle-tankers-usd-oct-2024-green-frn-tap-qydd7bp0z> accessed in 15/06/2021



Company	Altera Shuttle ⁵⁷
Exchange	No information
Company Sector	Offshore
Type	Bond
Further Details	Green Bonds
USD Equiv.	125.000.000
Sustainability Advisors	Cicero
Currency	USD
Amount	125.000.000
Coupon Rate	LIBOR3M+6.50%
Maturity	2024-October-09
Publish Information	No information

Company	Mitsui OSK Lines ⁵⁸
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse
Type	Bond
Further Details	24th Series (Sustainability) Bonds
USD Equiv.	92.826.342
Sustainability Advisors	Japan Credit Agency
Currency	JPY

⁵⁷ GlobalCapital, "Altera Shuttle Tankers taps transition-style green bond", link: <https://www.globalcapital.com/article/b1n2kqzxqvzmsf/altera-shuttle-tankers-taps-transition-style-green-bond> accessed in 15/06/2021

⁵⁸ Mitsui & Co., Releases, link: <https://www.mitsui.com/jp/en/release/index.html> accessed in 15/06/2021



Amount	10.000.000.000
Coupon Rate	0.49%
Maturity	2025-July-29
Publish Information	Proceeds to be used for plans including the establishment of a maritime academy in the Philippines and the promotion of work reforms. Money will also be used on technical items such as ballast water treatment systems, scrubbers, LNG-fuelled vessels. Money will also be used on technical items such as ballast water treatment systems, scrubbers, LNG-fuelled vessels.

Company	Mitsui OSK Lines ⁵⁹
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse
Type	Bond
Further Details	22nd Series (Sustainability) Bonds
USD Equiv.	46.413.171
Sustainability Advisors	Japan Credit Agency
Currency	JPY
Amount	5.000.000.000
Coupon Rate	0.32%
Maturity	2023-July-19
Publish Information	Proceeds to be used for plans including the establishment of a maritime academy in the Philippines and the promotion of work reforms. Money will also be used on technical items such as ballast water treatment systems, scrubbers, LNG-fuelled vessels. Money will also be used on technical items such as ballast water treatment systems, scrubbers, LNG-fuelled vessels.

⁵⁹ Mitsui & Co., Releases, link: <https://www.mitsui.com/jp/en/release/index.html> accessed in 15/06/2021



Company	Mitsui OSK Lines ⁶⁰
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse
Type	Bond
Further Details	23rd Series (Sustainability) Bonds
USD Equiv.	46.413.171
Sustainability Advisors	Japan Credit Agency
Currency	JPY
Amount	5.000.000.000
Coupon Rate	0.49%
Maturity	2025-July-19
Publish Information	Proceeds to be used for plans including the establishment of a maritime academy in the Philippines and the promotion of work reforms. Money will also be used on technical items such as ballast water treatment systems, scrubbers, LNG-fuelled vessels. Money will also be used on technical items such as ballast water treatment systems, scrubbers, LNG-fuelled vessels.

Company	Mitsui OSK Lines ⁶¹
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse
Type	Bond
Further Details	Unsecured Corporate (Green) Bonds
USD Equiv.	45.005.636

⁶⁰ Mitsui & Co., Releases, link: <https://www.mitsui.com/jp/en/release/index.html> accessed in 15/06/2021

⁶¹ Mitsui & Co., Releases, link: <https://www.mitsui.com/jp/en/release/index.html> accessed in 15/06/2021



Sustainability Advisors	Vigeo Eiris
Currency	JPY
Amount	5.000.000.000
Coupon Rate	0.42%
Maturity	2023-September-10
Publish Information	Proceeds to be allocated across MOL's green projects: ballast water treatment systems, Sox scrubber, LNG fuelled vessels, LNG fuel bunkering vessels, new propeller boss cap fins and Wind Challenger Plan.

Company	Mitsui OSK Lines ⁶²
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse
Type	Bond
Further Details	Unsecured Corporate (Green) Bonds
USD Equiv.	44.977.892
Sustainability Advisors	Vigeo Eiris
Currency	JPY
Amount	5.000.000.000
Coupon Rate	0.42%
Maturity	2023-August-30
Publish Information	Proceeds to be allocated across MOL's green projects: ballast water treatment systems, Sox scrubber, LNG fuelled vessels, LNG fuel

⁶² Mitsui & Co., Releases, link: <https://www.mitsui.com/jp/en/release/index.html> accessed in 15/06/2021



Company	Evergreen Marine ⁶³
Exchange	Taiwan Stock Exchange
Company Sector	Ship Owner - Container
Type	Bond
Further Details	Secured Green Bonds
USD Equiv.	66.244.066
Sustainability Advisors	DNV
Currency	TWD
Amount	2.000.000.000
Coupon Rate	0.86%
Maturity	2023-June-19
Publish Information	Proceeds to be used to purchase and install environmental protection equipment for marine fuel. The installation of the environmental protection equipment will reduce emissions of Sox during ship voyages. Benefits include reduced atmospheric pollution and lower environmental impact. Installation to begin 2018 Q3 and finish by 2021 Q2.

⁶³ Marine Traffic, "Evergreen issues \$65.7m of green bonds", link: <https://www.marinetraffic.com/en/maritime-news/article/22559> accessed in 15/06/2021



APPENDIX 2: Other Green Loans in Shipping Industry

Company	U-Ming Marine ⁶⁴
Exchange	Taiwan Stock Exchange
Company Sector	Ship Owner - Bulkcarrier
Type	Loan
Further Details	Green Loan
USD Equiv.	45.000.000
Sustainability Advisors	No information
Currency	USD
Amount	45.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Proceeds to be used to purchase of an LNG dual-fuel 190,000-dwt bulker that has been ordered on the back of a 10-year charter by Anglo American.

Company	Euronav NV ⁶⁵
Exchange	Euronext Brussels
Company Sector	Ship Owner - Tanker
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	95.000.000
Sustainability Advisors	No information

⁶⁴ Uming.com, News, link: <https://www.uming.com.tw/news/Index.aspx> accessed in 15/06/2021

⁶⁵ Offshore Energy, "Euronav fixes \$95M in green financing", link: <https://www.offshore-energy.biz/euronav-fixes-95m-in-green-financing/> accessed in 15/06/2021



Currency	EUR
Amount	80.000.000
Coupon Rate	No information
Maturity	2024-April-12
Publish Information	Proceeds to be used in financing vessel acquisitions, general corporate purposes and working capital.

Company	Sembcorp Marine ⁶⁶
Exchange	Singapore Exchange (SGX)
Company Sector	Shipyards
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	375.000.000
Sustainability Advisors	DBS
Currency	SGD
Amount	500.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Use of proceeds not disclosed.

Company	Nippon Yusen Kaisha ⁶⁷
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse

⁶⁶ Sembcorp, Media Release, link: <https://www.sembcorp.com/en/media/media-releases> accessed in 15/06/2021

⁶⁷ NYK Lines, Latest News, link: <https://www.nyk.com/english/> accessed in 15/06/2021



Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	50.000.000
Sustainability Advisors	R&I Inc
Currency	USD
Amount	50.000.000
Coupon Rate	No information
Maturity	2025-February-05
Publish Information	Loan interest rate is linked to the company's Carbon Disclosure Project score.

Company	TORM A/S ⁶⁸
Exchange	NASDAQ OMX Copenhagen Stock Exchange
Company Sector	Ship Owner - Tanker
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	150.000.000
Sustainability Advisors	Danish Ship Finance
Currency	USD
Amount	150.000.000
Coupon Rate	No information
Maturity	2027-November-11
Publish Information	Proceeds are for refinancing. Pricing is linked to the reductions in CO2 emissions year on year, so that it aligns with the International Maritime

⁶⁸ Offshore Energy, "TORM signs 1st sustainability-linked loan", link: <https://www.offshore-energy.biz/torm-signs-1st-sustainability-linked-loan/> accessed in 15/06/2021



	Organization's 40% industry reduction target in greenhouse gas emissions by 2030.
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Company	Euronav NV ⁶⁹
Exchange	Euronext Brussels
Company Sector	Ship Owner - Tanker
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	713.000.000
Sustainability Advisors	Nordea
Currency	USD
Amount	713.000.000
Coupon Rate	No information
Maturity	2026-March-11
Publish Information	Proceeds to be used for refinancing vessels (9 VLCCs & 3 Suezmaxes) and partly assist in financing the acquisition of four vessels under construction as DSME. Proceeds will also be used for general corporate purposes and working capital. The loan includes terms with clear targets to reduce GHG emissions over its entire duration. These targets start immediately with compliance over the first 12 months being rewarded with a reduced interest coupon of five basis points. This will be independently measured and verified.

Company	Ardmore Shipping ⁷⁰
Exchange	New York Stock Exchange (NYSE)
Company Sector	Ship Owner - Tanker
Type	Loan
Further Details	Sustainability Linked Receivables Facility
USD Equiv.	15.000.000

⁶⁹ Offshore Energy, "Euronav bags \$713 million loan", link: <https://www.offshore-energy.biz/euronav-bags-713-million-loan/> accessed in 15/06/2021

⁷⁰ Ardmore Shipping News, link: <https://ardmoreshipping.com/news/> accessed in 15/06/2021.



Sustainability Advisors	ABN AMRO
Currency	USD
Amount	15.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Has pricing adjustment connected with its performance on carbon emission reduction and other environmental and social initiatives?

Company	KCC AS ⁷¹
Exchange	Euronext Expand
Company Sector	Ship Owner - Bulkcarrier
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	60.000.000
Sustainability Advisors	Credit Agricole
Currency	USD
Amount	60.000.000
Coupon Rate	LIBOR+2.75%
Maturity	2026-March-01
Publish Information	Proceeds to be used to finance two CLEANBU Chem/Bulk Oil vessels with delivery in 2021. The credit margin will be adjusted, up or down, based on KCC's sustainability performance, as defined by the company's ability to meet its goal of reducing CO2 emissions per ton of transported cargo per nautical mile (EEOI) and reducing absolute CO2 emissions per vessel. Potential margin adjustments up to +/- 10 bps once every year based on sustainability KPIs.

⁷¹ Offshore Energy, "Klaveness Combination Carriers nets green financing for its two newbuilds", link: <https://www.offshore-energy.biz/klaveness-combination-carriers-nets-green-financing-for-its-two-newbuilds/> accessed in 15/06/2021



Company	F. Olsen Wind AS ⁷²
Exchange	No information
Company Sector	Offshore
Type	Loan
Further Details	Green Loan
USD Equiv.	85.000.000
Sustainability Advisors	No information
Currency	USD
Amount	85.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Proceeds for two wind turbine installation vessels, Brave Tern & Bold Tern, EUR29m of the facility is covered but by the green loan framework.

Company	Oman Shipping Co ⁷³
Exchange	No information
Company Sector	Ship Owner - Diverse
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	350.000.000

⁷² TradeWinds, “Fred Olsen fixes \$85m of green finance for wind vessels”, link: <https://www.tradewindsnews.com/finance/fred-olsen-fixes-85m-of-green-finance-for-wind-vessels/2-1-831295> accessed in 15/06/2021

⁷³ Observer, “Oman Shipping Company signs \$35m ‘green loan’ “, link: <https://www.omanobserver.om/article/12677/Main/oman-shipping-company-signs-35m-green-loan> accessed in 15/06/2021.



Sustainability Advisors	No information
Currency	USD
Amount	350.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Proceeds to be used for two ultramax vessels, Jabal Al Mish & Jabal Shams

Company	A.P. Moller ⁷⁴
Exchange	NASDAQ OMX Copenhagen Stock Exchange
Company Sector	Ship Owner - Diverse
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	5.000.000.000
Sustainability Advisors	Credit Agricole, SEB
Currency	USD
Amount	5.000.000.000
Coupon Rate	No information
Maturity	2025-February-25
Publish Information	Proceeds to be used for refinancing. The credit margin under the facility will be adjusted based on Maersk's progress to meet its target of reducing CO2 emissions per cargo moved by 60% by 2030.

⁷⁴ A.P. Moller, Press Releases, link: <https://www.maersk.com/news/articles/2020/02/25/ap-moller-maersk-links-new-5bn-revolving-credit-facility-to-its-co2-performance> accessed in 15/06/2021



Company	Intl Seaways ⁷⁵
Exchange	New York Stock Exchange (NYSE)
Company Sector	Ship Owner - Diverse
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	390.000.000
Sustainability Advisors	ABN AMRO
Currency	USD
Amount	390.000.000
Coupon Rate	No information
Maturity	2025-January-23
Publish Information	Proceeds are to refinance an existing \$540m facility signed 14 Jun 2018. The adjustment in pricing will be linked to the carbon efficiency of the International Seaway's fleet as it relates to reductions in CO2 emissions year-over-year, such that it aligns with the International Maritime Organization's 50% industry reduction target in GHG emissions by 2050.

Company	Nippon Yusen Kaisha ⁷⁶
Exchange	Tokyo Stock Exchange (TSE)
Company Sector	Ship Owner - Diverse
Type	Loan
Further Details	Sustainability Linked Loan
USD Equiv.	50.000.000

⁷⁵ Offshore Energy, "International Seaways Nets USD 390 Mn for Refinancing", link: <https://www.offshore-energy.biz/international-seaways-nets-usd-390-mn-for-refinancing/> accessed in 16/06/2021

⁷⁶ OffShore Energy, "NYK Obtains Japan's 1st Sustainability-Linked Loan", link: <https://www.offshore-energy.biz/nyk-obtains-japans-1st-sustainability-linked-loan/> accessed in 16/06/2021



Sustainability Advisors	Japan Credit Agency
Currency	JPY
Amount	50.000.000.000
Coupon Rate	No information
Maturity	2024-November-29
Publish Information	Proceeds are for operating fund and cash reserve purposes. Loan interest rate is linked to the company's Carbon Disclosure Project score.

Company	UECC ⁷⁷
Exchange	No information
Company Sector	Ship Owner - Other
Type	Loan
Further Details	Green Loan
USD Equiv.	70.000.000
Sustainability Advisors	No information
Currency	USD
Amount	70.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Proceeds to be used for three new Battery Hybrid LNG Solution PCCs.

⁷⁷ UECC, News, link: <https://www.uecc.com/news/2019/november/green-financing-secured-for-new-vessels/> accessed in 16/06/2021



Company	Jan De Nul Group ⁷⁸
Exchange	No information
Company Sector	Offshore
Type	Loan
Further Details	Green Loan
USD Equiv.	620.000.000
Sustainability Advisors	KBC
Currency	EUR
Amount	550.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Proceeds to be used for two new offshore installation vessels, Lez Allizes & Voltaire

Company	Eastern Pacific Shpg ⁷⁹
Exchange	No information
Company Sector	Ship Owner - Diverse
Type	Loan
Further Details	Green Loan
USD Equiv.	400.000.000
Sustainability Advisors	Vigeo Eiris

⁷⁸ JandenuL, News, Jan De Nul Group 2019: Solid performances ensure broad support, link: <https://www.jandenuL.com/news/jan-de-nul-group-2019-solid-performances-ensure-broad-support> accessed in 16/06/2021

⁷⁹ Lloyst's List, News, "Eastern Pacific Shipping wins green loan for scrubbers on 16 ships", link: <https://lloydslist.maritimeintelligence.informa.com/LL1125426/Eastern-Pacific-Shipping-wins-green-loan-for-scrubbers-on-16-ships> accessed in 16/06/2021



Currency	USD
Amount	400.000.000
Coupon Rate	No information
Maturity	No information
Publish Information	Proceeds to be used to purchase and install Exhaust Gas Cleaning Systems

Company	Star Bulk Carriers ⁸⁰
Exchange	NASDAQ
Company Sector	Ship Owner - Bulkcarrier
Type	Loan
Further Details	Green Loan
USD Equiv.	70.000.000
Sustainability Advisors	DNV
Currency	USD
Amount	70.000.000
Coupon Rate	LIBOR+2.80%
Maturity	2023-September-27
Publish Information	Proceeds to be used to finance the procurement and retrofitting of scrubbers for up to approx. 50 vessels in Star Bulk's fleet. The \$70m green tranche is a part of a \$310m loan agreement.

⁸⁰ Sea Trade Maritime, News, "Star Bulk secures \$70m in green loan financing for scrubber retrofits", link: <https://www.seatrade-maritime.com/americas/star-bulk-secures-70m-green-loan-financing-scrubber-retrofits> accessed in 16/06/2021

