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Assessing the Cost of Inaction in Shipping: The Case
of the European Union's Emissions Trading System
and Energy Taxation Directive

Name of Students:

Cecilie Reholt

Benedikte Maria Flandorfer

Supervisor:

Kjell Jørgensen

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Abstract

This thesis examines the cost implications of sustainability inaction within the shipping industry. By employing a discounted cash flow approach and forecasting until 2050, we assess the influence of the European Union's Emissions Trading System and the revised Energy Taxation Directive on the share prices of five shipping firms across three scenarios. These scenarios encompass full decarbonization by 2050, achieving the goals outlined in the International Maritime Organization's Greenhouse Gas Strategy, entailing a 50% reduction in total emissions, and a trajectory aligned with the long-term growth of each company. Our analysis reveals that scenario 1 yields the highest share prices, followed by scenario 2 and scenario 3, highlighting potential costs associated with neglecting sustainability initiatives. However, the differences across the scenarios are generally marginal, indicating that the regulations and associated costs have limited impact on share prices, regardless of the chosen emission trajectory. Additionally, our findings suggest that the regulations will affect the industry in an uneven manner, potentially disrupting competition based on specific market segments.

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1 Introduction

1.1 Introduction of the problem

Shipping plays a crucial role as the most efficient mode of transport, facilitating 80% of global trade volume (United Nations Conference on Trade and Development [2022](#)). However, the sector represents a significant source of Greenhouse gas (GHG) emissions, contributing to severe damage to the environment, resources, and human health. Estimates by the International Maritime Organization (IMO) suggests that the industry accounts for 2.9% of total carbon dioxide (CO₂) emissions and 13% of emissions from the transport sector (International Maritime Organization [2020](#)). Predictions indicate that these emissions could increase between 50% and 250% by 2050, depending on various scenarios (Fovrum et al. [2022](#)). Given the continued growth and expansion of the sector, the need for responsible shipping practices has never been more pressing.

With the growing awareness of climate change risks and opportunities, investors and stakeholders are increasingly demanding action from companies within the shipping industry to mitigate their environmental impact. This demand is fueled by the development of new regulations affecting the industry. In particular, the European Union (EU) has reached an agreement on including shipping in its Emission Trading System (ETS) from 2024. Additionally, a revision of the current Energy Taxation Directive (ETD) is deemed crucial to complement this measure. Effective from 2023, the revised ETD introduces a minimum tax on energy products supplied as fuel for vessels. These regulatory implementations are expected to have a significant impact on the industry's profitability (Hesse [2023](#)). To comply with these regulations, companies will need to incur significant costs associated with vessel upgrades, investments in new technologies, and exploration of alternative fuel options. Non-compliance will result in penalties and additional expenses, potentially affecting the financial stability of these companies (Vierth et al. [2023](#)).

Despite mounting pressure, many companies in the shipping industry have yet to take action, raising the question about the potential cost of inaction regarding sustainability. Current evaluation models do not adequately factor in the cost of inaction, or accurately value sustainability. Neglecting sustainable initiatives will not only harm the environment but potentially also the profitability of shipping firms. One of the most critical initiatives that companies must prioritize is the future fuel composition. With the push towards decarbonization, it is imperative to explore alternative options such as biofuels, hydrogen, and ammonia to reduce the sector's carbon footprint (Serra & Fancello 2020).

Consequently, the purpose of this this thesis is to develop an innovative valuation model for assessing the impact of regulatory frameworks on the share prices for companies operating in the shipping industry. In particular, the model will be applied to different trajectories for emissions reduction. This model aims to investigate whether the costs that companies may incur by disregarding sustainability initiatives, such as neglecting the adoption of environmentally friendly fuel compositions, are significant enough to drive substantial changes towards decarbonization.

1.2 Objectives

To fulfil the purpose outlined above, we will leverage the EU ETS and ETD and its relations to the share price. By constructing a model that explores the influence of these regulations on share prices, we aim to develop a valuation model for shipping firms affected by these directives. The result is an equity valuation model which will be applied on several companies. The modelled share price estimate will be compared in three different scenarios, together with a sensitivity analysis. By doing so, this thesis seeks to address the research question outlined below.

To what extent does the inclusion of shipping in the European Union's Emissions Trading System and the subsequent revision of the Energy Taxation Directive affect the share prices of shipping companies, and what are the financial implications associated with different trajectories for emissions reduction?

This study will contribute to the growing body of research on sustainability in the shipping industry, and provide insights regarding the efficacy of new regulations. The concept of being a "first mover" in sustainability carries inherent risks, as investing in the wrong solution can potentially endanger a company's future. However, this study takes a different perspective by examining the consequences of not investing in sustainable initiatives.

1.3 Road map

The purpose of this section is to present an overview of the structure of the thesis. The thesis is composed of nine chapters, each designed to address the research question.

After the introduction, we review the existing literature on Market-Based Measures (MBMs), with a particular focus on the effectiveness of the EU ETS and ETD as appropriate MBMs. Additionally, the review explores the financial implications of including shipping in the ETS and the subsequent revision of the ETD. These findings form the basis of our research and provide a foundation for the model to assess the financial costs of these measures across different emissions reduction trajectories, thus capturing the cost associated with inaction. Chapter three introduces the shipping industry and identifies the companies that we will apply the model to, namely Wallenius Wilhelmsen, Frontline, Stolt-Nielsen, Klaveness and Golden Ocean Group. Chapter four, outlines the valuation approach, which is based on the Discounted Cash Flow (DCF) method. Chapter five analyzes the freight emissions data, construct the model, and calculates the carbon costs associated with the implementation of the EU ETS and ETD regulations from 2022-2050. Chapter six presents the primary findings of the valuations, including a comparative analysis of the estimated share prices in three distinct scenarios. Chapter seven evaluates the results using sensitivity analysis, examining the impact of variables such as the Weighted Average Cost of Capital (WACC), growth assumption and carbon costs, on the validity of the model. In Chapter eight, we provide recommendations for future research, followed by a conclusion summarizing the key findings of the thesis in Chapter nine.

1.4 Notes

The valuation computations were based on the information accessible as of December 31st, 2021 and the forecast period of the freight emissions starts on the same date, as this was the available emission data at that time.

2 Literature Review

This literature review examines the effectiveness of MBMs in mitigating GHG emissions from the shipping industry. Additionally, it investigates the existing body concerning the EU ETS and the subsequent revision of the ETD as appropriate MBMs to incentivize shipping companies towards decarbonization. The review aims to provide insights into the potential of MBMs in driving sustainable practices in the maritime sector.

2.1 Market-Based Measures and Abatement of Greenhouse Gas Emissions from Shipping

A multitude of climate policy instruments have been developed over time for the abatement of GHG emissions across industrial sectors, including shipping. These instruments have gained importance within the realm of climate regulations, with the Paris Agreement being the most recent and binding agreement under the United Nations Framework Convention on Climate Change (United Nations Framework Convention on Climate Change [2015](#)). In addition to conventional ‘command and control’ regulations that impose absolute limits on emissions, the adoption of MBMs has emerged as a successful approach in addressing environmental challenges (Meckling & Hepburn [2013](#)). MBMs are policy tools designed to mitigate GHG emissions by placing a price on carbon. By adhering to the ‘polluter pays principle’, MBMs internalize the negative external environmental cost associated with emissions, compelling the polluter to compensate for the cost (Lagouvardou, Psaraftis & Zis [2020](#)). According to (Psaraftis [2012](#)), MBMs have the potential to incentivize investments in energy-efficient technologies, promote the use of alternative fuels, and thereby contribute to the abatement of GHG emissions within the shipping industry .

In a study conducted by (Culliane & Yang [2022](#)), it is asserted that zero-carbon fuels represents the optimal trajectory for the shipping industry to achieve decarbonization. However, the study emphasizes the necessity for further innovation to fully realize this objective. While operational and technological innovations are necessary, the study contends that they alone are unlikely to fully decarbonize the shipping industry in the foreseeable future, necessitating

the implementation of MBMs. Without such measures, the aggregate GHG emissions of the shipping industry are projected to persistently increase under a 'Business-as-Usual' scenario. This is attributed to the continuous growth of international trade and the shipping industry itself, outpacing incremental improvements in operational and technological energy efficiency (Culliane & Yang [2022](#)). This notion is supported by (Lagouvardou, Psaraftis & Zis [2020](#)), who note that considering the projected growth of 39 % in world trade by 2050, technical and operational measures are insufficient to reduce emissions, thereby underscoring the requirement for MBMs.

However, existing literature emphasizes that the effectiveness of MBMs in achieving emission reduction targets and the challenges associated with their implementation, such as measurement, reporting, and verification (MRV) of emissions, have become subject of debate within the industry. Despite the growing recognition of the need for MBMs to reduce GHG emissions, opposition from certain developing countries persists. The opposition is primarily rooted in concerns about the uncertainties surrounding the form of MBMs, apprehensions regarding their economic impacts, and doubts about the regulatory competence of the IMO in effectively governing MBMs (Shi [2016](#)). Although MBMs have been introduced and implemented in the shipping industry, (Culliane & Yang [2022](#)) emphasizes in their study that it may take time to ascertain their precise effectiveness in reducing GHG emissions. While MBMs possess the potential to initiate the necessary changes for emissions reduction, (Lagouvardou, Psaraftis & Zis [2020](#)) emphasizes that the prospect of complete decarbonization can only be envisioned if MBMs are appropriately designed to stimulate the transition towards new fuels and propulsion systems.

2.2 Inclusion of Shipping in The European Union's Emissions Trading System (ETS) and Energy Taxation Directive (ETD)

In July 2021, the European Commission introduced the 'fit for 55' package to update its existing climate and energy legislation to achieve a minimum 55% reduction in GHG emissions by 2030 relative to 1990 levels (European Commission [2023](#)). This package includes several proposals such as the inclusion of shipping in the EU ETS and the subsequent revision of the ETD. However, the efficacy of these measures as appropriate MBMs for mitigating GHG emissions remains a subject of debate in the existing literature.

The integration of shipping into an ETS is advantageous from the perspectives of cost-effectiveness, market transparency, and stability, as supported by scholarly research (Kågeson et al. [2009](#); Koesler, Achtnicht & Köhler [2015](#); Gu, Wallace & Wang [2019](#)). Increasing demand for transparency in shipping operations, driven by customer expectations and awareness of sustainable consumption, has the potential to shape emission reduction and sustainability efforts of shipping companies. This transparency serves as an incentive for companies to actively pursue emission reduction and sustainability, as it enhances their reputation and fosters long-term business relationships. Shipping firms that have established a reputation for being responsible are preferred by shippers, leading to continued business opportunities (Xue & Lai [2023](#)).

According to (Koesler, Achtnicht & Köhler [2015](#)), an ETS offers two main advantages. Firstly, it ensures environmental effectiveness by setting a cap on the total permitted emissions within the system. Secondly, it can achieve environmental benefits in a cost-efficient manner. By assigning a price to emissions, regulated entities treat their emissions as a regular production factor, thus encouraging rational deployment in their production processes. A study by (Kosmas & Acciaro [2017](#)) emphasize that the scheme would favour more energy-efficient operators, and penalise progressively the less environmentally friendly. Comparison with the aviation sector, which was included in the EU ETS in 2012, reveal that airline companies have made substantial investments in clean technologies, including alternative fuels and energy sources, to remain competitive in the long run, considering the gradual increase in allowance prices (Meleo, Nava & Pozzi [2016](#)). Further, the success of various ETS implementations in other sectors, such as the Regional Clean Air Incentives Market (RECLAIM) program for the abatement of SO_x emissions in California (Kågeson et al. [2009](#)), further supports the feasibility and effectiveness of an ETS. Additionally, (Dessens et al. [2014](#)) reports that the inclusion of shipping in the scheme has the potential to reduce emissions by up to 65% from 2000 to 2050, relative to a base scenario that relies solely on fossil fuels.

However, the implementation of such a scheme may involve several difficulties. (Koesler, Achtnicht & Köhler [2015](#)) emphasize carbon leakage as one significant difficulty. In the context of shipping, carbon leakage primarily refers to the concern of shipping firms altering their activities to avoid being subject to

the regulation, for instance by adapting their operation patterns. (Psaraftis [2012](#)) also notes carbon leakage as a potential challenge in the context of ETS. The study points out that exemptions within the scheme, such as the ship size cut-off at 5,000 gross tonnage and the exemption of cargoes associated with Small Island Developing States (SIDS), raise concerns. These exemptions can potentially create a situation where traffic is diverted to these countries, leading to the development of mega transshipment hubs solely for evading emissions regulations. Consequently, the potential for evasion within the ETS framework is significant, as noted by (Psaraftis [2012](#)). Furthermore, (Koesler, Achtnicht & Köhler [2015](#)) note that the cap itself is considered a critical element of an ETS. The shipping industry is acknowledged to be highly cyclical, and as the cap within an ETS sets a fixed amount of emission allowances, variations in the demand for allowances can heavily affect the price of emissions. This may result in increased price uncertainty. Moreover, the effectiveness and ambition of these measures remain subjects of debate, with some scholars arguing that a 'command and control' carbon tax might be a more effective alternative to an ETS. (Wu et al. [2022](#)) state that while an ETS is more market-oriented, it is also more complex compared to a carbon tax. Their study raises uncertainty as to whether an ETS is the superior mechanism, highlighting the ongoing debate surrounding the optimal policy instrument for addressing shipping emissions.

The enforcement of the EU ETS in 2005 has led to the inclusion of over 11,000 heavy energy-using installations (Terxidó, Verde & Nicoli [2019](#)). However, including an international sector that operates globally like shipping, into a regional scheme has presented challenges and may potentially induce counter effects on trade within the EU (Lagouvardou, Psaraftis & Zis [2020](#)). The report emphasizes that while total emission from the participating sector in the EU ETS have decreased, emissions from aviation, another international sector like shipping, have increased since its inclusion in the scheme. This finding underscores the need for regulating internationally trading sectors on a global scale. The inclusion of shipping in the EU ETS has also been examined by (Miola, Marra & Ciuffo [2011](#)), who observe that although the flexible nature of MBMs and the EU ETS provide a definite window of opportunity without imposing a unnecessary high burden on the sector, the development of a regional policy at the European level for the shipping sector faces several

obstacles. These include challenges related to emission allocation, carbon leakage, permit allocation, handling of the wide diversity of ship types, sizes, and fuel consumption, as well as transaction costs. (Miola, Marra & Ciuffo [2011](#)) further note that as economies of scale emerge, the issue of higher transaction costs can impact small firms with lower carbon emissions, potentially increasing the cost of European shipping and creating competitive distortion in the whole sector.

Overall, the inclusion of the shipping in the EU ETS and the subsequent revision of ETD have garnered significant scholarly discussion regarding their potential economic impacts and effectiveness. Researchers have examined various factors that influence these impacts, with a particular focus on the design features of the schemes. Elements such as geographical scope, the price of emission allowances, and allocation methodology have been identified as crucial determinants of the economic outcomes (Christodoulou et al. [2021](#)). Although the ETS and ETD have achieved notable success in reducing GHG emissions within the EU, concerns remain about their effectiveness in the shipping industry. One specific concern is that the current prices of emission allowances are insufficiently high to create a significant incentive for shipping companies to undertake substantial efforts in reducing their emissions. Studies have concluded that, in comparison to fuel prices and their volatility, the additional costs and risks associated with a maritime ETS are assessed as rather modest (Koesler, Achtnicht & Köhler [2015](#)). This limitation hampers the scheme's ability to drive substantial changes in behavior and encourage the adoption of cleaner practices across the industry (Edenhofer et al. [2017](#)).

3 The Shipping Industry

The purpose of this chapter is to delve into the shipping industry, providing essential comprehension for valuation and modeling objectives. The chapter commences with an industry overview, before focusing on the benefits of taking action on sustainability in shipping. Subsequently, we present and highlight the key characteristics of the valued firms in the model.

3.1 Perspectives of the Industry

Throughout history, shipping has played a crucial role in driving economic growth, dating back as far as 5,000 years. Over the centuries, sea routes have remained the primary mode of global transportation, serving as vital arteries of trade and commerce. However, the maritime sector is not without its challenges. It is characterized by high volatility, intense competition, and a dependence on political stability and secure passage (Stopford 2009). These factors contribute to market uncertainty, making future projections reliant on various macroeconomic factors.

The shipping industry faces a unique and complex challenge in reducing its environmental impact, particularly when it comes to emissions. Unlike other sectors like power generation or road transportation, shipping encounters distinct technical, operational, and regulatory barriers (Serra & Fancello 2020). For instance, ships have long lifespans, often exceeding 20 years, which makes the adoption of new technologies and fuels a gradual process. Further, ships operate within different jurisdictions, making it difficult to harmonize regulations and ensure universal compliance. In addition, the capital-intensive nature of the industry poses a hurdle to implementing sustainability measures, as significant investments may not always yield immediate returns. However, the industry recognizes the need for action, considering the potential consequences of inaction. Sustainability has emerged as a critical issue within the shipping industry, driven not solely by environmental concerns, but also by economic and social factors. The implications of sustainability regulations on the future of shipping are significant. Compliance with these regulations can lead to operational and cost efficiencies, such as fuel savings and lower insurance premiums (United Nations Conference on Trade and Development 2022). Moreover, companies that prioritize sustainability may gain a competitive edge

by meeting the increasing demand of consumers and investors for environmentally responsible practices. Failure to comply with sustainability regulations can result in reputational damage and financial risks, as stakeholders increasingly value companies that demonstrate a commitment to sustainability. The potential long-term impact on profitability resulting from reputational damage and the loss of customers and investors should not be underestimated. While the immediate penalties associated with non-compliance with regulations may appear manageable, the hidden costs of non-compliance can inflict greater harm on a company's financial health in the long run. In the face of a rapidly changing global economy, companies that prioritize sustainability position themselves favorably for future success (Tran et al. 2020).

3.2 Benefits of Taking Action on Sustainability for a Company within the Shipping Industry

Taking action on sustainability within the shipping industry is driven by a combination of regulatory requirements, customer pressure, market competition, and the numerous benefits it offers in economic, environmental, resources, and social aspects. Beyond these motivating factors, there are performance benefits that incentivize shipping firms to prioritize sustainability in their operations. By providing responsible shipping services that support sustainable production and consumption in other industries, shipping companies have the opportunity to contribute to responsible practices while also achieving their own sustainable growth (Xue & Lai 2023). While responsible operations may initially involve significant investment costs for innovation and organizational changes, the adoption of effective technologies and operational upgrades can lead to cost and resource reductions, thereby enhancing the economic, environmental, social, and resource-related benefits.

One of the most appealing benefits for shipping companies is the potential for increased profitability and improved business performance. Research has shown that environmentally conscious shipping lines can achieve higher returns compared to those solely focused on profit maximization (Lin, Juan & Ng 2021). Furthermore, the implementation of shipping designs that comply with environmental standards, a key aspect of green shipping, has been empirically demonstrated to be beneficial for shipping companies' financial and

service performance, particularly when accompanied by robust policies, procedures, and shipper cooperation (Chang & Danao 2017). By implementing sustainability-related initiatives, shipping companies can improve their corporate evaluations, enhance customer satisfaction, and increase market value, ultimately leading to greater profitability (Zhou, Li & Yen 2023).

Additionally, there is growing recognition within the literature about the potential for stranded assets and resources in the shipping sector due to future climate change mitigation regulations. The long lifetimes and substantial costs associated with ships and marine fuel infrastructure make them susceptible to the risks of stranded assets. Delaying the implementation of low-carbon technologies increases the likelihood of assets becoming stranded and undermines efforts to meet the commitments outlined in the Paris Agreement, including the target of limiting global warming to 2°C or even 1.5°C (Traut et al. 2018).

3.3 Firm Presentation

In this section, we will provide a brief overview of the companies that we will test the model on through equity valuation. The sample of companies chosen for this study was selected to represent the shipping industry and its exposure to sustainability-related risks. To this end, the Oslo Shipping Index was chosen as a starting point as it is widely regarded as a reputable benchmark for the shipping industry, and comprises some of the largest and most influential shipping companies in the world. Specifically, five companies were chosen for inclusion in the study, namely Wallenius Wilhelmsen, Frontline, Stolt-Nielsen, Klaveness, and Golden Ocean Group. The selection of these companies was based on several criteria, including market capitalization, industry diversification, and availability of financial data, which would allow for a comparison of their performance and valuation under different scenarios. The companies selected all have a significant presence in the market, but with different sustainability profiles, allowing for a comprehensive analysis of their sustainability-related risks. By including a diverse set of companies, the study aims to provide a more comprehensive understanding of the industry.

3.3.1 Wallenius Wilhelmsen

Wallenius Wilhelmsen is a prominent Norwegian-Swedish company founded in 1999 through the merger of two shipping firms: Wallenius Lines and Wilhelmsen Lines. With its headquarters located in Oslo, Norway, the company operates as a global logistics provider. Its primary business is the transportation of cars, trucks, and other rolling cargo, as well as heavy equipment and breakbulk cargo. Wallenius Wilhelmsen is listed on the Oslo Stock Exchange (OSEX) and has a market capitalization of approximately USD 2.4 billion as of December 2021 (Refinitiv). The company's closing share price stood at USD 5.75 as of December 31, 2021 (Nordnet). Wallenius Wilhelmsen operates in over 20 countries and maintains a workforce of approximately 7,000 employees (Wallenius Wilhelmsen [2022](#)).

3.3.2 Frontline

Frontline is a crude oil transportation company that was established in 1985 and is currently headquartered in Bermuda. It is listed on both the OSEX and New York Stock Exchange (NYSE). As of December 31, 2021, Frontline's closing share price stood at USD 7.14 (Nordnet) and the market capitalization at approximately USD 1.5 billion (Refinitiv). Over the years, the company has undergone a series of acquisitions, restructurings, and rebuildings, shaping its complex history. Currently, their fleet consists of 66 vessels. Frontline has made notable efforts to address environmental concerns, by embracing innovative and efficient shipping solutions (Frontline [2022](#)).

3.3.3 Stolt-Nielsen

Stolt-Nielsen Limited is a Norwegian-based company that provides integrated transportation, storage, and distribution solutions for various chemicals and other bulk liquids. The company was founded in 1959 and is listed on the OSEX. As of December 21, 2021, its market capitalization was around USD 0.8 billion (Refinitiv) and the company's closing share price was USD 15.5 (Nordnet). Stolt-Nielsen operates a fleet of over 150 vessels, including parcel tankers, tank containers, and tank terminals. The company has a strong global

presence, with operations in Europe, North and South America, Asia, and the Middle East (Stolt-Nielsen Limited [2022](#)).

3.3.4 Klaveness

Klaveness is a Norwegian shipping company founded in 1946. The company is headquartered in Oslo, and operates on a global scale across multiple segments of the shipping industry, including dry bulk, container, and tanker shipping. In addition to its shipping activities, Klaveness provides ship management services and specializes in delivering tailored transport solutions. As of December 31, 2021, the company's market capitalization was approximately USD 0.3 billion, and its closing share price was USD 5.24 (Nordnet). Klaveness employs over 1,000 people. Notably, the company has placed a strong emphasis on sustainability, prioritizing innovative and efficient shipping solutions that have contributed to reduced emissions and enhanced environmental performance (Klaveness [2022](#)).

3.3.5 Golden Ocean Group

Golden Ocean Group is a Norwegian shipping company specializing in dry bulk shipping. The company was founded in 2004 and is headquartered in Oslo, Norway. It owns and operates a fleet consisting of 81 vessels. With a strong commitment to sustainability, the company has made significant investments in fuel-efficient vessels and energy-saving technologies, aiming to minimize its carbon footprint. Golden Ocean Group is listed on the OSEX, boasting a market capitalization of around USD 1.9 billion (Refinitiv) and a closing share price of USD 9.04 (Nordnet) as of December 31, 2021. The company operates on a global scale and has offices in Singapore, Bermuda, and Norway, with a workforce of approximately 450 employees (Golden Ocean Group [2022](#)).

4 Valuation Setup

The aim of this section is to explain the valuation approach used in our model, covering both theoretical insights and the practical process for valuing the selected companies. It provides an overview of the valuation techniques, with a focus on shipping-specific elements. The section includes an explanation of Enterprise Value (EV) and the implementation of the Free Cash Flow (FCF) method within our model. Lastly, it offers a detailed description of how free cash flows and their inputs are applied.

4.1 Enterprise Value

The theoretical takeover price for a company is often referred to as the Enterprise Value (EV). It represents the total value of the company's equity and debt net of liquid assets, typically consisting of Cash and Cash Equivalents. The EV can be calculated using the following formula:

$$EV = V_{equity} + V_{debt} + \text{Preferred Equity} + \text{Minority Interest} - \text{Cash and Cash Equivalents} \quad (4.1)$$

$$\text{Enterprise Value} - \text{Value of Debt} + \text{Value of Cash and Cash Equivalents} = \text{Equity Value} \quad (4.2)$$

When a company is acquired, the buyer assumes the responsibility of paying off the company's debts but has the option to withdraw its cash reserves. Thus, the calculation of EV includes debt value and excludes liquid assets like cash.

4.1.1 Value of Equity

The total value of outstanding shares of a company represents the market value of equity. Thus, the share price is determined by dividing the value of equity by the number of outstanding shares, as shown in Equation [4.2](#).

$$\text{Share Price} = \frac{\text{Equity Value}}{\text{Shares Outstanding}} \quad (4.3)$$

In this thesis, the focus is on estimating the equity value using the present value approach, which involves calculating the present value of free cash flows and subtracting debt plus liquid assets (usually cash) net of debt.

4.1.2 Value of Debt

The debt of a company is in our case comprised of both its Long-Term Debt and the Current Portion of Long-Term Debt, which can typically be obtained from the annual reports. These reports may provide information on repayment and issuance plans, as well as current levels and associated interest rates.

To project future debt levels, a constant Debt-to-Equity ratio (D/E ratio) is assumed to maintain a stable capital structure for discounting the FCF. The projected debt levels are indirectly determined as a portion of the D/E ratio from the ending balance in the estimation period, which in our case is December 31, 2021. It is also assumed that the ratio of long-term to current portion of long-term debt remains constant. Additionally, based on the stated repayment plans, new issuance of debt is estimated using the goal seek function in Excel in order to achieve a value that satisfies the following equation:

$$\text{Beginning Balance} + \text{Issuance} = \text{End Balance with respect to constant D/E ratio} \quad (4.4)$$

4.2 Discounted Cash Flow Model (DCF)

The DCF method is a way to estimate the intrinsic value of an asset by calculating the present value of expected cash flows over its lifetime, discounted for both risk and the time value of money. To address the difficulty in projecting future cash flows, the forecast period is often split into one explicit forecast period and one subsequent period called the Terminal Value (TV), which is shown in Equation 4.5. While the DCF method has drawbacks, such as a dependency on stable cash flows and subjectivism, it remains a widely used valuation method.

$$\text{Value of Business} = \sum_{t=1}^N \frac{E[CF_t]}{(1+r)^t} + \frac{TV_N}{(1+r)^N} \quad (4.5)$$

4.2.1 Our Valuation Approach

In our analysis, we began by establishing a **base case** that excluded the impact of carbon costs, serving as a reference point for evaluating the effects of different decarbonization scenarios on share prices. Subsequently, we integrated the carbon cost associated with the implementation of the EU ETS and ETD into

the DCF method. This integration allowed us to assess the effects of these regulations on the DCF and share prices of the companies, providing a deeper understanding of their influence on the intrinsic value of equity.

One main objective of our thesis is to investigate whether the financial impact of prioritizing full decarbonization versus neglecting sustainability ambitions altogether is significant enough to compel companies across the shipping industry to make substantial investments. To analyze this, we employed scenario analysis. The scenarios depict potential decarbonization pathways without assuming the likelihood of their realization, thereby avoiding a definitive view of the future. To validate our model, we examined three different scenarios based on decarbonization ambitions, relying on the main scenarios from DNV Maritime Forecast to 2050 (Fovrum et al. 2022). These scenarios encompass two decarbonization pathways and one business-as-usual pathway.

The first, **Decarbonization by 2050**, assumes full decarbonization of the fleet by 2050. This ambitious pathway necessitates the implementation of stringent operational requirements or high carbon pricing measures, and involves a rapid transition to alternative fuel types to achieve complete decarbonization. The second, **IMO ambitions**, aligns with the goals set in the current IMO GHG Strategy, which targets a 50% reduction in total GHG emissions by 2050 compared to 2008 levels. This scenario considers the implementation of rigorous operational requirements or moderate carbon pricing measures to drive emission reductions. The third scenario, **No ambitions**, assumes emissions will increase in line with the growth of the company, without significant efforts to reduce emissions. By exploring these three scenarios, we gain a comprehensive understanding of the potential outcomes and implications of different decarbonization pathways for the shipping industry.

4.3 Free Cash Flow

Free Cash Flow (FCF) represents the net cash generated by a company's operating activities after deducting capital expenditures. It is the cash flow available to be distributed among all security holders, including equity holders, creditors, and preferred stock holders. Estimating the EV requires calculating FCF as the initial step before discounting the cash flows. In our analysis, we decompose FCF using the direct method:

- Cost of Goods Sold (COGS)
- General and Administrative Expenses (G&A)
- Other Operating Expenses
- Depreciation
- = **Operating Profit**
- Cash Tax
- = **NOPLAT**
- + Depreciation
- Increase in Net Working Capital (NWC)
- Investment in CAPEX
- = **Free Cash Flow**

4.3.1 Cost

The cost projection is based on the revenue estimation, which serves as the fundamental driver. Initially, the average ratio of each cost factor to the historical values of total revenue is determined. Subsequently, these ratios are applied to the forecasted revenues to estimate the costs for each future year within the forecast period, corresponding to the respective factors.

4.3.2 Depreciation

The projection of depreciation rates follows a similar approach to the cost projection, but with a distinction in the driver utilized. Depreciation is assumed to be influenced by the level of fixed assets over the course of a year. Thus, the driver used is the ratio of depreciation to the average level of fixed assets for the current and past accounting year.

As depreciation is a non-cash expense eligible for tax deductions, it is added back to the Net Operating Profit Less Adjusted Taxes (NOPLAT) since it represents the wear on capital. During the forecast period, depreciation is estimated as a percentage of total revenues, with the ratio aligning with the average percentage of revenues from the estimation period. It is worth noting

that amortization has been excluded from the analysis due to the lack of disclosure on the breakdown between amortization and depreciation in shipping company reports. Hence, we assume amortization to be zero.

4.3.3 Cash Tax

Shipping companies are often based in tax havens like Bermuda, which typically have minimal tax liabilities on Earnings Before Interest, Taxes, and Amortization (EBITA) due to the 0% domestic tax rate. Their tax costs primarily stem from harbor usage fees, which constitute a small proportion of their expenses worldwide. To determine cash tax, we rely on the income tax provision and calculate an implied marginal tax rate based on historical tax expenses. In our model, cash tax aligns with the tax from the income provision since detailed tax information is unavailable in the annual reports. We calculate the marginal tax rate as the average percentage of pre-tax income and utilize it to estimate future income tax provisions by multiplying operating income.

4.3.4 Increase in Net Working Capital

In the calculation of FCF, Net Working Capital (NWC) is determined by net receivables and inventory with accounts payable. An increase in current assets, such as inventory, requires a cash outflow and therefore has a negative impact on cash flow. A positive change in NWC indicates higher cash disbursement by the company during the specified period. Thus, an increase (or decrease) in NWC from the previous year is subtracted (or added) after calculating the NOPLAT to obtain FCF.

To project future NWC levels and its change, each of its components is individually forecasted. The estimation of inventory utilizes the inventory turnover ratio, derived from total cost of revenue divided by inventory level. Net receivables projection is based on historical average days to collect cash.

4.3.5 CAPEX

Capital Expenditures (CAPEX), which involves cash outflows for machinery, equipment, and fixed asset replacement or upgrades, has a negative impact

on FCF. Predicting this cash flow in the shipping industry is challenging due to the complex strategic nature and seasonal trends of the industry. It is not guaranteed that companies will decrease CAPEX during unfavorable times or increase them during favorable times. Even in challenging periods, vessel purchase could be a strategically wise decision if future prospects are promising.

In our model, CAPEX projection is based on historical percentages of Earnings Before Interest, Taxes, and Depreciation (EBITD) for each year. To address seasonality, a "normal" year is defined in the valuations of each company. If there is a more negative EBITD resulting in higher CAPEX, it is considered a special case since it lacks logical alignment.

4.3.6 Other

The analysis also considers investments in goodwill. However, since the model does not assume any future acquisitions, it assumes zero investments in goodwill. Investors who possess such information can incorporate it to enhance the accuracy of the estimates.

4.3.7 Terminal Value

As mentioned previously, the valuation of a company can be divided into two estimation periods. The Terminal Value (TV) represents future cash flows that extend far into the future, making them challenging to forecast accurately. To overcome this challenge, it is common to assume a growth rate (g) for the FCF from the last forecast period and use this to forecast the following year FCF. In our model, which estimates FCF indefinitely, we employ a perpetuity growth model. This model treats the TV as an infinite annuity, using the cost of capital as the discount rate and the assumed long-term growth rate (g) as the growth rate. Mathematically, the expression of TV is the following:

$$TV = (FCF_{n+1}) \times \frac{1 + g}{r - g} \quad (4.6)$$

The growth rate (g) is a company-specific assumption that reflects the expected average growth of FCF. Since all the companies in our analysis belong to the same industry, we apply a common terminal growth rate of 2.25%. This rate is

based on the 5-year Forward Inflation Expectation Rate from St. Louis Fed in 2021 (Federal Reserve Bank of St. Louis [2023](#)). By using this growth rate, we assume no real growth. To maintain neutrality, we project the TV as neutrally as possible, and therefore, we consider the inflation forecast to be a reasonable measure for this purpose.

4.4 The Discount Rate

This section discusses the theory and application of the Weighted Average Cost of Capital (WACC) in our model. The WACC is used to discount the FCF in order to account for both operational risk and the time value of money when calculating EV. It consists of three components: the cost of equity, the cost of debt, and financial leverage. Mathematically, it is expressed as follows:

$$\text{WACC} = R_E \times \frac{E}{D + E} + R_D \times \frac{D}{D + E} \times (1 - t_c) \quad (4.7)$$

Here, R_E represents the cost of equity, R_D represents the cost of debt and $(1-t_c)$ is the tax shield on debt. The remaining components are the equity and debt ratios. The tax shield arises from the tax-deductible nature of interest expenses, increasing the cash flows for stock- and bondholders, and enhancing company value.

The cost of equity is determined by the relationship between capital structure and equity beta, given by the following equation:

$$\begin{aligned} \beta_A &= \beta_D \times \frac{D}{D + E} + \beta_E \times \frac{E}{D + E} \\ \beta_E &= \beta_A + (\beta_A - \beta_D) \times \frac{D}{E} \\ R_E &= R_f + \beta_E \times (R_m - R_f) \end{aligned}$$

Increased leverage raises the riskiness of equity investments (β_E) and requires a higher cost of equity (R_E) as compensation. Thus, there is a trade-off between the cost of equity and the tax benefits of debt. An efficiently managed company optimally balances these factors to minimize the WACC and maximize the present value of the FCF. The tables below present the WACC values for the respective companies.

Table 1: Cost of Equity, Cost of Debt and WACC

	Cost of Equity	Cost of Debt	WACC
Wallenius	6.76%	5.95%	6.59%
Frontline	6.53%	3.24%	4.65%
Klaveness	3.37%	3.60%	3.41%
Stolt-Nielsen	3.45%	5.32%	5.40%
Golden Ocean	6.56%	3.86%	5.51%

4.4.1 Cost of Equity

The cost of equity is a crucial component of the WACC calculation, as it represents the required rate of return for shareholders. It compensates shareholders for the risk associated with owning company shares. The cost of equity can be expressed as:

$$R_E = R_f + \text{Risk Premium} \quad (4.8)$$

Equity is considered riskier than debt, which is why you need to add a premium above the risk-free rate as a compensation. This is due to factors such as fixed debt payments, collateral, and priority in case of default. There are different methods to calculate the cost of equity, with the dividend discount model and CAPM being commonly used.

The dividend discount model estimates the cost of equity based on the present value of predicted dividend payouts. However, the model has limitations in volatile industries like shipping, where reliance on price changes and dividend forecasts may be challenging. It is also dependent on future cash flow estimates and dividend policies set by the respective firms.

CAPM

The CAPM (Capital Asset Pricing Model) provides another method to calculate the cost of equity, as shown in the following equation:

$$R_E = \beta_E \times (E[R_m] - r_f) \quad (4.9)$$

In this equation, the risk-free rate (r_f), which we assume to be the return on 5-year US Treasury Bills (Federal Reserve Bank of St. Louis [2023](#)), represents the excess returns of a stock's response to changes in the market index's excess return. The market risk premium, $(E[R_m] - r_f)$, indicates the expected earnings relative to a riskless asset when the market performs well.

The CAPM relies on two assumptions to estimate R_E (Bodie, Kane & Marcus [2014](#)):

Assumption 1: Perfectly competitive markets with frictionless trading, publicly available information, publicly owned and traded securities, and no taxes or transaction costs.

Assumption 2: Investors with similar characteristics, choose investment portfolios in the same way, and have homogeneous expectations.

Although these assumptions may not be fully met, the CAPM remains a widely used tool for estimating the cost of capital. It allows for easier comparison with other valuations and serves as a good alternative until a more widely accepted method is available.

Beta

Beta is a compensating risk parameter for investors. It can be calculated as either the adjusted or unadjusted beta. The shipping sector is known for its volatility and cyclical nature, which can lead to significant fluctuations in stock prices. By using the adjusted beta, which considers the historical volatility and correlation patterns of shipping stocks, we can better capture the industry-specific risk and make more accurate risk assessments for shipping companies. We estimate the beta of the companies by utilizing the beta calculated by the Bloomberg terminal using data correspondingly to our sample period.

Market Risk Premium

The market risk premium can be calculated using different approaches, such as historical values or the dividend discount model. Since we do not use the dividend discount model in our FCF calculation, we rely on historical returns to estimate the premium. The market risk premium (R_p) is expressed mathematically as follows:

$$\text{Market Risk Premium} = R_m - r_f \quad (4.10)$$

For our estimate, we use a market proxy provided by PWC, which suggests an equity market risk premium of 5% as of December, 2021 (PricewaterhouseCoopers [2021](#)).

4.4.2 Cost of Debt

The cost of debt (R_D) is crucial in determining the present value of free cash flows (EV) for a company, as a substantial portion of its operations is financed through debt. By analyzing the annual reports of the companies, we can identify the loan structure and associated interest rates, which consist of a risk-free rate (LIBOR) plus a risk premium (margin). To estimate the effective interest rate paid by a company on its debt, we calculate a weighted average of the interest expenses for each loan, based on their respective loan values by using the following formula:

$$\begin{aligned} \text{Weighted Interest Rate Loan}_k &= (\text{US Treasury}_{5\text{-year}} + \text{Risk Premium}) \\ &\times \frac{\text{Total Value of Debt}}{\text{Loan Value}_k} \end{aligned} \quad (4.11)$$

In our analysis, we utilized the 5-year Treasury yield for the LIBOR, which was at 1.26% on December 31, 2021 (Board of Governors of the Federal Reserve System [2023](#)). The cost of debt (R_D) is then determined as the average weighted interest rate across all loans, as shown in Equation [4.4.2](#). We assume the same interest rate and duration for all interest-bearing debt. This allows us to disregard the specific type of future interest-bearing debt acquisitions. Given that we anticipate each liability post to vary based on total revenues, while assuming a constant D/E ratio, the relationship between these factors will remain consistent. Consequently, we calculate the effective cost of debt using the following formula:

$$R_D = \frac{1}{n} \sum_{i=1}^n \text{Weighted Interest Rate Loan}_k \quad (4.12)$$

5 Methodology

This chapter will comprehensively construct the valuation model. By the end of this chapter, we will have derived the projected values for emissions, fuel consumption, and associated carbon costs. As the main methodology of our work, this technical section of the thesis is vital in providing a conclusive answer to the research question.

5.1 CO2 Emissions and Fuel Consumption Forecast

The accurate forecast of CO2 emissions and fuel consumption in the shipping industry is of immense significance in understanding the industry's future environmental impact and evaluating the effectiveness of decarbonization efforts. In this section, we present a comprehensive forecast for the three distinct scenarios that project CO2 emissions and fuel consumption until 2050, providing valuable insights by considering different assumptions and ambitions within the context of shipping decarbonization. This forecast aims to assess the different levels of ambition on the share price and examine the implications of compliance with the EU ETS and ETD.

The CO2 emissions forecast commences by leveraging historical emissions data from each ship, spanning the years 2018 to 2021. To project emissions in scenario 1 (Decarbonization by 2050) from 2022 to 2050, we divide the historical emissions per ship in 2021 by 29, representing the remaining years until 2050. This division allows us to determine the annual reduction rate required for each ship to achieve zero emissions by the target year. In Scenario 2 (IMO Ambitions), the released emissions per ship in 2021 are divided by 2 to get a 50% emission reduction until 2050. Subsequently, this value is further divided by the remaining 29 years to estimate the annual reduction rate necessary to meet the IMO goals. In Scenario 3 (No Ambitions), we consider a situation where no specific decarbonization ambitions are explicitly taken into account. For this scenario, emissions in 2022 are forecasted by multiplying the average of historical emissions by the terminal growth of 2.25%, based on the 5-year Forward Inflation Expectation Rate (Federal Reserve Bank of St. Louis [2023](#)). For subsequent years, the same growth assumption is

multiplied with the emissions from the previous year, allowing us to project emissions until 2050. In each scenario, we aggregate the emissions from all of the company's ships on an annual basis to determine the total amount of released CO2 emissions for each year.

The fuel consumption projections are conducted for the aforementioned scenarios. In Scenario 1, assumptions from DNV's Maritime Forecast to 2050 (Fovrum et al. 2022) regarding Heavy Fuel Oil (HFO) consumption are used. These includes 100% HFO consumption from 2020 to 2030, 60% from 2030 to 2040, 40% from 2040 to 2050, and 0% in 2050. The projected values for fuel consumption in this scenario are obtained by multiplying the fuel consumption figures for each ship annually by the corresponding percentages for each time period, covering the years from 2022 to 2050. Scenario 2 also utilizes forecast assumptions from DNV, assuming 100% HFO consumption from 2020 to 2030, 80% from 2030 to 2040, 45% from 2040 to 2050, and 40% in 2050. Similarly, the forecasted values for fuel consumption for this scenario are derived by multiplying the consumption figures for each ship by the respective percentages for each time period spanning 2022 to 2050. In Scenario 3, where no specific decarbonization ambitions are considered, a constant consumption of 100% HFO is assumed until 2050, and the constant terminal growth rate of 2.25% is applied to estimate future consumption. The forecasted fuel consumption values for this scenario are obtained by multiplying the fuel consumption figures for each ship by the growth rate assumption. For simplicity, we assume a similar fuel mix for all ships, specifically relying on HFO. This assumption is based on the historical prevalence of HFO as the primary fuel for propulsion in many ocean-going vessels (Fovrum et al. 2022). In each scenario, we aggregate the fuel consumption from all of the company's ships on an annual basis to determine the total HFO consumption for each year.

The CO2 emissions and fuel consumption forecasts generated within these three scenarios, plays a vital role as foundational inputs for constructing the valuation model. By employing these scenarios, we aim to provide a comprehensive understanding of the potential CO2 emissions and fuel consumption trends until 2050, enabling a systematic and rigorous analysis of the environmental impact and cost considerations associated with various decarbonization pathways. Integrating the CO2 emissions and fuel consumption projections into the valuation model enhances our understanding of the implications for decarbonization efforts and energy transition within the sector.

5.2 Carbon Cost resulting from the EU ETS and ETD

To determine the additional **carbon cost from the inclusion of shipping in the EU ETS**, our methodology incorporates several key factors and assumptions. Firstly, the payment periods for reported emissions are based on the European Commission's revision of the ETS directive in July 2021 (European Commission [2023](#)). According to this, 40% of emissions reported in 2024 are to be paid for in 2025, 70% of emissions reported in 2025 are to be paid for in 2026, and 100% of emissions reported in 2026 are to be paid for in 2027. These payment periods ensure a gradual transition towards emission reductions.

The EU ETS imposes a cap on the total amount of emissions that can be emitted, gradually reducing this cap over time to drive emissions reductions. For emissions released above this cap, a spot allowance price is set at USD 98.74 for Extra-EU voyages and USD 76.79 for Intra-EU voyages as of July, 2021 (Sørås [2022](#)). Each EU ETS allowance represents one tonne of CO₂ equivalent. In our analysis, we considered all shipping routes as Extra-EU voyages, simplifying the assessment. These voyages involve activities between ports located outside the EU and ports within the EU. We consider this assumption reasonable as the selected companies operate both within and outside EU waters, ensuring consistency in the analysis. Additionally, we consider all ships included in our analysis to be cargo vessels and passenger ships with a gross tonnage exceeding 5,000, as these are the types of ships covered by the EU ETS. This choice is based on the assumption that the selected companies align with the size criteria outlined in the regulatory framework.

To estimate the additional carbon cost associated with the EU ETS, we multiply the projected CO₂ emissions figures annually for each ship with the assumptions and the spot allowance price mentioned above, spanning the years 2022 to 2050. This calculations is conducted for all three scenarios. By doing so, we can approximate the financial implications and payment obligations associated with the reported emissions within the specified timeframes. For each scenario, we aggregate the carbon cost from all of the company's ships annually to determine the total carbon cost for each year. The resulting carbon cost is then included as an expense in the DCF analysis, providing an evaluation of the carbon cost related to projected emissions within the EU ETS framework.

Regarding the additional **carbon cost resulting from the revision of the ETD**, our methodology relies on the additional cost per tonne of HFO consumed that the company is required to pay. As of July 2021, this cost amounts to USD 49.35 per tonne (Sørås [2022](#)). To estimate the carbon cost associated with the HFO consumption until 2050 in all three scenarios, we multiply the projected fuel consumption figures for each ship by the annual additional cost per tonne of HFO. For each scenario, we aggregate the carbon cost from all of the company's ships annually to calculate the total carbon cost for each year until 2050. Subsequently, this carbon cost is incorporated as an expense in the DCF analysis. Through this calculation, we can evaluate the financial implications for different decarbonization pathways within the ETD framework.

By incorporating these calculations into our methodology, we gain valuable insights into the economic implications of carbon costs within the EU ETS and ETD frameworks. This enhances our understanding of the financial considerations associated with different decarbonization pathways.

5.3 Data Sample Collection and Description

In this section, we will outline the primary data utilized in our model and its collection process, including the freight emissions data and financial statement numbers.

5.3.1 Freight Emissions Data

To ensure accuracy and reliability of our analysis, the freight emissions data utilized is sourced from the European Commission's Monitoring, Reporting, Verification (MRV) system of carbon dioxide emissions from maritime transport (European Maritime Safety Agency [2023](#)). This robust framework is specifically designed to monitor and verify GHG emissions from ships operating within EU waters. Under the MRV system, shipping companies are obligated to collect and report detailed information on fuel consumption, vessel activity, and other relevant parameters. This meticulous data collection process ensures the highest levels of transparency, accountability, and consistent monitoring of emissions within the shipping industry. The integration of MRV data in this study holds significant value due to the regulatory nature of

the system. By leveraging this dataset, our study benefits from reliable and verified information, establishing a solid foundation for the analysis. Thus, the inclusion of MRV data ensures that the findings and conclusions drawn from this study are grounded in a trustworthy basis, further strengthening the overall integrity of our research.

It is important to note that not all ships belonging to the selected companies in our analysis have reported their emissions to the MRV database. This can be attributed to various factors, including compliance challenges and a lack of awareness or understanding among ship owners or operators. Furthermore, although the European Commission has established penalties for non-compliance with MRV reporting requirements, the effectiveness of enforcement mechanisms may be limited in monitoring and penalizing all non-compliant ships, potentially contributing to incomplete reporting.

5.3.2 Financial Statement Numbers

In order to conduct the valuation, we collected financial data from the annual reports of the subject companies for the five previous years preceding the forecast period, specifically from 2017 to 2021. The "Income Statement," "Balance Sheet," and "Cash Flow Statement" sections of these reports provided crucial financial information regarding the companies' performance, position, and cash flows. To ensure the suitability of the data for our analysis, we reformatted the data, by standardizing the financial information to align with the valuation methodology employed. This standardized format allows for accurate and comparable analysis of the financial data.

It is important to acknowledge that the shipping industry's confidentiality policies impose limitations on the level of detail disclosed in the annual reports. Despite efforts to obtain more specific data, we encountered constraints in acquiring the desired level of detail. This limited availability of detailed financial information imposes constraints on the depth and precision of the valuation analysis. However, the accessible financial statements still provide valuable insights into the subject companies' financial performance and position. By leveraging the available information, this study aims to derive meaningful conclusions and provide accurate assessments. The analysis recognizes the constraints imposed by the industry's confidentiality policies, utilizing the best available financial information to inform the findings of this study.

6 Results and Analysis

The objective of this chapter is to apply the valuation model introduced in the previous chapters to estimate the equity value of Wallenius Wilhelmsen, Frontline, Stolt-Nielsen, Klaveness, and Golden Ocean Group. Our primary focus is to evaluate the efficacy of incorporating the shipping sector into the EU ETS and the subsequent revision of the ETD, while also examining the influence of the decarbonization trajectory chosen on share prices. The resulting share prices for each scenario are presented and evaluated, followed by a more in-depth investigation of Frontline and Golden Ocean Group to discern the underlying factors contributing to their divergent outcomes. All pertinent numbers for all of the companies are provided in the appendix. Although we will not make any recommendations on buying or selling a particular share, we aim to emphasize the significance of establishing carbon costs at a level that is sufficiently high to drive meaningful change and effectiveness.

6.1 Main Results and Discussions

To provide a clear overview of our results, we summarize the findings in Table 2, which presents the actual share prices of each company along with a comparison against both the base case and the three scenarios. The percentages enclosed in brackets beneath the share price of each scenario indicate the difference in percentage between the share price of that particular scenario and the base case.

Table 2: Share Price

	Wallenius	Frontline	Klaveness	Stolt-Nielsen	Golden Ocean
Actual	50.6	7.14	5.24	15.48	9.04
Base case	30.44	14.05	82.22	24.07	42.33
Scenario 1	29.93	10.87	82.09	21.91	41.66
	(1.68%)	(22.63%)	(0.16%)	(8.97%)	(1.58%)
Scenario 2	29.71	9.35	82.03	21.07	41.40
	(2.39%)	(33.45%)	(0.23%)	(12.46%)	(2.20%)
Scenario 3	28.91	7.99	81.74	20.56	41.47
	(5.03%)	(43.13%)	(0.58%)	(14.58%)	(2.03%)

Analysis of the companies reveals minor deviations between the base case and the three examined scenarios for Wallenius Wilhelmsen, Klaveness, and Golden Ocean Group. Stolt-Nielsen exhibits a slightly higher deviation, although not particularly noteworthy. Notably, Frontline stands out with a significant divergence, warranting further investigation in Chapter [6.3](#). Overall, these findings indicate that the regulatory measures are likely to have a limited impact on the share prices for most of the companies analyzed. The achievement of full decarbonization (scenario 1), a 55% reduction in emissions (scenario 2), or the absence of ambitious sustainability goals (scenario 3) will neither of them exert a significant influence on the share prices. The observed minimal difference among the scenarios suggests that the current regulatory design and associated costs are inadequate in driving substantial changes in share prices. This result aligns with existing literature, which questions the effectiveness of these measures in the shipping industry, emphasizing the need for stronger regulatory frameworks and a more comprehensive assessment of the financial implications associated with decarbonization efforts.

These findings shed light on the potential limitations of the EU ETS and the subsequent revision of the ETD as effective MBMs for incentivizing companies to prioritize emission reduction and sustainability at their current ambitions, given their limited influence on overall company value. Consequently, it becomes evident that a combination of MBMs, operational enhancements, and technological innovations will be crucial to achieve full decarbonization in the shipping industry.

In addition to our analysis, valuable insights obtained from discussions with industry professionals at Nordea further reinforce our findings. These insights suggests that the financial repercussions of non-compliance with the new regulations are unlikely to exert a substantial impact on companies due to the substantial financial resources prevalent within the shipping industry.

It is essential to acknowledge the limitations and potential impact of data deficiencies on our analysis. The limited availability of comprehensive emissions data for certain ships within the companies could have constrained our analysis and potentially led to an underestimation of the potential impact on share prices. If we had possessed all the necessary data, it is plausible that share prices could have experienced a more substantial decline, thereby reveal-

ing a weakness in our thesis. Also, the limited availability of data highlights potential inadequacies in reporting regulations, allowing companies to potentially conceal their total emissions per ship and mask their true environmental impact. Furthermore, several assumptions were made during our analysis, including the assumption of constant growth rates and a simplified approach to valuing the companies. These assumptions may have introduced additional limitations and affected the accuracy and reliability of our results. It is vital to consider these factors when interpreting the outcomes of our analysis and to approach the results with a degree of caution.

6.2 Financial impact of the ETS and ETD on the Shipping Industry

Our analysis indicates that there is some variation in the financial impact between including shipping in the EU ETS versus not including it and the revision of the ETD, but variations observed across the examined scenarios are marginal for most of the analyzed companies. This suggests that although the current ETS and ETD frameworks have a limited effect, they may be insufficient to drive substantial transformations within the shipping industry. The difference in financial impact between prioritizing full decarbonization (scenario 1) and neglecting sustainability ambitions altogether (scenario 3) is not significant enough to compel companies to make substantial investments in new vessels, alternative fuels, or other decarbonization solutions. These findings suggest that the frameworks do not impose sufficiently punitive measures on companies that do not comply with decarbonization goals.

To assess the impact of prioritizing decarbonization on the share prices of each company, we conducted a comparative analysis between scenario 1 and scenario 3. This analysis aims to evaluate the potential influence of decarbonization efforts on the financial performance of the companies. The summarized results of this analysis can be found in Table 3 below.

Table 3: Comparison of Share Prices between Scenario 1 and Scenario 3

	Wallenius	Frontline	Klaveness	Stolt-Nielsen	Golden Ocean
Difference	3.40%	26.49%	0.43%	6.16%	0.46%

Wallenius Wilhelmsen, encompassing a fleet of 52 ships and emissions data reported for 96% of their vessels, displayed a modest disparity of 3.40% between the scenarios. The notably high proportion of reported emissions for Wallenius Wilhelmsen's fleet lends credibility to the reliability of these results. The relatively small disparity suggests that Wallenius Wilhelmsen's emissions and the associated costs are not significantly affected by the examined scenarios. Thus, it can be inferred that the financial disadvantage of following a trajectory without sustainability ambitions, as opposed to prioritizing full decarbonization, remains relatively constrained within the context of the examined frameworks.

Frontline, with a fleet of 67 ships and emissions data reported for 78% of their vessels, exhibited the largest difference in share price, with a significant difference of 26.49% between the scenarios. This finding indicates that Frontline's fleet contributes significantly to emissions, thereby incurring higher associated costs and exerting a more pronounced impact on the company's share price. Notably, analysis of their historical emission data, underscores Frontline's position as one of the highest emitters per vessel, reinforcing the notion that the inclusion of the shipping industry in the regulatory framework do penalizes entities with substantial emissions. The reliability of these results is relatively robust due to the considerable extent of available emissions data.

Klaveness, comprising a fleet of 15 ships, displayed a mere 0.43% difference between the scenarios. However, it is important to note that emissions data was reported for only 13% of their vessels. Due to the low data coverage, the reliability of this result is questionable. The abundance of available data for Klaveness' ships do undoubtedly result in lower emission from their vessels. It can also potentially suggest that the number of ships plays a role in the financial implication of the ETS and ETD as they have the smallest fleet out of the companies assessed. Nonetheless, the limited data coverage highlights the need for more comprehensive emissions reporting in order to obtain a more accurate assessment.

Stolt-Nielsen, boasting an extensive fleet of 159 ships and emission data reported for 59% of their vessels, exhibited a difference of 6.16% between the scenarios. This finding suggests that the financial impact of prioritizing de-

carbonization versus not having sustainability ambitions on their share price is relatively limited. Despite the significant size of their fleet, the observed difference indicates that Stolt-Nielsen’s emissions and associated costs are not significantly affected by the scenarios under investigation.

Golden Ocean Group, despite possessing a larger fleet compared to Frontline, exhibits a mere 0.46% difference between the scenarios. Consequently, the number of ships, as previously highlighted, does not appear to exert a significant influence on the financial implications of the ETS and the ETD for Golden Ocean Group, indicating that there must be additional factors influencing the resulting share prices. It is worth noting that emissions data was reported for 49% of their vessels, implying some limitations in data availability. Thus, there is a possibility that the actual emissions costs associated with Golden Ocean Group’s vessels may have been underestimated, which could have affected the observed disparities across the scenarios. However, it is noteworthy that Golden Ocean Group reported emissions for 46 of their ships, a figure close to Frontline’s reporting of 52 ships. As a result, the similarity in reported numbers lends credibility to the reliability of the results.

Table 4 shows an overview of the number of ships within the vessel fleet for each company that have reported emissions, indicating both the count of ships and the corresponding percentage of the fleet.

Table 4: Overview of Emission Reporting for Vessel Fleet

	Vessel Fleet	Number of Ships with Reported Emissions	Percentage of Ships with Reported Emissions
Wallenius	52	50	96%
Frontline	67	52	78%
Klaveness	15	2	13%
Stolt-Nielsen	159	94	59%
Golden Ocean	93	46	49%

6.3 Frontline and Golden Ocean Group for Further Investigation

Frontline emerges as a significant standout within the analyzed companies, with a remarkable 26.49% difference in share price between scenario 1 and scenario 3. Considering the significant disparity, further investigation is warranted to ascertain the underlying factors responsible for this. Conversely, Klaveness exhibited the smallest difference in share price between the aforementioned scenarios. However, it is imperative to note that they only reported emissions for a mere 13% of their vessel fleet. Consequently, our investigation will focus on Golden Ocean Group, in addition to Frontline, as they demonstrated the second smallest difference in share price between the aforementioned scenarios, amounting to 0.46%. The objective of this section is to examine the factors contributing to these observed differences. Overall, three key factors were identified.

Firstly, the number of ships with reported emissions unequivocally influences the resulting share prices. While Frontline has reported emissions for 78% of their vessels, Golden Ocean Group has a reporting rate of only 49% as shown in Table 4. This disparity bears implications for the calculation of total carbon costs, as these costs are contingent upon the number of ships considered. However, it is worth noting that Stolt-Nielsen, despite exhibiting a relatively higher difference in share price between scenario 1 and 3 compared to Golden Ocean Group, have reported emissions for 94 out of their total fleet of 159 vessels, constituting 59%. This figure is somewhat close to Golden Ocean Group's reporting rate of 49%. This emphasizes that although the number of ships with reported emissions does impact the resulting share price, it is not the sole determining factor contributing to the observed disparities.

Secondly, another pivotal factor affecting the resulting share prices is the reported emissions per ship. As evidenced in Table 5, Golden Ocean Group reported a mere 4,163 (CO₂/year) per ship, which is less than half of Frontline's reported 8,824 (CO₂/year) per ship. The observed heterogeneity in emissions levels, as exemplified by the substantial difference in emissions intensity between Frontline and Golden Ocean Group, highlights the implications for

share prices and the associated sensitivity to additional carbon costs. The notable disparity in emissions per ship between the two companies suggests that they encounter distinct challenges and opportunities pertaining to regulatory compliance.

Table 5: Overview of Emissions per Vessel in 2021

	Total Emissions (CO ₂ /year)	Vessel Fleet	Emissions per Vessel (CO ₂ /year)
Wallenius	393,790	50	7,876
Frontline	458,833	52	8,824
Klaveness	9,238	2	4,619
Stolt-Nielsen	588,168	94	6,257
Golden Ocean	191,513	46	4,163

Thirdly, a decisive factor contributing to the observed disparities between the companies is the nature of their shipping operations. The increased costs associated with the EU ETS and ETD are likely to be disproportional among the maritime segments, as exemplified by the case of Frontline and Golden Ocean Group. As previously mentioned, Frontline primarily operates as an oil tanker company, while Golden Ocean Group predominantly engages in dry bulk shipping. Oil tankers, with their higher fuel consumption per transport work in comparison to dry tankers and bulkers, face higher costs under the scheme. This disparity in fuel consumption rates among the different segments implies that oil tankers would be more heavily penalized by not prioritizing decarbonization within the framework of the scheme.

To ensure the effective inclusion of shipping into the EU ETS and the subsequent revisions of the ETD, and to prevent distortions in competition within the maritime industry, differentiated benchmarks for each segment should be established. Such benchmarks would acknowledge the variations in fuel consumption rates and incentivize the operation of energy-efficient vessels within each specific segment. By adopting differentiated benchmarks, the EU ETS and ETD would encourage and reward the utilization of energy-efficient vessels in each maritime segment, fostering sustainability while avoiding unfair competition among different types of ships.

7 Sensitivity Analysis

Conducting a sensitivity analysis to test critical assumptions is a crucial aspect of equity valuation. The estimated share price obtained from chapter 6 relies heavily on these assumptions, making it necessary to scrutinize them in detail for a credible evaluation. As such, the next two subsections will delve into two essential assumptions, namely "WACC and Growth" and "Carbon Cost".

7.1 WACC and Growth

An essential assumption in our analysis pertains to the constant debt-to-equity (D/E) ratio. As previously mentioned, this assumption is employed to minimize the need for frequent adjustments to the discount rate. However, it is crucial to address the cyclical nature intrinsic to the shipping industry, which often entails significant fluctuations for highly leveraged companies. Consequently, it becomes imperative to examine this assumption to evaluate the sensitivity of our model to changes in leverage and ascertain that it remains within an acceptable range.

To account for the cyclical nature of the shipping industry, we conducted a sensitivity analysis on the share price of Wallenius Wilhelmsen. We selected this company specifically due to its high emissions reporting rate, which encompasses 96% of its fleet, thereby enhancing the credibility and reliability of these results. Our model assumes that the long-term growth rate in the terminal value aligns with the 5-year forward inflation expectation rate. This assumption indicates no real growth. However, growth rate assumptions are subject to uncertainty and can significantly impact valuation results.

Lowering the growth rate to 1.25%, which is below the risk-free rate assumed in the model, the share price decrease from USD 30.44 to USD 26.27, corresponding to a reduction of USD 4.17 per share. It should be noted that assuming such a low growth rate would be unrealistic. Consequently, it appears that the model's dependence on growth rate assumptions is minimal. Table 6 provides an illustration of this relationship. To further investigate this relationship, we maintained the WACC at a constant 6.59% while increasing the growth rate.

		GROWTH								
		0.25%	0.75%	1.25%	1.75%	2.25%	2.75%	3.25%	3.75%	4.25%
WACC	30.44	42.43	44.42	47.00	50.50	55.49	63.20	76.65	106.13	222.29
	4.59%	37.50	38.88	40.61	42.86	45.91	50.26	56.97	68.68	94.35
	5.59%	33.55	34.53	35.72	37.23	39.20	41.85	45.64	51.49	61.70
	6.09%	30.32	31.02	31.87	32.92	34.23	35.95	38.26	41.56	46.66
	6.59%	27.63	28.15	28.76	29.50	30.42	31.56	33.06	35.08	37.96
	7.09%	25.36	25.75	26.20	26.74	27.38	28.18	29.18	30.49	32.25
	7.59%	23.43	23.72	24.06	24.45	24.92	25.48	26.18	27.06	28.20
	8.09%	21.76	21.98	22.24	22.53	22.87	23.28	23.78	24.39	25.15
	8.59%	20.31	20.48	20.67	20.89	21.15	21.45	21.81	22.24	22.77
	9.09%	19.03	19.16	19.31	19.48	19.68	19.90	20.17	20.48	20.86
	9.59%	17.90	18.01	18.12	18.25	18.40	18.57	18.77	19.00	19.28
	10.09%	16.90	16.98	17.07	17.17	17.29	17.42	17.57	17.74	17.94
	10.59%	16.00	16.07	16.14	16.22	16.31	16.41	16.52	16.65	16.80
	11.09%	15.19	15.25	15.30	15.36	15.43	15.51	15.60	15.70	15.82
11.59%	14.46	14.50	14.55	14.60	14.65	14.72	14.78	14.86	14.95	
12.09%	13.80	13.83	13.87	13.91	13.95	14.00	14.06	14.12	14.18	

Table 6: Sensitivity Analysis - WACC and Growth

7.2 Carbon Cost related to the EU ETS

Another crucial assumption in our study pertains to the assumption regarding the allowance price associated with the EU ETS. This metric is characterized by volatility and uncertainty, making accurate forecasting of this cost challenging. To account for the potential escalation and its financial implications, we conducted a sensitivity analysis on the share price of Wallenius Wilhelmsen under each decarbonization scenario.

Within this analysis, we examined different cases in which the allowance price was assumed to increase by different percentages: 50%, 100%, 150%, 200%, and 500% from its initial value of USD 98.74, as utilized in our model. These cases aim to illustrate the effect of changes in the allowance price, stemming from the EU ETS, on the company's share price and provide an understanding of the potential effects across different pricing scenarios.

Notably, when we simulated a 500% increase in the allowance price, as depicted in Table 7, we observed an approximate 9% decrease in the share price for scenarios 1 and 2, and a substantial approximate 26% decrease in scenario 3. These findings suggest that a 500% increase in the allowance price would indeed exert a significant effect on the company's share price, particularly in scenario 3. However, it is crucial to acknowledge that assuming such a drastic increase would be unrealistic. Thus, this analysis primarily serves as an indicator of the

share price’s sensitivity to fluctuations in the allowance price. By examining extreme cases, we gain insights into the potential range of effects and better understand the relative significance of the allowance price in influencing the company’s valuation.

Table 7: Sensitivity Analysis - Carbon Cost

	% Increase in Carbon Cost					
	0%	50%	100%	150%	200%	500%
Scenario 1	29.92	29.66	29.40	29.14	28.88	27.32
Scenario 2	29.71	29.32	28.94	28.63	28.25	27.13
Scenario 3	28.91	28.14	27.38	26.62	25.85	21.27

Moreover, it is crucial to emphasize that our study focuses exclusively on the analysis of carbon costs within the scope of the EU ETS and the subsequent revision of the ETD. It is worth noting that these are just facets of the broader regulatory landscape governing carbon emissions and environmental sustainability. Indeed, numerous other regulations and policies may exert a substantial influence on the financial position of companies operating within the shipping industry. When considering the cumulative impact of these regulations, the overall effect on the company’s financial position may become significant.

8 Recommendations

Following the assessment of the limitations of the valuation model in Chapter six, this chapter presents our recommendations for improving the valuation model further.

8.1 Recommendations for Future Research

Although this thesis presents a thorough analysis of the cost implications associated with the inclusion of shipping in the EU ETS and the subsequent revision of the ETD, there are several aspects that could be further explored to better comprehend the dynamics of this complex sector. The following recommendations provide guidance for future researchers seeking to enhance the current model and address its inherent limitations.

Firstly, it is crucial to conduct further research and analysis to gain a deeper comprehension of the factors contributing to the observed variations among the companies. Specifically, an investigation into the influence of data availability on emissions reporting should be undertaken to assess its impact on the analysis. Examining the extent to which data availability affects the estimation of carbon costs related to the EU ETS and ETD, it can illuminate the potential underestimation of the actual costs. Furthermore, the influence of the nature of shipping operations should be further investigated to ascertain the need for differentiated benchmarks. Investigating this aspect can contribute to a more equitable penalization mechanism for companies operating in different maritime segments. As a potential next step, researchers can assess various benchmarking strategies for different segments, aiming to identify an approach that mitigates competition distortions. By delving into these aspects, future studies can foster a more comprehensive understanding of the financial implications pertaining to decarbonization efforts within the maritime sector.

Secondly, an analysis of cost considerations concerning the acquisition of new ships and the maintenance of the existing fleet reveals crucial aspects that warrant further investigation. While the industry possesses substantial financial resources, it is imperative to acknowledge the potentially high expenses

associated with procuring and developing ships that comply with stringent regulations and ambitious decarbonization pathways. Additionally, assessing the lifespan, efficiency, and associated costs of the existing fleet is vital to comprehend the overall cost implications, including maintenance, repairs, and upgrades required for regulatory compliance and operational efficiency. Conducting a comprehensive analysis of these cost and development factors is recommended to enhance the analysis. A cost-benefit analysis can be performed to compare the cost of acquiring new ships with the penalties incurred due to regulatory requirements. This will provide further insights into the significance of carbon costs resulting from the EU ETS and ETD and help determine the threshold at which these costs become substantial enough to drive change.

9 Conclusion

This chapter presents the conclusion and main insights derived from our research. The EU ETS and the subsequent revision of the ETD have emerged as prominent MBMs for controlling GHG emissions in the shipping industry. While existing literature emphasizes the potential of these measures to incentivize investments in new technologies and facilitate long-term emissions reductions, concerns persist regarding their efficacy in driving substantial decarbonization efforts.

The objective of our study was to develop a valuation model that assesses the financial implications of the EU ETS and ETD by considering various trajectories for emissions reductions. In this model, we generated projected carbon costs associated with three distinct scenarios: 1) Achieving full decarbonization by 2050, 2) Attaining the targets outlined in the IMO GHG strategy, and 3) Adopting no explicit decarbonization ambitions. The projected carbon costs related to the EU ETS were derived by multiplying anticipated emissions figures by corresponding assumptions and the prevailing spot allowance price. Similarly, the projected carbon costs associated with the revision of the ETD were obtained by multiplying projected fuel consumption figures by the additional cost per metric tonne of HFO.

By incorporating the projected carbon costs derived from the EU ETS and the ETD revision into the DCF model for five shipping companies, we computed the share prices for each scenario and observed varying differentials between full decarbonization and the absence of sustainability ambitions. These differentials were 0.43%, 0.46%, 3.40%, 6.16% and 26.49% for Klaveness, Golden Ocean Group, Wallenius Wilhelmsen, Stolt-Nielsen and Frontline, respectively. Further investigation of Frontline revealed that specific characteristics, such as its higher-than-average emissions per vessel and a higher reporting rate, contributed to the pronounced disparity in its share price across the scenarios. Conversely, Golden Ocean Group exhibited lower emissions per vessel and a lower reporting rate, resulting in a smaller decrease in share price across the scenarios. Notably, the nature of their shipping operations also played a significant role in the observed differences in share prices. Frontline and Golden

Ocean Group possess substantially similar vessel fleet sizes, but operate in different maritime segments, suggesting that the EU ETS and the ETD revision penalize the absence of decarbonization prioritization differently across these segments, potentially distorting competition within the industry. Thus, the in-depth analysis of Frontline and Golden Ocean Group demonstrates the significance of specific company characteristics in shaping the financial impact of decarbonization efforts.

The main insights derived from our study indicate that the financial impact of prioritizing full decarbonization versus neglecting sustainability ambitions altogether is not significant enough to compel companies across the shipping industry to undertake substantial investments in new vessels, alternative fuels, or other decarbonization solutions within the current design of the regulatory frameworks. Moreover, it becomes evident that these measures will affect the industry in an uneven manner, potentially disrupting competition dynamics. These findings highlight the potential limitations of the EU ETS and ETD revision as effective MBMs and accentuate the necessity for stronger and more robust regulatory frameworks. We assert that the proposed valuation approach represents a positive stride towards evaluating the cost of inaction within the shipping industry.

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Detailed forecast period																	
USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Operating Income	-420,000.00	320,000.00	369,000.00	69,000.00	391,000.00	216,491.44	393,195.44	408,080.35	443,258.49	491,504.69	524,194.74	585,835.60	580,460.00	601,630.74	619,164.35	675,631.54	710,204.49
Cash Tax	3,000.00	20,000.00	10,000.00	-4,000.00	23,000.00	23,000.00	30,802.76	22,990.64	25,202.73	35,199.47	38,185.85	43,630.50	42,905.10	44,616.55	45,988.11	50,935.81	53,863.86
NOPLAT	-417,000.00	300,000.00	359,000.00	73,000.00	368,000.00	193,491.44	362,392.68	385,089.71	418,055.77	456,305.22	486,008.89	542,205.10	537,554.90	557,014.18	573,176.24	624,695.73	656,340.63
Depreciation	271,000.00	279,000.00	436,000.00	404,000.00	439,000.00	439,000.00	307,286.72	302,116.15	287,161.41	273,838.10	258,368.26	243,703.53	230,721.38	219,112.97	208,534.19	199,021.67	190,693.31
Increase in WC	NA	-283,000.00	-82,000.00	176,000.00	206,000.00	-136,928.30	-1,569.28	16,447.30	15,585.71	13,700.53	10,155.31	11,034.15	9,826.91	10,675.59	10,858.22	11,983.23	11,778.48
Investments in CAPEX	-10,000.00	-10,000.00	-1,000.00	127,000.00	136,000.00	63,127.99	71,550.61	89,422.73	110,544.40	97,896.96	100,099.64	106,108.48	103,760.79	104,983.44	105,873.05	111,879.14	115,236.15
FCF	NA	872,000.00	878,000.00	174,000.00	465,000.00	706,291.76	599,698.07	581,335.84	579,687.07	618,345.83	634,122.20	668,766.00	654,689.07	660,468.12	664,979.17	699,855.64	720,019.11

Figure A.2: FCF – Base Case

Forecast period																
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033				
FCF	706292	599698	581336	579087	618346	634122	668766	654689	660468	664979	699855	720019				
Carbon Cost (EU ETS)	0	0	0	33386	31826	30195	28882	27569	26256	24943	23651	22318				
Carbon Cost (ETD)	675	675	675	675	675	675	675	675	405	405	405	405				
New FCF	705617	599023	580661	545026	585845	603252	639209	626445	633807	639631	675819	697296				

Figure A.3 FCF – Scenario 1

Scenario 2																
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033				
FCF	706292	599698	581336	579087	618346	634122	668766	654689	660468	664979	699855	720019				
Carbon Cost (EU ETS)	0	0	0	36580	35661	34648	33991	33335	32679	32022	31366	30709				
Carbon Cost (ETD)	675	675	675	675	675	675	675	675	540	540	540	540				
New FCF	705617	599023	580661	541832	582010	598799	634099	620679	627249	632417	667949	688770				

Figure A.4 FCF – Scenario 2

Scenario 3																
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033				
FCF	706292	599698	581336	579087	618346	634122	668766	654689	660468	664979	699855	720019				
Carbon Cost (EU ETS)	0	0	0	51232	52018	52656	53841	55052	56291	57558	58853	60177				
Carbon Cost (ETD)	690	706	722	738	755	771	789	807	825	843	862	882				
New FCF	705602	598992	580614	527118	565574	580695	614136	598830	603352	606578	640140	658961				

Figure A.5 FCF – Scenario 3

Value of the Firm	12,743,971.74
Debt	493,500.00
Cash Equivalents	607,800.00
Value of Equity	12,858,271.74

Ordinary Shares Outstanding	422,399.00
Estimated Share Price	30.44

Figure A.6: Share Price - Base case

Value of the Firm	12,524,765.81
Debt	493,500.00
Cash Equivalents	607,800.00
Value of Equity	12,639,065.81
Ordinary Shares Outstanding	422,399.00
Estimated Share Price	29.922

Figure A.7: Share Price - Scenario 1

Value of the Firm	12,426,409.31
Debt	493,500.00
Cash Equivalents	607,800.00
Value of Equity	12,540,709.31
Ordinary Shares Outstanding	422,399.00
Estimated Share Price	29.689

Figure A.8: Share Price - Scenario 2

Value of the Firm	12,098,361.61
Debt	493,500.00
Cash Equivalents	607,800.00
Value of Equity	12,212,661.61
Ordinary Shares Outstanding	422,399.00
Estimated Share Price	28.91

Figure A.9: Share Price - Scenario 3

		GROWTH								
		0.25%	0.75%	1.25%	1.75%	2.25%	2.75%	3.25%	3.75%	4.25%
WACC	30.44	42.43	44.42	47.00	50.50	55.49	63.20	76.65	106.13	222.29
	4.59%	37.50	38.88	40.61	42.86	45.91	50.26	56.97	68.68	94.35
	5.59%	33.55	34.53	35.72	37.23	39.20	41.85	45.64	51.49	61.70
	6.09%	30.32	31.02	31.87	32.92	34.23	35.95	38.26	41.56	46.66
	6.59%	27.63	28.15	28.76	29.50	30.42	31.56	33.06	35.08	37.96
	7.09%	25.36	25.75	26.20	26.74	27.38	28.18	29.18	30.49	32.25
	7.59%	23.43	23.72	24.06	24.45	24.92	25.48	26.18	27.06	28.20
	8.09%	21.76	21.98	22.24	22.53	22.87	23.28	23.78	24.39	25.15
	8.59%	20.31	20.48	20.67	20.89	21.15	21.45	21.81	22.24	22.77

Figure A.10: Sensitivity Analysis

Vessel name	Vessel class	Year built	Flag	IMO number
Aniara	LCTC	2008	SE	9377494
Asian Emperor	PCTC	1999	KR	9176632
Asian Vision	PCTC	1997	KR	9122966
Bess	PCTC	2010	PA	9531715
Boheme	LCTC	1999	SG	9176565
Carmen	LCTC	2011	SE	9505027
Don Juan	PCTC	1995	SG	9082934
Elektra	LCTC	1999	SG	9176577
Fidelio	LCTC	2007	SE	9332937
Figaro	LCTC	2011	SE	9505041
Glorious Leader	PCTC	2007	BS	9357298
Liberty	PCTC	2006	US	9310109
Manon	LCTC	1999	SE	9179725
Mignon	LCTC	1999	SE	9189251
Nabucco	HERO	2021	SE	9731652
Oberon	LCTC	2008	SE	9377509
Parsifal	MK V	2011	SG	9515395
Porgy	PCTC	2009	PA	9409338
Salome	MK V	2012	SG	9515412
Taipan	PCTC	2006	BS	9311866
Talia	PCTC	2006	BS	9311845
Talisman	MK IV	2000	NO	9191319
Tamerlane	MK IV	2001	NO	9218648
Tamesis	MK IV	2000	NO	9191307
Tarago	MK IV	2000	NO	9191321
Tannhauser	HERO	2020	SE	9731640
Thalatta	HERO	2015	MT	9702455
Theben	HERO	2016	SG	9722302
Themis	HERO	2016	SG	9722314
Thermopylae	HERO	2015	MT	9702443
Tiger	LCTC	2011	MT	9505039
Tijuca	LCTC	2008	NO	9377511
Tiranna	LCTC	2009	NO	9377523
Titania	LCTC	2011	MT	9505053
Titus	HERO	2018	MT	9700512
Toledo	PCTC	2005	MT	9293624
Tomar	PCTC	2008	MT	9375264
Tombarra	PCTC	2006	MT	9319753
Tongala	PCTC	2012	MT	9605786
Tonsberg	MKV	2011	MT	9515383
Toreador	PCTC	2008	MT	9375288
Torino	PCTC	2009	MT	9398321
Toronto	PCTC	2005	MT	9302205
Torens	PCTC	2004	MT	9293612
Tortugas	PCTC	2006	MT	9319765
Tosca	PCTC	2013	SG	9605798
Toscana	PCTC	2009	MT	9398321
Traviata	HERO	2019	MT	9700524
Tugela	LCTC	2011	MT	9505065
Tulane	LCTC	2012	MT	9505089
Turandot	PCTC	1995	SE	9070450
Tysla	MKV	2012	MT	9515400
Undine	LCTC	2003	SE	9240160

Figure A.11: Fleet List

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
COGS (% of revenue)	80.52%	66.03%	59.46%	62.47%	62.20%	66.25%	63.39%	62.74%	63.64%	63.66%	63.66%	63.66%	63.66%	63.66%	63.66%	63.66%	63.66%
Administrative and General Expenses (% of revenue)	10.52%	7.41%	8.01%	9.63%	7.62%	8.64%	8.26%	8.43%	8.52%	8.29%	8.29%	8.29%	8.29%	8.29%	8.29%	8.29%	8.29%
Other Operating Expense (% of revenue)	-13.89%	-11.22%	-12.00%	-11.90%	-8.81%	-11.56%	-11.10%	-11.07%	-10.89%	-10.69%	-10.69%	-10.69%	-10.69%	-10.69%	-10.69%	-10.69%	-10.69%
Depreciation (% of fixed assets)	NA	5.27%	7.90%	8.10%	10.70%	7.99%	7.99%	8.54%	8.66%	8.78%	8.78%	8.78%	8.78%	8.78%	8.78%	8.78%	8.78%
Other Income (% of revenue)	-2.08%	-1.84%	-0.28%	-5.17%	-2.19%	-2.33%	-2.38%	-2.47%	-2.91%	-2.46%	-2.46%	-2.46%	-2.46%	-2.46%	-2.46%	-2.46%	-2.46%
Interest Income (% of avg. Cash and Short Term Investments)	NA	0.14%	2.27%	6.46%	13.93%	5.70%	5.70%	6.81%	7.72%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%
Interest Expense (% of Total Liabilities)	2.21%	3.55%	3.98%	5.13%	4.07%	3.79%	4.10%	4.21%	4.26%	4.09%	4.09%	4.09%	4.09%	4.09%	4.09%	4.09%	4.09%
Marginal Tax rate	-0.51%	24.72%	5.75%	1.30%	11.62%	8.58%	10.39%	7.53%	7.88%	9.20%	9.20%	9.20%	9.20%	9.20%	9.20%	9.20%	9.20%

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
COGS (% of revenue)	80.52%	66.03%	59.46%	62.47%	62.20%	66.25%	63.39%	62.74%	63.64%	63.66%	63.66%	63.66%	63.66%	63.66%	63.66%	63.66%	63.66%
Average days to collect (Net Receivables)	56.19	43.33	38.68	44.18	42.36	44.95	42.70	42.57	43.35	43.19	43.19	43.19	43.19	43.19	43.19	43.19	43.19
Short Term Investments (% of revenue)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inventory turnover	25.36	25.30	21.50	23.39	16.44	22.40	21.81	21.11	21.03	20.55	20.55	20.55	20.55	20.55	20.55	20.55	20.55
Other Current Assets (% of revenue)	4.07%	3.20%	3.15%	4.73%	4.25%	3.88%	3.84%	3.97%	4.13%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%
Other assets (% of revenue)	6.28%	3.99%	5.01%	52.70%	45.21%	22.64%	25.91%	30.30%	35.35%	31.88%	31.88%	31.88%	31.88%	31.88%	31.88%	31.88%	31.88%
Accounts Payable (% of Cost of Revenue)	9.08%	8.13%	6.37%	7.68%	6.37%	7.53%	7.22%	7.04%	7.17%	7.06%	7.06%	7.06%	7.06%	7.06%	7.06%	7.06%	7.06%
Short Term Debt (% of Long term Debt)	26.84%	17.32%	14.64%	16.96%	22.88%	19.77%	18.35%	18.25%	18.30%	19.76%	19.76%	19.76%	19.76%	19.76%	19.76%	19.76%	19.76%
Other Current Liabilities (% of revenue)	10.15%	7.33%	7.98%	11.60%	11.71%	9.76%	9.68%	10.14%	10.58%	10.37%	10.37%	10.37%	10.37%	10.37%	10.37%	10.37%	10.37%
Other Liabilities	2.94%	1.55%	0.15%	10.89%	4.27%	3.96%	4.17%	4.69%	5.59%	4.54%	4.54%	4.54%	4.54%	4.54%	4.54%	4.54%	4.54%

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CAPEX (% of EBITDA)	-6.71%	1.67%	0.12%	-26.85%	-16.39%	-9.63%	-10.21%	-12.99%	-15.13%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%
Total Other Cash Flow not affecting CF (% of revenue)	11.44%	8.52%	12.74%	10.82%	4.38%	9.58%	9.21%	9.34%	8.66%	8.23%	8.23%	8.23%	8.23%	8.23%	8.23%	8.23%	8.23%
Other Operating Activities (% of revenue)	-11.97%	-7.85%	-1.66%	4.46%	-5.07%	-4.42%	-2.91%	-1.92%	-1.97%	-3.26%	-3.26%	-3.26%	-3.26%	-3.26%	-3.26%	-3.26%	-3.26%
Other Investing Activities (% of revenue)	-6.12%	-4.55%	-3.43%	0.14%	0.05%	-2.78%	-2.12%	-1.63%	-1.27%	-1.55%	-1.55%	-1.55%	-1.55%	-1.55%	-1.55%	-1.55%	-1.55%
Other Financing Activities (% of revenue)	-0.99%	-0.74%	-0.79%	-12.37%	-9.32%	-4.84%	-5.61%	-6.99%	-7.75%	-6.82%	-6.82%	-6.82%	-6.82%	-6.82%	-6.82%	-6.82%	-6.82%
Common Dividend Payout Ratio	2.83%	4.21%	31.64%	0.99%	4.57%	8.50%	10.76%	11.28%	8.39%	8.39%	8.39%	8.39%	8.39%	8.39%	8.39%	8.39%	8.39%
Increase in Investments (% of revenue)	NA	0.00%	-24.00%	-1.50%	7.63%	-4.47%	-4.77%	-5.30%	-1.63%	-1.66%	-1.66%	-1.66%	-1.66%	-1.66%	-1.66%	-1.66%	-1.66%

Forecast period																		
	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Income Statement	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%	63.60%
Balance Sheet	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%	7.55%
Cash Flow	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%	-12.79%

Figure A.12: Drivers

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash	796,000.00	484,000.00	398,000.00	654,000.00	710,000.00	607,800.00	607,600.00	607,400.00	607,200.00	607,000.00	606,800.00	606,600.00	606,400.00	606,200.00	606,000.00	605,800.00	605,600.00
Net receivables	472,000.00	489,000.00	420,000.00	363,000.00	457,000.00	495,838.92	481,630.31	491,015.36	511,244.08	520,751.19	532,468.10	544,448.63	556,698.72	569,224.44	582,031.99	595,127.71	608,518.90
Inventory	96,000.00	107,000.00	108,000.00	79,000.00	147,000.00	117,458.62	118,051.54	124,704.22	127,987.64	133,878.81	136,891.09	138,542.32	143,600.11	147,111.32	150,981.39	153,000.11	156,123.23
Accounts Payable	221,000.00	220,000.00	148,000.00	142,000.00	154,000.00	198,025.84	185,779.43	185,169.87	192,896.30	194,394.06	198,767.92	201,165.55	208,307.12	213,607.86	219,227.26	222,158.48	226,693.28
Net Working Capital	1,143,000.00	860,000.00	778,000.00	954,000.00	1,160,000.00	1,023,071.70	1,021,502.41	1,037,949.71	1,053,535.42	1,067,235.95	1,077,391.26	1,088,425.41	1,098,252.31	1,108,927.91	1,119,786.12	1,131,769.35	1,143,548.03
Increase in NWC	NA	-283,000.00	-82,000.00	176,000.00	206,000.00	-136,928.30	-1,569.28	16,447.30	15,885.71	13,706.53	10,155.31	11,034.15	9,826.91	10,675.59	10,858.22	11,983.23	11,728.68

	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
605,400.00	605,200.00	605,000.00	604,800.00	604,600.00	604,400.00	604,200.00	604,000.00	603,800.00	603,600.00	603,400.00	603,200.00	603,000.00	602,800.00	602,600.00	602,400.00	602,200.00	602,000.00
622,209.74	636,209.46	650,524.18	665,160.97	680,127.09	695,429.95	711,077.13	727,076.36	743,435.58	760,162.88	777,266.54	794,755.04	812,637.03	830,921.36	849,617.09	868,733.48	888,279.98	908,279.98
159,712.05	163,477.83	167,457.42	171,225.21	175,363.36	179,168.03	182,988.02	186,816.64	191,069.28	195,562.35	200,110.36	204,673.75	209,201.39	213,840.18	218,555.11	223,439.59	228,500.98	233,750.98
231,904.31	237,372.28	243,150.70	248,621.59	254,630.24	260,154.68	265,701.37	271,260.59	277,435.48	283,599.49	290,563.26	297,189.38	303,763.58	310,499.17	317,343.44	324,437.66	331,786.88	339,300.00
1,155,417.48	1,167,515.01	1,179,830.89	1,192,564.59	1,205,460.21	1,218,843.30	1,232,563.78	1,246,632.42	1,260,869.38	1,275,365.74	1,290,213.64	1,305,439.41	1,321,074.84	1,337,062.37	1,353,427.47	1,370,135.41	1,387,194.09	1,404,650.00
11,869.45	12,097.53	12,315.88	12,733.70	12,895.62	13,383.09	13,720.48	14,068.64	14,236.96	14,496.37	14,847.90	15,225.77	15,635.43	15,987.53	16,365.10	16,707.94	17,058.68	17,415.00

Figure A.13: Net Working Capital

USD '000	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Beginning Balance	493,500.00	493,500.00	493,500.00	540,102.00	591,405.00	648,857.00	718,077.00	794,153.00	882,020.00	970,932.00	1,064,815.00	1,162,544.00	1,270,804.00
Issuance			235,888.00	118,671.00	124,814.00	446,168.00	411,972.00	423,763.00	424,808.00	429,779.00	433,625.00	444,156.00	369,272.00
Repayment Plan			189,286.00	67,368.00	67,368.00	67,368.00	67,368.00	67,368.00	67,368.00	67,368.00	67,368.00	67,368.00	67,368.00
Ending Balance	493,500.00	493,500.00	540,102.00	591,405.00	648,857.00	718,077.00	794,153.00	882,020.00	970,932.00	1,064,815.00	1,162,544.00	1,270,804.00	1,404,076.00
Goal of Ending Balance	493,500.00	493,500.00	540,102.00	591,405.00	648,857.00	718,077.00	794,153.00	882,020.00	970,932.00	1,064,815.00	1,162,544.00	1,270,804.00	1,404,076.00

	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
1,640,076.00	2,021,163.00	2,414,071.00	2,818,667.00	3,236,589.00	3,667,097.00	4,112,415.00	4,573,356.00	5,049,894.00	5,541,086.00	6,046,782.00	6,567,660.00	7,104,604.00	7,658,765.00	8,230,678.00	8,821,073.00	9,430,273.00	10,058,100.00
297,204.00	310,220.00	325,016.00	342,067.00	360,924.00	383,869.00	410,648.00	441,491.00	477,602.00	519,558.00	568,900.00	627,042.00	695,686.00	776,787.00	872,770.00	986,184.00	1,120,279.00	1,275,000.00
-83,883.00	-82,688.00	-79,580.00	-75,855.00	-69,584.00	-61,649.00	-50,203.00	-35,047.00	-13,500.00	13,805.00	48,022.00	100,000.00</						

Cost of Equity	
Risk-free rate	1.26%
Equity Beta	1.100
Market Risk Premium	5.00%
Cost of Equity	6.76%
Cost of Debt	
Cost of Debt	5.95%
Marginal Tax Rate	0%
After-tax Cost of Debt	5.95%
Target financial leverage (\$M)	
Debt	493,500
Equity	2,817,093.85
Target market value weights	
Equity ratio	0.850933089
Debt ratio	0.149066911
Estimated WACC	
WACC	6.59%

Cost of Capital 6.64%

Figure A.15: Key Metrics

A.2 Frontline

	Detailed forecast period												
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Revenue	646,230.00	742,266.00	897,222.00	1,021,887.00	1,161,301.00	1,312,222.00	1,478,111.00	1,659,888.00	1,858,888.00	2,075,555.00	2,311,111.00	2,566,667.00	2,842,223.00
Cost of Goods Sold (COGS)	184,000.00	210,000.00	250,000.00	290,000.00	330,000.00	370,000.00	410,000.00	450,000.00	490,000.00	530,000.00	570,000.00	610,000.00	650,000.00
Net Income	462,230.00	532,266.00	647,222.00	731,887.00	831,301.00	942,222.00	1,068,111.00	1,209,888.00	1,368,888.00	1,545,555.00	1,741,111.00	1,956,667.00	2,192,223.00
Operating Expenses	184,000.00	210,000.00	250,000.00	290,000.00	330,000.00	370,000.00	410,000.00	450,000.00	490,000.00	530,000.00	570,000.00	610,000.00	650,000.00
Net Cash Flow	182,230.00	212,266.00	252,222.00	292,887.00	332,301.00	372,222.00	412,111.00	452,888.00	492,888.00	532,555.00	572,111.00	611,667.00	651,223.00
Balance Sheet													
Assets													
Liabilities													
Equity													
Income Statement													
Operating Income													
Net Income													
Net Cash Flow													
Capital Expenditures													
Dividends													
Debt Issuance													
Debt Repayment													
Share Repurchases													
Share Issuance													
Net Cash Flow													
Balance Sheet													
Assets													
Liabilities													
Equity													
Income Statement													
Operating Income													
Net Income													
Net Cash Flow													
Capital Expenditures													
Dividends													
Debt Issuance													
Debt Repayment													
Share Repurchases													
Share Issuance													
Net Cash Flow													
Balance Sheet													
Assets													
Liabilities													
Equity													
Income Statement													
Operating Income													
Net Income													
Net Cash Flow													
Capital Expenditures													
Dividends													
Debt Issuance													
Debt Repayment													
Share Repurchases													
Share Issuance													
Net Cash Flow													

Figure A.16: Financial Statements

USD '000	Detailed forecast period																			
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033			
Operating Income	-198,652.00	61,299.00	232,856.00	462,559.00	-3,176.00	185,239.02	95,611.50	113,256.00	114,345.81	117,342.60	123,052.08	149,657.95	139,833.95	113,738.82	145,657.50	150,966.44	159,254.62			
Cash Tax	290.00	316.00	307.00	-14.00	4,633.00	4,633.00	-5,633.00	-7,684.71	-6,624.87	-12,299.90	-12,858.59	-14,510.85	-14,472.77	-12,110.42	-15,079.87	-15,605.80	-16,406.25			
NOPLAT	-198,362.00	60,983.00	232,549.00	462,573.00	-7,809.00	189,602.02	89,977.79	107,571.29	107,720.10	105,042.70	110,193.49	135,147.10	125,361.18	101,628.40	130,577.63	135,360.64	142,848.37			
Depreciation	141,748.00	122,246.00	117,550.00	138,770.00	147,774.00	147,774.00	145,966.72	132,422.83	133,000.14	132,555.59	132,468.82	132,689.04	133,179.14	133,857.78	134,211.94	134,623.58	135,460.77			
Increase in WC	NA	-365,212.00	88,975.00	-18,404.00	-38,074.00	49,304.27	-3,617.51	10,916.22	17,182.82	23,204.00	15,252.66	14,463.56	13,808.06	17,444.76	13,662.92	15,403.34	15,440.51			
Investments in CAPEX	713,560.00	216,310.00	195,972.00	196,568.00	182,409.00	396,875.08	151,138.11	126,638.40	125,553.93	136,137.76	139,209.86	148,912.92	148,741.02	154,889.91	152,465.28	155,981.69	160,553.95			
FCF	NA	332,451.00	65,452.00	421,179.00	-284,361.00	595,950.83	99,490.41	116,689.53	114,514.07	102,756.34	113,925.98	124,482.26	122,954.79	107,178.35	128,821.11	138,010.78	135,128.19			
Percent per year																				
2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	TV
166,217.88	166,170.63	171,928.52	177,673.36	181,851.68	186,310.43	198,246.57	203,806.74	209,490.92	214,026.76	218,138.08	225,057.81	231,971.97	238,909.90	246,205.27	253,000.03	259,147.86				
-17,085.88	-17,123.43	-17,891.15	-18,263.62	-18,617.66	-19,145.42	-20,287.57	-20,845.05	-21,414.97	-21,880.49	-22,308.10	-22,994.82	-23,682.18	-24,372.89	-25,097.65	-25,805.20	-26,399.46				
183,282.76	182,293.86	189,821.67	195,316.98	199,649.34	205,455.87	218,554.13	224,661.79	236,905.89	235,907.25	240,444.18	248,862.63	256,454.15	262,282.79	271,262.91	279,165.32	285,547.32				
136,443.98	137,586.90	138,789.59	140,035.90	141,392.20	142,829.33	144,339.76	146,021.54	147,875.80	149,826.48	151,859.05	153,953.49	156,136.12	158,438.08	160,857.57	163,396.73	166,055.07				
15,601.47	16,162.73	15,832.32	15,913.69	16,157.65	16,107.16	15,722.12	16,249.18	16,321.90	16,491.26	16,612.93	16,511.05	16,607.29	16,701.57	16,744.88	16,889.65	17,080.43				
164,811.97	165,478.86	169,270.79	173,079.39	175,658.68	179,306.42	186,631.74	190,576.96	194,083.70	198,217.38	201,564.40	206,475.07	211,630.75	216,464.60	221,756.79	227,005.99	231,639.02				
139,244.30	139,238.37	143,388.14	146,979.80	149,245.22	152,871.61	168,520.84	163,847.00	165,776.10	171,025.09	174,127.90	179,820.00	183,752.22	188,554.81	193,628.82	198,407.22	202,882.94				8,635,445.86

Figure A.17: FCF – Base case

Scenario 1																				
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033								
FCF	595951	99690	116690	114514	102756	113926	124482	122957	107178	128821	130011	135128								
Carbon Cost (EU ETS)	0	0	0	77800	74165	70364	67305	64246	61826	58127	55068	52008								
Carbon Cost (ETD)	6543	6543	6543	6543	6543	6543	6543	6543	6543	6543	6543	6543								
New FCF	589408	93147	110147	30171	22048	37019	50634	52168	42066	68339	73530	82272								
2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	TV
139264	139238	143308	146980	149245	152872	160520	163847	167776	171025	174128	179020	183752	188555	193629	198607	202883	8,635,445.86			
48949	45890	42830	39771	36712	33652	30593	27534	24474	21415	18356	15297	12237	9178	6119	3059	0				
509	305	183	110	66	40	20	10	5	3	2	1	1	1	0	0	0				
65195	66699	72299	77900	81295	86451	92608	103365	108823	113602	118235	124656	130918	137250	143854	150062	156167				8635446

Figure A.18: FCF – Scenario 1

Scenario 2																				
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033								
FCF	595951	99690	116690	114514	102756	113926	124482	122957	107178	128821	130011	135128								
Carbon Cost (EU ETS)	0	0	0	84024	81891	79542	78012	76483	74953	73423	71894	70364								
Carbon Cost (ETD)	6543	6543	6543	6543	6543	6543	6543	6543	6543	6543	6543	6543								
New FCF	589408	93147	110147	23947	14323	27841	39927	39931	26991	50163	52883	59530								
2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	TV
139264	139238	143308	146980	149245	152872	160520	163847	167776	171025	174128	179020	183752	188555	193629	198607	202883	8,635,445.86			
68834	67305	65775	64246	62716	61186	59657	58127	56597	55068	53538	52008	50479	48949	47419	45890	44360				
524	524	524	524	524	524	524	524	524	524	524	524	524	524	524	524	524				
65195	66699	72299	77900	81295	86451	92608	103365	108823	113602	118235	124656	130918	137250	143854	150062	156167				8635446

Figure A.19: FCF – Scenario 2

Scenario 3																				
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033								
FCF	595951	99690	116690	114514	102756	113926	124482	122957	107178	128821	130011	135128								
Carbon Cost (EU ETS)	0	0	0	71293	72387	73276	74925	76610	78334	79525	80742	81987								
Carbon Cost (ETD)	6690	6841	6995	7152	7313	7477	7646	7818	7994	8078	8163	8251								
New FCF	589261	92850	109695	36069	23056	33173	41912	38529	20851	41219	41105	44890								
2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	TV
139264	139238	143308	146980	149245	152872	160520	163847	167776	171025	174128	179020	183752	188555	193629	198607	202883	8,635,445.86			
83260	84561	85892	87253	88644	90067	91521	93008	94529	96084	97674	99300	100962	102662	104400	106177	107995				
8341	8433	8527	8623	8721	8821	8924	9029	9136	9246	9358	9473	9590	9710	9832	9958	10086				
47663	46244	44889	51104	51800	53884	60075	61810	64111	65695	67096	70247	73200	76183	79396	82472	84802				8635446

Figure A.20: FCF – Scenario 3

Value of the Firm	4,815,819.12
Debt	2,130,814.00
Cash Equivalents	174,898.28
Value of Equity	2,859,903.40

Ordinary Shares Outstanding	203,530.98
Estimated Share Price	14.05

Figure A.21: Share Price - Base Case

Value of the Firm	4,168,367.90
Debt	2,130,814.00
Cash Equivalents	174,898.28
Value of Equity	2,212,452.18

Ordinary Shares Outstanding	203,530.98
Estimated Share Price	10.87

Figure A.22: Share Price - Scenario 1

Value of the Firm	3,858,471.39
Debt	2,130,814.00
Cash Equivalents	174,898.28
Value of Equity	1,902,555.66

Ordinary Shares Outstanding	203,530.98
Estimated Share Price	9.35

Figure A.23: Share Price - Scenario 2

Value of the Firm	3,582,651.13
Debt	2,130,814.00
Cash Equivalents	174,898.28
Value of Equity	1,626,735.41

Ordinary Shares Outstanding	203,530.98
Estimated Share Price	7.99

Figure A.24: Share Price - Scenario 3

		GROWTH								
		0.25%	0.75%	1.25%	1.75%	2.25%	2.75%	3.25%	3.75%	4.25%
WACC	14.05									
	2.59%	26.52	32.04	41.67	62.76	145.90	-290.56	-65.72	-34.70	-22.37
	3.09%	19.84	22.94	27.73	36.09	54.41	126.62	-252.44	-57.17	-30.24
	3.59%	15.22	17.11	19.80	23.96	31.23	47.15	109.90	-219.53	-49.82
	4.09%	11.84	13.06	14.70	17.05	20.67	26.99	40.84	95.41	-191.09
	4.59%	9.28	10.10	11.16	12.59	14.63	17.78	23.28	35.33	82.82
	5.09%	7.28	7.84	8.55	9.47	10.72	12.50	15.24	20.03	30.52
	5.59%	5.68	6.08	6.57	7.18	7.99	9.07	10.62	13.01	17.18
	6.09%	4.36	4.65	5.00	5.43	5.96	6.66	7.61	8.96	11.05
	6.59%	3.27	3.48	3.73	4.04	4.41	4.88	5.49	6.32	7.49

Figure A.25: Sensitivity Analysis

Vessel name	Vessel class	Year built	Flag	IMO number
FrontTyne	FrontTyne	2023	MI	9933676
FrontOrkla	FrontOrkla	2023	MI	9933664
FrontGaula	FrontGaula	2022	MI	9933652
FrontTana	FrontTana	2022	MI	9933640
FrontTweed	FrontTweed	2022	MI	9920784
FrontAha	FrontAha	2022	MI	9920772
FrontFeature	FrontFeature	2021	MI	9903970
FrontNausta	FrontNausta	2019	MI	9845714
FrontDriva	FrontDriva	2019	MI	9845702
FrontFavour	FrontFavour	2021	MI	9903968
FrontFuture	FrontFuture	2021	MI	9887815
FrontFusion	FrontFusion	2021	MI	9887803
FrontDynamic	FrontDynamic	2020	MI	9874911
FrontCruiser	FrontCruiser	2020	MI	9797230
FrontSparta	FrontSparta	2019	MI	9847114
FrontSamara	FrontSamara	2019	MI	9845130
FrontSiena	FrontSiena	2019	MI	9832250
FrontSingapore	FrontSingapore	2019	MI	9832248
FrontSeoul	FrontSeoul	2019	MI	9831854
FrontSantiago	FrontSantiago	2019	MI	9831842
FrontSavannah	FrontSavannah	2019	MI	9831828
FrontSuez	FrontSuez	2019	MI	9831830
FrontShanghai	FrontShanghai	2019	MI	9832262
FrontSilkeborg	FrontSilkeborg	2019	MI	9832274
FrontDiscovery	FrontDiscovery	2019	MI	9830109
FrontDefender	FrontDefender	2019	MI	9830094
Sea Hope (Com.Mgt)	Sea Hope (Com.Mgt)	2009	MI	9439541
Sea Bay (Com.Mgt)	Sea Bay (Com.Mgt)	2009	MI	9439539
FrontCecilie	FrontCecilie	2010	MI	9400681
FrontDuke	FrontDuke	2016	MI	9771339
FrontDuchess	FrontDuchess	2017	MI	9771341
FrontEarl	FrontEarl	2017	MI	9788320
FrontEmpire	FrontEmpire	2018	MI	9788332
FrontEndurance	FrontEndurance	2009	MI	9353797
FrontKathrine	FrontKathrine	2017	MI	9384590
FrontPrince	FrontPrince	2018	MI	9788899
FrontPrincess	FrontPrincess	2009	MI	9788904
FrontQueen	FrontQueen	2010	MI	9384605
FrontSigne	FrontSigne	2011	MI	9410997
FrontBrage	FrontBrage	2017	MI	9418614
FrontCascade	FrontCascade	2016	MI	9769829
FrontChallenger	FrontChallenger	2017	MI	9759745
FrontClassic	FrontClassic	2017	MI	9759769
FrontClipper	FrontClipper	2017	MI	9759771
FrontCoral	FrontCoral	2017	MI	9743203
FrontCosmos	FrontCosmos	2017	MI	9769817
FrontCrown	FrontCrown	2017	MI	9759757
FrontCrystal	FrontCrystal	2017	MI	9743186
FrontIdun	FrontIdun	2017	MI	9600944
FrontLoki	FrontLoki	2017	MI	9406013
FrontNjord	FrontNjord	2017	MI	9408205
FrontOdin	FrontOdin	2017	MI	9406001
FrontThor	FrontThor	2017	MI	9399480
FrontUll	FrontUll	2017	MI	9600932
FrontAntares	FrontAntares	2017	MI	9745926
FrontAlair	FrontAlair	2017	MI	9745902
FrontCapella	FrontCapella	2017	MI	9790995
FrontCastor	FrontCastor	2017	MI	9780251
FrontCheetah	FrontCheetah	2016	MI	9686637
FrontCougar	FrontCougar	2016	MI	9686649
FrontJaguar	FrontJaguar	2016	MI	9703332
FrontLeopard	FrontLeopard	2016	MI	9703320
FrontLynx	FrontLynx	2016	MI	9726592
FrontOcelot	FrontOcelot	2017	MI	9726580
FrontPolaris	FrontPolaris	2018	MI	9791004
FrontPollux	FrontPollux	2017	MI	9780263
FrontSirius	FrontSirius	2017	MI	9767340
FrontVega	FrontVega	2017	MI	9767338

Figure A. 26: Fleet List

USD '000	Historical financial periods																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
COGS (% of revenues)	60.13%	68.83%	58.32%	44.69%	76.20%	61.63%	61.93%	60.56%	61.00%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%
Administrative and General Expenses (% of revenues)	5.82%	5.02%	4.70%	3.62%	3.72%	4.58%	4.33%	4.19%	4.09%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%
Other Operating Expense (% of revenues)	-42.86%	-1.37%	-0.34%	-2.45%	-0.79%	-9.26%	-2.90%	-3.21%	-3.78%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%
Depreciation (% of avg fixed assets)	NA	4.62%	4.16%	4.30%	4.18%	4.32%	4.32%	4.26%	4.28%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%
Other Income (% of revenues)	0.23%	0.56%	-0.99%	-1.55%	5.78%	0.80%	0.92%	0.99%	1.39%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%
Interest Income (% of avg. Cash and Short Term Investments)	NA	0.80%	1.18%	3.94%	0.08%	1.50%	1.50%	1.64%	1.73%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%
Interest Expense (% of Total Liabilities)	2.96%	4.83%	5.90%	9.88%	2.53%	5.16%	5.60%	5.75%	5.73%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%
Marginal Tax rate	-6.11%	-1.17%	0.24%	0.00%	-21.87%	-4.58%	-5.48%	-6.34%	-7.66%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%

USD '000	Forecast period																
	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%	64.26%
4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%
-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%	-4.05%
4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%	4.27%
1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%	1.98%
1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%	1.29%
4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%	4.95%
-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%	-9.19%

Income Statement

Balance Sheet

Cash Flow

Figure A.27: Drivers

USD '000	Historical financial periods																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash	104,145.00	66,484.00	174,223.00	174,721.00	113,073.00	164,357.10	176,966.40	189,575.70	202,185.00	214,794.30	227,403.60	240,012.90	252,622.20	265,231.50	277,840.80	290,450.10	303,059.40
Net receivables	71,947.00	78,945.00	81,372.00	171,719.00	85,208.00	73,494.53	72,734.82	72,204.91	74,670.18	81,033.48	82,856.73	84,721.01	86,627.23	88,576.34	90,569.31	92,607.12	94,690.78
Inventory	444,309.00	128,202.00	138,003.00	92,563.00	119,279.00	120,545.10	107,205.42	107,057.54	106,754.77	114,674.89	117,255.08	117,223.56	121,290.09	131,000.27	128,044.93	131,053.39	133,405.30
Accounts Payable	59,539.00	77,981.00	108,973.00	70,242.00	81,413.00	72,945.46	75,072.88	76,968.17	74,637.15	78,225.87	79,985.95	79,964.45	82,738.45	89,362.28	87,346.29	89,398.51	91,002.88
Net Working capital	566,862.00	195,650.00	284,625.00	274,221.00	236,147.00	285,451.27	281,833.76	291,869.98	308,971.81	332,276.80	347,528.46	361,993.02	377,801.07	395,445.84	409,108.76	424,712.10	440,152.60
Increase in NWC	NA	-365,212.00	88,975.00	-16,404.00	-38,674.00	49,304.27	-3,617.51	10,636.22	17,102.82	23,384.00	15,252.66	14,463.56	15,888.06	17,644.76	13,662.92	15,603.34	15,440.51

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
315,668.70	328,278.00	340,887.30	353,496.60	366,105.90	378,715.20	391,324.50	403,933.80	416,543.10	429,152.40	441,761.70	454,371.00	466,980.30	479,589.60	492,198.90	504,808.20	517,417.50
96,821.32	98,999.80	101,227.30	103,504.91	105,833.77	108,215.03	110,649.87	113,139.49	115,685.13	118,288.05	120,949.53	123,670.89	126,453.49	129,298.69	132,207.91	135,182.59	138,224.20
136,116.14	140,441.96	143,574.05	146,804.46	150,641.18	154,154.20	156,287.24	159,066.77	163,578.22	167,602.31	171,824.96	175,538.66	179,362.48	183,285.96	187,238.67	191,346.54	195,844.05
92,852.09	95,802.96	97,939.52	100,143.16	102,760.39	105,156.81	106,611.87	109,080.95	111,585.44	114,330.49	117,210.98	119,744.29	122,352.73	125,029.14	127,725.49	130,527.69	133,595.68
455,754.08	471,916.81	487,749.12	503,662.81	519,820.46	535,927.62	551,649.74	567,899.12	584,221.02	600,712.28	617,325.21	633,836.26	650,443.55	667,145.11	683,919.99	700,809.64	717,890.07
15,601.47	16,162.73	15,832.32	15,913.69	16,157.65	16,107.16	15,722.12	16,249.38	16,321.90	16,491.26	16,612.93	16,511.05	16,607.29	16,701.57	16,774.88	16,889.65	17,080.43

Figure A.28: Net Working Capital

USD '000	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Beginning Balance	2,130,814.00	2,130,814.00	2,130,814.00	2,234,582.00	2,350,087.00	2,467,161.00	2,612,588.00	2,764,621.00	2,936,190.00	3,107,308.00	3,250,495.00	3,428,791.00	3,613,306.00
Issuance			235,888.00	118,671.00	124,814.00	446,168.00	411,972.00	423,763.00	424,808.00	429,779.00	433,625.00	444,156.00	369,272.00
Repayment Plan			132,120.00	3,166.00	7,740.00	300,741.00	259,939.00	252,194.00	253,690.00	286,592.00	255,329.00	259,641.00	175,293.00
Ending Balance	2,130,814.00	2,130,814.00	2,234,582.00	2,350,087.00	2,467,161.00	2,612,588.00	2,764,621.00	2,936,190.00	3,107,308.00	3,250,495.00	3,428,791.00	3,613,306.00	3,807,285.00
Goal of Ending Balance			2,234,582.00	2,350,087.21	2,467,161.17	2,612,588.61	2,764,621.68	2,936,190.20	3,107,308.48	3,250,495.56	3,428,791.83	3,613,306.35	3,807,285.05

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
3,807,285.00	4,009,299.00	4,211,745.00	4,420,939.00	4,636,879.00	4,857,004.00	5,083,369.00	5,323,238.00	5,569,699.00	5,822,898.00	6,081,601.00	6,345,260.00	6,617,238.00	6,897,244.00	7,185,416.00	7,482,137.00	7,787,263.00
297,204.00	310,220.00	325,016.00	342,067.00	360,924.00	383,869.00	410,648.00	441,491.00	477,602.00	519,558.00	568,900.00	627,042.00	695,686.00	776,787.00	872,770.00	986,184.00	1,120,279.00
95,190.00	107,774.00	115,822.00	126,127.00	140,799.00	157,504.00	170,779.00	195,030.00	224,403.00	260,855.00	305,241.00	355,064.00	415,680.00	488,615.00	576,029.00	681,078.00	808,146.00
4,009,299.00	4,211,745.00	4,420,939.00	4,636,879.00	4,857,004.00	5,083,369.00	5,323,238.00	5,569,699.00	5,822,898.00	6,081,601.00	6,345,260.00	6,617,238.00	6,897,244.00	7,185,416.00	7,482,137.00	7,787,263.00	8,099,396.00
4,009,299.32	4,211,745.68	4,420,939.97	4,636,879.16	4,857,004.32	5,083,369.44	5,323,238.70	5,569,699.32	5,822,898.42	6,081,601.49	6,345,260.46	6,617,238.83	6,897,244.14	7,185,416.11	7,482,137.15	7,787,263.90	8,099,396.92

USD '000	Beginning Balance	Outstanding Repayment	Agreement	Margin	Tot. Rate	Weight	Contribution
Loan 1	328,600.00	281,009.00	Margin + NIBOR	1.90%	3.16%	13%	0.42%
Loan 2	50,000.00	39,348.00	Margin + NIBOR	1.90%	3.16%	2%	0.06%
Loan 3	250,700.00	185,627.00	Margin + NIBOR	1.90%	3.16%	9%	0.28%
Loan 4	100,800.00	93,075.00	Margin + NIBOR	1.90%	3.16%	4%	0.14%
Loan 5	328,400.00	200,255.00	Margin + NIBOR	1.90%	3.16%	9%	0.30%
Loan 6	321,600.00	203,163.00	Margin + NIBOR	1.90%	3.16%	10%	0.30%
Loan 7	110,500.00	91,709.00	Margin + NIBOR	1.90%	3.16%	4%	0.14%
Loan 8	110,500.00	98,166.00	Margin + NIBOR	1.90%	3.16%	5%	0.15%
Loan 9	110,500.00	103,116.00	Margin + NIBOR	1.90%	3.16%	5%	0.15%
Loan 10	544,000.00	490,500.00	Margin + NIBOR	2.30%	3.56%	23%	0.82%
Loan 11	42,900.00	39,325.00	Margin + NIBOR	1.90%	3.16%	2%	0.06%
Loan 12	62,500.00	57,292.00	Margin + NIBOR	1.90%	3.16%	3%	0.08%
Loan 13	133,700.00	131,229.00	Margin + NIBOR	1.90%	3.16%	6%	0.19%
Loan 14	58,500.00	58,500.00	Margin + NIBOR	1.70%	2.96%	3%	0.08%
Loan 15	58,500.00	58,500.00	Margin + NIBOR	1.70%	2.96%	3%	0.08%
Sum	2,611,700.00	2,130,814.00				100%	3.24%

NIBOR (5-year Treasury Yield)	1.26%
Cost of Debt	3.24%

Figure A.29: Cost of Debt

Cost of Equity	
Risk-free rate	1.26%
Equity Beta	1.054
Market Risk Premium	5.00%
Cost of Equity	6.53%
Cost of Debt	
Cost of Debt	3.24%
Marginal Tax Rate	0%
After-tax Cost of Debt	3.24%
Target financial leverage (\$M)	
Debt	2,130,814
Equity	1,720,606.14
Target market value weights	
Equity ratio	0.446745895
Debt ratio	0.553254105
Estimated WACC	
WACC	4.65%

Cost of Capital 4.71%

Figure A.30: Key Metrics

A.3 Klavness

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Total Revenues	326,500.00	376,521.00	401,040.00	421,731.00	477,995.00	502,409.00	526,933.00	511,891.00	516,313.00	522,249.00	526,228.00	531,314.00	536,522.00	541,844.50	547,266.00	552,688.00	558,110.00
growth		15.0%	6.4%	5.2%	12.8%	4.6%	4.6%	-2.8%	0.9%	1.7%	0.8%	0.9%	0.9%	1.0%	1.0%	1.0%	1.0%
Total Cost of Goods Sold (COGS)	248,500.00	275,194.00	291,424.00	312,920.00	336,000.00	350,769.00	365,277.00	369,743.00	374,210.00	378,676.00	383,142.00	387,608.00	392,074.00	396,540.00	401,006.00	405,472.00	410,000.00
of revenue	76.1%	73.1%	72.7%	74.2%	71.1%	71.2%	71.0%	71.4%	72.3%	72.9%	72.8%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%
Gross Profit	78,000.00	101,327.00	109,616.00	108,811.00	141,995.00	151,640.00	161,660.00	142,150.00	142,103.00	143,573.00	143,086.00	143,706.00	144,448.00	145,304.50	146,260.00	147,216.00	148,110.00
Administrative expenses	8,532.00	4,396.00	3,638.00	3,709.00	5,091.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00	5,991.00
Other Operating (Interest) gain	17,169.00	22,619.00	19,676.00	49,600.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00	45,004.00
EBITDA	27,709.00	25,742.00	36,750.00	48,125.00	47,004.00	46,118.00	56,675.00	52,474.00	59,613.00	61,428.00	61,428.00	61,428.00	61,428.00	61,428.00	61,428.00	61,428.00	61,428.00
Depreciation	22,309.00	14,070.00	18,641.00	19,155.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00	28,666.00
Operating Income	5,400.00	11,672.00	18,109.00	28,970.00	18,338.00	17,452.00	27,909.00	23,808.00	30,947.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00
Other Income (expense)	1,874.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EMT	7,274.00	11,672.00	18,109.00	28,970.00	18,338.00	17,452.00	27,909.00	23,808.00	30,947.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00	32,762.00
Interest Income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Expense	9,600.00	14,105.00	3,754.00	14,177.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00	13,866.00
Pre-Tax Income	2,074.00	411.00	11,355.00	14,793.00	4,472.00	3,586.00	14,043.00	9,942.00	17,081.00	18,896.00	18,896.00	18,896.00	18,896.00	18,896.00	18,896.00	18,896.00	18,896.00
Income Tax Expense (gain)	4,000.00	15.00	0.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Income after Tax (Ordinary activities)	4,000.00	996.00	8,755.00	15,820.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00
Equity Earnings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discontinued Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Income	4,000.00	996.00	8,755.00	15,820.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00
Minority Interest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Preferred Dividend	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Income attributable to the Company	4,000.00	996.00	8,755.00	15,820.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00	22,000.00
Common Dividend	1,500.00	1,814.00	490.00	4,802.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00
Retained Earnings	7,500.00	1,318.00	8,222.00	16,360.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00	19,798.00

USD '000	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
2025.931.50	264,356.26	270,941.27	276,361.12	282,684.81	288,963.41	295,460.69	302,133.00	308,938.00	315,869.00	322,927.00	330,114.00	337,445.00	344,922.00	352,545.00	360,314.00	368,229.00	376,290.00	384,507.00	392,880.00	401,409.00
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
112,974.99	124,214.70	126,279.20	130,264.94	134,249.68	138,234.42	142,219.16	146,203.90	150,188.64	154,173.38	158,158.12	162,142.86	166,127.60	170,112.34	174,097.08	178,081.82	182,066.56	186,051.30	190,036.04	194,020.78	198,005.52
0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
15,564.84	16,117.55	16,670.26	17,222.97	17,775.68	18,328.39	18,881.10	19,433.81	19,986.52	20,539.23	21,091.94	21,644.65	22,197.36	22,750.07	23,302.78	23,855.49	24,408.20	24,960.91	25,513.62	26,066.33	26,619.04
9,342.79	6,685.50	6,417.42	6,149.34	5,881.26	5,613.18	5,345.10	5,077.02	4,808.94	4,540.86	4,272.78	4,004.70	3,736.62	3,468.54	3,200.46	2,932.38	2,664.30	2,396.22	2,128.14	1,860.06	1,591.98
17,421.27	19,713.25	20,619.10	21,525.00	22,430.90	23,336.80	24,242.70	25,148.60	26,054.50	26,960.40	27,866.30	28,772.20	29,678.10	30,584.00	31,489.90	32,395.80	33,301.70	34,207.60	35,113.50	36,019.40	36,925.30
7,306.48	74,938.82	76,794.90	78,651.00	80,507.10	82,363.20	84,219.30	86,075.40	87,931.50	89,787.60	91,643.70	93,499.80	95,355.90	97,212.00	99,068.10	100,924.20	102,780.30	104,636.40	106,492.50	108,348.60	110,204.70
28,441.27	28,005.36	27,614.14	27,218.17	26,822.20	26,426.23	26,030.26	25,634.29	25,238.32	24,842.35	24,446.38	24,050.41	23,654.44	23,258.47	22,862.50	22,466.53	22,070.56	21,674.59	21,278.62	20,882.65	20,486.68
40,912.84	40,124.77	40,336.70	40,548.63	40,760.56	40,972.49	41,184.42	41,396.35	41,608.28	41,820.21	42,032.14	42,244.07	42,455.99	42,667.92	42,879.85	43,091.78	43,303.71	43,515.64	43,727.57	43,939.50	44,151.43
10.02	11.61	13.94	15.88	18.00	20.33	22.87	25.61	28.54	31.66	34.96	38.44	42.10	45.94	49.95	54.14	58.50	63.03	67.73	72.59	77.61
46,407.28	51,403.28	52,918.25	54,977.28	57,386.83	60,124.96	63,178.90	66,544.63	70,219.16	74,201.59	78,491.02	83,087.45	87,998.88	93,226.31	98,770.74	104,642.17	110,842.60	117,374.03	124,238.46	131,444.89	139,003.32
791.18	479.05	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10	1,117.10
10,000,017.70	18,164,161.97	32,399,776.23	59,779,624.21	108,625,271.55	197,600,007.00	359,716,688.00	651,654,764.32	1,184,141,413.87	2,127,647,444.65	3,811,842,112.73	6,609,611,121.37	11,609,611,121.37	20,479,611,121.37	36,479,611,121.37	64,479,611,121.37	113,479,611,121.37	201,479,611,121.37	359,479,611,121.37	637,479,611,121.37	1,125,479,611,121.37

USD '000	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash and Cash Equivalents	106,793.00	57,809.00	83,263.00	65,685.00	33,937.00	42,214.00	55,970.00	75,296.00	104,808.00	146,832.00	204,856.00	284,880.00	394,904.00	534,928.00	714,952.00	944,976.00	1,234,000.00	1,604,024.00	2,074,048.00	2,644,072.00
Short-Term Investments	0.00	1,077.00	464.00	87.00	678.00	644.12	814.88	665.96	619.93	573.00	528.00	483.00	438.00	393.00	348.00	303.00	258.00	213.00	168.00	123.00
Cash and Short-Term Investments	106,793.00	58,886.00	83,727.00	66,562.00	34,615.00	43,558.12	56,784.88	76,361.96	105,427.93	147,405.00	205,384.00	285,363.00	395,347.00	535,321.00	715,291.00	944,976.00	1,234,000.00	1,604,024.00	2,074,048.00	2,644,072.00
Net Receivables	29,077.00	14,441.00	10,644.00	19,243.00	20,503.00	21,101.37	22,729.22	25,275.37	27,821.52	30,367.67	32,913.82	35,459.97	38,006.12	40,552.27	43,098.42	4				

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Operating Income	5,420.00	11,692.00	13,916.00	28,970.00	38,399.00	17,444.50	24,778.22	25,837.68	28,990.55	32,439.32	34,699.67	40,457.43	41,356.30	41,840.78	40,992.12	45,472.69	48,359.26
Cash Tax	4,068.00	15.00	59.00	0.00	7.00	7.00	-1,761.64	-2,332.31	-3,180.07	-4,271.12	-4,568.15	-5,324.37	-5,442.67	-5,506.57	-5,395.45	-5,984.01	-6,363.30
NOPLAT	1,352.00	11,677.00	13,857.00	28,970.00	38,392.00	17,437.50	26,539.86	28,169.98	31,170.62	36,710.44	39,267.82	45,781.81	46,798.98	47,347.35	46,387.56	51,456.70	54,722.56
Depreciation	22,359.00	14,070.00	16,841.00	19,155.00	28,666.00	28,666.00	31,820.29	32,406.89	30,643.37	29,188.82	28,315.11	27,489.58	26,764.21	26,125.25	25,528.43	24,957.52	24,412.22
Increase in WC	NA	-93,604.00	35,155.00	-19,087.00	-7,403.00	-9,901.03	-10,621.53	-8,250.28	-9,719.45	-9,059.27	-9,338.21	-9,100.52	-9,404.48	-9,419.22	-9,496.65	-9,140.30	-9,233.62
Investments in CAPEX	1,310.00	6,010.00	2,817.00	19,570.00	17,790.00	9,637.42	13,646.84	14,134.91	16,274.14	15,169.82	15,511.14	16,725.21	16,767.92	16,729.90	16,374.09	17,336.46	17,919.80
FCF	NA	113,341.00	-5,274.00	45,445.00	56,671.00	46,377.11	55,334.85	54,093.25	56,259.31	59,788.71	63,410.09	65,446.68	66,199.74	66,161.93	65,036.55	68,318.07	70,477.51

Forecast period																	
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV
50,932.84	53,125.21	54,641.77	56,668.76	57,992.24	59,737.82	61,930.65	64,760.34	67,021.52	68,940.23	70,679.26	72,427.90	74,495.77	76,633.78	78,941.16	81,274.62	83,523.80	8,838,930.66
-6,701.51	-6,989.67	-7,189.12	-7,455.58	-7,629.69	-7,859.23	-8,147.49	-8,519.38	-8,816.63	-9,068.93	-9,297.65	-9,527.63	-9,799.54	-10,080.67	-10,384.04	-10,690.85	-10,986.60	
57,634.35	60,114.88	61,830.89	64,124.34	65,621.94	67,597.85	70,783.15	73,270.96	75,838.15	78,009.16	79,776.91	81,955.53	84,295.31	86,714.45	89,325.20	91,965.47	94,510.40	
24,005.96	23,634.14	23,317.15	23,044.24	22,811.86	22,616.59	22,454.49	22,330.52	22,251.24	22,215.24	22,213.58	22,240.50	22,293.27	22,373.09	22,481.70	22,619.62	22,786.98	
-9,241.48	-9,254.78	-9,287.68	-9,243.73	-9,279.03	-9,240.94	-9,201.28	-9,148.74	-9,174.22	-9,184.86	-9,185.25	-9,173.47	-9,141.45	-9,125.40	-9,102.53	-9,088.76	-9,081.95	
18,446.25	18,894.38	19,189.66	19,621.42	19,990.00	20,271.61	20,771.48	21,457.49	21,974.57	22,438.00	22,865.65	23,302.71	23,824.70	24,370.63	24,965.32	25,573.66	26,168.49	
72,435.54	74,109.42	75,246.07	76,790.89	77,822.83	79,182.97	80,962.44	83,321.49	85,289.65	86,971.26	88,510.09	90,066.79	91,965.32	93,842.31	95,944.11	98,100.20	100,210.84	

Figure A.32: FCF – Base Case

Scenario 1												
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
FCF	46377	55335	54692	56259	59789	61410	65647	66200	66162	65039	68218	70478
Carbon Cost (EU ETS)	0	0	0	846	824	801	785	770	755	739	724	708
Carbon Cost (ETD)	11	11	11	11	11	11	11	11	9	9	9	9
New FCF	46366	55324	54681	55403	59031	60691	64958	65542	65539	64447	67657	69947

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV
72436	74109	75246	76791	77823	79183	80962	83321	85289	86971	88510	90067	91905	93842	95944	98100	100211	8,838,930.66
493	462	431	400	370	339	308	277	246	216	185	154	123	92	62	31	0	
7	7	7	7	7	7	7	3	3	3	3	3	3	3	3	3	0	
71936	73641	74808	76384	77447	78838	80652	83042	85040	86753	88323	89910	91780	93747	95880	98067	100211	8838931

Figure A.33: FCF – Scenario 1

Scenario 2												
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
FCF	46377	55335	54692	56259	59789	61410	65647	66200	66162	65039	68218	70478
Carbon Cost (EU ETS)	0	0	0	846	824	801	785	770	755	739	724	708
Carbon Cost (ETD)	11	11	11	11	11	11	11	11	9	9	9	9
New FCF	46366	55324	54681	55403	58954	60598	64851	65419	65399	64291	67486	69761

2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV
70478	72436	74109	75246	76791	77823	79183	80962	83321	85289	86971	88510	90067	91905	93842	95944	98100	100211	8,838,930.66
708	693	678	662	647	631	616	601	585	570	554	539	524	508	493	477	462	447	
9	9	9	9	9	9	9	4	4	4	4	4	4	4	4	4	4	2	
69761	71734	73423	74875	76135	77183	78558	80358	82732	84715	86413	87967	89539	91393	93346	95463	97634	99763	8838931

Figure A.34: FCF – Scenario 2

Scenario 3												
USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
FCF	46377	55335	54692	56259	59789	61410	65647	66200	66162	65039	68218	70478
Carbon Cost (EU ETS)	0	0	0	1522	1545	1564	1600	1636	1672	1672	1672	1672
Carbon Cost (ETD)	11	11	12	12	12	12	13	13	13	13	13	13
New FCF	46366	55324	54681	54725	58231	59833	64035	64551	64476	63353	66533	68792

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV
72436	74109	75246	76791	77823	79183	80962	83321	85289	86971	88510	90067	91905	93842	95944	98100	100211	8,838,930.66
1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	1672	
13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
70750	72424	73561	75105	76137	77497	79277	81636	83604	85286	86825	88381	90220	92157	94259	96415	98525	8838931

Figure A.35: FCF – Scenario 3

Value of the Firm	4,536,887.96
Debt	276,483.00
Cash Equivalents	45,882.72
Value of Equity	4,306,287.68

Ordinary Shares Outstanding	52,372.00
Estimated Share Price	82.22

Figure A.36: Share Price - Base Case

Value of the Firm	4,529,916.65
Debt	276,483.00
Cash Equivalents	45,882.72
Value of Equity	4,299,316.37

Ordinary Shares Outstanding	52,372.00
Estimated Share Price	82.09

Figure A.37: Share Price - Scenario 1

Value of the Firm	4,526,416.62
Debt	276,483.00
Cash Equivalents	45,882.72
Value of Equity	4,295,816.34

Ordinary Shares Outstanding	52,372.00
Estimated Share Price	82.03

Figure A.38: Share Price - Scenario 2

Value of the Firm	4,511,263.44
Debt	276,483.00
Cash Equivalents	45,882.72
Value of Equity	4,280,663.16

Ordinary Shares Outstanding	52,372.00
Estimated Share Price	81.74

Figure A.39: Share Price - Scenario 3

		GROWTH								
		0.25%	0.75%	1.25%	1.75%	2.25%	2.75%	3.25%	3.75%	4.25%
WACC	82.22									
	1.41%	137.57	220.83	824.47	-347.30	-124.11	-67.48	-41.62	-26.82	-17.23
	1.91%	91.99	120.70	192.89	716.29	-299.72	-106.20	-57.09	-34.68	-21.84
	2.41%	67.75	81.13	106.03	168.67	622.82	-258.76	-90.84	-48.23	-28.78
	2.91%	52.79	60.04	71.65	93.28	147.67	541.99	-223.46	-77.66	-40.67
	3.41%	42.69	46.99	53.29	63.38	82.17	129.43	472.04	-193.04	-66.35
	3.91%	35.44	38.16	41.90	47.37	56.15	72.48	113.57	411.46	-166.80
	4.41%	30.00	31.80	34.16	37.42	42.18	49.81	64.03	99.78	358.96
	4.91%	25.78	27.01	28.58	30.64	33.47	37.62	44.26	56.64	87.76
	5.51%	21.84	22.64	23.64	24.90	26.55	28.79	32.03	37.11	46.21

Figure A.40: Sensitivity Analysis

Vessel name	Vessel class	Year built	Flag	IMO number
MV Barcarena	CABU	2001	NIS	9214147
MV Banastar	CABU	2001	MI	9228045
MV Bangor	CABU	2002	NIS	9122966
MV Bantry	CABU	2005	MI	9228057
MV Bakkadal	CABU	2007	MI	9308728
MV Balboa	CABU	2016	NIS	9729740
MV Baffin	CABU	2016	MI	9739496
MV Ballard	CABU	2017	NIS	9729738
MV Baru	CLEANBU	2019	MI	9813096
MV Barracuda	CLEANBU	2019	MI	9505041
MV Barramundi	CLEANBU	2019	MI	9353876
MV Baleen	CLEANBU	2020	MI	9855367
MV Bangus	CLEANBU	2020	MI	9861990
MV Baiacu	CLEANBU	2021	MI	9872353
MV Bass	CLEANBU	2021	MI	9885908
MV Balzani	CLEANBU	2021	MI	9885910

Figure A.41: Fleet List

	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
USD 900																	
COGS (% of revenues)	76.11%	55.08%	44.62%	43.99%	41.47%	52.25%	47.48%	45.96%	46.23%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%
Administrative and General Expenses (% of revenues)	2.61%	3.22%	3.55%	2.17%	1.87%	2.69%	2.70%	2.60%	2.41%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%
Other Operating Expense (% of revenues)	-12.77%	-22.83%	-21.62%	-24.26%	-22.78%	-20.85%	-22.47%	-22.40%	-22.55%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%
Depreciation (% of avg fixed assets)	NA	4.35%	6.98%	6.71%	6.09%	6.03%	6.03%	6.37%	6.25%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%
Other Income (% of revenues)	0.60%	0.00%	0.00%	0.00%	0.00%	0.12%	0.02%	0.03%	0.03%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%
Interest Income (% of avg. Cash and Short Term Investments)	NA	3.67%	3.04%	0.68%	0.12%	1.88%	1.88%	1.52%	1.22%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%
Interest Expense (% of Total Liabilities)	3.16%	18.95%	15.95%	4.31%	2.25%	9.32%	10.55%	8.88%	7.46%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%
Marginal Tax rate	-196.33%	2.45%	0.67%	0.00%	0.03%	-38.63%	-7.10%	-9.01%	-10.94%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%
USD 900																	
Growth in Minority Interest	NA	485.84%	-29.11%	41.06%	18.11%	128.98%	128.98%	57.60%	74.95%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%
Average days to collect (Net Receivables)	32.72	38.09	37.00	42.57	37.28	37.53	38.49	38.57	38.89	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15
Short Term Investments (% of revenues)	0.00%	0.79%	0.46%	0.05%	0.34%	0.33%	0.39%	0.31%	0.29%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%
Inventory turnover	6.44	10.50	7.72	11.62	6.69	8.59	9.02	8.73	8.93	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39
Other Current Assets (% of revenues)	13.18%	0.00%	0.00%	0.00%	0.00%	2.64%	0.53%	0.63%	0.76%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%
Other assets (% of revenues)	0.09%	0.15%	1.82%	3.18%	2.86%	1.62%	1.93%	2.28%	2.37%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%
Accounts Payable (% of Cost of Revenue)	7.88%	22.40%	16.73%	18.39%	19.73%	17.03%	18.86%	18.15%	18.43%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%
Short Term Debt (% of Long term Debt)	46.44%	95.78%	95.19%	376.99%	841.29%	291.14%	340.08%	388.94%	447.68%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%
Other Current Liabilities (% of revenues)	17.75%	1.46%	2.25%	0.11%	0.12%	4.34%	1.66%	1.69%	1.58%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%
Other Liabilities	3.05%	13.20%	8.14%	176.65%	165.79%	73.37%	87.43%	102.28%	121.10%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%
USD 900																	
CAPEX (% of EBITDA)	-4.72%	-23.33%	-9.16%	-40.66%	-26.53%	-20.88%	-24.11%	-24.27%	-27.29%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%
Total Other Cash Flow net affecting CF (% of revenues)	-0.59%	2.18%	-0.92%	-3.36%	-3.80%	-1.30%	-1.44%	-2.16%	-2.41%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%
Other Operating Activities (% of revenues)	-2.63%	8.91%	2.01%	-5.51%	1.28%	0.86%	1.56%	0.09%	-0.29%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Other Investing Activities (% of revenues)	-0.82%	0.00%	0.85%	7.99%	5.30%	2.66%	3.36%	4.03%	4.67%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%
Other Financing Activities (% of revenues)	13.16%	77.67%	30.65%	-26.39%	11.02%	21.22%	22.83%	11.87%	8.11%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%
Common Dividend Payout Ratio	21.92%	-639.93%	-5.68%	-31.63%	-31.88%	-137.44%	-169.31%	-75.19%	-89.09%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%
Increase in Investments (% of revenue)	NA	271.95%	-85.34%	-72.72%	15.53%	32.53%	32.55%	-15.57%	-1.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Income Statement	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	46.68%	
	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	
	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	-22.21%	
	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	6.16%	
	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	
	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	1.32%	
	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	8.09%	
	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	-13.13%	
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Balance Sheet	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	81.72%	
	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	38.15	
	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	0.33%	
	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	8.39	
	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	
	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	
	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	18.44%	
	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	461.82%	
	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	1.88%	
	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	109.99%	
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Cash Flow	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	-24.62%	
	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	-2.22%	
	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	
	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	4.01%	
	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	15.01%	
	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	-100.58%	
	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	12.61%	

Figure A.42: Drivers

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash	106,793.00	57,089.00	88,263.00	65,685.00	53,937.00	45,218.60	35,507.00	25,795.40	16,083.80	6,372.20	-3,339.40	-13,051.00	-22,762.60	-32,474.20	-42,185.80	-51,897.40	-61,609.00
Net receivables	29,677.00	14,443.00	10,464.00	19,243.00	20,502.00	21,101.37	22,129.72	22,675.57	23,375.62	23,449.31	23,976.92	24,516.40	25,068.02	25,632.05	26,208.77	26,798.47	27,401.43
Inventory	38,584.00	7,163.00	5,883.00	6,159.00	12,279.00	12,306.75	10,889.15	11,509.85	11,303.28	12,516.71	12,798.34	12,667.58	13,114.08	13,610.16	14,270.82	14,304.42	14,532.67
Accounts Payable	19,596.00	16,841.00	7,601.00	13,165.00	16,199.00	18,008.75	18,529.42	18,234.67	18,935.99	19,370.79	19,806.63	19,604.27	20,295.26	21,063.01	22,085.43	22,137.43	22,490.67
Net Working capital	155,458.00	61,854.00	97,069.00	77,922.00	70,519.00	60,617.97	49,996.44	41,746.16	32,026.70	22,967.43	13,629.23	4,528.71	-4,875.77	-14,294.99	-23,791.64	-32,931.94	-42,165.57
Increase in NWC	NA	-93,604.00	35,155.00	-19,087.00	-7,483.00	-9,901.03	-10,621.53	-8,250.28	-9,719.45	-9,859.27	-9,338.21	-9,100.52	-9,484.48	-9,419.22	-9,496.65	-9,140.30	-9,233.62

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
-71,320.60	-81,032.20	-90,743.80	-100,455.40	-110,167.00	-119,878.60	-129,590.20	-139,301.80	-149,013.40	-158,725.00	-168,436.60	-178,148.20	-187,859.80	-197,571.40	-207,283.00	-216,994.60	-226,706.20
28,017.96	28,648.37	29,292.96	29,952.05	30,625.97	31,315.05	32,019.64	32,740.08	33,476.74	34,229.96	35,000.14	35,787.64	36,592.86	37,416.20	38,258.07	39,118.87	39,999.05
14,800.04	15,117.03	15,520.01	15,869.21	16,309.96	16,708.84	17,063.61	17,351.39	17,715.50	18,128.90	18,574.16	19,029.56	19,458.84	19,891.89	20,317.02	20,751.59	21,209.10
22,904.46	23,395.02	24,018.68	24,559.10	25,241.20	25,858.50	26,407.54	26,852.90	27,416.09	28,056.17	28,745.26	29,450.03	30,114.39	30,784.57	31,442.50	32,115.04	32,823.07
-51,407.05	-60,661.82	-69,949.51	-79,193.23	-88,472.26	-97,713.20	-106,914.49	-116,063.23	-125,237.45	-134,422.31	-143,607.56	-152,781.03	-161,922.48	-171,047.88	-180,150.41	-189,239.17	-198,321.13
-9,241.48	-9,254.78	-9,287.68	-9,243.73	-9,279.03	-9,240.94	-9,201.28	-9,148.74	-9,174.22	-9,184.86	-9,185.25	-9,173.47	-9,141.45	-9,125.40	-9,102.53	-9,088.76	-9,081.95

Figure A.43: Net Working Capital

USD '000	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Beginning Balance	276,483.00	276,483.00	276,483.00	537,553.00	821,628.00	1,396,816.00	2,486,239.00	4,468,755.00	8,076,611.00	14,618,746.00	26,516,623.00	48,137,885.00
Issuance	-	-	-	450,356.00	351,443.00	642,550.00	1,469,381.00	2,321,203.00	3,943,752.00	6,892,334.00	12,250,583.00	21,987,745.00
Repayment Plan	-	-	-	189,286.00	67,368.00	67,362.00	379,968.00	338,677.00	335,896.00	350,199.00	352,706.00	366,483.00
Ending Balance	276,483.00	276,483.00	537,553.00	821,628.00	1,396,816.00	2,486,239.00	4,468,755.00	8,076,611.00	14,618,746.00	26,516,623.00	48,137,885.00	87,428,705.00
Cost of Ending Balance	276,483.00	276,483.00	538,152.03	821,279.04	1,395,316.45	2,486,239.23	4,468,755.93	8,071,543.22	14,618,746.93	26,516,623.43	48,137,885.23	87,428,705.89

2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
129,231.00	238,790.00	526,506.00	952,844.00	1,711,484.00	3,146,449.00	5,717,906.00	10,390,412.00	18,881,674.00	34,312,211.00
129,450.00	238,037.00	526,016.00	952,444.00	1,711,091.00	3,146,056.00	5,717,513.00	10,386,019.00	18,877,281.00	34,307,814.00
1,000.00	753.00	490.00	400.00	393.00	393.00	393.00	393.00	393.00	393.00
282,579,906.40	524,366,488.00	952,844,018.00	1,711,484,018.00	3,146,449,738.00	5,717,906,797.00	10,390,412,721.00	18,881,674,620.00	34,312,211,524.00	62,382,975,160.00
282,579,906.40	524,366,488.00	952,844,018.00	1,711,484,018.00	3,146,449,738.00	5,717,906,797.00	10,390,412,721.00	18,881,674,620.00	34,312,211,524.00	62,382,975,160.00

USD '000	Beginning Balance	Outstanding	Repayment	Agreement	Margin	Tot. Rate	Weight	Contribution
Loan 1	100,000.00	0.00	Margin + LIBOR	2.30%	3.56%	0%	0.00%	
Loan 2	105,000.00	83,344.00	Margin + LIBOR	2.30%	3.56%	30%	1.07%	
Loan 3	90,675.00	85,786.00	Margin + LIBOR	2.30%	3.56%	31%	1.10%	
Loan 4	60,000.00	27,353.00	Margin + LIBOR	2.75%	4.01%	10%	0.40%	
Loan 6	80,000.00	80,000.00	Margin + LIBOR	2.30%	3.56%	29%	1.03%	
Sum	435,675.00	276,483.00				100%	3.60%	

LIBOR (5-year Treasury Yield)	1.26%
Cost of Debt	3.60%

Figure A.44: Cost of Debt

Cost of Equity	
Risk-free rate	1.26%
Equity Beta	0.422
Market Risk Premium	5.00%
Cost of Equity	3.37%
Cost of Debt	
Cost of Debt	3.60%
Marginal Tax Rate	0%
After-tax Cost of Debt	3.60%
Target financial leverage (\$M)	
Debt	276,483
Equity	460,231.87
Target market value weights	
Equity ratio	0.624708267
Debt ratio	0.375291733
Estimated WACC	
WACC	3.41%
Cost of Capital	3.46%

Figure A.45: Key Metrics

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		Detailed forecast period												Historical period															
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Revenues		1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00
Cost of Goods Sold (COGS)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00
Gross Profit		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Administrative expenses		1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00	1,538,000.00
Other Operating (Losses) gains		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EBITDA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operating Income		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Income (expenses)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EBIT		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Expense		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pre-Tax Income		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income Tax Expense		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income after Tax (Ordinary activities)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity Earnings		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discontinued Operations		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Income		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minority Interest		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Preferred Dividend		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Income attributable to the Company		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Dividend		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Retained Earnings		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Figure A.46: Financial Statements

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Operating Income	-532,249.00	176,241.00	148,068.00	166,291.00	205,433.00	-41,850.03	193,448.68	218,078.15	235,556.22	251,240.85	270,703.88	281,657.51	297,209.32	300,854.44	303,381.17	306,254.27	374,813.45
Cash flow	12,219.00	-7,701.00	18,534.00	8,321.00	24,401.00	24,401.00	15,811.18	143,399.74	95,111.72	108,249.66	117,116.83	121,981.64	128,965.04	130,462.56	131,450.84	137,376.42	163,879.50
NPVAT	-544,488.00	183,942.00	129,534.00	157,978.00	181,648.00	-46,258.03	197,657.57	219,118.24	240,424.47	259,791.39	280,820.71	292,639.05	306,174.36	309,706.90	312,832.34	316,560.69	386,692.95
Depreciation	164,497.00	264,664.00	294,553.00	292,242.00	295,439.00	295,439.00	252,046.87	239,138.24	233,516.08	222,664.73	213,660.08	205,571.16	198,399.67	192,035.14	186,337.73	181,108.52	176,034.23
Increase in WC	NA	15,854.00	33,758.00	25,747.00	36,852.00	33,097.44	8,237.45	31,213.70	38,952.28	39,717.01	36,451.84	30,029.56	30,482.80	29,873.18	29,931.37	33,689.40	33,648.71
Investments in CAPEX	160,372.00	146,327.00	156,297.00	140,748.00	185,486.00	23,734.03	132,837.75	133,251.12	127,629.02	125,587.84	128,413.56	129,173.05	131,341.36	130,673.86	129,831.25	143,524.08	146,278.20
FCF	NA	286,425.00	194,833.00	253,537.00	254,195.00	170,372.50	217,609.17	151,091.83	207,556.25	206,151.28	208,381.82	206,942.40	204,719.20	201,881.59	198,503.32	206,714.56	216,541.38

Figure A.47: FCF – Base Case

Scenario 1	USD '000	Forecast period																															
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV		
FCF		170372	217609	151092	207356	200151	208382	206042	204719	201882	198503	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	212000	
Carbon Cost (EU ETS)		0	0	0	49655	47535	45099	43138	41177	39217	37256	35295	33334	31373	30393	29412	28432	27452	26472	25492	24512	23532	22552	21572	20592	19612	18632	17652	16672	15692	14712	13732	12752
Carbon Cost (ETD)		8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	
New FCF		161978	209215	142697	149097	144222	154888	154510	155147	156404	156266	167263	173455																				

Figure A.48: FCF – Scenario 1

Scenario 2	USD '000	Forecast period																															
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV		
FCF		170372	217609	151092	207356	200151	208382	206042	204719	201882	198503	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	212000	
Carbon Cost (EU ETS)		0	0	0	53854	52487	50982	49021	47060	45099	43138	41177	39217	37256	35295	33334	31373	30393	29412	28432	27452	26472	25492	24512	23532	22552	21572	20592	19612	18632	17652	16672	15692
Carbon Cost (ETD)		8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	8394	
New FCF		161978	209215	142697	145108	139270	149006	147647	147304	147126	144728	153976	158727																				

Figure A.49: FCF – Scenario 2

Scenario 3	USD '000	Forecast period																															
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	TV		
FCF		170372	217609	151092	207356	200151	208382	206042	204719	201882	198503	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	206772	210541	212000	
Carbon Cost (EU ETS)		0	0	0	42498	41150	39822	38474	37126	35778	34430	33082	31734	30386	29038	27690	26342	24994	23646	22298	20950	19602	18254	16906	15558	14210	12862	11514	10166	8818	7470	6122	4774
Carbon Cost (ETD)		8583	8776	8974	9176	9382	9593	9809	10030	10256	10482	10708	10934	11160	11386	11612	11838	12064	12290	12516	12742	12968	13194	13420	13646	13872	14098	14324	14550	14776	15002	15228	
New FCF		161789	208833	142118	155882	147769	158890	156233	157689	159145	160601	162057	163513	164969	166425	167881	169337	170793	172249	173705	175161	176617	178073	179529	180985	182441	183897	185353	186809	188265	189721	191177	192633

Figure A.50: FCF – Scenario 3

Value of the Firm	4,932,530.04
Debt	224,970.80
Cash Equivalents	190,432.00
Value of Equity	4,897,991.24
Ordinary Shares Outstanding	203,530.98
Estimated Share Price	24.07

Figure A.51: Share Price - Base Case

Value of the Firm	4,493,387.78
Debt	224,970.80
Cash Equivalents	190,432.00
Value of Equity	4,458,848.98
Ordinary Shares Outstanding	203,530.98
Estimated Share Price	21.91

Figure A.52: Share Price - Scenario 1

Value of the Firm	4,322,766.11
Debt	224,970.80
Cash Equivalents	190,432.00
Value of Equity	4,288,227.31
Ordinary Shares Outstanding	203,530.98
Estimated Share Price	21.07

Figure A.53: Share Price - Scenario 2

Value of the Firm	4,219,485.55
Debt	224,970.80
Cash Equivalents	190,432.00
Value of Equity	4,184,946.75
Ordinary Shares Outstanding	203,530.98
Estimated Share Price	20.56

Figure A.54: Share Price - Scenario 3

		GROWTH								
		0.25%	0.75%	1.25%	1.75%	2.25%	2.75%	3.25%	3.75%	4.25%
WACC	24.07	35.10	38.21	42.76	50.06	63.72	98.39	364.21	-129.45	-42.33
	3.40%	29.85	31.81	34.51	38.47	44.82	56.69	86.84	317.96	-111.26
	4.40%	25.91	27.20	28.91	31.26	34.70	40.22	50.55	76.78	277.86
	4.90%	22.84	23.73	24.85	26.34	28.38	31.38	36.19	45.19	68.02
	5.40%	20.40	21.02	21.79	22.77	24.07	25.85	28.46	32.65	40.49
	5.90%	18.41	18.86	19.40	20.07	20.92	22.05	23.61	25.88	29.53
	6.40%	16.76	17.09	17.47	17.95	18.53	19.28	20.26	21.62	23.60
	6.90%	15.37	15.61	15.90	16.24	16.65	17.16	17.81	18.67	19.85
	7.40%	14.19	14.37	14.58	14.83	15.12	15.48	15.93	16.50	17.25

Figure A.55: Sensitivity Analysis

Vessel name	IMO number
Bochem Ghent	9565649
Bochem Mumbai	9565637
Bochem Oslo	9420710
Stolt Acer	9272668
Stolt Achievement	9124469
Stolt Bobcat	9511167
Stolt Breland	9414084
Stolt Cedar	8919049
Stolt Cobalt	9739305
Stolt Commitment	9168647
Stolt Concept	9178197
Stolt Confidence	9102071
Stolt Courage	9296731
Stolt Creativity	9102095
Stolt Efficiency	9102112
Stolt Effort	9178202
Stolt Endurance	9284697
Stolt Facto	9359363
Stolt Focus	9214305
Stolt Glory	9311012
Stolt Groenland	9414072
Stolt Innovation	9102069
Stolt Inspiration	9102083
Stolt Integrity	9680097
Stolt Island	9414058
Stolt Kashi	9266243
Stolt Betula	9266267
Stolt Larix	9617650
Stolt Lotus	9617648
Stolt Lotyalty	9680114
Stolt Magnesium	9739317
Stolt Mercury	9739329
Stolt Norland	9414060
Stolt Ocelot	9459539
Stolt Perseverancee	9124471
Stolt Pondo	9374521
Stolt Pridee	9680073
Stolt Sagaland	9352200
Stolt Sea	9149495
Stolt Sequoia	9235062
Stolt Sincerity	9680085
Stolt Sisto	9359375
Stolt Sneland	9352212
Stolt Spray	9168611
Stolt Stream	9169940
Stolt Strenght	9311024
Stolt Sun	9149512
Stolt Surf	9168623
Stolt Sycamore	9198563
Stolt Sypress	9505089
Stolt Tenacity	9680102
Stolt Vanguard	9274305
Stolt Viking	9196711
Stolt Virtue	9274317
Stolt Vision	9274329
Stolt Agron	9739288
Stolt Basuto	9351543
Stolit Bismuth	9739290
Stolt Capability	9102124
Stolt Excellence	9720081
Stolt Invention	9102100
Stolt Span	9149524
Stolt Zulu	9351531
City Island	9360960
Glen Cove	9414228
Monax	9311256
Octonaut	9340477
Orchid Americas	9304306
Orchid Kefalonia	9363821
Orchid Madeira	9367401

Orchid Sylt	9367413
Stolt Alm	9719238
Stolt Apal	9719240
Stolt Calluna	9744893
Stolt Ebony	9744908
Stolt Lerk	9719252
Stolt Lind	9719264
Stolt Maple	9764491
Stolt Palm	9764506
Stolt Auk	9164108
Stolt Cormorant	9148960
Stolt Fulmar	9148972
Stolt Greenshank	9518799
Stolt Gullmot	8920581
Stolt Jaeger	9114775
Stolt Kingfisher	9154323
Stolt Osprey	9147461
Stolt Pelican	9016882
Stolt Redshank	9566746
Stolt Sanderling	9518804
Stolt Sandpiper	9566758
Stolt Seagull	9125645
Stolt Shearwater	9148958
Stolt Ajsai	9477555
Stolt Hagi	9750206
Stolt Kikyo	9156565
Stolt Momiji	9470545
Stolt Renge	9781126
Stolt Rindo	9314765
Stolt Sakura	9432969
Stolt Satsuki	9781114
Stolt Suisen	9156577
Stolt Tsubaki	9477543
Stolt Yuri	9750218
Stolt Distributor	9276145
Stolt Voyager	9297292
Stolt Agulia	9391983
Stolt Flamenco	9391995
Stolt Halcon	9376658
Stolt Ilex	9505936
Stolt Kiri	9266231
Stolt Quetal	9376660
Stolt Skua	9199311
Stolt Teal	9199323
Aquamarin	9370135
Artega	8337253
Bacchus	8536184
Balder	7710226
Comuns 2	7327794
Emma	9477309
Emma 2	9374703
Justina	9602083
Mayflower	9714680
Panamera	9669691
Pilator	9345489
Piz Albana	9014169
Piz Alibris	9014157
Piz Amalia	9063897
Piz Bernina	8857370
Piz Everst	7324869
Relationship	8911724
Stolt Donau	9928607
Stolt Emsland	8336314
Stolt Filia	9582893
Stolt Florence	9582910
Stolt Koeln	8643690
Stolt Maas	9017719
Stolt Main	9017525
Stolt Merwede	9617064
Stolt Mosel	9017537
Stolt Neckar	9017721
Stolt Rhine	9617052

Stolt Schelde	9353498
Stolt Waal	9017733
Synergy	8801515
Targa	9515539
Tolerantie	9353515
Valinte	8615485
Vertigo	1011147
AL 2300	-
AL 2301	-
DBL 206	1234567
Bai Yang	9854260
Cui Bai	9425394
Hong Feng	9756573
Qiu Hai Tang	9589437
Nan Yang Lan	9258832
Zi Ding Xiang	9534535
Zi Luo Lan	9426178
Zi Tong	9469261

Figure A.56: Fleet List

USD '000	Detailed forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
COGS (% of revenues)	112.62%	67.29%	68.34%	66.31%	66.25%	76.16%	68.87%	69.19%	69.36%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%
Administrative and General Expenses (% of revenues)	18.70%	10.50%	10.14%	9.60%	10.11%	11.81%	10.43%	10.42%	10.47%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%
Other Operating Expense (% of revenues)	-2.17%	-1.46%	-1.71%	-0.64%	-0.67%	-1.33%	-1.16%	-1.10%	-0.98%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
Depreciation (% of avg fixed assets)	NA	7.90%	7.96%	9.21%	9.43%	8.62%	8.62%	8.77%	8.93%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%
Other Income (% of revenues)	-1.32%	-1.24%	-0.27%	-0.63%	-0.46%	-0.79%	-0.68%	-0.57%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%
Interest Income (% of avg. Cash and Short Term Investments)	NA	11.39%	7.79%	3.47%	3.14%	6.45%	6.45%	5.46%	4.99%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%
Interest Expense (% of Total Liabilities)	12.21%	9.31%	10.26%	4.04%	3.70%	7.90%	7.04%	6.59%	5.85%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%
Marginal Tax rate	-1.75%	-55.68%	198.39%	29.19%	29.27%	39.88%	48.21%	68.99%	43.11%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%

USD '000	Forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
COGS (% of revenues)	112.62%	67.29%	68.34%	66.31%	66.25%	76.16%	68.87%	69.19%	69.36%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%
Administrative and General Expenses (% of revenues)	18.70%	10.50%	10.14%	9.60%	10.11%	11.81%	10.43%	10.42%	10.47%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%
Other Operating Expense (% of revenues)	-2.17%	-1.46%	-1.71%	-0.64%	-0.67%	-1.33%	-1.16%	-1.10%	-0.98%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
Depreciation (% of avg fixed assets)	NA	7.90%	7.96%	9.21%	9.43%	8.62%	8.62%	8.77%	8.93%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%
Other Income (% of revenues)	-1.32%	-1.24%	-0.27%	-0.63%	-0.46%	-0.79%	-0.68%	-0.57%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%
Interest Income (% of avg. Cash and Short Term Investments)	NA	11.39%	7.79%	3.47%	3.14%	6.45%	6.45%	5.46%	4.99%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%
Interest Expense (% of Total Liabilities)	12.21%	9.31%	10.26%	4.04%	3.70%	7.90%	7.04%	6.59%	5.85%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%
Marginal Tax rate	-1.75%	-55.68%	198.39%	29.19%	29.27%	39.88%	48.21%	68.99%	43.11%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%

USD '000	Forecast period																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CAPEX (% of EBITDA)	92.94%	-33.19%	-38.82%	-30.69%	-37.03%	-9.36%	-29.82%	-29.14%	-27.21%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%
Total Other Cash Flow not affecting CF (% of revenues)	29.01%	15.99%	14.63%	18.56%	15.02%	18.64%	16.37%	16.68%	17.99%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%
Other Operating Activities (% of revenues)	-1.17%	-0.68%	-1.12%	-0.43%	-0.28%	-0.74%	-0.65%	-0.64%	-0.55%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%
Other Investing Activities (% of revenues)	-2.22%	-0.81%	2.02%	0.97%	1.41%	0.43%	0.96%	1.16%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%
Other Financing Activities (% of revenues)	-4.77%	-7.71%	-0.16%	-2.03%	-20.33%	-7.00%	-7.45%	-7.40%	-8.84%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%
Common Dividend Payout Ratio	7.74%	-127.55%	292.86%	-66.71%	-83.80%	12.53%	13.49%	41.69%	-8.56%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%
Increase in Investments (% of revenue)	NA	-57.24%	-25.56%	15.23%	27.53%	-10.01%	-8.56%	4.44%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%	69.97%
10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%	10.65%
-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%	8.87%
-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%	-0.62%
5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%	5.30%
6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%	6.22%
45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%	45.89%

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44	49.44
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94	181.94
8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%	8.53%
9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%	7.21%
45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%	45.34%
19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%	19.05%
19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%	19.18%

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%	-26.51%
16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%
-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%	-0.57%
0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%
-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%	-10.20%
3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%	3.07%
2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%	2.28%

Figure A.57: Drivers

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash	58,308.00	64,529.00	136,151.00	187,767.00	123,868.00	190,432.00	215,867.80	241,303.60	266,739.40	292,175.20	317,611.00	343,046.80	368,482.60	393,918.40	419,354.20	444,790.00	470,225.80
Net receivables	241,115.00	243,910.00	217,909.00	220,264.00	344,347.00	312,567.46	288,559.48	300,536.76	317,624.96	334,798.92	342,331.89	350,034.36	357,910.14	365,963.11	374,197.28	382,616.72	391,225.60
Inventory	8,851.00	9,043.00	8,093.00	7,741.00	6,986.00	9,975.21	8,981.28	9,010.96	9,145.70	9,227.47	9,435.89	9,691.53	9,924.88	10,223.31	10,531.71	10,845.39	10,792.53
Accounts Payable	89,891.00	83,245.00	94,158.00	92,030.00	114,607.00	117,283.23	108,479.67	114,408.72	118,112.18	121,086.71	123,811.16	127,176.31	130,238.43	134,154.45	138,201.45	138,380.97	141,624.06
Net Working capital	218,383.00	234,237.00	267,995.00	323,742.00	368,594.00	395,691.44	464,928.89	436,442.60	475,397.87	515,114.88	545,564.83	575,596.39	606,079.19	635,950.37	665,881.74	699,571.14	730,619.87
Increase in NWC	NA	15,854.00	33,758.00	55,747.00	36,852.00	35,097.44	9,237.45	31,611.70	38,955.28	39,717.81	30,451.94	30,029.56	30,482.80	29,871.18	29,931.37	33,689.40	31,048.73

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
495,661.60	521,097.40	546,533.20	571,969.00	597,404.80	622,840.60	648,276.40	673,712.20	699,148.00	724,583.80	750,019.60	775,455.40	800,891.20	826,327.00	851,762.80	877,198.60	902,634.40
400,028.17	409,028.81	418,231.96	427,642.18	437,264.12	447,102.57	457,162.37	467,448.53	477,966.12	488,720.36	499,716.57	510,960.19	522,456.79	534,212.07	546,231.84	558,522.06	571,088.81
11,048.87	11,328.08	11,631.77	11,893.49	12,152.27	12,415.87	12,673.25	12,927.27	13,242.08	13,560.08	13,880.11	14,195.12	14,498.12	14,812.93	15,141.25	15,482.64	15,837.81
144,987.88	148,651.71	152,636.92	156,071.26	159,467.05	162,926.15	166,303.69	169,636.95	173,768.06	177,940.94	182,140.53	186,274.23	190,250.37	194,381.39	198,689.74	203,169.56	207,830.36
761,750.76	792,802.57	823,760.00	855,433.41	887,354.14	919,432.89	951,808.34	984,451.04	1,016,588.14	1,048,923.29	1,081,475.75	1,114,336.48	1,147,595.75	1,180,970.61	1,214,446.15	1,248,033.74	1,281,730.66
31,130.89	31,051.81	30,957.43	31,673.40	31,920.73	32,078.75	32,375.46	32,642.70	32,137.10	32,335.15	32,552.46	32,860.73	33,259.26	33,374.86	33,475.54	33,587.58	33,696.93

Figure A.58: Net Working Capital

USD '000	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Beginning Balance	224,970.80	224,970.80	224,970.80	239,425.00	251,866.00	267,729.00	285,906.00	305,571.00	326,054.00	347,693.00	369,600.00	391,672.00	418,998.00
Issuance	-	-	235,888.00	118,671.00	124,814.00	446,168.00	411,972.00	423,763.00	424,808.00	429,779.00	433,625.00	444,156.00	449,272.00
Repayment Plan	-	-	221,433.80	106,230.00	108,951.00	427,991.00	392,307.00	403,280.00	403,169.00	407,872.00	411,553.00	417,730.00	341,754.00
Ending Balance	224,970.80	224,970.80	239,425.00	251,866.00	267,729.00	285,906.00	305,571.00	326,054.00	347,693.00	369,600.00	391,672.00	418,998.00	445,616.00
Goal of Ending Balance	224,970.80	224,970.80	239,425.00	251,866.00	267,729.00	285,906.00	305,571.00	326,054.00	347,693.00	369,600.00	391,672.00	418,998.00	445,616.00
Loan Year DSC	0.1382												

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
445,616.00	474,104.00	503,295.00	532,912.00	563,620.00	595,536.00	628,664.00	663,165.00	699,162.00	735,883.00	773,373.00	811,707.00	851,062.00	891,714.00	933,603.00	976,647.00	1,020,776.00
297,204.00	310,220.00	325,016.00	342,067.00	360,924.00	383,869.00	410,648.00	441,491.00	477,602.00	519,558.00	568,900.00	627,042.00	695,686.00	776,787.00	864,184.00	963,770.00	1,076,279.00
268,716.00	281,029.00	295,399.00	311,359.00	329,008.00	350,741.00	376,147.00	405,494.00	440,881.00	482,068.00	530,566.00	587,687.00	655,034.00	734,898.00	829,726.00	942,055.00	1,075,139.00
474,104.00	503,295.00	532,912.00	563,620.00	595,536.00	628,664.00	663,165.00	699,162.00	735,883.00	773,373.00	811,707.00	851,062.00	891,714.00	933,603.00	976,647.00	1,020,776.00	1,065,916.00
474,104.35	503,295.73	532,912.78	563,620.66	595,536.76	628,664.52	663,165.19	699,162.95	735,883.60	773,373.25	811,707.28	851,062.56	891,714.65	933,603.78	976,647.80	1,020,776.80	1,065,916.88

USD '000	Beginning Balance	Outstanding	Repayment	Agreement	Margin	Tot. Rate	Weight	Contribution
Loan 1	109,575.00	109,575.00	Margin + NIBOR		4.50%	5.76%	49%	2.81%
Loan 2	115,395.80	115,395.80	Margin + NIBOR		3.65%	4.91%	51%	2.52%
Sum	224,970.80	224,970.80					100%	5.32%

NIBOR (5-year Treasury Yield)	1.26%
Cost of Debt	5.32%

Figure A.59: Cost of Debt

Cost of Equity	
Risk-free rate	1.26%
Equity Beta	0.838
Market Risk Premium	5.00%
Cost of Equity	5.45%
Cost of Debt	
Cost of Debt	5.32%
Marginal Tax Rate	0%
After-tax Cost of Debt	5.32%
Target financial leverage (\$M)	
Debt	224,971
Equity	1,628,061.66
Target market value weights	
Equity ratio	0.878593168
Debt ratio	0.121406832
Estimated WACC	
WACC	5.40%

Cost of Capital 5.43%

Figure A.60: Key Metrics

A.5 Golden Ocean Group

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033		
Total Revenues	460,233.00	658,079.00	705,999.00	607,943.00	1,283,331.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00		
growth	0.00	44.25	6.79	-13.80	107.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Total Cost of Goods Sold (COGS)	-3,569.00	-1,321.00	-1,700.00	-2,865.00	-1,783.00	-5,111.33	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66	-4,706.66		
% of revenues	0.8%	0.2%	0.2%	0.5%	0.1%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%		
Gross Profit	463,992.00	659,310.00	704,299.00	610,808.00	1,285,114.00	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33	1,235,368.33		
Administrative expenses	12,588.00	14,700.00	14,123.00	13,722.00	18,149.00	26,420.34	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37	24,997.37		
Other Operating (Income) gains	0.00	0.00	0.00	0.00	0.00	-555,959.00	-677,655.00	-696,005.00	-547,545.00	-555,959.00	-677,655.00	-696,005.00	-547,545.00	-555,959.00	-677,655.00	-696,005.00	-547,545.00		
EBITDA	128,168.00	337,141.00	184,581.00	49,641.00	637,965.00	653,836.00	381,154.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00		
Depreciation	78,093.00	92,148.00	93,645.00	113,303.00	123,699.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00	129,279.00		
Operating Income	50,075.00	145,093.00	190,656.00	-64,262.00	514,266.00	524,557.00	251,876.00	240,836.00	240,836.00	240,836.00	240,836.00	240,836.00	240,836.00	240,836.00	240,836.00	240,836.00	240,836.00		
Other Income (expenses)	5,266.00	7,286.00	-11,317.00	-29,592.00	33,424.00	53,544.00	-81.00	-81.00	-81.00	-81.00	-81.00	-81.00	-81.00	-81.00	-81.00	-81.00	-81.00		
EBIT	55,341.00	152,379.00	179,339.00	-93,854.00	547,690.00	578,101.00	251,795.00	240,755.00	240,755.00	240,755.00	240,755.00	240,755.00	240,755.00	240,755.00	240,755.00	240,755.00	240,755.00		
Interest Income	2,287.00	5,774.00	4,434.00	1,933.00	444.00	54,826.00	303,878.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00	370,115.00		
Interest Expense	59,840.00	73,000.00	59,547.00	47,477.00	39,900.00	39,900.00	50,875.00	36,291.00	35,053.63	35,053.63	35,053.63	35,053.63	35,053.63	35,053.63	35,053.63	35,053.63	35,053.63		
Income Tax Expense (gains)	56.00	232.00	237.00	131.00	389.00	389.00	307,878.00	416,708.00	416,708.00	416,708.00	416,708.00	416,708.00	416,708.00	416,708.00	416,708.00	416,708.00	416,708.00		
Income after Tax (Ordinary activities)	-2,488.00	84,538.00	37,889.00	-17,669.00	572,180.00	543,749.56	302,722.27	410,965.55	433,696.66	442,121.12	405,506.66	422,474.99	452,573.63	454,008.12	437,309.18	429,409.31	435,665.42		
Equity in Earnings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Discontinued Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Net Income	-2,488.00	84,538.00	37,889.00	-17,669.00	572,180.00	543,749.56	302,722.27	410,965.55	433,696.66	442,121.12	405,506.66	422,474.99	452,573.63	454,008.12	437,309.18	429,409.31	435,665.42		
Minority Interest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Preferred Dividend	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Net Income attributable to the Company	-2,488.00	84,538.00	37,889.00	-17,669.00	572,180.00	543,749.56	302,722.27	410,965.55	433,696.66	442,121.12	405,506.66	422,474.99	452,573.63	454,008.12	437,309.18	429,409.31	435,665.42		
Common Dividend	0.00	-66,912.00	-46,017.00	-7,164.00	-120,029.00	-286,316.09	-197,272.81	-241,629.64	-197,999.64	-246,492.56	-220,073.89	-235,546.17	-252,247.95	-253,607.75	-243,799.62	-239,609.77	-242,843.38		
Retained Earnings	-2,488.00	17,626.00	9,872.00	-24,833.00	292,556.00	263,433.47	105,449.46	107,706.71	239,691.02	195,739.66	179,566.77	197,524.82	309,239.29	306,398.34	198,605.65	192,124.04	192,124.04		
2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-4,863.00	-5,025.38	-5,057.64	-5,057.64	-5,102.17	-4,916.76	-4,821.62	-4,859.85	-4,930.55	-5,021.19	-5,032.52	-4,991.77	-4,952.23	-4,926.81	-4,910.61	-4,933.17	-4,967.20	0.00	0.00	0.00
1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00	1,230,257.00
23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23	23,775.23
781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48	781,038.48
430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95
-25,517.00	-1,933.43	2,496.27	4,025.59	2,087.81	343.97	855.00	2,012.62	1,217.47	1,605.54	1,237.38	1,440.87	1,740.80	1,898.88	1,571.78	1,496.88	1,527.84	0.00	0.00	0.00
430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95	430,891.95
10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30	10,029.30
442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15
-1,801.30	-4,228.40	-4,655.49	-5,082.59	-5,509.64	-5,936.78	-6,363.92	-6,791.06	-7,218.20	-7,645.34	-8,072.48	-8,499.54	-8,926.64	-9,353.53	-9,780.63	-10,207.72	-10,634.82	0.00	0.00	0.00
88,950.51	92,962.65	96,974.83	100,987.01	104,999.19	109,011.37	113,023.55	117,035.73	121,047.91	125,060.09	129,072.27	133,084.45	137,096.63	141,108.81	145,121.00	149,133.18	153,145.36	157,157.54	161,169.72	165,181.90
442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15	442,808.15
59.48	-58.81	-59.41	-58.81	-59.10	-58.82	-58.87	-58.85	-58.84	-58.94	-58.99	-58.96	-58.92	-58.93	-58.91	-58.95	-58.94	0.00	0.00	0.00
442,947.63	442,808.15	437,977.14	436,561.29	436,621.22	440,182.85	439,651.51	438,734.15	438,244.88	438,942.44	439,321.88	439,977.81	438,738.48	438,708.18	438,653.73	438,963.19	438,926.45	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
442,947.63	442,808.15	437,977.14	436,561.29	436,621.22	440,182.85	439,651.51	438,734.15	438,244.88	438,942.44	439,321.88	439,977.81	438,738.48	438,708.18	438,653.73	438,963.19	438,926.45	0.00	0.00	0.00
-246,902.54	-246,589.57	-244,131.95	-243,342.74	-244,090.56	-245,316.83	-246,533.25	-246,281.21	-246,670.02	-244,881.52	-244,745.47	-244,556.33	-244,539.44	-244,627.25	-244,681.58	-244,661.10	0.00	0.00	0	

USD '000	Detailed forecast period																			
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033			
Operating Income	50,075.00	145,013.00	100,656.00	-61,862.00	513,808.00	530,139.56	303,853.13	414,440.95	434,996.34	432,123.65	395,497.10	412,488.25	442,447.16	443,918.06	427,221.36	419,402.54	425,577.83			
Cash Tax	56.00	232.00	237.00	131.00	389.00	389.00	347.83	340.85	-117.30	-59.38	-54.46	-56.73	-60.77	-60.97	-58.72	-57.67	-58.50			
NOPLAT	50,019.00	144,781.00	100,419.00	-61,731.00	513,219.00	529,750.56	303,505.29	414,100.10	435,113.64	432,183.03	395,551.56	412,545.00	442,807.93	443,979.03	427,280.08	419,460.22	425,636.33			
Depreciation	70,093.00	92,148.00	93,855.00	111,263.00	123,699.00	123,699.00	78,429.37	-44,329.38	-60,016.79	-1,080.13	34,646.42	17,376.95	-11,233.15	-12,983.13	3,083.49	10,740.97	4,510.03			
Increase in WC	NA	-7,736.00	-220,519.00	5,548.00	99,209.00	-24,764.73	-49,229.98	-35,034.16	-76,269.49	-22,949.65	-37,625.30	-39,435.18	-28,853.96	-39,310.12	-41,852.78	-38,674.46	-37,987.28			
Investments in CAPEX	-7,906.00	-2,021.00	19,284.00	-1,770.00	-963.00	-1,069.15	3,966.40	5,238.55	-1,070.46	1,593.92	1,593.92	1,597.89	1,597.89	1,596.93	1,594.52	1,593.92	1,593.92			
FCF	NA	246,686.00	395,489.00	45,732.00	538,672.00	679,283.43	427,230.24	399,566.32	452,436.79	451,588.63	466,229.36	467,764.24	458,530.85	468,729.09	470,621.84	467,281.73	466,539.92			

Figure A.62: FCF – Base Case

USD '000	Forecast period													TV
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033		
FCF	679283	427230	399566	452437	451559	466229	467764	458531	468729	470622	467282	466540		
Carbon Cost (EU ETS)	0	0	0	16237	15478	14685	14046	13408	12769	12131	11492	10854		
Carbon Cost (ETD)	1905	1905	1905	1905	1905	1905	1905	1905	1905	1905	1905	1905		
New FCF	677378	425325	397661	434295	434176	449640	451813	443218	454817	457348	454646	454543		

Figure A.63: FCF – Scenario 1

USD '000	Forecast period													TV
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033		
FCF	679283	427230	399566	452437	451559	466229	467764	458531	468729	470622	467282	466540		
Carbon Cost (EU ETS)	0	0	0	17535	17090	16600	16281	15962	15642	15323	15004	14685		
Carbon Cost (ETD)	1905	1905	1905	1905	1905	1905	1905	1905	1905	1905	1905	1905		
New FCF	677378	425325	397661	432996	432563	447724	449578	440664	451564	453775	450754	450331		
Discounting Factor	0.947781	0.898289	0.851381	0.806923	0.764786	0.724850	0.686999	0.651125	0.617124	0.584898	0.554355	0.525408		
PV	642,006.42	382,064.93	338,561.36	349,394.68	330,818.54	324,532.90	308,859.92	286,927.35	278,670.01	265,411.95	249,877.78	236,607.40		

Figure A.64: FCF – Scenario 2

USD '000	Forecast period													TV
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033		
FCF	679283	427230	399566	452437	451559	466229	467764	458531	468729	470622	467282	466540		
Carbon Cost (EU ETS)	0	0	0	9552	9698	9817	10038	10264	10495	10731	10973	11220		
Carbon Cost (ETD)	1948	1992	2037	2082	2129	2177	2226	2276	2327	2380	2433	2488		
New FCF	677336	425239	397530	440803	439731	454235	455500	445991	455907	457511	453876	452832		

Figure A.65: FCF – Scenario 3

Value of the Firm	9,691,486.34
Debt	1,273,723.00
Cash Equivalents	97,811.50
Value of Equity	8,515,574.84
Ordinary Shares Outstanding	201,190.62
Estimated Share Price	42.33

Figure A.66: Share Price - Base Case

Value of the Firm	9,557,731.85
Debt	1,273,723.00
Cash Equivalents	97,811.50
Value of Equity	8,381,820.35

Ordinary Shares Outstanding	201,190.62
Estimated Share Price	41.66

Figure A.67: Share Price - Scenario 1

Value of the Firm	9,504,752.38
Debt	1,273,723.00
Cash Equivalents	97,811.50
Value of Equity	8,328,840.88

Ordinary Shares Outstanding	201,190.62
Estimated Share Price	41.40

Figure A.68: Share Price - Scenario 2

Value of the Firm	9,518,778.01
Debt	1,273,723.00
Cash Equivalents	97,811.50
Value of Equity	8,342,866.51

Ordinary Shares Outstanding	201,190.62
Estimated Share Price	41.47

Figure A.69: Share Price - Scenario 3

		GROWTH								
		0.25%	0.75%	1.25%	1.75%	2.25%	2.75%	3.25%	3.75%	4.25%
WACC	42.33	61.65	66.39	73.22	83.93	103.14	147.64	363.28	-319.58	-79.65
	3.51%	52.90	55.92	60.04	65.98	75.29	92.00	130.70	318.21	-275.59
	4.01%	46.20	48.21	50.84	54.43	59.60	67.70	82.24	115.91	279.08
	4.51%	40.91	42.29	44.04	46.33	49.45	53.95	61.01	73.67	102.99
	5.01%	36.61	37.59	38.80	40.33	42.32	45.04	48.96	55.11	66.14
	5.51%	33.07	33.77	34.62	35.67	37.00	38.74	41.12	44.53	49.90
	6.01%	30.08	30.60	31.21	31.95	32.87	34.03	35.55	37.62	40.60
	6.51%	27.53	27.92	28.37	28.90	29.55	30.35	31.37	32.69	34.50
	7.01%	25.33	25.62	25.96	26.35	26.82	27.38	28.08	28.97	30.13
	7.51%									

Figure A.70: Sensitivity Analysis

Vessel name	IMO number
Battsea	9457402
Belguvia	9443592
Golden Amber	9458987
Golden Amreen	9696058
Golden Anastasia	9696046
Golden Aquamarine	9882475
Golden Arcus	9743162
Golden Anion	9461336
Golden Aso	9701334
Golden Bamet	9721487
Golden Behike	9722417
Golden Beijing	9439412
Golden Bexley	9721499
Golden Bull	9438626
Golden Calvus	9743174
Golden Champion	9842724
Golden Cimus	9717395
Golden Comfet	9851804
Golden Competence	9856490
Golden Confidence	9856488
Golden Coml	9842712
Golden Courage	9851816
Golden Cumulus	9717400
Golden Daisy	9878008
Golden Deb	9678484
Golden Diamond	9470387
Golden Earl	9882451
Golden Faith	9131606
Golden Fast	9860116
Golden Fellow	9854313
Golden Feng	9435648
Golden Finsbury	9701346
Golden Fomane	9852523
Golden Forward	9852535
Golden Foeze	9849904
Golden Friend	9854301
Golden Frost	9849899
Golden Fulham	9701358
Golden Furious	9860128
Golden Future	9443607
Golden Gayle	9479228
Golden Ginger	9590761
Golden Grace	9937701
Golden Hawk	9745598
Golden Hopee	8626408
Golden Houston	9701188
Golden Incus	9743198
Golden Isanari	9586344
Golden Jakce	9461324
Golden John	9363974
Golden Kai	9310226
Golden Kathine	9701322
Golden Keen	9595723
Golden Kennedy	9740835
Golden Light	9445057
Golden Lion	9363974
Golden Magnum	9494230
Golden Montemey	9722429
Golden Myralia	9511416
Golden Nimbus	9743150
Golden Opal	9470404
Golden Pearl	9470375
Golden Rossee	8801620
Golden Rugby	9470399
Golden Saint	9847982
Golden Savannah	9723538
Golden Scape	9702479
Golden Shui	9437696
Golden Skies	9847970
Golden Soul	9950715
Golden Spirit	9856933
Golden Spny	9856945
Golden Star	9146900
Golden sue	9678472
Golden Sack	9438614
Golden Sambaya	9723526
Golden Swift	9702481
Golden Tide	7802926
Golden Wave	9819911
Golden Zheejiang	9443619
Golden zhoushan	9448554
KSL China	9483138
KSL Sakum	9719941
KSL Salvador	9683271
KSL San Francisco	9719915
KSL Santia go	9719927
KSL Santos	9719939
KSL Sapporo	9683257
KSL Seattle	9683245
KSL Seoul	9723502
KSL Seville	9723540
KSL Singapore	9719903
KSL Stockholm	9723514
KSL Sydney	9683269

Figure A.71: Fleet List

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
COGS (% of revenues)	-0.78%	-0.50%	0.17%	-0.49%	-0.65%	-0.45%	-0.38%	-0.36%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%
Administrative and General Expenses (% of revenues)	2.73%	2.24%	2.80%	2.26%	1.51%	2.15%	2.03%	1.99%	1.99%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%
Other Operating Expense (% of revenues)	-70.18%	-62.11%	-70.28%	-90.07%	-46.17%	-67.76%	-67.28%	-68.31%	-67.92%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%
Depreciation (% of avg fixed assets)	NA	329.04%	75.07%	57.81%	97.13%	139.76%	139.76%	101.91%	107.27%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%
Other Income (% of revenues)	1.14%	1.11%	-1.15%	-4.87%	4.44%	0.14%	-0.07%	-0.30%	-0.13%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%
Interest Income (% of avg. Cash and Short Term Investments)	NA	2.47%	2.25%	0.99%	0.28%	1.49%	1.49%	1.30%	1.11%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%
Interest Expense (% of Total Liabilities)	4.35%	5.26%	4.01%	3.51%	2.62%	3.97%	3.89%	3.82%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%
Marginal Tax rate	-2.44%	0.27%	0.83%	-0.10%	0.07%	-0.31%	0.11%	0.08%	-0.03%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%

USD '000	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Growth in Minority Interest	NA	-99.95%	206.87%	36.92%	-70.89%	18.24%	18.24%	41.88%	8.88%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%
Average days to collect (Net Receivables)	42.68	22.55	27.90	13.78	12.01	23.78	20.00	19.49	17.81	18.62	18.62	18.62	18.62	18.62	18.62	18.62
Short Term Investments (% of revenues)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inventory turnover	-0.18	-0.12	0.04	-0.12	-0.18	-0.11	-0.10	-0.09	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12
Other Current Assets (% of revenues)	13.22%	13.21%	14.34%	13.65%	7.38%	12.36%	12.19%	11.99%	11.51%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%
Other assets (% of revenues)	33.40%	15.76%	7.44%	3.80%	1.92%	12.46%	8.28%	6.78%	6.65%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%
Accounts Payable (% of Cost of Revenue)	-292.07%	-278.25%	229.21%	-171.68%	-393.37%	-78.29%	-35.54%	13.00%	442.98%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%
Short Term Debt (% of Long term Debt)	10.13%	54.22%	11.66%	9.17%	9.15%	18.91%	20.66%	13.91%	14.36%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%
Other Current Liabilities (% of revenues)	12.26%	8.39%	12.31%	16.92%	9.26%	11.83%	11.74%	12.41%	12.43%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%
Other Liabilities (% of revenues)	11.18%	1.38%	27.38%	25.16%	10.05%	15.03%	15.80%	18.68%	16.94%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CAPEX (% of EBITDA)	6.17%	0.85%	-9.92%	3.57%	0.15%	0.16%	-1.04%	-1.42%	0.29%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	
Total Other Cash Flow not affecting CF (% of revenues)	0.31%	0.23%	0.30%	0.58%	-0.24%	0.23%	0.22%	0.22%	0.20%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	
Other Operating Activities (% of revenues)	0.50%	12.34%	0.60%	21.48%	-20.74%	2.84%	3.30%	1.50%	1.68%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	
Other Investing Activities (% of revenues)	-5.51%	-21.83%	-7.62%	-3.44%	-32.50%	-14.18%	-15.91%	-14.73%	-16.15%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	
Other Financing Activities (% of revenues)	26.57%	-0.43%	-1.58%	24.1%	-0.32%	5.33%	1.08%	1.38%	1.98%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	
Common Dividend Payout Ratio	0.00%	-76.79%	-12.35%	5.20%	-60.83%	-51.55%	-61.86%	-58.89%	-45.58%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	
Increase in Investments (% of revenue)	NA	709.05%	-48.26%	-73.78%	1936.37%	630.89%	630.89%	615.26%	747.97%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	

Forecast period																	Income Statement
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	-0.46%	
1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	1.93%	
-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	-63.49%	
117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	117.17%	
0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	0.82%	
1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	1.14%	
3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	3.52%	
-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	

Balance Sheet																
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%	3.27%
18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62	18.62
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12
11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%	11.09%
7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%	7.22%
-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%	-187.84%
15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%	15.40%
11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%	11.54%
15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%	15.30%

Cash Flow																
2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%	-0.37%
0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%
-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%	-2.28%
-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%	-18.69%
1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%
-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%	-55.74%
912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%	912.32%

Figure A.72: Drivers

USD '000	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash	309,029.00	305,332.00	88,931.00	153,093.00	197,633.00	97,811.30	60,186.20	22,540.90	-15,064.40	-52,689.70	-90,315.00	-127,940.30	-165,565.60	-203,190.90	-240,816.20	-278,441.50	-316,066.80
Net receivables	54,538.00	41,089.00	54,601.00	23,779.00	40,132.00	81,279.00	66,359.49	46,621.61	40,479.81	63,634.15	63,634.15	63,634.15	63,634.15	63,634.15	63,634.15	63,634.15	63,634.15
Inventory	20,142.00	28,154.00	28,235.00	25,165.00	43,383.00	50,250.87	48,918.62	50,964.00	39,513.81	39,431.60	39,431.60	37,098.94	48,403.84	46,232.37	40,783.80	39,431.60	38,965.07
Accounts Payable	10,424.00	9,046.00	26,827.00	50,959.00	30,760.00	4,315.09	1,672.03	-611.73	20,840.59	8,837.07	8,837.07	8,314.29	10,847.85	10,361.19	9,140.11	8,837.07	8,732.51
Net Working capital	373,285.00	365,549.00	148,030.00	158,578.00	249,787.00	225,022.27	175,792.28	140,758.12	64,488.63	41,538.99	3,913.69	-35,521.50	-44,3				

USD '000	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Beginning Balance	1,273,723.00	1,273,723.00	1,273,723.00	1,340,705.00	1,438,662.00	1,575,479.00	1,688,984.00	1,793,088.00	1,901,554.00	2,017,710.00	2,134,245.00	2,246,493.00	2,356,736.00
Issuance			235,888.00	118,671.00	124,814.00	446,168.00	411,972.00	423,763.00	424,808.00	429,779.00	433,625.00	444,156.00	369,272.00
Repayment Plan			168,906.00	20,714.00	-12,003.00	332,663.00	307,868.00	315,297.00	308,652.00	313,244.00	321,377.00	333,913.00	257,444.00
Ending Balance	1,273,723.00	1,273,723.00	1,340,705.00	1,438,662.00	1,575,479.00	1,688,984.00	1,793,088.00	1,901,554.00	2,017,710.00	2,134,245.00	2,246,493.00	2,356,736.00	2,468,564.00
Goal of Ending Balance		1,273,723.00	1,340,705.26	1,438,662.32	1,575,479.48	1,688,984.64	1,793,088.75	1,901,554.60	2,017,710.83	2,134,245.04	2,246,493.90	2,356,736.25	2,468,564.16

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Goal Seek
2,468,564.00	2,582,261.00	2,695,815.00	2,808,237.00	2,920,297.00	3,032,886.00	3,145,856.00	3,258,675.00	3,371,203.00	3,483,698.00	3,596,372.00	3,709,145.00	3,821,855.00	3,934,479.00	4,047,097.00	4,159,755.00	4,272,439.00	
297,204.00	310,220.00	325,016.00	342,067.00	360,924.00	383,869.00	410,648.00	441,491.00	477,602.00	519,558.00	568,900.00	627,042.00	695,686.00	776,787.00	872,770.00	986,184.00	1,120,279.00	
183,507.00	196,666.00	212,594.00	230,007.00	248,335.00	270,899.00	297,829.00	328,963.00	365,107.00	406,884.00	456,127.00	514,332.00	583,062.00	664,169.00	760,112.00	873,500.00	1,007,604.00	
2,582,261.00	2,695,815.00	2,808,237.00	2,920,297.00	3,032,886.00	3,145,856.00	3,258,675.00	3,371,203.00	3,483,698.00	3,596,372.00	3,709,145.00	3,821,855.00	3,934,479.00	4,047,097.00	4,159,755.00	4,272,439.00	4,385,114.00	
2,582,261.52	2,695,815.27	2,808,237.95	2,920,297.79	3,032,886.84	3,145,856.72	3,258,675.92	3,371,203.31	3,483,698.14	3,596,372.63	3,709,145.16	3,821,855.74	3,934,479.92	4,047,097.06	4,159,755.38	4,272,439.48	4,385,114.96	

USD '000	Beginning Balance	Outstanding Repayment	Agreement	Margin	Tot. Rate	Weight	Contribution
Loan 1	175,000.00	122,477.00	Margin + LIBOR	1.95%	3.21%	10%	0.31%
Loan 2	260,000.00	256,905.00	Margin + LIBOR	3.90%	5.16%	20%	1.04%
Loan 3	93,750.00	77,314.00	Margin + LIBOR	2.15%	3.41%	6%	0.21%
Loan 4	131,790.00	98,681.00	Margin + LIBOR	2.10%	3.36%	8%	0.26%
Loan 5	155,300.00	121,573.00	Margin + LIBOR	2.10%	3.36%	10%	0.32%
Loan 6	304,000.00	235,315.00	Margin + LIBOR	2.35%	3.61%	18%	0.67%
Loan 7	120,000.00	81,071.00	Margin + LIBOR	2.25%	3.51%	6%	0.22%
Loan 8	420,000.00	280,387.00	Margin + LIBOR	2.50%	3.76%	22%	0.83%
Sum	1,659,840.00	1,273,723.00				100%	3.86%

LIBOR (5-year Treasury Yield)	1.26%
Cost of Debt	3.86%

Figure A.74: Cost of Debt

Cost of Equity	
Risk-free rate	1.26%
Equity Beta	1.059
Market Risk Premium	5.00%
Cost of Equity	6.56%
Cost of Debt	
Cost of Debt	3.86%
Marginal Tax Rate	0%
After-tax Cost of Debt	3.86%
Target financial leverage (\$M)	
Debt	1,273,723
Equity	2,196,535.44
Target market value weights	
Equity ratio	0.63296019
Debt ratio	0.36703981
Estimated WACC	
WACC	5.51%

Cost of Capital	5.56%
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Figure A.75: Key Metrics