

# BONDS FOR PONDS

GREEN BONDS CAN ASSIST  
AQUAFEEDS TRANSITION

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BRIEFING PAPER  
NOVEMBER 2020



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## ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank aligning capital markets with planetary limits. It was created to investigate the risk of market failure related to environmental limits. This investigation is primarily for the investor community where environmental limits, other than climate change, are poorly understood, even more poorly communicated and not aligned with investor capital.

Planet Tracker generates breakthrough analytics to redefine how financial and environmental data interact with the aim of changing the practices of financial decision makers to help avoid both environmental and financial failure.

## SEAFOOD TRACKER INITIATIVE

Seafood Tracker investigates the impact that financial institutions can have on sustainable corporate practices through their funding of publicly listed wild-catch and aquaculture companies.

Our aim is to align capital markets with the sustainable management of ocean and coastal marine resources.

This report focuses on how debt markets can assist the sustainable management of feeds used in aquaculture.

Seafood Tracker is a part of the wider Planet Tracker Group of Initiatives.

## ACKNOWLEDGEMENTS

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This report is funded in part by the Gordon and Betty Moore Foundation through the Finance Hub, which was created to advance sustainable finance.

*Suggested citation: Cage A, Willis J, Mosnier F and McLuckie M:  
Bonds for ponds: green bonds can assist aquafeeds transition: Planet Tracker (2020).*



## KEY TAKEAWAYS

- ➔ The aquaculture industry supplies 46% of the global demand for fish.
- ➔ Aquafeed is both its largest operating cost and largest source of environmental impacts, on land and at sea.
- ➔ As fish protein prices have soared, in part because of overfishing, soy has replaced fishmeal as the primary protein source in aquafeed, raising deforestation concerns.
- ➔ Alternative ingredients such as blackfly larvae and algae are set to replace soy and fishmeal in aquafeed, but do not exist at scale yet.
- ➔ Scaling innovative feeds or transitioning to deforestation-free soy can be financed via green bonds, supplying the upfront capital required to research and scale innovation, while providing lower risk for creditors.
- ➔ Recent examples in salmon aquaculture demonstrate that such debt financing is feasible and desirable, both for investors and companies.

# THE AQUAFEED MARKET

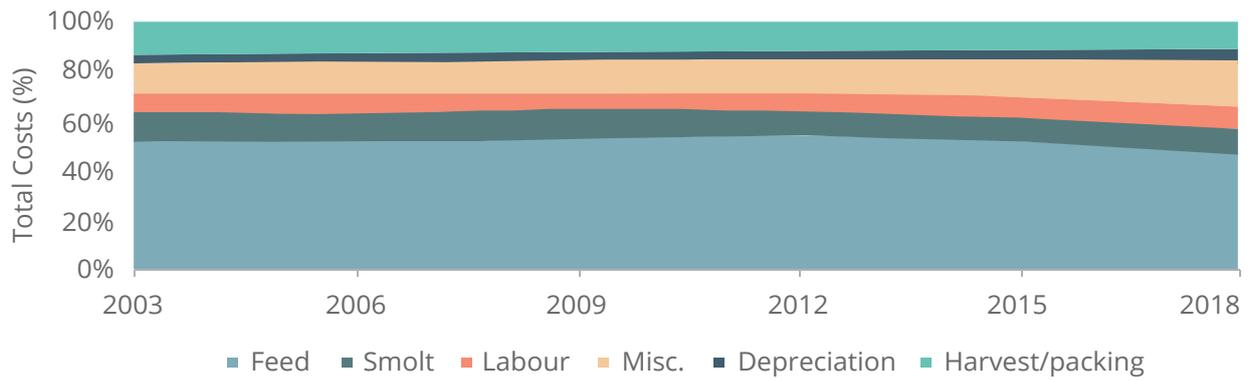
## FEEDING GROWTH IN AQUACULTURE TO 2025



Aquaculture has become a vital part of seafood supply, comprising 46% of total seafood production in 2017, excluding aquatic plants.<sup>1</sup> This appetite for farmed products has been satisfied by a booming aquafeed industry, estimated to have a market value of USD 107 billion in 2017. Forecasts project growth up to USD 215 billion by 2024.<sup>2</sup> In terms of volume, aquafeed production is projected to rapidly grow to 2025, from 49.7 million tonnes in 2016 to 87.1 million tonnes, an increase of 75%.<sup>3</sup>

However, this growth has caused an unsustainable extraction of resources, contributing to both fishery collapse and deforestation – BioMar estimates that feed accounts for 80% of environmental impact in seafood productions.<sup>4</sup> Problems have been caused by the overfishing of feeder fish and the cultivation of soy on deforested land. These are likely to become exacerbated as the market grows.

Price variability of input materials has already directly impacted the profitability of feed companies and, by extension, aquaculture companies. Feed is the largest input cost of aquaculture production. For example, for Atlantic salmon, feed accounts for approximately 50% of the cost of production – see Figure 1.



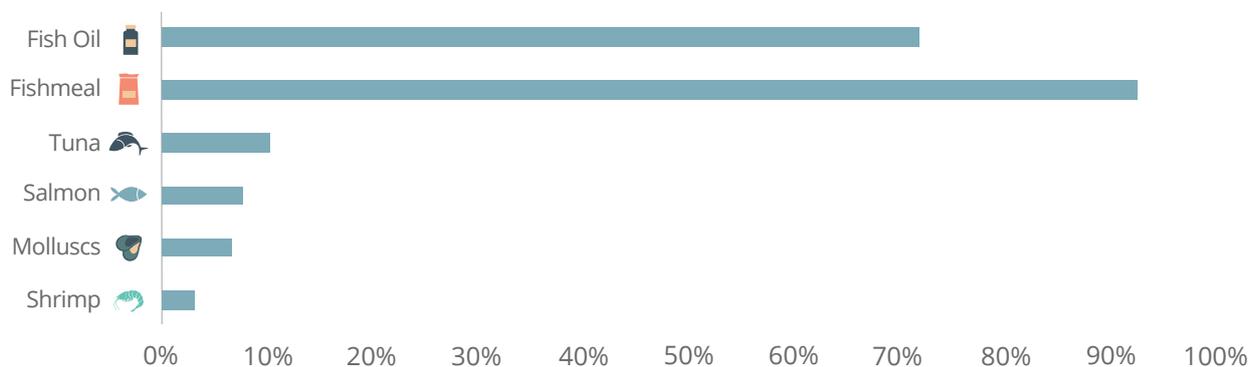
**Figure 1:** Averaged Cost of Production for Salmon Farming across Norway, Scotland, the Faroe Islands, Canada and Chile, 2003-2018 in USD/kg.<sup>5</sup>

## BOOM IN DEMAND, COLLAPSE IN SUPPLY FOR FISH PROTEIN IN AQUACULTURE

Feed companies have tried to control input costs by using new ingredients as the price for traditional components has increased. Fish meal and fish oil have historically been used, more than any other aquafeed source, to produce feed for aquaculture, primarily from species such as anchovies and sardines. In 1994, fishmeal production peaked at 30 million tonnes. In part due to supply constraints, fishmeal production declined to 15 million tonnes by 2016 and is expected to fall to 7.6 million tonnes by 2030.<sup>6</sup>

Aquaculture is expected to grow to 2050 – by 48% under a business as usual scenario, or by up to 118% if a transition to sustainable diets is achieved.<sup>7</sup> This means that demand for fishmeal and fish oil is projected to continue increasing to 2030, driving up the cost.<sup>8</sup>

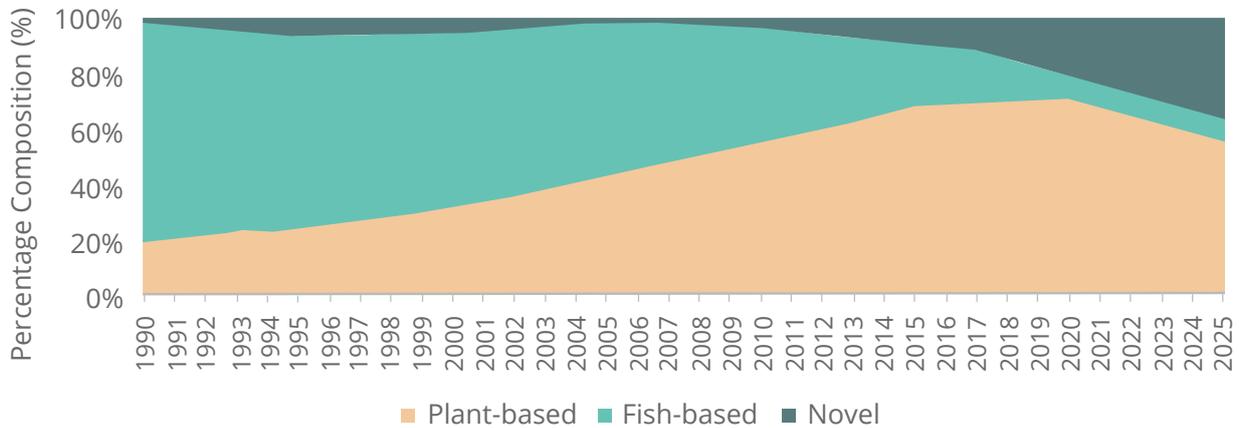
The World Bank has projected that prices for fish oil and fishmeal will increase by 72% and 92% respectively by 2030, relative to 2010 prices<sup>9</sup> – see Figure 2.



**Figure 2:** Projection of Price Changes to 2030.<sup>10</sup>

## SOY HAS OFFSET RISING FISH PROTEIN COSTS

Rising supply costs have led to the substitution of fish meal and oil by plant-based alternatives such as soy. Overall marine protein content in BioMar's salmon feed decreased from nearly 80% in 1990 to less than 16% in 2018, primarily replaced by soy protein concentrate – see Figure 3.



**Figure 3:**

*Sources of Feed for Farmed Salmon, (Adapted from BioMar), 1990–2025.<sup>11</sup> Novel Ingredients include blood meal, used through the 1990's but since phased out and prospective new ingredients, such as krill meal, insect meal and single cell raw materials.*



Soy is now a major component of aquafeed and is projected to have the largest share of any ingredient in the aquafeed market between 2019 and 2025.<sup>12</sup> The implication of substituting greater ratios of fish-based with plant-based feed regimes in carnivorous species, such as salmon, is known to negatively impact growth. The increased reliance on soy also led to another notable but an unintended consequence – exposure to deforestation. While fish-related inputs have significantly decreased between 1990 and 2020, fish meal and fish oil's role in providing key nutritional elements means the sector will remain reliant on fish protein until alternatives can be scaled.<sup>13</sup>

# DEFORESTATION & SOY:

## AGILITY IN THE SALMON FARMING INDUSTRY

### IMPORTED SOY IN NORWAY LINKED TO DEFORESTATION IN 2018

In September 2016, 70% of Norway's total imported soy was used for fish feed.<sup>14</sup> The Norwegian salmon industry is dependent primarily on Brazilian soy cultivation, with 94% of supply for aquaculture operations originating from Brazil in 2017 - 282,448 tonnes of soy protein concentrate in total for that year.<sup>15</sup> To grow the soy needed for that year alone, 2,258 km<sup>2</sup> of cropland was required.<sup>16</sup>



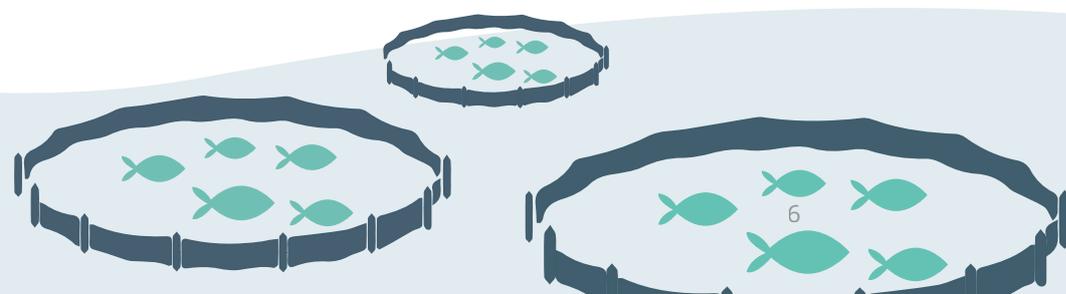
To feed its salmon industry, Norway's imported soy protein concentrate's land-use footprint is equal to the size of the Luxembourg.



In October 2018, Rainforest Alliance Norway released a report linking salmon feed producers with deforestation and human rights abuse-related soy production.<sup>17</sup>

### MAJORITY OF NORWAY AND CHILE'S SALMON FARMERS CHANGE SOURCING POLICY TO MITIGATE RISK

Alongside reports linking deforestation to salmon farmers in 2018, companies representing 67% and 74% of Norway's and Chile's farmed salmon production respectively made robust commitments regarding the use of sustainable soy protein concentrate.<sup>18</sup> For example, Norway's Salmon Group, representing 12% of the country's farmed salmon production, removed Brazilian soy from its feeds from September 24, 2019, because of record Amazonian deforestation rates.<sup>19</sup> By December 2019, Grieg Seafood, Lerøy Seafood and Mowi had signed the Amazon Soy Moratorium<sup>20</sup> – an agreement not to trade soybean sourced from areas in the Brazilian Amazon that were deforested after July 24 2006.<sup>21</sup> These policies continue to be built on – in July 2020, Mowi stated that their suppliers will not trade soy that is grown on land deforested from Q3 2021, including soy grown on legally deforested land.<sup>22</sup>



The farmed salmon companies in Norway with public sustainable soy protein concentrate commitments include:

Alsaker Fjordbruk	Empresas Aquachile	Norway Royal Salmon
Australis Seafood	Grieg Seafood	Nova Austral
Blumar	Invermar	Nova Sea
Bremnes Seashore	Lerøy Seafood	Pesquera Los Fiordos
Camanchaca	Mowi	Salmar
Cermaq	Nordlaks	Salmones Multiexport

## AQUAFEED COMPANIES UNITE WITH SALMON COMPANIES AGAINST DEFORESTATION SOY

Alongside commitments made at the farm level, feed suppliers to the aquaculture industry have also introduced sustainability mandates. They also continue to strengthen channels for better industry communication, such as the *Aquaculture Dialogue on Soy Sourcing from Brazil*<sup>23</sup> and the *Roundtable on Responsible Soy (RTRS)*<sup>24</sup> – of which Skretting and Nutreco have been long-term supporters.

## DEFORESTATION RISK STILL PRESENT IN SALMON AQUAFEED SUPPLY CHAINS

BioMar, the top Norwegian feed producer, which controlled up to 25% across the Norwegian salmon feed market in 2019,<sup>25</sup> noted concerns with ‘pirate soy’, the process by which deforestation-linked soy enters certified supply chains.<sup>26</sup>

Pirate soy degrades zero-deforestation commitments and is a reputational risk for the companies who have publicly supported sustainable soy protein concentrate. Failure to verify the sources of materials in certified supply chains means that there is a material risk of deforestation-linked soy entering supply chains. This is a particular concern because land under soy cultivation is increasing - primarily in the Brazilian Amazon and Cerrado, and the Argentinian and Paraguayan Gran Chaco regions<sup>27</sup> - and supply chains with weak traceability systems can have a difficult time detecting the pirate soy coming from those recently deforested locations.



# NOVEL PROFITABILITY IN DEVELOPING SUSTAINABLE FEED INGREDIENTS

## WILD-CATCH STAGNATION LIMITS FED AQUACULTURE POTENTIAL

The projected growth in aquaculture production is dependent on a steady and increasing source of feed. Fish oil has been, and still is, a key component in the diets of farmed seafood because it provides essential nutrients such as omega-3 for growth and overall health.<sup>28</sup> But the supply of fish oil and fish meal will not fuel the aquaculture industry's projected growth. As stated above, and in "[Loch-ed Profits](#)", fish protein in feed is already a key limiting factor and forecasts predict that condition will only get worse. Assuming current feed practices, dependencies on fish meal and oil and the availability of fish products, potential global finfish aquaculture production will be unable to exceed 14.4 million tonnes.<sup>29</sup> To go beyond that will require other feed inputs.

## ALTERNATIVE INGREDIENTS EXIST, BUT NEED SCALING

Removing the limitation of fish protein on aquaculture could lead to a sixfold increase in production – two thirds of the edible meat-based protein requirements for the global population in 2050.<sup>30</sup>

Alternative ingredients already exist that can replace conventional materials and vary in potential across geographies and species. Non-carnivorous fish, such as carp and tilapia, can already receive fishless feeds, whereas high-value species such as salmonids appear more sensitive to plant-based alternatives and so require novel inputs to deliver key nutritional elements.<sup>31</sup>

Some of the novel ingredients which fulfil the omega-3 feed requirements include:



- ➔ Blackfly larvae<sup>32</sup>
- ➔ Single-cell proteins, algal oils and meals<sup>33</sup>
- ➔ Bacterial bioprocessing, covering CO<sub>2</sub> emissions into fish feed<sup>34</sup>
- ➔ Canola oil, engineered to produce omega-3 oils<sup>35</sup>

Whilst keystone actors in this area are already moving towards novel feeds, the pace of that transition could be – and probably should be – significantly accelerated. Skretting, for instance, allocated USD 2 million in 2019 for the development of novel aquaculture feed ingredients.<sup>36</sup> However, that research and development spending only represented 0.07% of its sales that year.<sup>37</sup>

The key reason behind the slow transition is that these novel solutions do not currently exist at scale, in part due to the difficulty of securing the necessary capital for upfront research and development to identify the most effective production pathways.



**Green bonds can help provide the capital needed to accelerate the increases in operational efficiency which novel ingredient inclusion may provide, and can generate positive outcomes for lenders, feed producers and aquaculture firms.**

# FINANCING INNOVATION WITH GREEN BONDS

## GREEN BONDS ARE A TOOL TO ENABLE A SUSTAINABLE TRANSITION IN AQUAFEED

A green or blue bond – the latter being ocean-focused – is a debt instrument issued by governments, development banks or others to raise capital from investors to finance projects with positive environmental, economic and climate benefits.<sup>38</sup> Green bond issuance has risen rapidly in recent years, climbing to USD 262 billion worldwide in 2019.<sup>39</sup>

The success of the recent green bonds issued by aquaculture companies Mowi and Grieg Seafood, the first ever in the seafood sector, demonstrates how lenders to the aquaculture sector can constructively engage with corporate sustainability strategy.

## OVERVIEW OF MOWI & GRIEG SEAFOOD ISSUANCES

Mowi and Grieg Seafood were the first two companies to raise green bonds in the seafood sector. The two bonds share several similarities – see Table 1:

**Table 1:** Overview of Mowi's and Grieg Seafood's Green Bonds <sup>40</sup>

	Mowi	Grieg Seafood
Issuance Date	23.01. 2020	16.06. 2020
Secured/Unsecured	Unsecured	Unsecured
Amount issued	EUR 200 million	NOK 1 billion (c. EUR 95 million)
Maturity	5 years	5 years
Coupon	3-month Euribor <sup>1</sup> + 160bps	3-month NIBOR <sup>2</sup> + 340 bps
Coupon (in %, as of August 3 <sup>rd</sup> )	1.14%	3.68%
Cicero rating	Medium Green	Medium Green

- ➔ They both bind their issuers to a Green Bond Framework, which outlines, in particular, how proceeds can be used.
- ➔ In both cases sustainable feed is a key use for the proceeds.
- ➔ Both bonds were significantly oversubscribed with, for instance, demand for Mowi's EUR 200 million issuance over EUR 700 million.<sup>41</sup>
- ➔ Both were rated 'Medium Green' (the second-best rating) by Cicero, a provider of second opinions on green bonds.
- ➔ In both cases, a key concern from the rating provider was that deforestation-linked soy could end up in Mowi's and Grieg Seafood's supply chains despite their commitment to source from certified suppliers.<sup>42,43</sup> Grieg Seafood, therefore, excluded Cargill Aqua Nutrition from the proceeds of the bond until its parent-company (Cargill) has reduced its soy-related deforestation-risk in Brazil. Cargill's removal was, reportedly, a key reason that the bond was rated 'Medium Green' rather than 'Light Green'.<sup>44</sup>



## LINKING DEBT CAPITAL TO SUSTAINABILITY VIA A GREEN BOND FRAMEWORK

Green bonds are a useful tool to embed sustainability in corporate practice.

Grieg's Green Bond Framework specifically states:

- All marine ingredients will meet the sustainability standard set by the Marine Stewardship Council (MSC), or the International Fishmeal and Fish Oil Organization Responsible Supply Standard (IFFO RS), or the Aquaculture Stewardship Council (ASC) standard on fish meal and fish oil.
- All soy ingredients are to be sourced from certified suppliers, meeting the standard of Proterra or the Round Table on Responsible Soy (RTRS) to ensure segregation of certified and non-certified soy.
- Procurement of feed should either support commercialisation of novel fish feed ingredients with a smaller footprint, such as insect meal, or improve fish health and welfare.

Mowi's Green Bond Framework does not specifically mention novel fish feed ingredients but it does contain a requirement on 100% deforestation-free soy as verified by ProTerra certification or by a certification scheme with equivalent requirements, ensuring segregation of certified and non-certified soy in the supply chain.

Among other potential projects financed via Mowi's green bond are investments and expenditures related to fish farms and processing facilities certified, or in preparation to become certified, by the Aquaculture Stewardship Council (ASC) salmon standard.

## GREEN BONDS & GREATER PERFORMANCE

As evidenced by the Green Bond Frameworks previously mentioned, an opportunity exists to finance step-changes in capital needs to allow aquaculture companies to evolve their financial and environmental performance in the face of high growth expectations, benefitting both the companies involved and their creditors.

For aquafeed companies, debt issued to embed and scale effective sustainable practice in aquaculture not only offers gains to long-term corporate sustainability, but benefits operational, reputational and financial factors.

Greater liquidity and agility will help to overcome projected supply side constraints, so growth can be achieved both sustainably and efficiently.



# SPECIFICALLY, GREEN BOND ISSUANCES CAN PROVIDE:

## LOWER COST OF CAPITAL

Research shows that green bond yields at issuance are typically between 10 bps (AAA-rated issuers) to 45 bps (A- and BBB-rated issuers) lower than those of non-green bonds from the same issuer.<sup>45</sup> This is even more pronounced in the case of Mowi - compared to its previous bond issue in June 2018 with the same maturity, the spread on the salmon company's green bond was 55bps lower.<sup>46</sup>



## INNOVATION-DRIVEN OPERATIONAL EFFICIENCY

In the case of aquafeed, forecasts of increased demand for feed alongside rising input costs due to feed ingredient bottlenecks create a situation in which innovation will improve capital and operational efficiency. Scaling novel ingredients can deliver this outcome, while alleviating pressure on threatened ecosystems.

## REDUCTION IN INPUT COSTS AND FEED PRICE VARIABILITY

Financing a transition of aquaculture through the debt markets towards more efficient and sustainable feed sources offers a potential reduction in input costs and feed price variability at the farm level as well as greater profitability and ease of scalability at the production level.

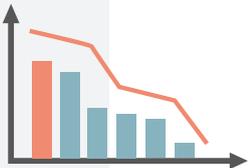


## POSITIVE MEDIA COVERAGE

The issuance of Grieg Seafood's green bond was mentioned in more than 20 publications, including the Financial Times. Mowi's green bond was also widely publicised.

## DECLINING TRANSACTION COSTS

The appetite for the Grieg and Mowi green bonds indicates that a transition to sustainability can be assisted through debt markets. Transaction costs are likely to decrease as this practice becomes more common and as the process becomes more streamlined.



# APPENDIX:

## DEBTHOLDERS OF GREEN BONDS

**Table 2.** Debtholders of Mowi's Green Bond, as of 15 June 2020.<sup>47</sup>

Investor	Number of bonds	% of top 20	% of total	Country
Geveran Trading	68,345,215	23.96%	13.22%	CYP
Folketrygdfondet	51,173,910	17.94%	9.90%	NOR
Clearstream Banking	28,535,073	10.00%	5.52%	LUX
State Street Bank and Trust	26,606,789	9.33%	5.15%	USA
UBS Switzerland	17,297,223	6.06%	3.34%	CHE
Euroclear Bank	10,195,442	3.57%	1.97%	BEL
State Street Bank and Trust Comp	10,089,870	3.54%	1.95%	CAN
Citibank	9,308,924	3.26%	1.80%	USA
State Street Bank and Trust	8,888,495	3.12%	1.72%	USA
JP Morgan Chase Bank, London	7,557,438	2.65%	1.46%	USA
State Street Bank And Trust	7,486,344	2.62%	1.45%	USA
Six Sis Ag	6,964,225	2.44%	1.35%	CHE
Geveran Trading Co Ltd	5,444,072	1.91%	1.05%	CYP
The Northern Trust Comp, London Br	5,049,563	1.77%	0.98%	GBR
KLP Aksjenorge Indeks	4,812,659	1.69%	0.93%	NOR
State Street Bank And Trust Comp	3,987,355	1.40%	0.77%	USA
JP Morgan Chase Bank, N.A., London	3,871,491	1.36%	0.75%	GBR
Danske Invest Norske Instit.	3,337,609	1.17%	0.65%	NOR
Goldman Sachs International	3,228,885	1.13%	0.62%	GBR
JP Morgan Chase Bank, N.A., London	3,039,890	1.07%	0.59%	USA
<b>Total number owned by top 20</b>	<b>285,220,472</b>	<b>100%</b>	<b>55.16%</b>	
<b>Total number of shares</b>	<b>517,111,091</b>	<b>-</b>	<b>100%</b>	



**Table 3. Debtholders of Grieg Seafood's Green Bond, as of 6<sup>th</sup> October 2020**  
(55.45% currently outstanding).<sup>48</sup>

Holder	Number of bonds	% of top 20o 20	% of tota	Country
Pareto SICAV - Pareto Nordic Corporate Bond	10,320,480	17.50%	17.14%	LUX
Ohman Frn Fond Hallbar	7,632,855	12.94%	12.68%	SWE
Handelsbanken Kreditt	6,450,300	10.94%	10.71%	SWE
Handelsbanken Hoyrente	5,912,775	10.03%	9.82%	NOR
Landkreditt Extra	4,192,695	7.11%	6.96%	NOR
SEB Fund 5 - Dynamic Bond Fund	3,225,150	5.47%	5.36%	LUX
Ohman Rantefond Kompass Hallbar	3,010,140	5.10%	5.00%	NOR
Ohman Foretagsobligasjonsfond	2,902,635	4.92%	4.82%	SWE
First Hoyrente	2,418,863	4.10%	4.02%	NOR
EVLi Nordic Corporate Bond	2,150,100	3.65%	3.57%	FIN
Ohman Gron Obligasjonsfond	2,042,595	3.46%	3.39%	SWE
Simplicity Foretagobligationer	1,612,575	2.73%	2.68%	SWE
Fondsfinans Kreditt	1,128,803	1.91%	1.88%	NOR
Placerum Optimera	1,075,050	1.82%	1.79%	SWE
Maj Invest Gronne Obligationer	1,075,050	1.82%	1.79%	DEK
Cicero Avkastningsfond	1,075,050	1.82%	1.79%	SWE
Landkreditt Hoyrente	860,040	1.46%	1.43%	NOR
Localtapiola Esg Positive Impact Bond	806,288	1.37%	1.34%	FIN
Odin Kreditt	537,525	0.91%	0.89%	NOR
Maj Invest High Income Obligationer	537,525	0.91%	0.89%	DEK
Cicero Nordic Corporate Bond	537,525	-	0.89%	SWE
Zantke Global Credit Ami	430,020	-	0.71%	DEU
First Rente	268,763	-	0.45%	NOR
<b>Total</b>	<b>60,202,800</b>		<b>100.00%</b>	

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