



Aker BioMarine Company assessment

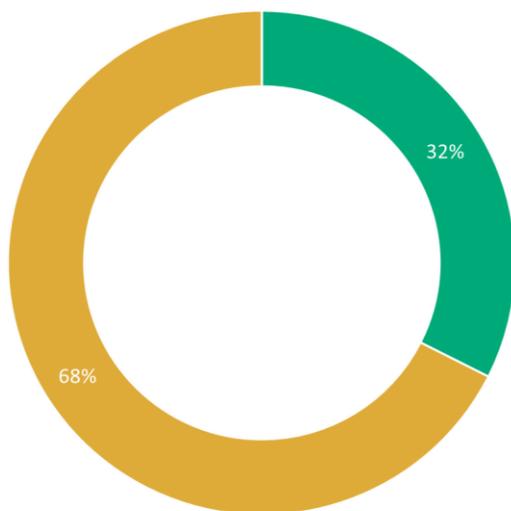


April 15th, 2021

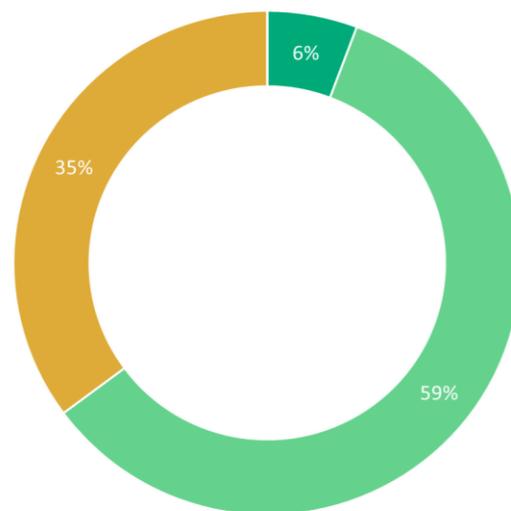
Executive summary

Aker BioMarine is a Norwegian harvesting and biotech company producing krill products. The biomarine sector has the potential to become a significant supplier of healthy nutrients in a climate adapted and resilient future. The company controls the entire harvesting and production process of the krill from catching the krill to the end product. The krill is harvested in the Southern Ocean around the Antarctic, turned into krill meal onboard the ships and brought to a logistic hub in Montevideo (Uruguay). From there, the meal is either shipped directly as feed to aquaculture customers and to pet food producers or sent to a krill oil production facility in Houston (USA) to produce omega-3 supplements.

Shades of Green by annual revenue 2020



Shades of Green by investments in 2020



■ Dark Green ■ Medium Green ■ Light Green ■ Yellow ■ Red

Roughly one-third of Aker BioMarine's revenues for 2020 are rated Medium Green. The company's products sold to the aquaculture sector have climate-mitigating and environmental benefits because they can replace fish meal and soy associated with deforestation. A Yellow shading is allocated to revenue streams stemming from pet food and human food supplements. While there are likely health benefits from krill oil food supplements, these products do not currently have a comparable emission reduction potential.

We rate Aker BioMarine's investments in 2020 as 59 % Light Green, 6 % Medium Green and the remaining share Yellow. The company is developing a new protein product for human consumption and respective investments were rated Medium Green. If this source becomes a substitute for high-GHG emitting animal-based protein sources or a significant further reduction of emissions in the production and transportation of these products is achieved, it could substantially lower climate impacts compared to other protein products. Aker BioMarine has informed us that they expect this product to be a substitute for whey protein (animal-based), that they expect the



majority of this product to be transported by sea-freight, and that the next phase of development includes a focus on further improving energy and water use in the production process. A Light Green shading is allocated to all the investments that are targeting a more efficient use of fossil fuel energy, such as the more efficient transportation vessel with a design that includes potential operation with ammonia in the future, but partly transports fossil fuels to the harvesting vessels. The rest of the investments are allocated a yellow shade as they do not improve fossil-based technology while being associated with emissions.

As a globalized biotech company, Aker BioMarine is exposed to both physical and transition risks from climate change. The most severe physical impacts will likely be increased flooding, as well as increased storms and extreme weather. Impacts on production facilities and supply chains can be expected, as has been experienced at the company’s plant in Houston in recent years. The effect of temperature changes on krill stocks is uncertain, however according to the company preliminary results suggest little or a slightly positive effect. Transition risks include changes in maritime regulations, a global price on carbon and changes in sourcing preferences. The company today seems reasonably well prepared to handle these risks, given its governance procedures around risk.

The majority of Aker BioMarine’s GHG emissions are in Scope 1 and come from the harvesting and transportation vessels’ consumption of fossil fuels. The main energy use of the company are the three harvesting vessels - which are used for both harvesting the krill and producing the krill meal- and the transportation vessel. The ships run on diesel. About 80% of the energy usage on board is driven by krill meal production and only 20% by propulsion. For a vessel built in 2020, the most competitive fuel in the ship’s early life will not be the same as when it is scrapped. We understand that Aker BioMarine’s policy is to strive to upgrade and improve its vessels ahead of regulations. The company has informed us that its new transportation vessel is a comparably efficient hybrid and future proofed vessel (capacity for ammonia tanks and engines’ capabilities to handle ammonia).

Aker BioMarine is given an overall governance score of **Excellent**. Aker BioMarine has set science-based and relevant net-zero targets for GHG emission reductions. The company is clearly driven by sustainability concerns and opportunities, as illustrated by the recent launch of AION, a circularity/plastics recycling company. The company has recently undergone a climate risk and ESG assessment based on TCFD recommendations. It actively engages with stakeholders and research efforts on conservation and the sustainable management of Antarctica’s resources, and has obtained certifications for relevant products.

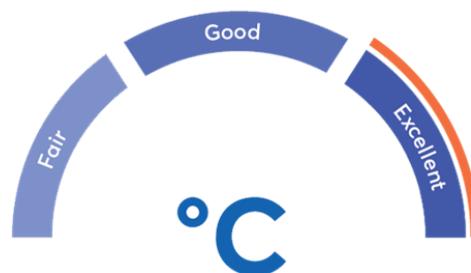


Table 1 Measured specific sector metrics for Aker BioMarine

<i>Specific sector metrics</i>	Total CO₂ emissions (tonnes, scope 1, 2 and 3)	Emissions (CO₂) per tonne of krill produced (caught)	Certification (% of krill caught)
2020	118 755 ¹	2.64 ² (0.46)	100%
2019	99,830	(0.43)	100%
2018	90,627	(0.50)	100%

¹ From 2019 to 2020, Aker BioMarine enhanced their emissions inventory to include e.g. packaging and other emissions sources in their accounting

² Starting int 2020, Aker BioMarine is measuring emission intensity in terms of tonnes of krill produced rather than krill caught. As a result, the figure is not comparable with previous years.



Contents

1	Terms and methodology	4
	Shading corporate revenue and investments	4
2	Brief description of Aker Bio Marine’s activities, strategies and related policies	5
	Company description	5
	Sector risk exposure	5
	Key issues	7
	<i>Energy use</i>	7
	<i>Emissions</i>	7
	<i>Certifications</i>	8
	Environmental Strategies and Policies	8
	Governance	9
	Reporting	11
3	Assessment of Aker BioMarine’s green activities and policies	12
	Governance Assessment	14
	Strengths	14
	Weaknesses	14
	Pitfalls	14
	EU Taxonomy	15
	Appendix 1: Source List	17
	Appendix 2: Background	18
	Appendix 3: About CICERO Shades of Green	19



1 Terms and methodology

The aim of this analysis is to be a practical tool for investors, lenders and public authorities for understanding climate risk. CICERO Green encourages the client to make this assessment publicly available. If any part of the assessment is quoted, the full report must be made available. This assessment is based on a review of documentation of the client's policies and processes, as well as information gathered during meetings, teleconferences and email correspondence.

Shading corporate revenue and investments

Our view is that the green transformation must be financially sustainable to be lasting at the corporate level. We have therefore shaded the company's current revenue generating activities. Shaded investments add a forward-looking element and provide insight into future revenue streams and corporate strategy in relation to the green transformation.

The approach is an adaptation of the CICERO Shades of Green methodology for the green bond market. The Shade of Green allocated to a green bond framework reflects how aligned the likely implementation of the framework is to a low carbon and climate resilient future, and we have rated investments and revenue streams in this assessment similarly.

SHADES OF GREEN	EXAMPLES
 Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future.	 Solar energy projects
 Medium green is allocated to projects and solutions that represent steps towards the long-term vision but are not quite there yet.	 Green buildings with a high level of certification and energy efficiency
 Light green is allocated to transition activities. These projects and solutions could have lower emissions, but do not by themselves represent or contribute to the long-term vision.	 Substantially more efficient manufacturing of fossil fuel intensive materials
 Yellow is allocated to projects and activities that do not contribute to transition. These activities could have some emissions and be exposed to climate risks. This category also includes activities with too little information to assess.	 Efficiency in fossil fuel infrastructure
 Red is allocated to projects and activities that have no role to play in a low-carbon and climate resilient future. These are heaviest emitting assets, with the most potential for lock-in of investments and risk of stranded assets.	 New infrastructure for coal

In addition to shading from dark green to red, CICERO Shades of Green also includes a governance score to show the robustness of the environmental governance structure. CICERO Green has also assessed potential alignment with the EU taxonomy of Nov. 2020, see section on the Taxonomy for details of our approach.



2 Brief description of Aker Bio Marine's activities, strategies and related policies

Company description

Aker BioMarine (AKBM) is a Norwegian biotech and pharmaceutical company harvesting and producing krill products. Krill is a small crustacean which is rich in proteins and omega-3 phospholipids and can be converted into krill meal, krill oil, protein and other health promoting ingredients, which in turn are used for aquaculture and pet food and for human consumption through health products and omega-3 supplements.

Headquartered in Oslo, AKBM has krill harvest operations in the Southern Ocean around the Antarctic, a logistics plant in Uruguay and a production facility for krill oil in the USA (Houston), as well as distribution hubs in several regions. Aker Bio Marine is part of the Aker Group, a large Norwegian-owned industrial conglomerate. Its products are sold worldwide, with North America as its largest region.

Aker BioMarine owns three harvesting vessels and one transport vessel, which all operate in Antarctic waters in the southern Atlantic. AKBM has recently replaced two of its vessels – a harvesting vessel and the supply vessel – with new and more efficient ships. The supply vessel is designed for easy conversion to green fuel (ammonia), when the technology and infrastructure for bunkering of such fuel is ready.

The Antarctic Krill Fishery (consisting of 11 vessels, of which three are owned and operated by AKBM) operates only within a small area of the Southern Ocean, called Area 48. Within this area, the CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) has set an industry catch quota of 1% of the total biomass, which is intended to ensure the sustainable replenishment of stocks.

Aker BioMarine controls the entire harvesting and production process of the krill from catching the krill to the end product. The company's vessels produce krill meal immediately after the krill has been brought onboard, hence the vessels are harvesting as well as production vessels. The krill meal is brought to the logistic hub in Montevideo (Uruguay) by a transport (supply) vessel. From there, the majority of the meal is shipped directly as feed to aquaculture customers and to pet food producers, while some is sent to a production facility in Houston (USA) where krill oil is produced (and krill protein will be extracted).

In 2020, the company established Aion - a circularity company for plastics and re-use of material. Aion will provide services to AKBM as well as other companies. AKBM is also developing a new product through the launch of INVI™, a protein hydrolysate which is designed to be a direct substitute for other animal-based proteins such as whey protein.

Sector risk exposure

Physical climate change such as extreme events (fires, flooding etc.) and incremental weather-related changes (in temperatures and precipitation) are affecting a range of sectors and regions globally. Due to historical emissions, we are de facto already locked in for approximately 1.5°C global warming³. Given today's policy ambition, the world is most likely heading toward 3°C warming in 2100 which implies accelerated physical climate impacts,

³ <https://www.cicero.oslo.no/en/posts/news/scientists-demystify-climate-scenarios-for-investors>



including more extreme storms, accelerated sea level rise, droughts and flooding⁴. For near-term physical risk, investors and companies must consider the probabilities of physical events and resiliency measures to plan for and protect against the worst impacts.

For globalized biotech company such as Aker BioMarine the most severe physical impacts will likely be increased flooding, as well as increased storms and extreme weather. Impacts on production facilities and supply chains can be expected. Developing projects with climate resilience in mind is critical for this sector, as is looking into the possible opportunities presented by climate change. CICERO's company assessment assesses these risks and opportunities - and the company's response to these - to give investors a sense of how resilient and forward looking the company is.



Physical climate risks: With global air temperatures increasing, oceans are warming too¹. The effect of temperature changes on krill stocks is uncertain and could positively or negatively affect volumes. In addition to the vessels harvesting the krill catch, AKBM is subject to transportation-related climate risk when transporting raw materials (krill meal) to its plant in Houston and in the transport of end-products to consumers.

Physical risks can lead to financial risk exposure: for Aker BioMarine this can happen when frequent/severe storms lead to longer transportation routes that are less storm prone, as well as costs related to weather-related delays and assessment of ice conditions, necessary additional safety measures or destruction of port infrastructure.

Transition risks: AKBM's harvesting vessels are subject to local and global regulations. These may become tighter over time - for instance by requiring zero emission solutions - and represent a transition risk for the company. There is arguably increased support for carbon taxes or a global price on carbon, which would affect the company. Also, climate policies may over time favor more local value chains and hence result in decreased demand for long distance transportation of goods. This will decouple economic growth from long distance marine transport and could lead to decreased demand for some of AKBM's products. Increased scrutiny from customers seeking to cut supply chain emissions and increasing pressure from investor groups could lead to increased cost of capital for companies not responding to investors' climate concerns and impact companies locked-in to fossil fuel infrastructure.

Weighed against these risks are the opportunities presented by increased demand for marine-based products which have a low carbon footprint compared to land-based ones (due to land use considerations). Since the carbon footprint of transport is a relatively small share of the overall carbon footprint of these products, the latter positive transition effect may in the end dominate for a company such as AKBM.

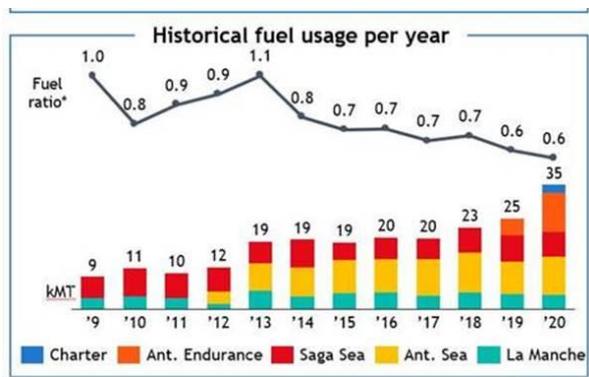
⁴ https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf



Key issues

Energy use

The main energy use of the company are the three harvesting vessels which are used for both harvesting the krill and producing the krill meal. Around 70-80% of the energy usage on board is driven by krill meal production and only 20-30% by propulsion. The ships run on diesel and the potential for using cleaner alternatives such as biofuel or electricity is currently very limited due to the long distance to land which makes refueling/recharging challenging. Given the difficulty of upgrading the fuel to more environmentally friendly options, AKBM has focused its efforts on improving the energy efficiency and emission performance of its engines (ongoing initiatives to upgrade boilers etc.) However, the company has also just signed an agreement with Aker Clean Hydrogen to develop green ammonia for its vessels and is aiming to start using ammonia when the necessary solution and infrastructure are ready.



A key metric for the company to monitor is the fuel ratio – that is, the energy used per tonne of krill meal produced. The ratio in 2009 was 0.6, and the development since 2009 is shown in

Figure 1. The company’s recent launch of its newest vessel - Antarctic Provider –means this metric is likely to improve further over time (the vessel uses 58% less energy per krill meal produced than the company’s oldest vessel).

Figure 1: Fuel usage and fuel ratio for AKBM's harvesting fleet (measured in thousand metric tonnes (MT))

The company’s energy use in buildings and transportation comes from direct fossil fuel use (diesel and natural gas) or electricity from the grid. The grid in both Montevideo (warehouse) and Norway (office) are both mainly based on renewable power (hydropower, wind, solar) although in Uruguay thermal capacity is also part of the mix. In Texas, the grid is majority natural gas and coal-based but with an increasing amount of wind (approximately 30% in 2019) and a growing pipeline of solar power coming online in the next few years. The company is considering installing solar panels at its warehouse in Montevideo and on the plant in Houston, as well as measures to improve production efficiency which can reduce the carbon intensity of production.

Emissions

Aker BioMarine’s total Scope 1, 2 and 3 emissions amounted to 118 755 tCO₂e in 2020. In 2020, Aker BioMarine developed a comprehensive and automated CO₂ reporting system, which updates emission data on a regular basis, and is disclosed in the company’s annual report. KPMG has provided limited assurance on scope 1, 2, and 3 emissions for 2020.

Emissions	Total GHG emissions (tCO ₂ eq)	Scope 1	Scope 2	Scope 3
Target	Net zero by 2050. Reduce carbon intensity per ton krill produced by 50 % (from 2020 levels)			
2020	118 755	98 224	5 218	15 313
2019	99 830	83 550	5 670	10 611
2018	90 627	77 461	4 296	8 870

Figure 2: AKBM CO₂ emissions 2018-20. Note that the figures for 2019 and 2018 have not been verified externally.



Aker BioMarine's Scope 1 emissions amounted to 98 224 tCO₂ in 2020. The majority of the company's scope 1 emissions comes from the harvesting vessels consumption of fossil fuels. There is some use of natural gas in the production process at the plant in Houston. Scope 2 emissions are mainly due to electricity use in the production plant in Houston. Scope 3 emissions are mainly from transportation of goods. In 2020, Aker BioMarine had a carbon intensity of 2.64 tCO₂e/t krill produced.

Certifications

Aker BioMarine has been certified by the Marine Stewardship Council (MSC) since 2010. MSC certification is awarded to fisheries which are well managed and have sustainable operations and practices. The three groups of criteria are: 1) sustainable fish stocks, 2) minimizing environmental impacts, and 3) effective fisheries management. In December 2020 Aker BioMarine was re-certified until 2025 with no conditions attached.

The company is also certified by Friends of the Sea: this certification is given to products and services which respects and protects the marine environment. The certification awards sustainable practices in Fisheries, Aquaculture, Fishmeal and Omega 3 Fish Oil.

The Antarctic Krill Fishery, managed by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and which AKBM is a part of, is rated by the Sustainable Fishery Partnership (SFP). In 2020, the Fishery received a rating of 'A', the top rating, indicating that the harvests come from stocks classified as in "very good condition." Only 3 % achieved this (top) mark, compared to the 88 percent of stocks managed by European and Latin American fisheries which is rated as (at least) "reasonably well-managed" (Asian fisheries are not rated).

Environmental Strategies and Policies

Aker BioMarine has a strong focus on sustainability in its operations and company strategy. In its 2020 annual report it announced six 2030 Sustainability Commitments, including reducing its carbon intensity per ton krill produced by 50 percent from 2020 levels, full circularity on all of its principal waste streams as well as production goals related to the consumption of sustainable foods and supplements – e.g. making aquaculture more efficient by contributing to 1 billion extra servings of seafood produced annually. The company has laid out key performance indicators on how the 2030 targets will be reached.

Aker BioMarine endorses the ambition set out in the Paris Agreement (2015) to remain within a trajectory well below 2°C warming towards 2050, pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. The company has set a goal of net zero emissions 2050, and has committed to 'reduce all possible sources of emissions down to unavoidable emissions' and then to compensate for the remainder using offsets. The commitment concerns Scopes 1-3 in the company's own value chain.

The company supports the Sustainable Development Goals and has identified four as particularly relevant for its activities. They are: Life Below Water (SDG14), Sustainable Production and Consumption (SDG 12), ZeroHunger (SDG2) and Improve Human Health (SDG3). AKBM has defined sustainability as its core principle and actively engages employees across business segments to participate in SDG-led processes and initiatives

AKBM operates in Antarctica – a very fragile and climate-dependent ecosystem. As such, the industry is monitored by international NGOs and concerns are raised from time to time about the sustainability of the industry and the impacts it is having on the Antarctic environment. Moreover, campaigners point out the importance of maintaining krill populations, after an 80% drop in the decades after the 1970s. Populations have since grown and there is, as



we understand it, no current evidence suggesting that krill populations are declining. Due to the fragility of its surroundings, the company is subject to strict regulations by international bodies such as CCAMLR. These regulations imply that no waste is emitted, and all vessels have independent observers on board to verify the harvesting quotas and to monitor the environmental footprint of the ship.

The company uses a technology (Eco-Harvesting) that brings live krill on board the boat and prevents the unnecessary by-catch such as birds and sea mammals. It also reduces the waste incurred by traditional methods when a proportion of the catch at the bottom of the net is rendered unusable through pressure from the rest as it is hauled aboard.

Aker BioMarine's newest krill harvesting vessel is purpose-built and the company has estimated it to be 30 percent more energy efficient than comparable harvesting vessels. The company's aim is to continuously upgrade its vessel fleet when that is possible, although the vessels are large and time-consuming investments and as such tend to be long-lived AKBM's oldest vessel, Saga Sea, was originally built in 1975 and rebuilt many times. A new build to replace this vessel is in the investment pipeline for upcoming decision.

Aker BioMarine co-founded the Association of Responsible Krill Harvesting Companies (ARK) in 2010. The global industry association was developed to promote research for the sustainable harvest of Antarctic krill and to generate scientific data from harvesting operations in order to facilitate better management of the krill fishery – including Voluntary Restrictive Zones, a set of scientifically mapped and voluntarily adopted no-go zones within the actual harvesting areas. Approximately 90% of the active industry is currently a member. From the 2019 harvesting season, ARK members jointly committed to keeping krill fishery operations away from Antarctic Peninsula penguin colonies during the breeding season. This measure was enhanced in 2020 by the all-year closure of Hope Bay in the Antarctic Peninsula from the 2021 season.

Aker BioMarine has partnered with the Antarctic and Southern Ocean Coalition (ASOC) and WWF-Norway to establish the Antarctic Wildlife Research Fund (AWR). The fund's purpose is to facilitate and promote Antarctic marine ecosystem research. Since its inception, AWR has funded 14 research projects that will improve the management of the fishery for Antarctic krill. In 2020 the Aker BioMarine funding to AWR surpassed 1 million USD since the inception of the Fund in 2015

In 2020, the company joined an industry collaboration platform (*Råvareløftet*), to reduce the carbon footprint of Norwegian salmon. The purpose of *Råvareløftet* is to accelerate the phasing in of new and sustainable raw materials for fish feed in order to enable increased production of seafood while reducing the overall climate and environmental footprint of the aquaculture industry.

Governance

When assessing the governance of Aker BioMarine, CICERO Green looks at the overarching structures and procedures for decision making connected to climate risk analysis in Aker BioMarine's, strategy and policy formulation and implementation including policies towards sub-contractors and use of LCA, handling of resilience issues and quality of reporting.

AKBM has explained that all new investments and operational efficiency projects are evaluated according to their corporate 2030 sustainability goals and four selected Sustainable Development Goals. All investments considered to have significant impacts on the company's decarbonization KPIs must be considered in the company's Climate & Decarbonization Committee before final decisions are made. To cover downside risk, an assessment is undertaken twice a year at corporate level where environmental risk is part of the evaluation. If the risk evaluation changes, new measures are put in place to mitigate the risk.



A Climate & Decarbonization committee has been established with key stakeholders in the organization – including senior management. The committee is responsible for ongoing oversight of climate-related issues, monitoring quarterly progress on climate-related targets and metrics and evaluating proposals from the business units. The committee will be consulted on all significant investment decisions,

The company has recently undergone a process to map key climate risk and opportunities. The exercise was based on the TCFD framework's recommendations. The responsibility for implementation is spread across defined units and roles.

In addition to its headquarters, the AKBM has a logistics facility in Montevideo and a krill oil manufacturing plant in Houston (as well as smaller distribution facilities in several cities). Built assets are exposed to climate events such as flooding, mudslide, stronger winds, heat stress as well as sea level rises for production facilities close to the ocean. The plant in Houston was impacted by the electricity outage of February 2021 and by the flooding caused by hurricane Harvey in 2017⁵. In both cases, production was stopped for some days but as we understand it there were no physical damages to the plant in either event.

The effect of temperature changes on krill stocks is uncertain and could positively or negatively affect volumes. We understand that AKBM is monitoring the issue and the company reports that preliminary results suggest little or a slightly positive effect. As its operational permit is linked to a quota (1%) of total stock (biomass), the near-term effect of any changes in stock is that the company's catch will change proportionally, however in the longer term the quotas may be reduced or increased.

AKBM works actively with its supply chain in order to reduce its environmental impacts. A large share of Scope 3 emissions come from transportation to customers. The company works with the logistics company Kuehne + Nagel and most transportation takes place via ships, followed by air and land. The shipping routes are selected in part based on their environmental footprint. The intention of the company is to reduce air freight as much as possible over the coming years. For 2020, about 70% of AKBM's CO₂ transport footprint came from sea and 13% from air transport. Kuehne + Nagel is working on a programme to offset CO₂ emissions related to sea transport. From an environmental perspective there is a longer term risk that if shipping technology does not become less fossil fuel dependent, krill harvesting could be outperformed by more locally produced protein sources with lower emissions - such as protein produced from insects onshore (and using renewable energy in the process). The company is committed to reducing waste and lowering the impacts of its packaging needs. In 2020, this led to the establishment of AION, a circularity company to recycle waste and re-use materials. The company has informed us that they are also in the process of developing a new packaging strategy that includes a focus on recycled materials.

The company undertook in 2020 a third LCA analysis of its three main products since the establishment of the company. The carbon footprint includes the complete system, from harvesting until the products are delivered to clients. According to the company, the figures show a reduction of ca. 50% in CO₂ emissions (intensity) since the previous assessment in 2014.

⁵ Hurricane Harvey was a devastating Category 4 hurricane that made landfall on Texas and Louisiana in August 2017, causing catastrophic flooding and many deaths. The power outage in February 2021 affected much of the state and resulted in significant water, food and heat shortages.



Reporting

The company has committed to report on carbon annually based on the GRI. The report is published on the company's homepage, and the most recent numbers are from 2020 and third party audited. The company is in the process of implementing TCFD recommendations, and uses climate scenarios which combine qualitative and quantitative data. The company bases its risk modelling on the high-emissions and a low-emissions scenarios of the United Nations' Intergovernmental Panel on Climate Change's (IPCC) *Special Report on the Ocean and Cryosphere in a Changing Climate*.

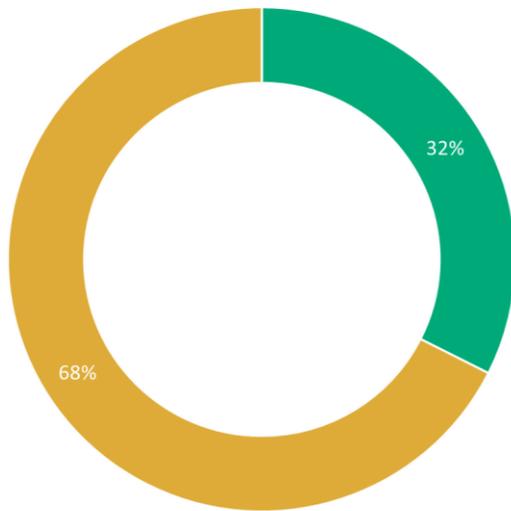
The company has developed an automated CO₂ reporting system, and its carbon accounts are disclosed in the annual report. Climate-related reporting includes overall scope 1, 2 and 3 CO₂ emissions, carbon intensity of krill harvesting, overall energy consumption, as well as other environmental metrics (ethanol, packaging, water, acidity levels).



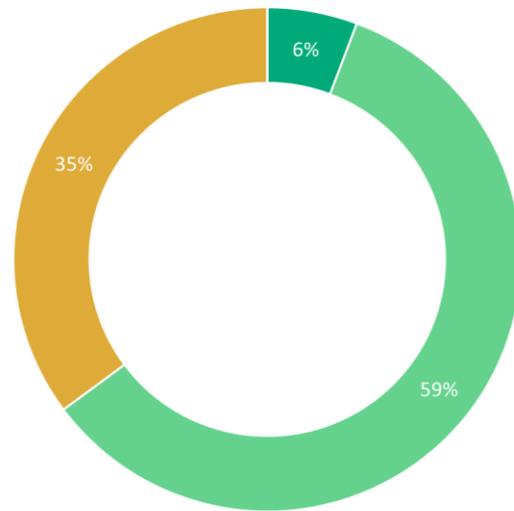
3 Assessment of Aker BioMarine's green activities and policies

According to CICERO Green's methodology a shade of green should be allocated to the revenue stream and investments according to how these streams reflect alignment of the underlying activities to a low carbon and climate resilient future and taking into account governance issues. (See methodology page for further details on shading).

Shades of Green by annual revenue 2020



Shades of Green by investments in 2020



■ Dark Green ■ Medium Green ■ Light Green ■ Yellow ■ Red

Figure 3: Shading of AKBM's 2020 group revenue and capital expenditures (cash flow outlays from investment activities).

CICERO Green allocates a Medium Green shading to revenue streams stemming from products sold to aquaculture. Antarctic krill (*Euphasia superba*) is a source of sustainable aquaculture feed with positive climate contribution potential. Aquaculture is a booming industry, and surpassed fisheries as the main provider of seafood globally in 2014. No reliable estimate of aquaculture's contribution to global GHG emissions exist, however, in comparison to other animal protein sources, the carbon footprint of farmed salmon is considered low⁶. The footprint of aquaculture (at slaughter) is made up almost entirely by the feed production⁷, some of it attributed to the use of soy – although it should be said that the negative impacts of soy use depends on the extent to which the soy production is associated with land-use change (and tropical deforestation). Soy make up 10%-26% of the feed

⁶ The carbon footprint of farmed salmon is around 80% lower than that of beef, slightly lower than that of poultry, but higher than that of chicken and wild-caught fish, according to a recent report (Winther, U., Hognes, E.S., Jafarzadeh, S. & Ziegler, F. (2020). Greenhouse gas emissions of Norwegian seafood production in 2017. SINTEF Ocean AS)

⁷ Although air transport over long distances can more than double the final product's footprint (Winther, U. et al 2020.)



produced in Norway⁸, around 85% of which is imported from Brazil⁹. Fish oil and fish meal make up around 30% of the feed and contribute significantly to the carbon footprint of farmed salmon, in addition to putting pressure on wild fish stocks. In comparison, krill is one of the most abundant species on earth. Moreover, studies have shown that krill improves fish health, and hence improves the feed and carbon efficiency of farmed salmon.

As opposed to soy and fish (meal), krill does not currently have many competing uses, nor does it require large areas of land for its cultivation. Krill meal's ability to replace fish meal and deforestation-causing soy in aquaculture feed is the main reason for awarding this revenue segment Medium Green, but the high sustainability standard the company adheres to for its fishing operations in Antarctica and the strategy to improve the efficiency of its transportation and harvesting vessels were also factored in the assessment. In order to improve the rating, the harvesting and transportation vessels and the transportation of the product to the costumers would need to be significantly greener. The 2050 solutions require near zero emission technologies.

A Yellow shading is allocated to revenue streams stemming from ingredients for pet food and human food supplements as well as those relating to brands and marketing activities. Revenue from brands are not directly tied to the krill harvesting. The health benefits of krill oil food supplements include decreased risk of heart disease; brain and cognitive health; sports and performance; and joint and skin benefits. However, while they can have positive effects on human health and contribute to SDG3 (human health) and could play a part of a more sustainable diet, these products do not currently have the same emission reduction effect as the products sold to the aquaculture sector. While using krill as feed reduces the need for soy and fish meal, the supplements add emissions through the whole value chain. The harvesting vessels and the transportation vessels owned by the company are becoming greener but are still 100 percent fossil fuel based. In addition, the largest share of the company's scope 3 emissions are emissions stemming from transportation of pet food and human food supplements to customers. The production process in Houston is also mainly fossil fuel based.

We find that in 2020, 32% of Aker BioMarine's revenue resulted from products sold to aquaculture and are considered Medium Green while 68 % of the company's activities are related to sales that are Yellow. Aker BioMarine currently has no revenue or investment streams that are rated Red, the shade allocated to highest emissions activities with high lock in risks.

We rate Aker BioMarine's investments in 2020 as 59 % Light Green, 6 % Medium Green and the remaining share Yellow. The company is developing a new protein product for human consumption and respective investments were rated Medium Green. If this source becomes a substitute for high-GHG emitting animal-based protein sources or a significant further reduction of emissions in the production and the transportation of these products is achieved, it could substantially lower climate impact compared to other protein products. AKBM has informed us that they expect this product to be a substitute for whey protein (animal-based), that they expect the majority of this product to be transported by sea-freight, and that the next phase of development includes a focus on further improving energy and water use in the production process. The Light Green is allocated to all the investments that are targeting a more efficient use of fossil fuel energy, such as the more efficient transportation vessel and other investments with environmental benefits. The investments in the transportation vessel constitute a significant share of the Light Green investments. This vessel is a comparably efficient hybrid vessel and future proofed (capacity for ammonia tanks and engines' capabilities to handle ammonia according to AKBM). However, it still is powered by fossil fuels and also transports fossil fuels (in addition to staff and krill) to the harvesting vessels. Aker BioMarine informed us that the vessel is expected to consume 66% less fuel per tonne of krill meal produced

⁸ Regnskogsfondet og Framtiden i Våre Hender 2017. Fra brasiliansk jord til norske middagsbord. En rapport om soya i norsk laksefôr

⁹ Source: <https://www.ssb.no/statbank/table/08801>



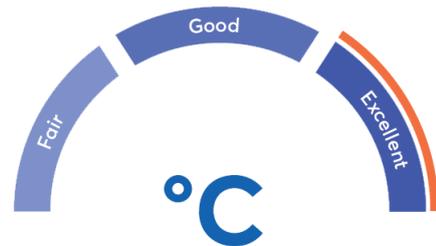
compared to the ship it replaces. However, a large amount of savings results from higher cargo capacity and associated reduced shipping needs. The rest of the investments are allocated a yellow shade as they do not improve fossil-based technology while being associated with it. While AKBM's R&D and innovation efforts seem focused on sustainability, they have not been included in the shading of investments. However, it is likely that these activities will lead to greener investments in the future.

Governance Assessment

When assessing the governance of AKBM, CICERO Green looks at four elements: 1) Strategy, goals, and targets 2) lifecycle considerations including supply chain policies and environmental considerations towards customers 3) the integration of climate considerations into their business and the handling of resilience issues; and 4) reporting. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.

Aker BioMarine has set science-based and relevant net-zero targets for GHG emission reductions. The company is clearly driven by sustainability concerns and opportunities, as illustrated by the recent launch of AION, a circularity/plastics recycling company. The company has recently undergone a climate risk and ESG assessment based on TCFD recommendations. It actively engages with stakeholders and research efforts related to conservation and the sustainable management of the Antarctic's resources, and has obtained certifications for relevant products.

Based on an assessment of the above, CICERO Green has assigned AKBM an overall governance score of **Excellent**



Strengths

Sustainability is core to the business culture of AKBM. Since 2016 it has defined its purpose "to improve human and planetary health". It has recently significantly revamped its climate targets and governance structures relating to climate risks and reporting.

We are impressed by how the company proactively seeks to engage with climate change issues – both in terms of mitigating negative effects and capitalizing on opportunities. Examples include the recent investments in new and improved vessels (where in due course the aim is to replace fossil fuel with green ammonia) and the establishment of a circularity company related to its supply chain.

As the largest krill harvester in Antarctica, AKBM is a good role model and sustainability pioneer. It collaborates with international research and conservation initiatives and seeks out voluntary measures and restrictions which benefit the industry and natural environment in the long run.

Weaknesses

Our assessment has not uncovered any significant weaknesses in Aker BioMarine's environmental management.

Pitfalls

Recent flooding and power outage events in Houston show that developing projects with climate resilience in mind is critical for a company like AKBM. We understand that AKBM has recently started incorporating resiliency concerns into its new plant location decisions and is working on a systematic approach for governing this process.



Given the significant exposure of its operations to different elements of climate risk, it is vital that the company work systematically to better understand climate risk exposure and mitigate the risks as needed.

AKBM's harvesting and transportation vessels are subject to local and global regulations. These may become tighter over time – for instance by requiring zero emission solutions – and represent a transition risk for the company. Likewise, the demand for krill for aquaculture feed will depend on policies and preferences which may change over time and represent another transition risk. However, AKBM has started incorporating transition risks into its risk assessments and is taking steps to 'future proof' its assets – e.g. by striving to upgrade vessels ahead of regulations and preparing them for future alternative fuels. By continuing this strategy, AKBM is mitigating against the risks that vessels – and indeed its business – may become stranded assets.

Our assessment is based on data reported or estimated by the company and has not always been verified by a third party. In addition, there are numerous ways to estimate, measure, verify and report e.g. data on emissions, which may make direct comparisons between companies or regulatory criteria difficult and somewhat uncertain. Additionally, there is typically not an explicit link between sustainability and financial data.¹⁰All in all, these uncertainties related to data may make the interpretation of the climate governance of Aker BioMarine more challenging.

EU Taxonomy

In March 2020, a technical expert group (TEG) proposed an EU taxonomy for sustainable finance that specified mitigation criteria and “do no significant harm” (DNSH) criteria for eligible activities. The DNSH-criteria are developed to make sure that progress against some objectives are not made at the expense of others and recognizes the relationships between different environmental objectives¹¹. In November 2020, EU published its draft delegated act to outline its proposed technical screening criteria for climate adaptation and mitigation objectives, respectively, which it was tasked to develop after it entered into law in July¹².

The relevant criteria for Aker BioMarine are those that guide fishing and manufacturing (of food/feed) processes. However, the Taxonomy does not presently give specific guidance for these activities. The EU Taxonomy includes *Sea and coastal freight water transport, vessels for port operations and auxiliary activities* which likely pertains to Aker BioMarine's transport vessel, but not to its fishing activities. However, it is unclear (probably not aligned) to which extent Aker BioMarine's transport vessel would qualify under this category.

A basis requirement in the draft criteria, applicable to all maritime transport activities, is that the vessels have zero direct (tailpipe) CO₂ emission. Vessels used for sea and coastal freight water transport will however qualify

- a) until 31 December 2025 for hybrid vessels that use at least 50 % of zero direct (tailpipe) CO₂ emission fuel mass or plug-in power for their normal operation, and
- b) until 31 December 2025 where the vessels have an attained Energy Efficiency Design Index (EEDI) value of 10 % below the EEDI requirements applicable on 1 January 2022.

¹⁰ Most accounting systems do typically not provide a break-down of revenue and investments by environmental impact, and the analysis therefore include imprecisions and may not be directly comparable with figures in the annual reporting

¹¹ Taxonomy: Final report of the Technical Expert Group on Sustainable Finance, March 2020.

https://ec.europa.eu/knowledge4policy/publication/sustainable-finance-teg-final-report-eu-taxonomy_en

¹² https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12302-Climate-change-mitigation-and-adaptation-taxonomy#ISC_WORKFLOW



There is also a requirement that vessels used for sea and coastal freight water transport are not dedicated to the transport of fossil fuels. There are also specific requirements as to inter alia sulphur oxides emissions, nitrogen oxides (NO_x) emissions, exhaust gas cleaning systems, ballast water, noise and vibrations.

Aker BioMarine is actively following and influencing the development of the taxonomy through e.g. the *Sjømat Norge* (Seafood Industry Association) reference group.



Appendix 1: Source List

Document Number	Document Name	Description
1	Aker BioMarine Annual Report 2020	
2	Aker BioMarine's GRI Report 2016	
3	CDP Response 2019 – Climate Change	Aker's response to CDP in 2019
4	200503 Aker BioMarine Investor presentation	
5	Sustainability Reporting Aker BioMarine pptx	Sustainability Report for 2016
6	CO2 Emissions Transport pptx	Overview of emissions from transport segment 2018-20
7	KN Carbon Offsetting Flyer.pdf	Overview of KN's offsetting and carbon activities
8	Operational and financial data per product per year historically.xls	
9	PPE additions 2019_Supply chain and Innovation 2020 budget_MASTER	Investment overview
10	2019_reduction fisheries_report_FINAL	Report (external) by SFP
11	Ecological Footprint and Life Cycle Environmental Performance of Aker BioMarine's Antarctic Krill-Derived Products	LCA Report on AKBM from 2010/11
12	Vessels Emissions Overview 2017-20.xlsx	
13	AKBM CO2 Emissions Overview 2017-19.docx	(Provisional) emissions figures for 2017-19
14	AKBM ESG Readiness_consolidated deliverables (002)	Climate Risk Mapping
15	Aker BioMarine Q4 2020 presentation (1)	Company presentation



Appendix 2: Background

Why We Talk About Emissions from the Food Sector: Research suggest that the global food sector is responsible for around 30 percent of the world’s energy consumption and contributes some 25 percent of the global greenhouse gas emissions¹³. As the world population increases, this means that to meet the future food demand without compromising the environment, we must develop a global food system that uses less energy, emits less greenhouse gases, and uses less freshwater. The 2019 International Panel on Climate Change (IPCC) “Report on Climate Change and the Land” suggests that even with substantial efficiency gains through innovation, the land-based food system alone cannot support the necessary growth in food production and that alternative sources have to be found. It is noteworthy that 70 % of our planet is covered by ocean, but only 2-3 % of today’s food production comes from the ocean. Responsible fisheries, sustainable aquaculture, and thinking in new ways about developing valuable marine resources are likely to future strongly in a 2050 climate solution.

Why We Talk About Emissions from Transport: Transportation is responsible for 24% of direct CO₂ emissions from fuel combustion globally. Road vehicles – cars, trucks, buses and two- and three-wheelers – account for nearly three-quarters of transport CO₂ emissions.¹⁴ Global transport emissions grew by only 0.6% in 2018 (compared to 1.7% annually over the past decade) as efficiency improvements, electrification and biofuels helped limit the growth in energy demand. To meet the SDG goals, direct transport emissions must peak in the early 2020s and then fall by 13.9% until 2030 to support the IEA’s Sustainable Development Scenario. The largest amount of carbon savings come from switching from inefficient modes of transport (e.g. private cars) to mass transit. The shipping sector represents 2.2% of global emissions and while vessel efficiency has improved since the financial crisis- mainly through slow steaming- total emissions have been increasing. The deep-sea (long haul) segment accounts for more than 80% of the sector’s emissions. International shipping is not covered by the Paris Agreement, but regulated through the International Maritime Organization (IMO). Shipping transports at least 80% of international trade (IPCC 2019). There are currently no available solutions to power long-haul vessels with alternative fuels. According to DNV GL, 99.7% of the world’s fleet are powered by conventional fuels whereas 0.3% of the world’s fleet are run on battery, Liquid Natural Gas (LNG) or methanol. IMO’s climate strategy for shipping is to reduce CO₂ emissions by 50% by 2050.

Why We Talk About Emissions from Energy: Energy accounts for about two-thirds of global greenhouse gas emissions. In 2017, global renewable electricity generation grew 6% and reached a quarter of global power output, thanks to the continued growth of solar PV and wind technologies. Despite these positive trends (especially with PV), additional efforts are needed in renewable power generation to meet the targets set out in the IEA’s SDS. According to the IEA, the share of renewables in global electricity generation must reach 47% by 2030, up from 25% in 2017.¹⁵

¹³ See for example <https://ourworldindata.org/food-ghg-emissions> and data from the Food and Agriculture Organization (FAO),

¹⁴ <https://www.iea.org/tcep/transport/>

¹⁵ <http://www.iea.org/tcep/power/renewables/>



Appendix 3: About CICERO Shades of Green

CICERO Green is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University, the International Institute for Sustainable Development (IISD) and the and the University of Michigan School for Environment and Sustainability (SEAS).

