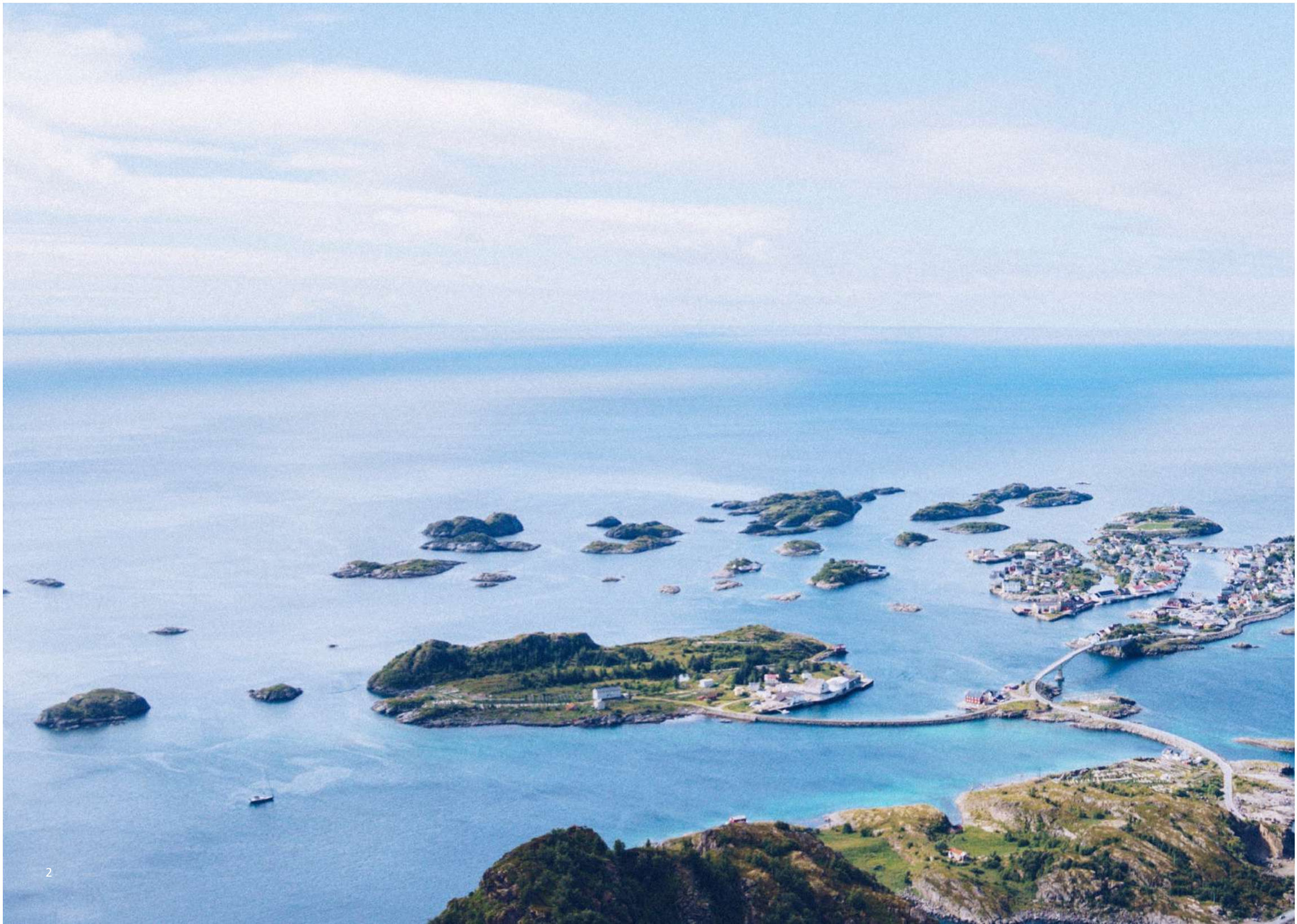


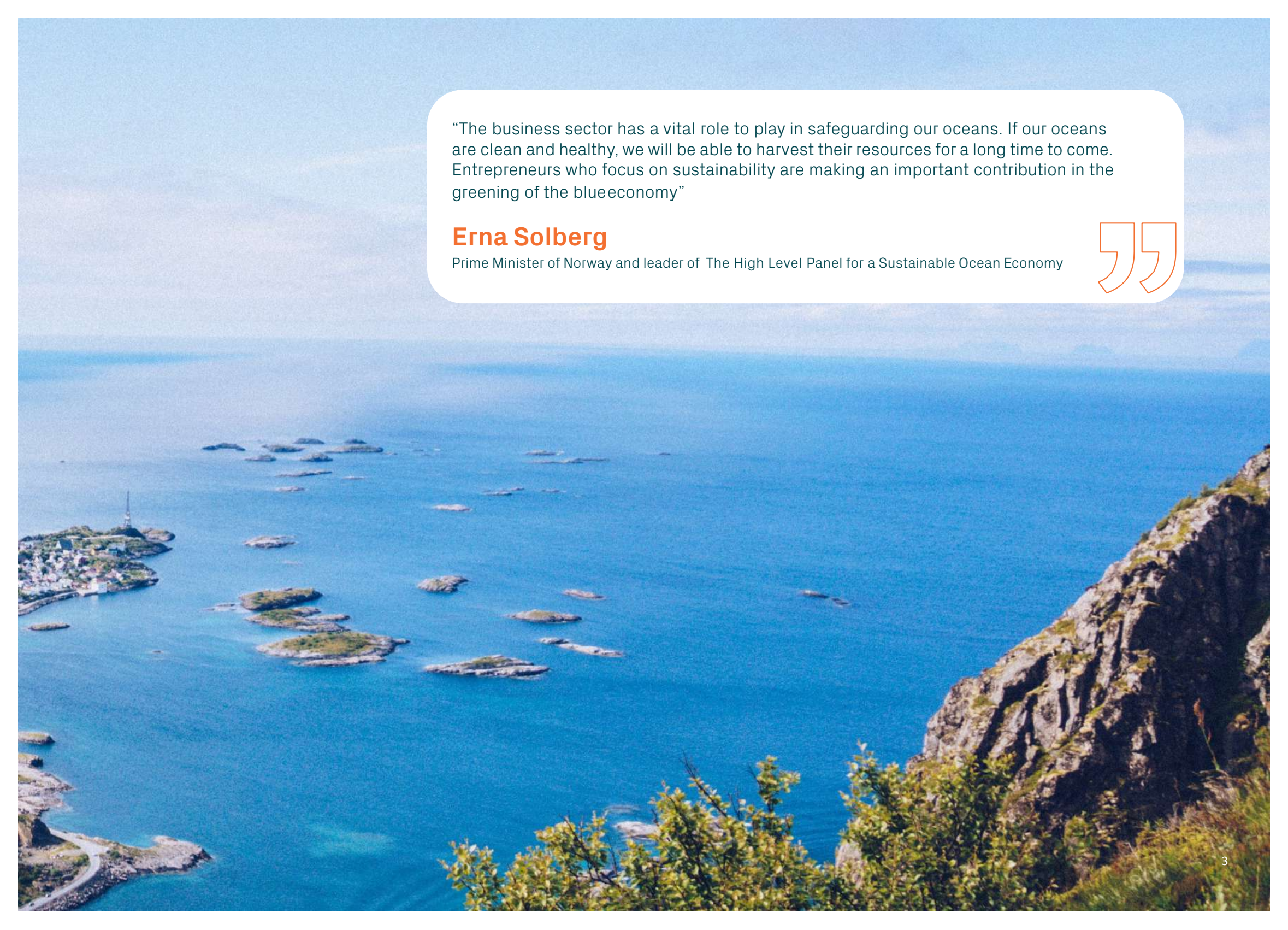


The Blue World Perspective

A publication by Katapult Ocean
First edition October 2019







“The business sector has a vital role to play in safeguarding our oceans. If our oceans are clean and healthy, we will be able to harvest their resources for a long time to come. Entrepreneurs who focus on sustainability are making an important contribution in the greening of the blueeconomy”

Erna Solberg

Prime Minister of Norway and leader of The High Level Panel for a Sustainable Ocean Economy





Preface

I grew up taking clean and healthy oceans for granted. Plastic did not regularly wash up on the shores where we went swimming as kids, and the changes due to acidification and climate change were not apparent to the naked eye.

That ocean view is long gone. The IPCC Special Report on the Ocean and Cryosphere as well as the report from the High-Level Panel on a Sustainable Ocean Economy have made it perfectly clear that the ocean is in a wretched condition. The sense of urgency is well established. With The Blue World Perspective, we want to establish a sense of opportunity. After all, if we do things right, the impact can be massive. As the report of the High-Level Panel pointed out, the ocean is also an important part of the solution: the ocean can contribute to more than 20 % of the reduction in CO₂-emissions needed to reach the 1.5% temperature target by 2050.

Over the past year we have mapped the global landscape for ocean impact startups. We have gathered data from more than 1000 startups from over 80 countries. This report is an overview of trends we observe, where the startups are based, and why we believe investing in ocean impact is a great business opportunity. By sharing this data, we want to mobilize finance and support for ocean impact start-ups.

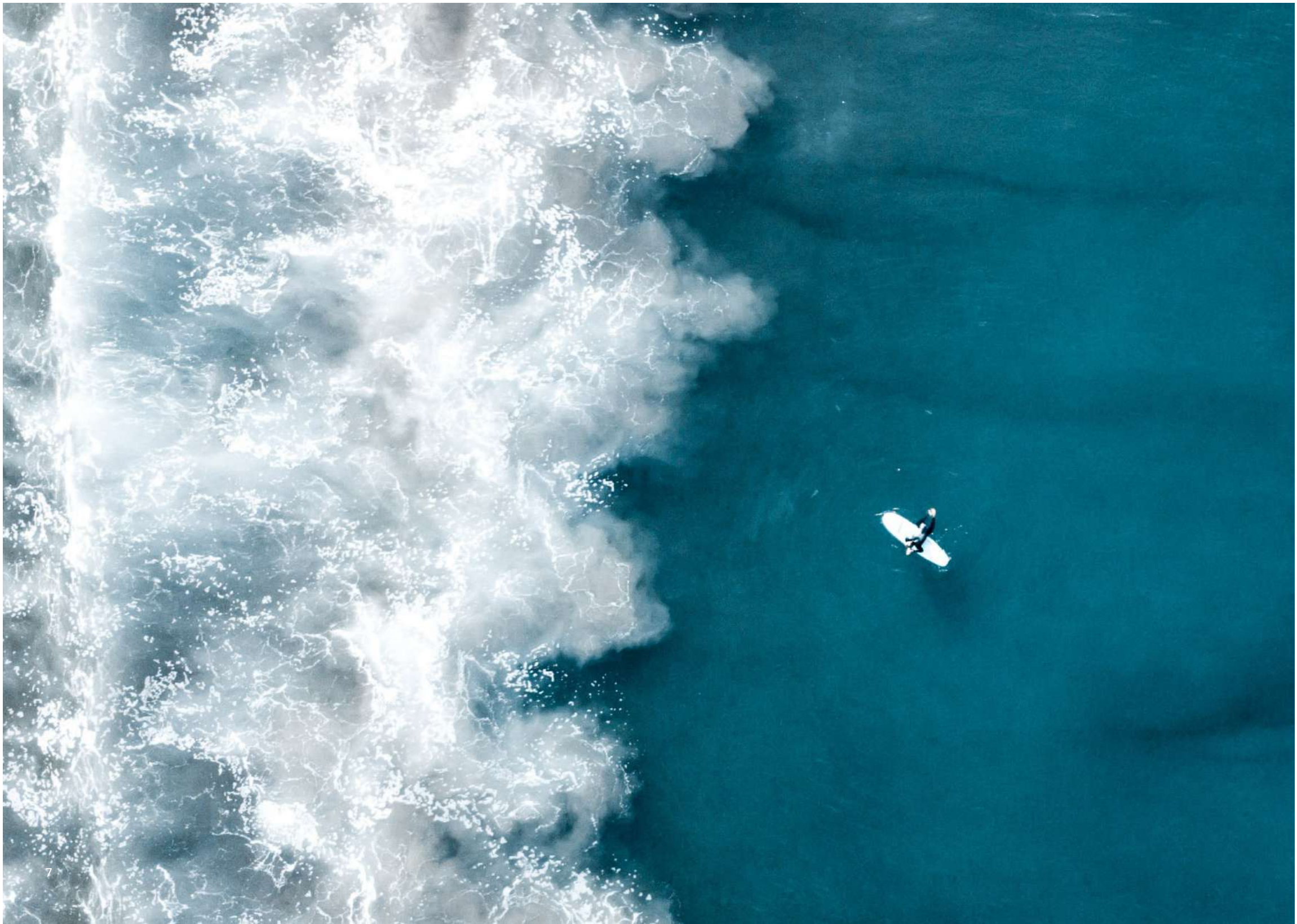
Many of the ocean challenges are man-made and can be solved. The plastic pollution crisis is a good example. The threats posed by climate change are more complex. That does not stop me from being optimistic. Technology and human ingenuity can work wonders if we get it right from the very beginning. This inspires us every day, as we speak with founders from all over the world: there is a magnitude of good ideas out there. With the Blue World Perspective, we want to give you a glimpse of this ocean of opportunities. Enjoy the dive!



Maren Hjorth Bauer

Co-founder and CEO





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Intro

Our vision is a world in which a thriving ocean is in harmony with economic development. To that end, we at Katapult Ocean

- **Invest** in startups that build profitable businesses with a positive impact on our ocean.
- **Catalyse** capital, talent, companies and startups to accelerate the blue shift within the ocean industries. We work to inspire corporates, research institutions and investors on the importance of collaborating with startups and how to do so effectively. We aspire to foster a more sustainable future through putting human ingenuity and capital to work.
- **Steward** ocean tech startups to achieve the UN Sustainable Development Goals with a main focus on SDG 14, Life below water.

The backdrop is dramatic. 66 percent of the marine environment is severely altered by human actions.¹ Pollution threatens the life of animals who mistake plastic for food, turning beautiful coast lines and seascapes into garbage dumps. Illegal fishing and overfishing are pushing fish stocks towards extinction, whilst at the same time we need to harvest more from the ocean in order to meet the protein demand of a growing population with the lowest possible carbon footprint. Climate change contributes to rising sea temperatures and acidification, putting coral reefs and marine life at severe risk. It also threatens the livelihood of coastal communities, who's economic and food security depends on the ocean.

In spite of this, we believe that these challenges carry opportunities for companies pursuing more sustainable business practices.

The report The Ocean as a Solution for Climate Change: 5 Opportunities for Action from the High-Level Panel on a Sustainable Ocean Economy shows that ocean-based climate solutions could deliver as much as 21% of the emissions reductions needed to limit global warming to no more than 1.5 degrees Celsius by 2050. This highlights how the ocean is an important part of the solution to one of the greatest challenges of our time. Moreover, we recognise the importance of technology in ameliorating other aspects of the blue economy and the tool it provides for businesses, societies and individuals to take better care of the ocean as an invaluable environmental asset.





Digitization, automation and AI can drive huge productivity gains in the blue economy. Crucially for us all, these technologies also have the tools to ensure a more sustainable blue economy. Traceability throughout value chains can reduce the market for illegally sourced fish. AI can dramatically improve decision making, encouraging efficiency and targeted interventions in aquaculture and shipping. This can increase yield in the former and reduce emissions in the latter whilst improving margins. Biotech is breaking new boundaries, finding new ways to improve fish health, grow algae, and create value from waste.

The uptake of new technology is further piqued by the mega trends defining our time: rapid population growth, increased focus on resource and energy efficiency as well as climate change. This results in behavioural changes on an individual level, but more importantly in the short to medium term is its impact on political and regulatory changes.

For business, big and small, sustainability is becoming a license to operate.

For the ocean industries, many still at the cusp of big technology advancements, these megatrends provide attractive investment opportunities.

Venture-backed aquaculture investments are growing as a result of worldwide recognition of the importance of sustainable protein. Adoption of precision farming techniques with the help of new technology is critical to make large-scale production happen sustainably.

The push to reduce CO₂ emissions requires oil and gas production for energy use to be replaced by renewable energy sources. Shipping is looking for new propulsion methods and alternative fuels, and the sector is pursuing energy-efficiency throughout its operations. To stop ocean-bound plastic and other waste from entering the oceans, entire value chains have to be re-thought. Better waste management and innovative materials are needed.

The market for tech allowing humans, the economy and nature to prosper together, continues to grow. The OECD report *The Ocean Economy in 2030* from 2016 estimated that the ocean economy by 2030 could more than double its contribution to global value added, at more than 3 billion USD. With the knowledge we have about the state of our oceans, it is impossible to champion the growth of the ocean economy without also championing sustainability.

In this report, we look at how the global ocean startup ecosystem is responding to ocean challenges and opportunities. We investigate where the impact driven startups are based and what technology they are putting to use. We have also surveyed a range of executives in the ocean industry about how they view innovation and the role of new technology in their operations. Lastly, we provide advice on how corporates and startups can form mutually beneficial relationships in pursuit of new, sustainable technology and business models.

Impact investment thesis

As an impact investor, Katapult Ocean firmly believes that the only way to make investments future-proof, is to integrate social and environmental impacts into decision making, using the UN Sustainable Development Goals as a guiding framework. Combining this process with the high growth potential in innovative, tech-driven startups, we believe sustainability and profitability can go hand in hand.

We look for impact along two dimensions:

Direct impact: startups that directly address the UN Sustainable Development Goals as a primary feature and a top-level priority. They will typically address the objective of a healthy ocean, and address SDG 14 Life below water, SDG 13 Climate Action and SDG 15 Biodiversity.

Indirect impact: startups that speed up a desirable development with the potential to indirectly address the UN Sustainable Development Goals or otherwise have a positive impact on the ocean, through what we consider 'enabling technologies'. Examples may be startups that dramatically reduce costs of renewable energy. Startups within this category will also be addressing SDG 14, but often through other SDGs, such as SDG 2 Zero Hunger, SDG 7 Clean Energy or SDG 12 Responsible Consumption and Production.

We hope this report will make you curious about the opportunities out there - to create the world you want to live in, and the ocean we all want to swim in.



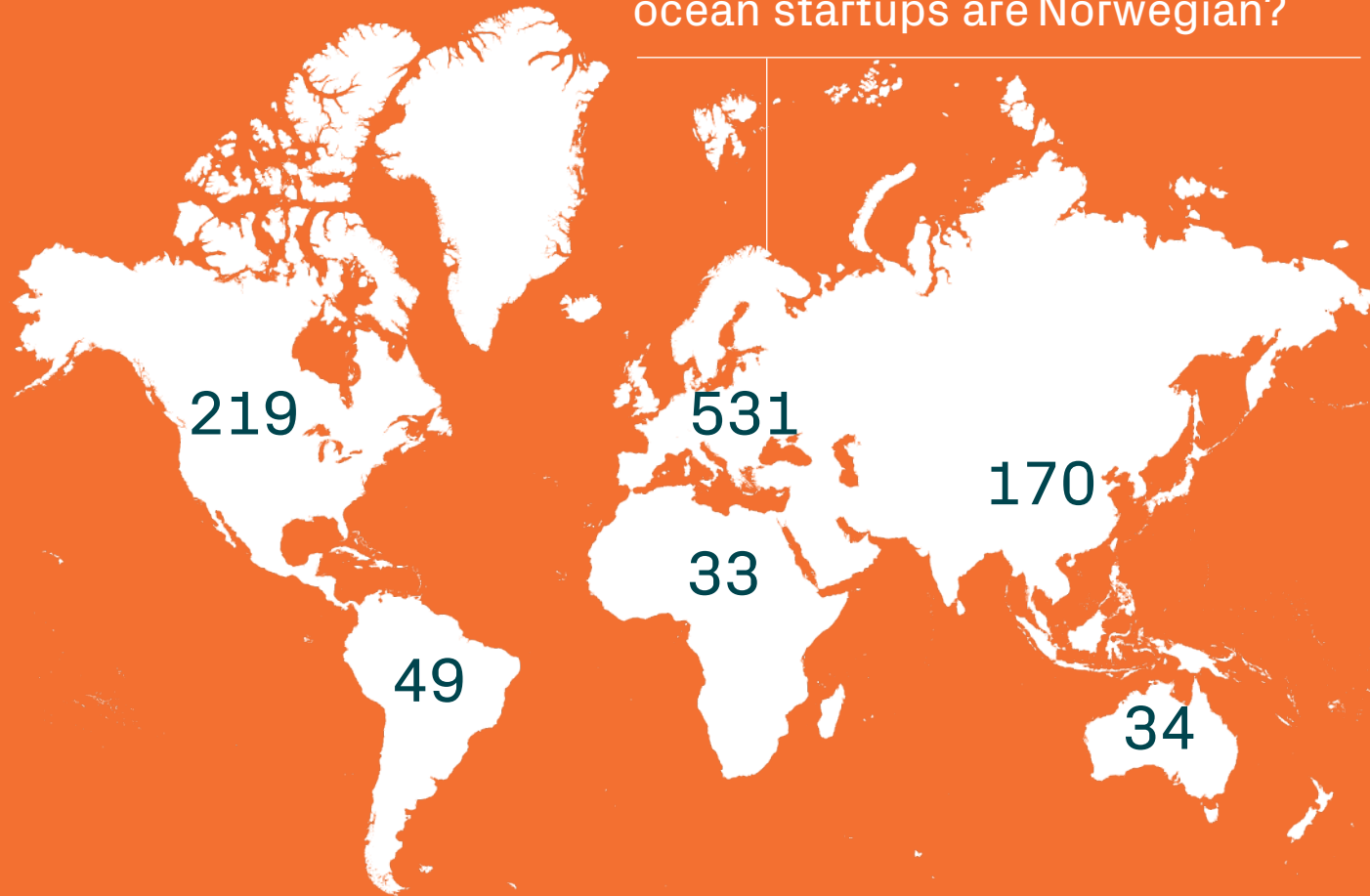
An underwater photograph featuring a vibrant blue background. On the left, the head and tail of an orange clownfish with white stripes are visible. On the right, there is a large, textured, brownish-purple coral structure. The text "Put your money where it does GOOD!" is centered in white, with "GOOD!" in all caps. A thin white vertical line is positioned to the left of the text.

Put your
money
where
it does
GOOD!

Global trends

Growth in the blue economy fuelled by changes in consumer preferences, regulations and lower cost of tech, Europe leading the way but female founders missing – and did you know that startups are key to teach an old dog new tricks?

Did you know that **25%** of European ocean startups are Norwegian?



World map: number of ocean startups per continent

Top ten countries for ocean impact startups:

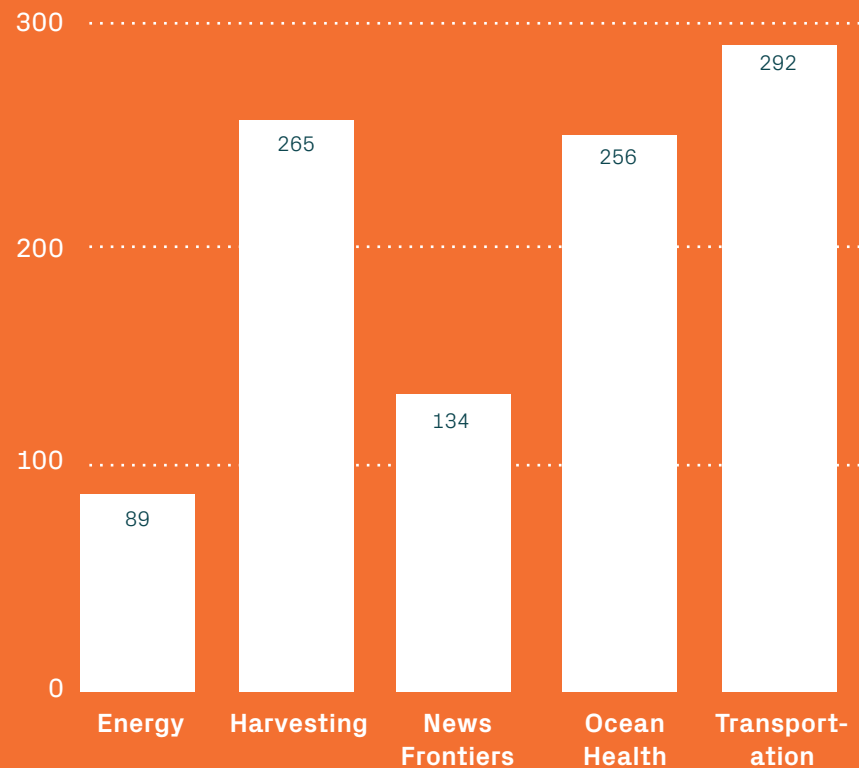
1. United States
2. Norway
3. UK
4. The Netherlands
5. Canada
6. Denmark
7. France
8. Germany
9. Israel
10. Australia

Global distribution

The ocean tech start-up scene is booming, and we find impact-driven founders all over the world. Europe is leading the way in the ocean tech space by a long shot, followed by North America. We believe one of the reasons could be access to soft funding: ocean tech start-ups typically go through an expensive R&D phase before they are ready to commercialize. Start-ups based in regions offering extensive public soft funding, or that have a tradition for philanthropic grants may therefore be at an advantage. Nonetheless, we see that start-ups based in regions with less soft-funding available develop creative ways to finance their projects. Founders running auxiliary consulting or business projects to finance their start-up is common.

Sector distribution

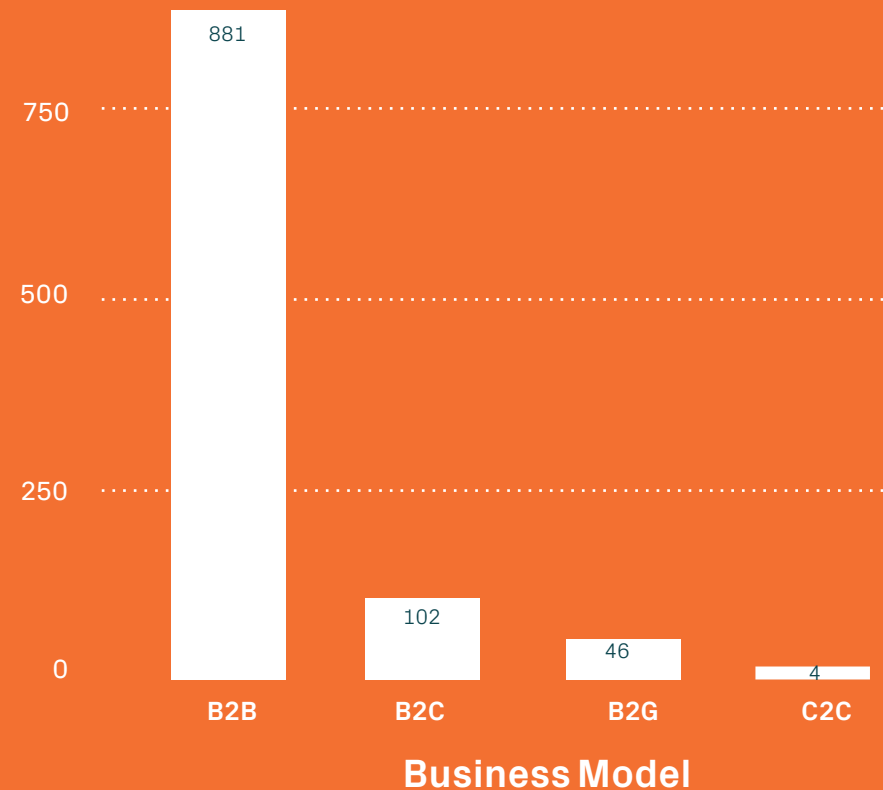
Marine transportation and Energy represent the tails of the regional sector distributions. European startups represent 5x the number of North American. Ocean Health and Harvesting are the most spread out sectors across regions, subject to fragmented markets with several stakeholders.



Graph: Number of ocean startups globally divided per sector

Business models

Ocean technology startups are mostly B2B focused. The largest share of B2C business models fall within the Ocean Health category. New products and services are increasingly common and appeal to end consumers' desire to preserve the ocean. B2G make up a large share for the Ocean Health, Energy and New Frontier sectors. This is partly due to ocean capital preservation as a public good, public infrastructure buyers and government backed research as a means to better understand the ocean.



Graph: Number of ocean startups globally divided per type of business model

Gender distribution

A majority of the founders we have interviewed over the past year and a half build on extensive industry experience before venturing into building a start-up. They are generally unafraid of working with hardware. They are also, typically, male. Only 10 percent of the ocean tech start-up founders are women. The US is leading the way with 14 percent female founder, followed by Norway with 11 percent.. Is ocean impact tech scoring worse than other sectors? The answer is yes when comparing the results to an industry wide finding by the European Commission, which reveals that about one-third of all entrepreneurs in Europe are women.

1/10

Female founders wanted!
Women represent a larger
share of ocean health &
harvesting specific business
applications. But even there,
numbers are very low.



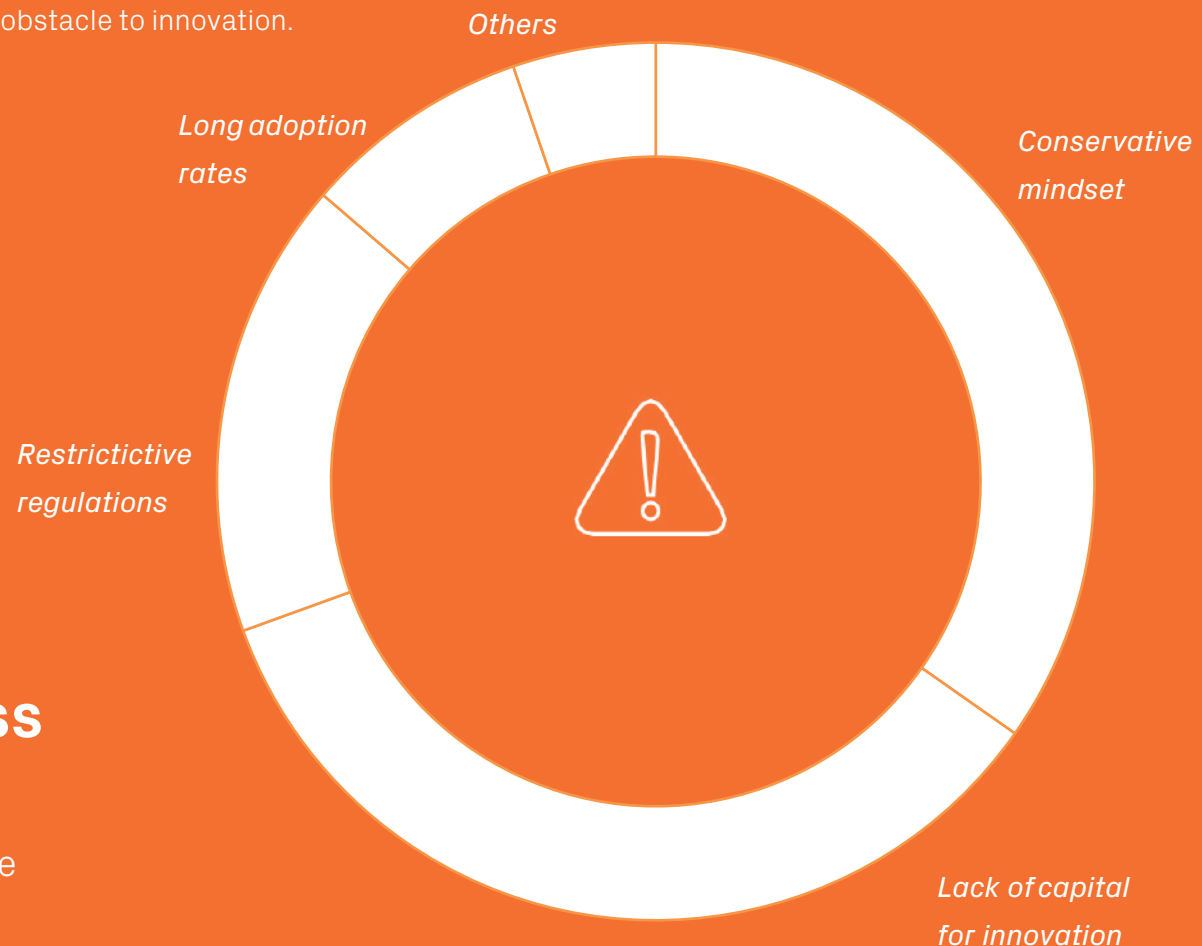
Industry survey findings

For this report, we surveyed 30 executives from across the ocean industries to get their input on the opportunities they see within their respective organisation and industry. We also asked what the main drivers for change are. Regulatory developments rank high, especially within transport and energy. In industries tagged as “frontier”, the availability of new technologies is an important factor. Unsurprisingly for harvesting (aquaculture, fisheries), changes in consumer demand is a strong driver for sustainability.

The survey also reveals that a conservative culture permeates many ocean industries and may be an obstacle to innovation.

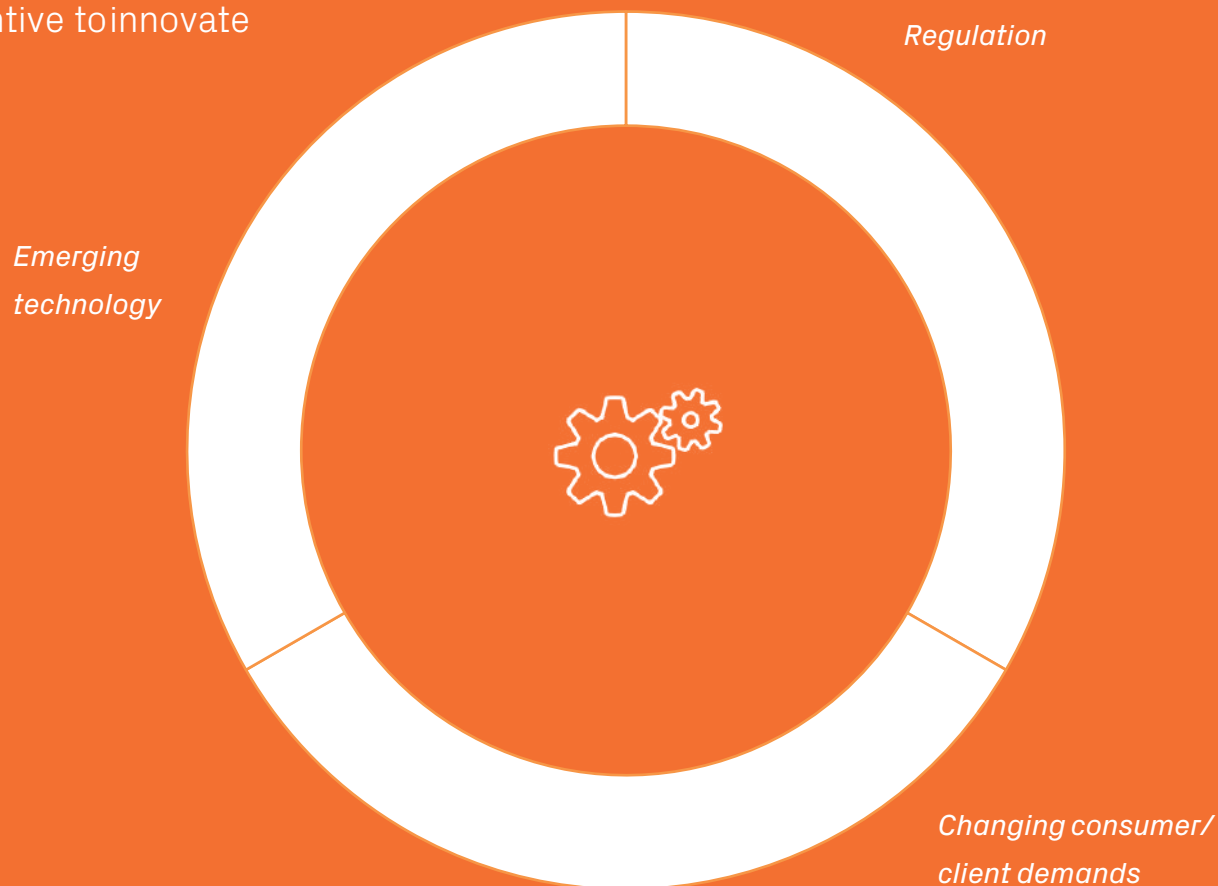
Barriers to innovation across industries

Culture can eat your innovative objectives for breakfast!



Change drivers across industries

Twin forces of regulation and consumer demand creates a powerful incentive to innovate



96%
of respondents
think that
**engagement
with startups
is an important
or somewhat
important
part of an
innovation
& growth
strategy.**

1 Ocean Health

Plastic pollution as a prism into the broader ocean challenges and opportunities – how to save our oceans and generate good returns.

Investment thesis

Resource shortage, costs and consumer preferences supports investments in technology, infrastructure, products and services that underpin circular economy models and reduces environmental footprint.

“As countries, like the Seychelles, venture to realise its blue economy, support for the development of sustainable ocean technologies is crucial. They are, often, of high risk but of high impact. Seychelles was fortunate enough to benefit from a project to monitor Illegal fishing activities conducted with drones. Making new technology accessible and affordable will help countries such as ours able to sustainably manage our precious ocean resource”

Angelique Pouponneau

CEO, Seychelles' Conservation and Climate Adaptation Trust



Outlook

Ocean health as affected by various sources of pollution includes its ecosystem services, habitat protection and environmental assets such as coral reefs.

Ocean plastic is the villain of the past years and has drawn popular attention to wider ocean health issues, incentivising companies ranging from cosmetics to shipping to showcase how their product or service provides a better alternative as the role of consumer preferences and CSR matter. Ocean health is also high on the political agenda. 70 countries have adopted regulations on plastics use, with more than half of the initiatives having come into force the past 4 years such as the EU ban on single-use plastic. In Norway, ocean plastic arise from fisheries (lost gear), waste from shipping, offshore oil and gas production, and run off from industry and agriculture.²

McKinsey & Company research shows that sustainability marketed consumer goods grow more than five times faster than other categories. We anticipate increased pressure on businesses to improve operations and continued rise of the conscious consumers to reduce our human impact on life below water.

Circular economy business models are gaining popularity due to resource scarcity and political pressure and are key to solving waste management problems. Research by McKinsey & Company shows that for the European economy, adopting circular economy principles can generate a net economic benefit of €1.8 trillion by 2030.³ According to National Geographic, 6.3 of the 8.3 billion metric tons of plastic that has been produced has ended up as waste – of which, only 9 % has been recycled.⁴ These numbers should urge investors, innovators and politicians to promote a circular economy model to prevent the ocean from suffering.

Ocean Health

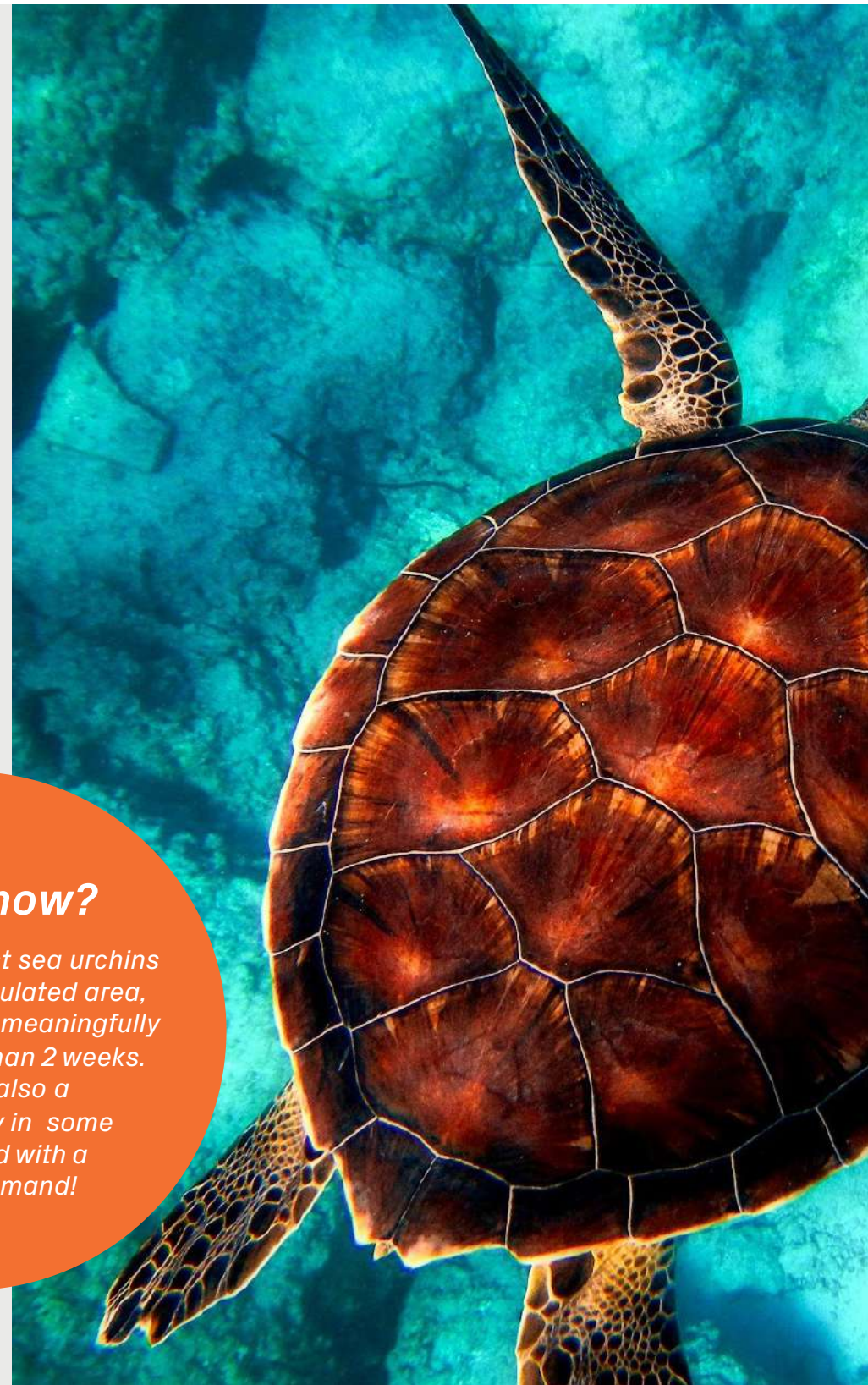
Opportunities

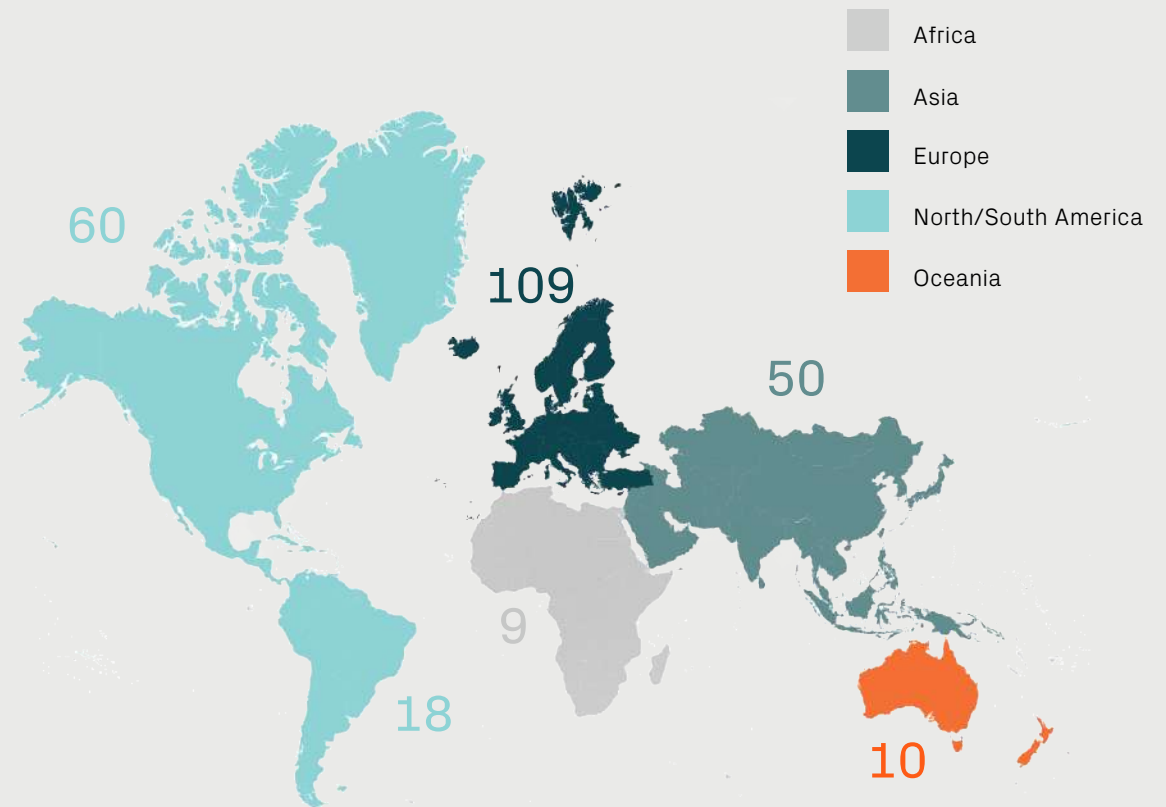
Start-ups within the following impact areas will make a positive contribution for the ocean health sector:

- Resource use efficiency
- Waste management
- Consumer oriented awareness building
- Alternative materials for
 - Packaging
 - Construction, for example alternatives to cement used in subsea construction and ports
- Technology to restore marine ecosystems like coral reefs and kelp forests

Did you know?

Once you harvest sea urchins from an overpopulated area, kelp forests can meaningfully recover in less than 2 weeks. Sea urchins are also a culinary delicacy in some parts of the world with a largely unmet demand!



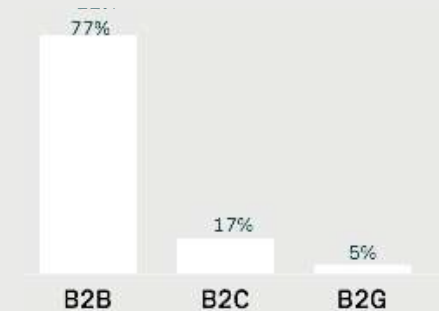


World map: Number of ocean health startups globally divided per continent

Top five tech applications for the ocean health sector:

1. Biotech
2. Industrial hardware
3. Hardware
4. Big data analytics
5. Machine learning

Business model distribution



Graph: Number of ocean health startups globally divided per type of business model

2 Transportation

The future is electric for transport close to shore, while artificial intelligence can help ports operate greener & leaner.

Investment thesis

Regulatory developments, high cost pressure, demand for low-carbon transport solutions and the development of new technology for this sector creates an exciting investment opportunity. Supporting innovation that improves the climate and environmental footprint of maritime transport will aid the transition to the low-carbon economy.

“A future-proof business is one which takes sustainability seriously.
For shipping, that means decarbonization”

Per Martin Tanggaard

CEO, Nor-Shipping



Outlook

Sea-borne transport already carries more than 80 % of global trade and about 400 million passengers go through EU ports annually⁵. According to the International Transport Forum (ITF), demand for ocean freight is set to triple by 2050.⁶ At the same time, the shipping industry has committed to reduce CO₂-emissions by at least 50% by 2050, a commitment that will require a (rapid) phase-out of fossil fuels. The maritime transport sector must therefore innovate to reduce its current carbon footprint that accounts for 2.2% of global CO₂ emissions.⁷ In order to remain competitive and sustainable, the shipping industry must meet the speed of innovation taking place in land-based transport and the race for biofuel in aviation.

Regulations and innovation in fuel technology and batteries must ensure CO₂-emissions are decoupled from growth in trade volume. Furthermore, innovation in low-emission electricity and battery range are required so that the 70% that operates within 200 nautical miles offshore can benefit further and make emission free cruising available for a wide range of ships and boats.

Noise pollution from shipping and other human activities is another area calling for attention. WWF has stressed how «anthropogenic noise affects the ability of fish to locate food, find mates, navigate, communicate and evade predators, and can cause commercial fish species to abandon their habitats.»⁸ Technology must further address ballast water treatment transferring invasive species from one ecosystem to another in addition to wildlife collisions at sea. Finally, cruise tourism is under increased pressure to become more sustainable, both from regulators and tourists.

The transformation of the shipping sector must run along three dimensions: retrofit and improved operational efficiency of the existing fleet, new technology for newbuilds and port efficiency. Autonomy will enable greater and more efficient usage of the waterways and could lead to a revolution in the overall transportation system.

Transportation

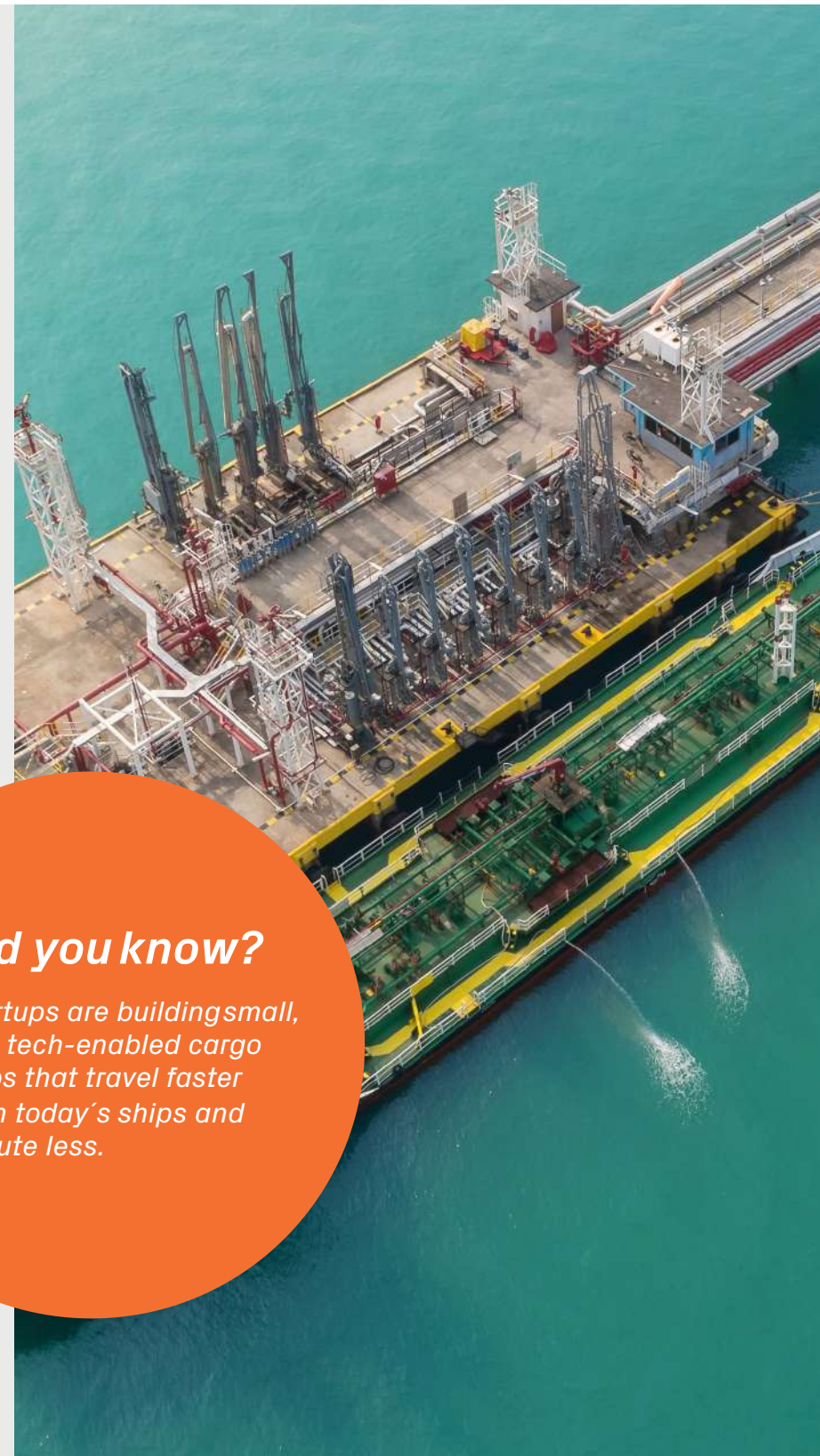
Opportunities

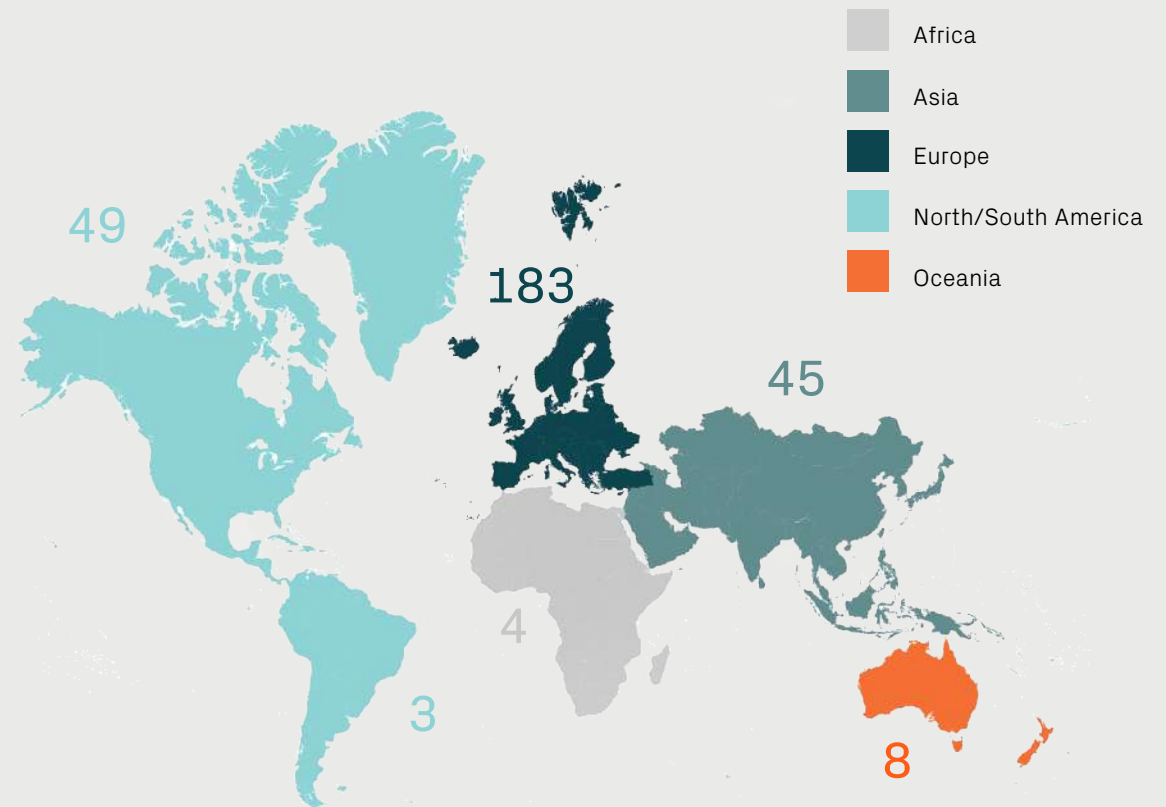
Start-ups within the following impact areas will make a positive contribution to the transformation of shipping and maritime transport:

- Clean shipping technology and supporting technology
 - Improved battery technology for ferries and smaller boats
 - Alternative fuels and combustion technology
- Digitalisation
 - To increase the emission efficiency of shipping operations
 - Autonomy
- Increased efficiency of port operations
 - Electrification of support boats and cargo handling equipment
 - Alternatives to cement for construction work in ports/seaside
- Reduction of carbon footprint of goods transported at sea
 - Innovation in the container segment
 - Alternative packaging materials
- Sustainable tourism operations at sea

Did you know?

Startups are building small, fast tech-enabled cargo ships that travel faster than today's ships and pollute less.

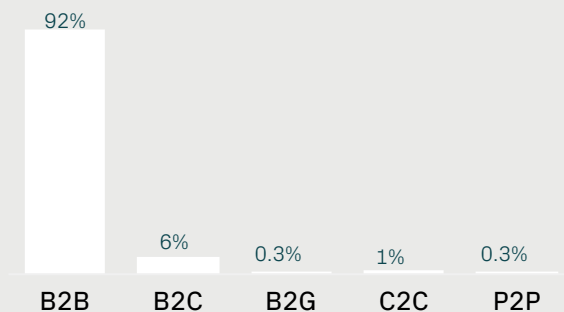




Top five tech applications for the transportation sector:

1. Big Data Analytics
2. Industrial Hardware
3. Machine Learning
4. IOT
5. Robotics

Business model distribution



Graph: Number of transportation startups globally divided per type of business model

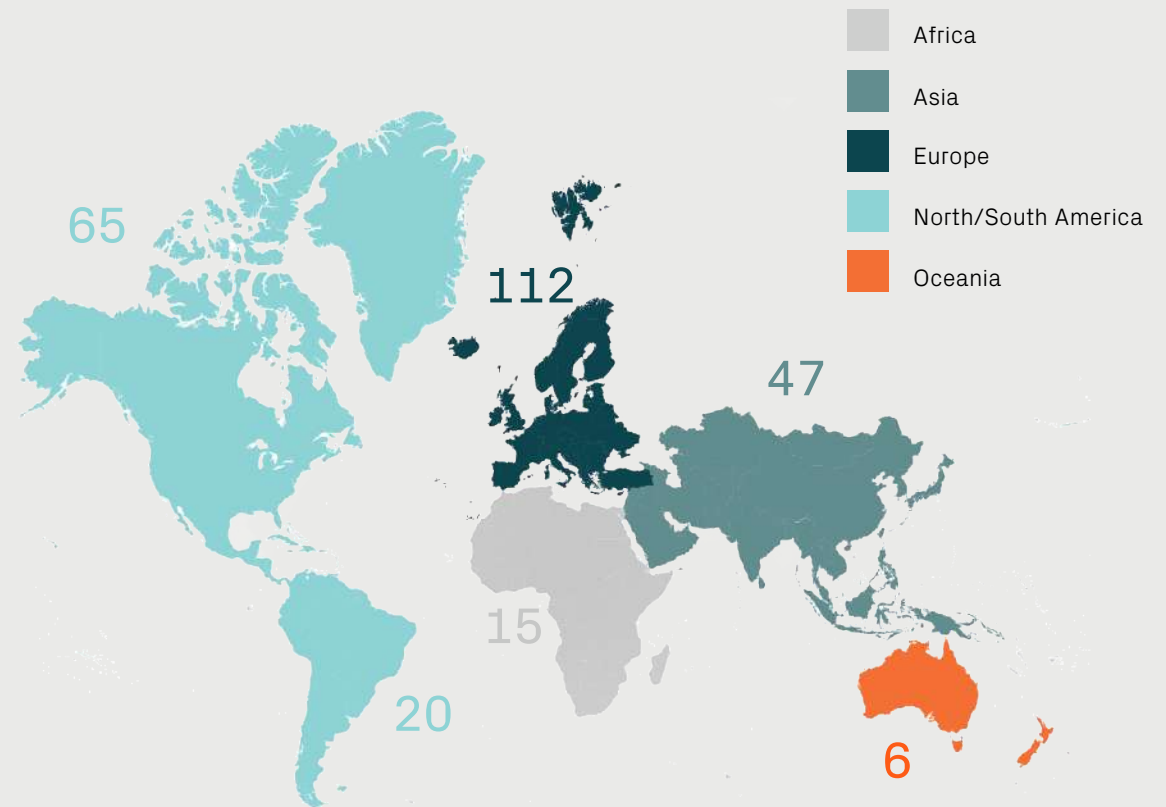
3 Harvesting

Pressure on land use & freshwater will have us produce and harvest more from the ocean - and preferably lower down the food chain, please.

Fisheries

Aquaculture



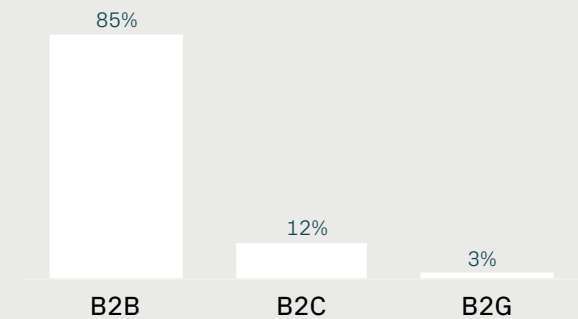


World map: Number of harvesting startups globally divided per continent

Top five tech applications for the harvesting sector:

1. Biotech
2. Robotics
3. Big Data Analytics
4. Industrial hardware
5. IoT

Business model distribution



Graph: Number of harvesting startups globally divided per type of business model

3

Fisheries

Drones can be a fish´ best friend, while making technology accessible to fishing communities is key to guarantee sustainable fisheries.

Investment thesis

Technology is opening up new ways to protect wild fish stocks from illegal, unreported and unregulated fishing (IUU), which costs governments up to 23 billion USD annually¹⁰. With a new momentum behind international measures to fight illegal fishing, the timing is right to develop easy-to-use technology that helps countries manage their fish stocks sustainably.

Outlook

For fishing to be a sustainable business, radical change is needed. While differences in geography and species are vast, 33% of all fish stocks are harvested at unsustainable levels.¹¹ 60 % of all fish stocks are fully fished or overfished, leaving almost no room for growth in wild catch.¹² WWF reports that fishing is one of the main drivers behind the decline in ocean wildlife populations, with bycatch playing a significant role. Illegal, unreported and unregulated (IUU) fishing is a closely related problem, and affects as much as 25 % of all fish caught.¹³ While many of the solutions to fight overfishing and IUU are political (for example ending subsidies), technology can play a role in making fishing more sustainable. Better monitoring capabilities can help coastal states with large territories under their jurisdiction, to better prioritise their enforcement efforts. In addition, smart fishing gear can reduce the problem with ghost fishing. With more than half a million tonnes of plastic fishing nets lost or abandoned each year, killing almost 400 000 sea mammals annually, the impact on marine animals and the environment is far from small.¹⁴ The negative impact also carries a strong social dimension: in impoverished fishing communities, lost gear can cause major financial stress. Smart gear may also reduce the amount of by-catch by identifying unwanted species.

Last but not the least, new and innovative business models are needed to help small-scale fishing communities operate within the boundaries of sustainability. For instance, the artisanal fleet represents 85 % of the global fishing fleet and provides between 25-33% of global wild catch. Affordable technology and innovative business models can help artisanal fishing communities flourish in harmony with the ocean.

Fisheries

Opportunities

Startups within the following impact areas will help fisheries become more sustainable:

- Smart fishing gear
- Affordable monitoring and enforcement technology
- Waste reduction
- Low and zero emission fishing vessels
- Supply chain efficiency and transparency

Did you know?

Did you know that the Seychelles is testing autonomous drones to identify illegal fishing vessels?



“All over the world, fisheries are on the point of collapse. We need to fish responsibly so that we can continue to fish, maintaining jobs, communities and food security. We need to fish smarter”

Bård Vegar Solhjell

CEO in WWF Norway



3 Aquaculture

An aquaculture revolution is in the making, and will we soon eat lab-grownfish?

Investment thesis

10 000 years ago, the agricultural revolution changed our societies forever. Now, population growth will drive the demand for high-quality protein with a low carbon footprint. With the industry pushing the boundaries for harvesting offshore and on land, we believe that we are on the cusp of the aquaculture revolution. At the same time greater consumer awareness makes sustainable harvesting a non-negotiable for responsible companies.

Outlook

The UN estimated world population of 9 billion by 2030, requires sustainable sources of protein from the oceans to reduce carbon footprints and resource drain from traditional food production. For 3 billion people, fish account for up to 20 percent of the average per-capita intake of animal protein.¹⁵ and seafood consumption has doubled since 1960 to over 20 kilos per capita¹⁶ with prospective increases. Aquaculture is considered the main source of seafood for human consumption¹⁷, and should remain so to reduce the pressure on wild catch. Small-scale farming dominates aquaculture on a global scale, but increased production per unit land, water and/or energy is seen as the key to the sector's economic viability (FAO, 2015¹⁸). Furthermore, the new dynamic brought about by land-based fish farming could completely alter the supply chains. Traditional fish farming will have to become more cost efficient to remain competitive.

Algae is not (yet) the most well-known aquaculture product. We believe this will change. Its biological and chemical composition make it a wonder input for natural fibres, durable product packaging, colouring for cosmetics, biofuels and nutrition, as a protein rich nutrient source for humans, packed with fibre and other health-promoting molecules.¹⁹ Seaweed grows 30 to 60 times faster than land-based plants, and if 9% of the world's ocean surface was used for seaweed farming,²⁰ it is estimated that it would remove 53 billion tonnes of CO₂ from the atmosphere (to put this in perspective, global CO₂ emissions in 2018 were 37 billion tonnes). Healthy kelp forests provide benefits to other marine plants and animals, and we believe in a significant commercial and ocean ecosystem restoration opportunity from sustainable algae cultivation.

We also expect more activity in the lab-grown food market. 15 out of the world's 60 largest meat, fish and dairy producers have exposure in the alternative proteins market, where the growing interest in lab-grown meat is likely to spill over to the lab-grown seafood space. Startups are already on the case.

Aquaculture

Opportunities

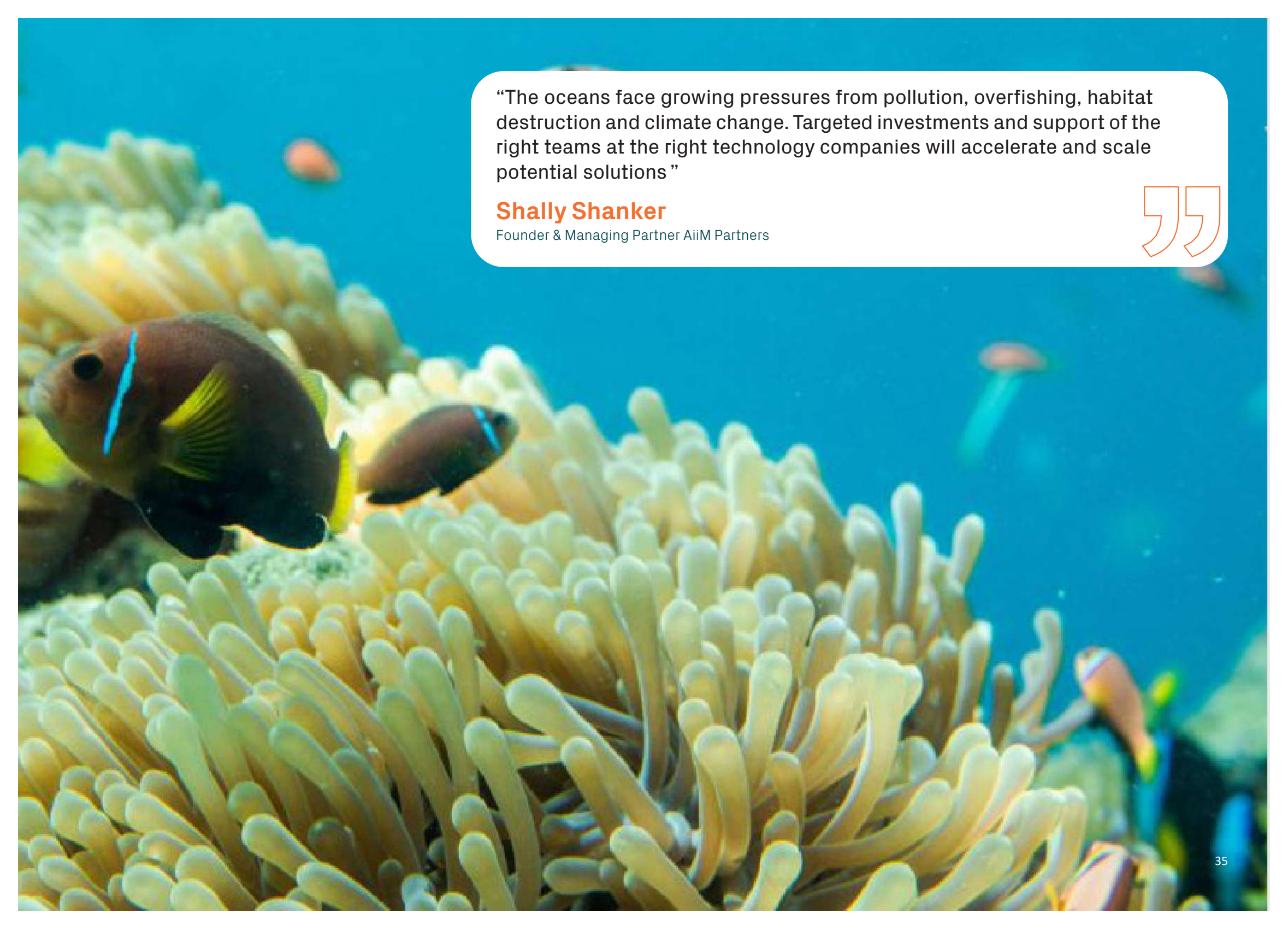
Startups within the following impact areas will help aquaculture become more sustainable:

- Decision-support technology for sustainable farm management
- Technology to improve animal welfare
- Technology to improve supply chain transparency (traceability, verification, quality segregation)
- Circular economy solutions (waste reduction, enhanced inputs, overall resource efficiency, sustainable feed)
- Affordable and easy-to-use tech for small farmers
- Lab-grown seafood
- Technology to support new use cases for algae, seaweed and other marine species

Did you know?

One startup is making it possible to turn sunlight into fish in a closed loop system!?



A vibrant underwater scene featuring a large, light-colored sea anemone in the foreground. Several clownfish, with their characteristic orange and white stripes, are swimming around the anemone. The background is a clear blue ocean with other marine life visible in the distance.

“The oceans face growing pressures from pollution, overfishing, habitat destruction and climate change. Targeted investments and support of the right teams at the right technology companies will accelerate and scale potential solutions”

Shally Shanker

Founder & Managing Partner AiiM Partners



4

Ocean Energy

Can the ocean provide us with affordable, blue, clean energy to support economic development and population growth?

Investment thesis

Bringing down the cost of offshore renewable energy deployment while improving performance will accelerate the shift towards low and zero emission energy sources.

Subsidy schemes have brought offshore wind to a competitive pricing point, while political interest in offshore renewable energy production is on the rise worldwide. Population growth continues to increase demand for energy. At the same time there is a growing pressure to meet this surge in demand with renewables as the economics for more localised energy generation becomes favourable and smart grid infrastructure comes online.

“We are committed to writing the future of safe, smart and sustainable electrification at sea, to achieve a zero emission and pollution free ocean space”

Jorulf Nergård

VP Market Development, Marine & Ports, ABB



Outlook

With 11 years left to prevent irreversible damage from climate change,²¹ the urgency of switching to renewable energy is real. Offshore wind energy is an integral part of the solution. Total installed capacity amounted to 4.5GW in 2018, a far cry from where we need to be if we are to meet the Sustainable Development Goals. According to the IEA, offshore wind annual capacity additions need to more than quadruple by 2030 if we are to align with the objectives in the Paris Agreement.

The EU and China are leading the way in installed offshore wind capacity with new markets developing in the US, Taiwan, Norway and Japan. Lower installation and technology costs, technology development alongside solving grid connectivity issues are critical milestones in achieving a high deployment rate.

Subsea hydrokinetic energy generation systems continue to face challenges. These systems take advantage of wave and tidal energy, but are subject to immense forces and a rough operational environment. This drives up operational and maintenance costs and make it difficult for larger projects to compete with the falling prices of wind and solar. We do, however, continue to watch the space with interest, with a focus on modular, capital light technologies, which could be deployed in more remote areas, on offshore installations and island communities.

We are also excited about the opportunities in floating solar. Pressure on land-use, but also the existence of large hydroelectric dams has spurred an exciting development in Asia, which is host to nine out of the world's top 10 floating solar installations. Who is next in line?

Ocean Energy

Opportunities

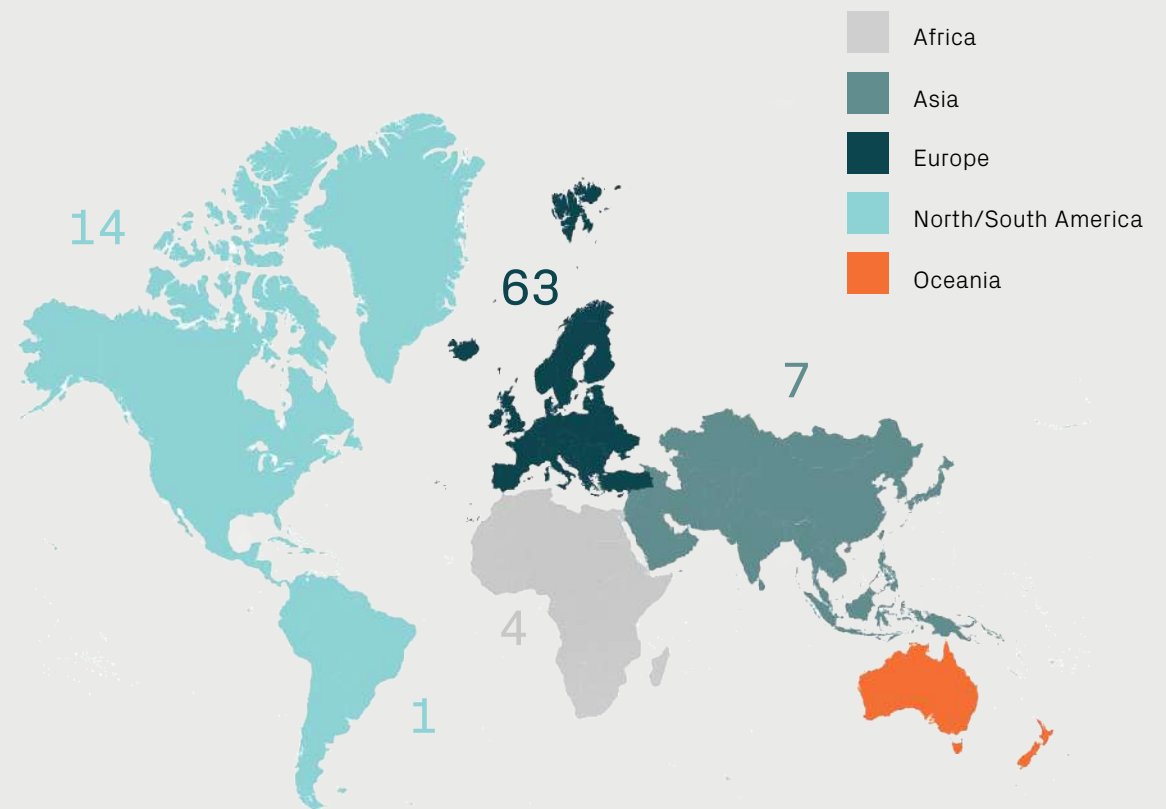
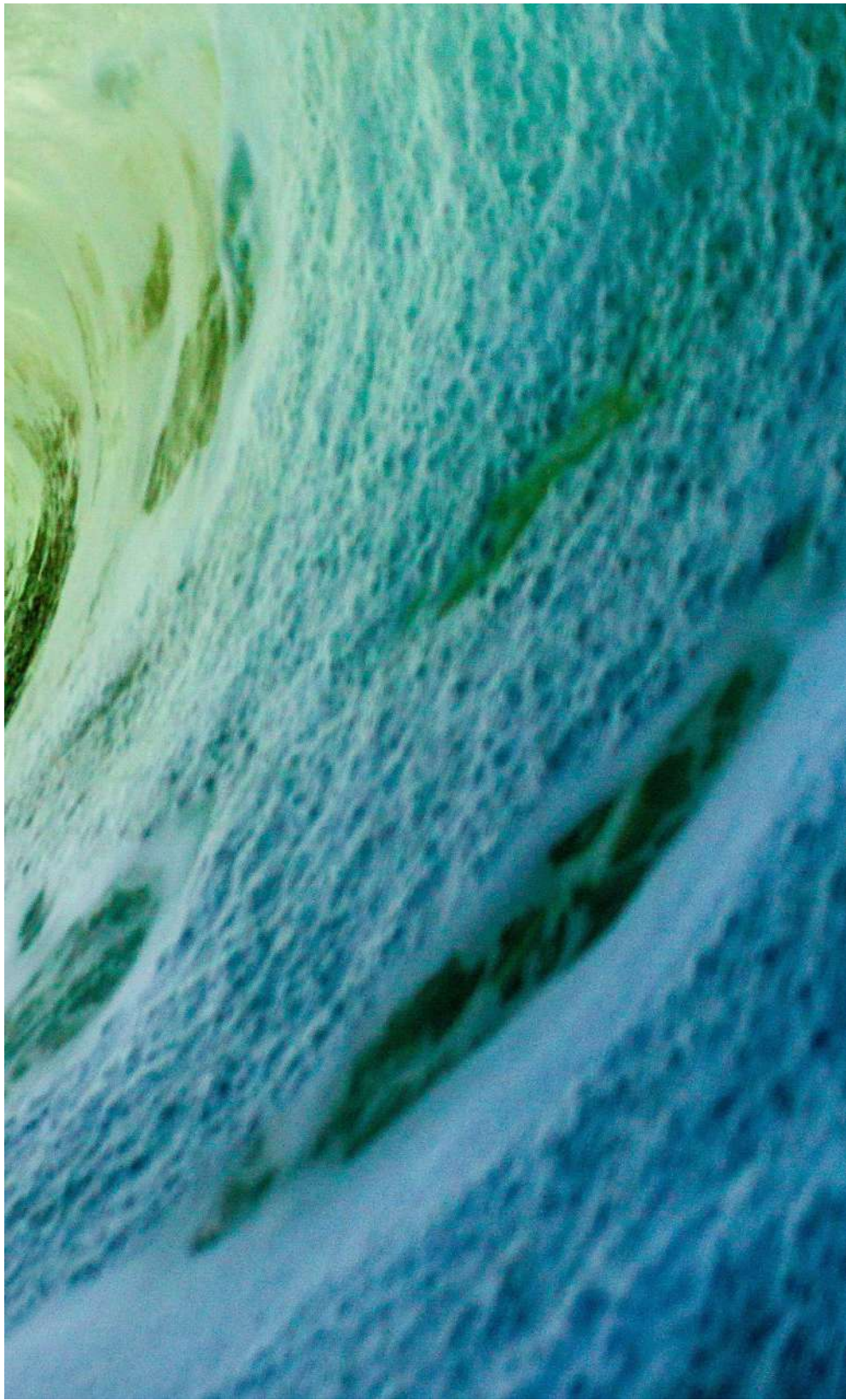
Start-ups within the following areas will contribute to the success of offshore and ocean energy:

- Technology for efficient system management
- Advanced storage capacity
- Improved turbine technology
- Grid connectivity
- Improved foundations with lesser environmental impact
- Material and design innovation to improve durability offshore
- Low CAPEX, modular systems
- Tech to service, maintain, increase longevity or lower installation cost of ocean energy infrastructure

Did you know?

If we could harness just 0.1% of the world's ocean wave energy, we could meet current global energy demand 5x over.



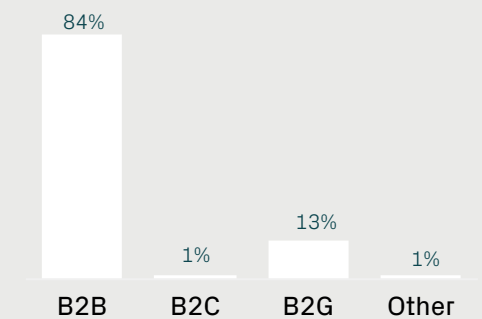


World map: Number of ocean energy startups globally divided per continent

Top five tech applications for the energy sector:

1. Industrial hardware
2. Hardware
3. Big data analytics
4. Robotics
5. Machine learning

Business model distribution



Graph: Number of energy startups globally divided per type of business model

5 New Frontiers

Exploring the unknown, understand our impact on the ocean and the facilitation of sustainable ocean operations.

Investment thesis

Sustainable development of the blue economy hinges on our ability to understand and sufficiently protect the ocean. 90 percent of the ocean is unexplored, and both business and government need more knowledge to understand the full impact of new industries and business models. We expect that existing as well as new ocean industries will have to meet increasingly strict sustainability criteria. Focus on sustainable ocean management creates a new market for technology to monitor, gather data and support good ocean management policies. We believe there is a good investment case to be made for technology in this category.

“The ocean feeds us, employs us and keeps us healthy yet we know so little about the ocean, and treat it with such contempt. We know what to do, and need to match this with innovation, technology and investment at the scale and urgency the ocean requires.”

Kristian Teleki

Director, Friends of Ocean Action



Outlook

As the ocean economy develops, more activities will take place offshore and in the depths of the ocean. Depletion of resources on land has led to a greater interest in seabed resources, but the environmental risks of extraction are largely unknown. For Norway only, full biodiversity inventories and as well as potential impact on the planktonic community surrounding seeps and hydrate areas are to a large extent lacking.²² Affordable and reliable underwater exploration and mapping technology is key to help us understand how new activities will impact the ocean.

Importantly, we need to be able to make sense of the ocean data becoming available to us. The data economy has also reached the ocean industries, and only in Norway at least three organizations are building large ocean data platforms to that end.

As we move more energy production offshore by way of wind, wave or tidal, the infrastructure must be constructed but also maintained with as few risks to the environment as possible. Today, many risky operations are done by professional divers. This poses not only a huge risk to the divers, but also limits what operations can take place. Easy-to-use and affordable unmanned, underwater vehicles (AUVs and ROVs) are part of the solution. Innovation in underwater communication will be critical to better ocean research, mapping and subsea operations.

With climate change and population growth comes the need to look at new ways of building cities. Even if we manage to stick with the 1.5C-scenario, sea-levels are estimated to rise 48 cm by 2100.²³ Floating cities, or at least floating neighbourhoods, can be a way to future-proof urban planning in coastal areas.

New Frontiers

Opportunities

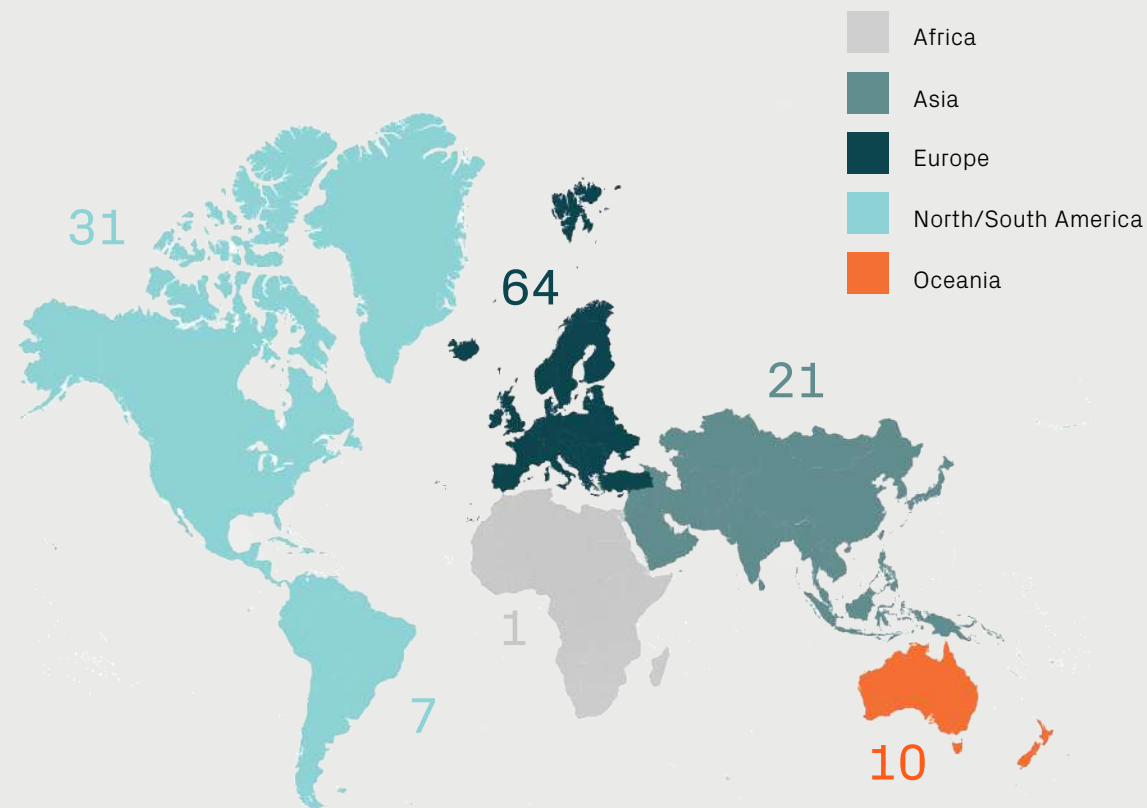
Startups within the following areas will contribute to the success of offshore and ocean energy:

- Technology for new ways to understand and work in the ocean
 - Underwater communications technology
 - Underwater robotics
 - Monitoring
- Data analytics
- Biotechnology
 - Increasing the value of marine raw materials, for example unexploited biomass, by-products or marine plants
- Infrastructure management
 - Floating cities
 - Offshore installations

Did you know?

A true “Internet of Underwater Things” is getting closer each day, helping us unlocking insight to the unknowns of the ocean as well bridging the gap between live above and underneath the surface.



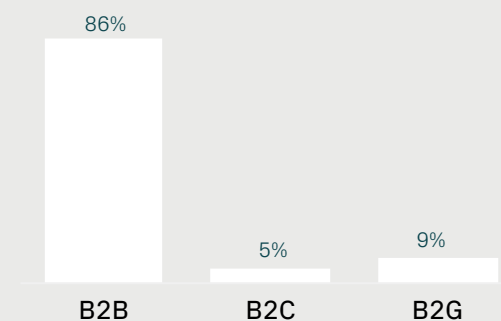


World map: Number of new frontiers startups globally divided per continent

Top five tech applications for new frontiers:

1. Robotics
2. Industrial hardware
3. IoT
4. Big Data Analytics
5. Machine learning

Business model distribution

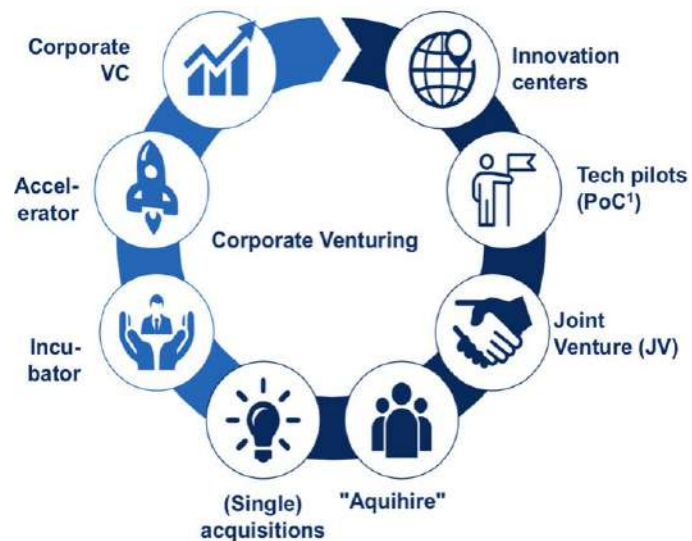


Graph: Number of new frontiers startups globally divided per type of business model

Advice to industry

Companies can approach innovation in a number of ways, corporate venture being one of them. Corporate venturing is all forms of interaction between a corporate and the ecosystem of start-ups; founders and incubators, seed investors and accelerators, VCs and PE.

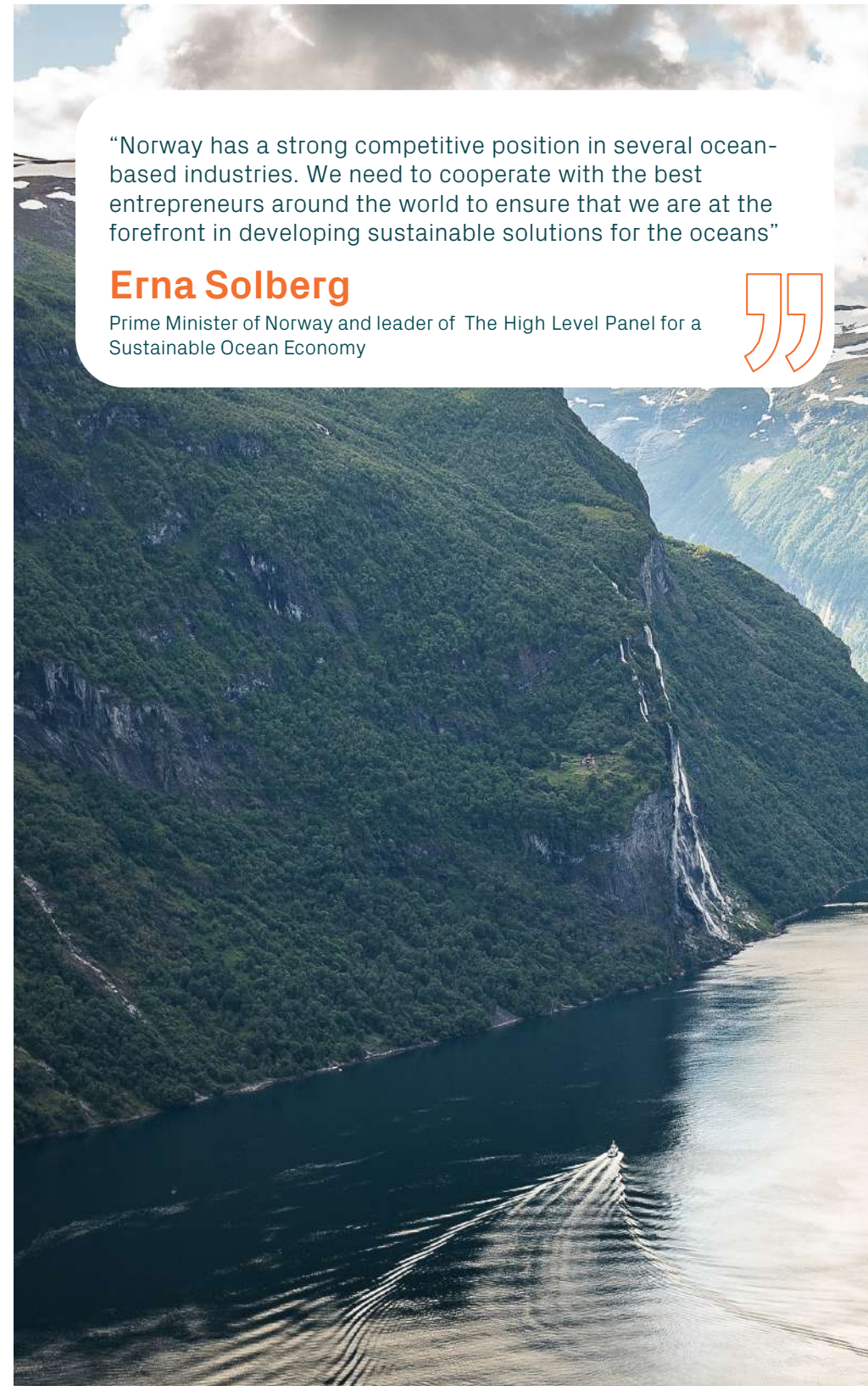
According to McKinsey, more than 75% of Fortune 100 companies have an active corporate venture capital unit.

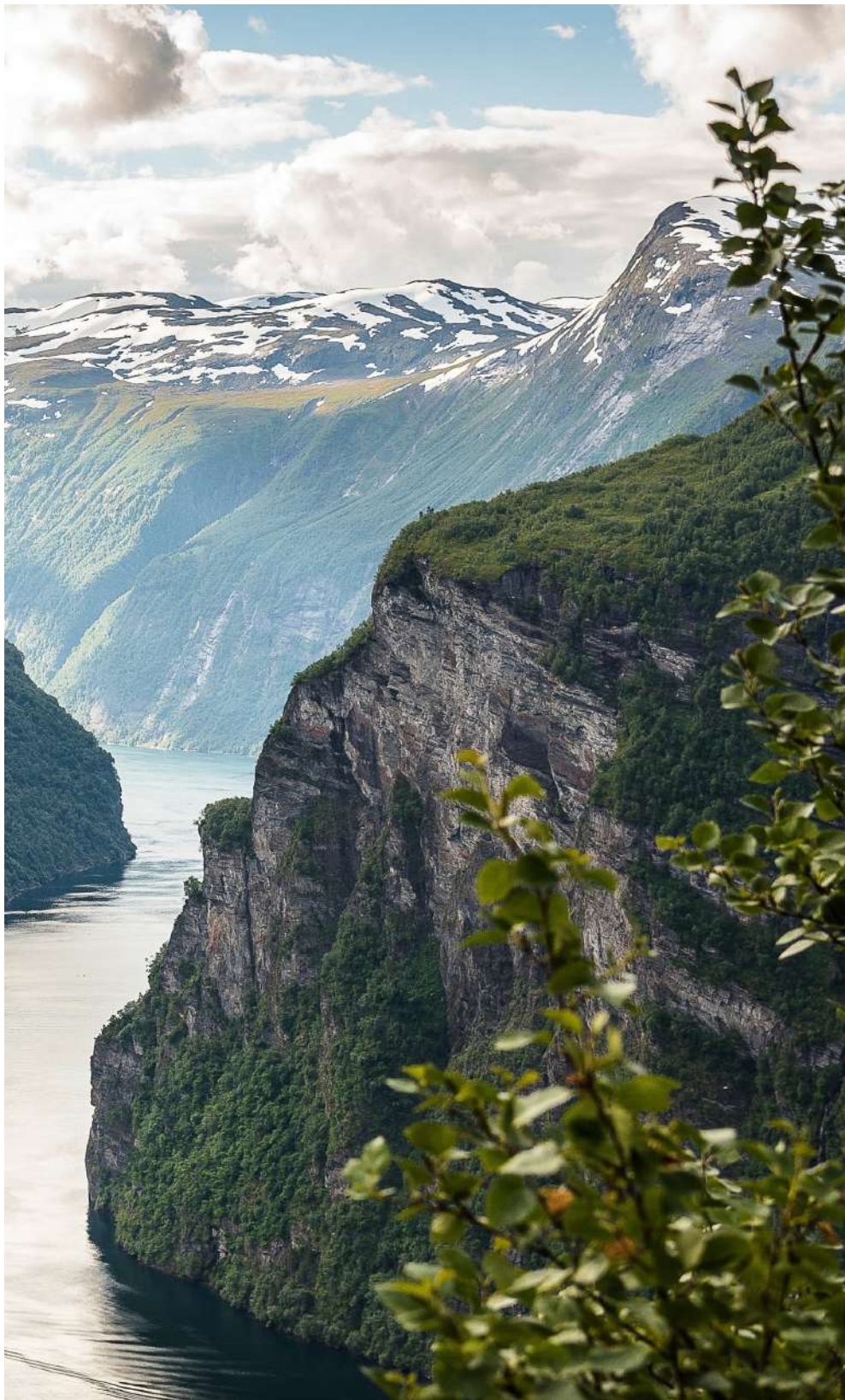


"Norway has a strong competitive position in several ocean-based industries. We need to cooperate with the best entrepreneurs around the world to ensure that we are at the forefront in developing sustainable solutions for the oceans"

Erna Solberg

Prime Minister of Norway and leader of The High Level Panel for a Sustainable Ocean Economy





The rationale for corporate ventures differ from one corporate to another. An open innovation strategy to work with startups to find new technologies, complementary products or new markets can underpin one corporate's motivation. Others choose to do corporate venture as a way to stay ahead of the competition, lead talent acquisition from start-up ecosystem or to spot the disruption before it hits the company. Finally, it can be a means to generate returns outside of the core business.

A win-win approach to corporate venturing should define the relationship from the very beginning. What can initially be seen as a David and Goliath relationship must be viewed by both partners as a business partnership in which both parties bring value to the table as peers.

Each accelerator is different. In Katapult Ocean, we have identified a few key tasks we believe an accelerator can help with when a relationship is being set up between a corporate and a startup:

Help prioritize

Accelerator programs are short. A key role for the accelerator is to help the founders prioritize a few select deliverables that can have great impact. This will help the startup get the most out of the program.

Be a translator

We believe that an accelerator can be an efficient translator between the corporate and the startup. Helping both sides understand the dynamics that shape their interactions is an important task. It is also critical for setting expectations right.

Understand key industry concerns

For an accelerator to be successful, it must understand key industry concerns and be able to fit startup solutions neatly into that picture. We believe that an accelerator should be able to give a good indication about product/market fit.

- ☐ Make sure that the engagement is anchored in a strategy. How do you otherwise know why you engage?
- ☐ Do you have support from top level management to allocate adequate resources? *Working with corporate venture should be part of your day job and your own KPIs. Make sure you have access to the right people in your organisation and that they also are incentivized to back startups*
- ☐ Are you willing to share? *Give honest and to-the-point feedback. Share your industry knowledge and network.*
- ☐ Are you willing to learn and co-create ? *Be open to new ways of working. Startups do not come with a ready-made product, but an approach to testing, failing and learning fast that most of us can learn from!*
- ☐ Can you make decisions quickly? *Remember that startups operate with much shorter time frames than most corporates!*
- ☐ Are you willing to share the risk? To test and bet on new products is risky, but if you succeed the rewards can be great, both financially and culturally.

Check list for corporates

Are you ready to work with startups?



☐

Know why you develop this particular relationship. *Are you looking for product market fit? Or to accelerate sales? Are you perhaps rather eyeing a strategic investor?*

☐

Be open to pivot if necessary. *But do not make a product for one customer only!*

☐

Are you solving a real problem? *Be a “must have”, not a “nice to have”.*

☐

Is there a cultural fit?


☐

Do you understand the corporate process?

☐

Have you safeguarded your independence and IP?

Check list for start-ups



Are you ready to engage with a corporate?

An aerial photograph of a vast, turquoise lagoon under a clear blue sky. The water is exceptionally clear, revealing dark, submerged sandbars and reefs. In the lower right, a person is kitesurfing, leaving a white wake. A vibrant, multi-colored kite is visible in the upper right corner. The horizon shows a distant, low-lying coastline with some vegetation.

Are you ready

An aerial photograph of a kitesurfing spot. The water is a vibrant turquoise color, with darker patches visible beneath the surface. Several kitesurfers are visible, each with a large, colorful kite. The kites are in various colors, including orange, blue, and red. The kitesurfers are leaving white wakes behind them as they move across the water. In the background, a low, dark landmass is visible under a clear blue sky.

to accelerate?

Methodology

The Katapult Ocean Startup Database consists of companies working to solve an ocean and/or ocean industry related problem, either directly or indirectly. For the purposes of this report, the start-ups have been characterized by their primary technology, sector focus and primary business model. Ocean tech start-ups lacking an impact angle, have been excluded from the database. This is thus not a comprehensive overview of all ocean tech startups worldwide.

Input to the database is derived from a variety of sources. Some of the companies have applied to join the Katapult Ocean Accelerator program, others have been referred through the Katapult Ocean network. The database is also built through a collection of information from public databases, lists and professional networks (online and digital), which have been filtered in accordance to in-house criteria.

The database is under constant development to ensure an up-to-date and comprehensive overview of the global landscape for impact ocean tech startups. If you would like to recommend a great ocean impact start-up, please do not hesitate to reach out!

Acknowledgements

Thank you to our extended network, who willingly shared and contributed to the industry survey. Thank you to Kaja, Bjørn, Otto and Charlotte, who all provided invaluable assistance in putting together this report. Thank you to all the amazing founders out there, who every single day go to work to create a more sustainable future.

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The launch of this report has been made possible with the help of ABB and Nor-Shipping. Thank you for your continued support in building the case for sustainable ocean industries!

About Katapult Ocean

Katapult Ocean invests in startups with a positive impact on our oceans. Since the establishment in 2018, Katapult Ocean has made 11 investments in exciting ocean tech companies from all over the world, each with a unique take on how to make our oceans great again. By end of 2019 the number of investments will double. Our team is based in Oslo, Norway and San Francisco, US. Together with our investors, partners and mentors, we work with value-driven founders to show that profitability and sustainability can go hand in hand. The Blue World Perspective is part of our efforts to build a global ecosystem for ocean impact start-ups and to catalyze capital, talent, companies and startups to accelerate the blue shift within the ocean industries.

Katapult Ocean is a member of the accelerator network of the UN Global Compact Action Platform for Sustainable Ocean Business. CEO Maren Hjorth Bauer is also part of the advisory network for the High-Level Panel for a Sustainable Ocean Economy.

Join us on our journey!



Katapult Ocean team: Ingrid Kylstad, Ross Brooks, Rikke H. Jørgensen, Jakub Pawlak, Maren Hjorth Bauer and Erika Montague



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References

1. Nordheim, Anders. "Why the UN's Latest Report on the State of Our Planet's Biodiversity and Ecosystems Matters to Financial Institutions." UNEP Finance Initiative, 2019.
2. The Norwegian Institute of Marine Research. "Plastsøppel i Havet." Havforskningsinstituttet, 2019.
3. McKinsey Center for Business and Environment. "Europe's Circular-Economy Opportunity." McKinsey & Company, 2015.
4. Parker, Laura. "A Whopping 91% of Plastic Isn't Recycled." National Geographic, 20 Dec. 2018.
5. ITF. "ITF Transport Outlook 2019". OECD Publishing, Paris, 2019.
6. The European Commission. "Maritime." Mobility and Transport, European Commission, 11 July 2019.
7. International Maritime Organization. Third IMO Greenhouse Gas Study 2014. 2015.
8. IEA. "CO2 Emissions Statistics." CO2 Emissions, 2019.
9. WWF. "Infographic: Underwater Noise." WWF Arctic.
10. FAO. The State of World Fisheries and Aquaculture - Meeting the Sustainable Development Goals. 2018.
11. 12.13. UNEP. "Why the UN's Latest Report on the State of Our Planet's Biodiversity and Ecosystems Matters to Financial Institutions." UNEP Finance Initiative, 2019.
14. Broom, Douglas. "Environmentalists Have Removed Nearly 40 Tonnes of Trash from the Pacific." World Economic Forum, 2019.
15. Levin, Kelly. "New Global CO2 Emissions Numbers Are In. They're Not Good." World Resources Institute, 11 Dec. 2018.
16. Nesheim, Malden C. "DIETARY RECOMMENDATIONS FOR FISH CONSUMPTION." A Framework for Assessing Effects of the Food System., U.S. National Library of Medicine, 17 June 2015.
17. F.A.O. "GLOBEFISH - Information and Analysis on World Fish Trade." Positive Outlook for Global Seafood as Demand Surges for Multiple Species in Markets across the World | GLOBEFISH | Food and Agriculture Organization of the United Nations, 2018.
18. Subasinghe, Rohana. World Aquaculture 2015: A Brief Overview. FAO - Fisheries and Aquaculture Circular, 2015.
19. Rajapakse, Niranjana, and Se-Kwon Kim. "Nutritional and Digestive Health Benefits of Seaweed." Advances in Food and Nutrition Research, U.S. National Library of Medicine, 2011.
20. De Ramon N'Yeurt, Antoine. "Negative Carbon Via Ocean Afforestation." Process Safety and Environmental Protection, 2012.
21. UN. "Only 11 Years Left to Prevent Irreversible Damage from Climate Change, Speakers Warn during General Assembly High-Level Meeting | Meetings Coverage and Press Releases." High Level Meeting on Climate and Sustainable Development, United Nations, 2019.
22. Rapp, Hans Tore. "Environmental Challenges Related to Offshore Mining and Gas Hydrate Extraction ." The Norwegian Environmental Agency, 2016.
23. McSweeney, Robert, and Rosamund Pearce. "The Impacts of Climate Change at 1.5C, 2C and Beyond." Interactive, 2018.



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