BLUE ECONOMY

IMPACT INVESTING THESIS

Ship2B Ventures

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Executive Summary

Investment Thesis

Blue Economy Climate Tech investments lay where Blue Economy Tech and Climate Tech overlap and therefore makes the following trends attractive for an early-stage VC-impact fund:

1. Reducing GHG emissions
   - Reduce, Recycle and Replace Plastics: (Ej. Bioplastics).
2. Preserving & Enhancing Ocean Sinks
   - Conservation and Restoration of Marine Ecosystems: (Study, observation, conservation and restoration of ocean resources).
3. Reducing GHG and Preserving & Enhancing Ocean Sinks
   - Improvement of Aquaculture and Fisheries Practices: (RAS Systems, digital monitoring, genetic species improvement, bycatch reduction devices, electronic monitoring, maritime surveillance, among others, enhance sustainability and reduce environmental impact).

Industry Overview

The blue economy encompasses various economic activities related to the ocean, which is essential for ecological balance and climate control, but is threatened by overexploitation and pollution, among other threats. In 2020, these activities generated significant economic output in the EU, especially notable in Spain, which led in employment and contribution to Gross Value Added (GVA).
We have identified 4 value chains that include all of the economic activities of the Blue Economy, but we have focused on the 2 that affect, both positively and negatively, the health of ocean resources, and that depend entirely on those resources (Direct Exploitation of Living Ocean Resources and Conservation & Restoration of Ocean Resources).

Climate Impact and Main Challenges

The Blue Economy's expansion, driven by unsustainable practices such as industrial fishing and destructive techniques like longline fishing and bottom trawling, has led to significant marine biodiversity loss, impacting essential ocean functions like carbon sequestration and oxygen production.
The industry is facing some trends and challenges that are increasing the volatility, complexity and scrutiny throughout the value-chain:

1. Socio-demographic challenge: Feeding a growing population sustainably.
2. Climate change challenge: Protect & Restore Marine Ecosystems to move to zero-emissions.

Targeted Solutions and Startups of Interest

In order to address key industry challenges, we've identified targeted solutions based on their "TAI" (Total Addressable Impact) → Number of Gt CO2-eq reduced / sequestered 2020-2050 (1Gt = 1bn ton)

Top 3 Targeted Solutions and their TAI:

	Gt CO2-eq reduced/sequestered 2020-2020	Gt CO2-eq reduced/sequestered /year
1. Conservation and Restoration of Marine Ecosystems	11.54	0.38
2. Reduce, Recycle and Replace Plastics	9.57	0.32
3. Improvement of Aquaculture and Fisheries Practices	7.04	0.24

Blue Economy Tech

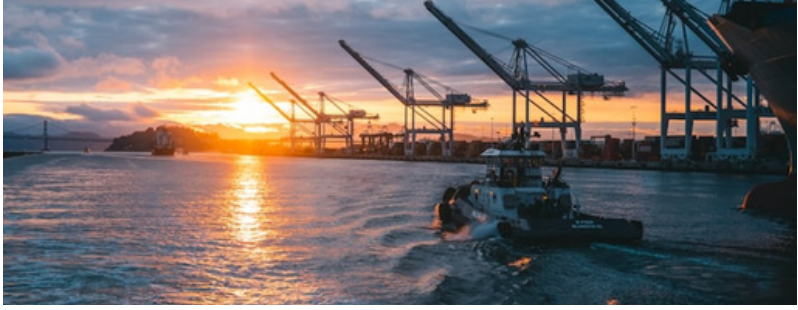
Blue Economy Tech encompasses all startups operating in the 10 value chains of the corresponding segments. However, we focus on the 5 segments we encompass in i) Direct exploitation of living ocean resources and ii) Conservation & restoration of ocean resources, either upstream or downstream.

ClimateTech and Blue Economy Tech Investment Landscapes

In 2023, total investment in Venture Capital and Private Equity dropped 50.2% to US$638 billion, with ClimateTech funding down 40.5% but increasing its share to 11.4% of total private market equity. On the other hand, investment notably rose in industrial emissions-focused startups to 14%, while energy remains underfunded relative to its 34% emission contribution.

In 2023, the Blue Economy's investments reached $3.1 billion, marking it the second highest year despite a 32% decline from 2022, and showing a robust long-term growth of nearly 300% over five years, outpacing sectors like ClimateTech and Fintech, with significant leadership in investment from the U.S. and Europe.

INDUSTRY OVERVIEW



The Blue Economy is the combination of economic activities that exploit, directly or indirectly, the resources of the sea, activities that use it as an instrument, and activities that conserve and restore its resources.

On the one hand, to better understand the dimension of the ocean's role in the planet's environment and climate, it is important to know that **it covers more than 70% of the Earth's surface** and plays a key role in maintaining the Earth's ecological balance. Ocean systems include vast depths that vary from the sunlit epipelagic zone, essential for photosynthesis that supports complex marine food chains, to the bathypelagic and abyssopelagic zones, in perpetual darkness.

According to Project Drawdown, **the ocean absorbs up to 17% of CO2 emissions and more than 90% of excess human-generated heat**, functioning as a crucial carbon sink for mitigating climate change. **It also produces approximately 70% of the oxygen we breathe**, highlighting its essential role in human survival and well-being. Despite its importance, only 1.5%[1] of the ocean are Marine Protected Areas (MPAs). This is worrying, considering that the ocean faces serious threats such as warming, sea level rise, acidification and pollution from sources such as oil spills, toxic chemicals and plastics, including ghost nets and microplastics. In addition, the loss of biodiversity poses a serious risk to its health and sustainability.

On the other hand, on a more economic level, the Blue Economy, if considered as a nation, would be the eighth largest economy in the world, with a gross marine product of $2.5 trillion annually in goods and services[2]. The value of ocean assets has been estimated at $24 trillion[3]. However, if we continue to do what we have done so far, the potential economic damage increases from $400 billion per year in 2050 to $2 trillion in 2100 if the current deterioration in its health continues[4].

The growing importance of the oceans in the global economy and in the fight against climate change has boosted efforts for their sustainable management, resulting, for example, in the incorporation of UN Sustainable Development Goal 14, which promotes the conservation and sustainable use of the oceans and highlights the target of protecting 30% of the seas by 2030. Ocean management includes economic zones and international areas, with a key development being the 2023 High Seas Treaty, which establishes Marine Protected Areas outside countries' jurisdictional waters and regulates activities such as deep mining. This treaty builds on other initiatives such as the United Nations Convention on the Law of the Sea and regulations against illegal fishing and on maritime transport and represents a significant advance in ocean protection.

Given that the Blue Economy comprises a broad set of economic activities, each independent of the others, we have focused primarily on the **two value chains whose direct activity not only has the greatest impact on the health of the oceans and their resources, but which are also completely dependent on it.**

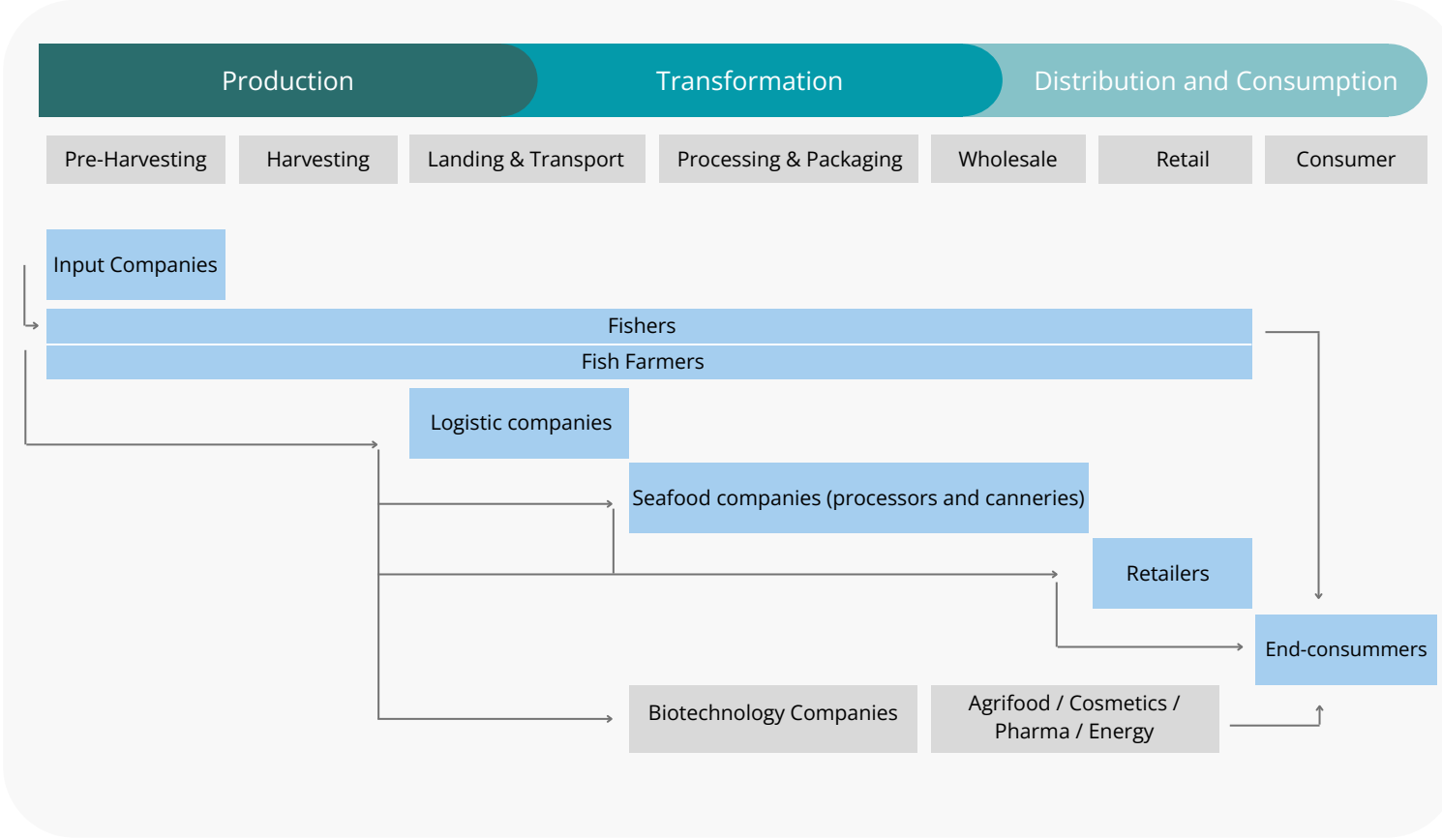
Although we only focus on these two value chains (they are identified with an * below), it is important to note that we have classified the activities belonging to the Blue Economy as follows:

[1] Data from the World Wildlife Fund (WWF)
[2] Data from the World Economic Forum
[3] Data from the World Wildlife Fund (WWF)
[4] Data from the High Level Panel for A Sustainable Ocean Economy

a) Direct exploitation of ocean resources:

i) Living resources*: The direct exploitation of the living resources sector ranges from pre-harvesting to distribution of renewable ocean living resources. This sector faces significant challenges due to external factors such as recent increases in energy and fuel costs following the conflict in Ukraine.

In economic terms, it generated in the EU more than €19.4 billion Gross Value Added (GVA) and recorded a turnover of approximately €119 billion in 2020. Although employment has decreased slightly, Spain remains the largest employer in the sector, standing out for its significant contribution to GVA and employment.



	Input Companies	Fishers & Fish Farmers	Logistics Companies	Seafood companies	Retailers	Biotechnology Companies	Different Sectors
#Players Globally		Fishing: 38.98M people (4.56M vessels) Aquaculture: 20.53M people (+2M fish farms*)		Thousands	Millions		100s of thousands
Size range	Small, medium and large companies	Fishing: Motorized vessels- 63% (<12m-82%) Aquaculture: Hatcheries/ Specialized fish farms/ Generalist fish farms/	SMEs (local trade) / Multinational (local & international trade)	Small and medium-sized companies	Fishmongers/ Supermarkets	Biotech Startups/ SMEs/ Multinationals	Startups/ Cosmetics & Pharma Multinationals
Products / Segments	Fishing: Shipbuilding & refit/ Fishing gear/ Bait/ Equipment/ Aquaculture: Hatchery and genetics/ Feed/ Health mgmt/ Tank manufacturers/	Fish/ Crustaceans/ Mollusks/ Aquatic plants/ By-products	Transport and refrigerated storage/ Customs management	Primary Processing/ Secondary processing/ Packaging and labeling	Commercialization/ Marketing and promotion	Genetic improvements and vaccines/ Novel foods and nutrients/ Disease control and health management solutions/ Bioactive compounds	Dietary supplements/ Skin care and anti-aging/ Pharmaceuticals/ Antibiotics and other medicines/ Biofuels
Top Players	Fishing: Hyundai Heavy Industries Aquaculture: Skretting, AKVA group, Cargill Aqua Nutrition, Zoetis	Fishing: Maruha Nichiro, Nippon Suisan Kaisha, Mowi Aquaculture: Mowi, Cooke Aquaculture	DHL, Dachser, Maersk Line	Marubeni America, Maruha Nichiro, Jealsa Foods	Walmart, Carrefour, Costco	Amgen, Gilead, AbbVie, Biogen	Sea Balance, Sarga Agriscience, Ficosterra
EU Gross Value Added		Harvesting: €4.8 billion		Processing: €5.6 billion	Distribution: €8.9 billion		
Environmental Impact	Marine pollution, GHG emissions	Marine pollution, GHG emissions, Seafloor degradation, Ecosystem destruction, Overfishing & bycatch (Biodiversity loss)	GHG emissions, Food and packaging waste	GHG emissions, Food and packaging waste, High water consumption	GHG emissions, Food and packaging waste	GHG emissions, High resource consumption	
Innovation Themes	Genetic Improvement of Species, Bycatch Reduction Devices	Recirculating Aquaculture Systems (RAS), Aquaculture Digitalisation, Electronic Monitoring Systems	Smart Sensors for Ocean Monitoring			Photobioreactors	Microalgae-based Nutrients & Supplements, Biofuels

Source: The EU Blue Economy Report 2023; Blue Invest Investor Report: An ocean of Opportunities; FAO: The State of World Fisheries and Aquaculture 2022

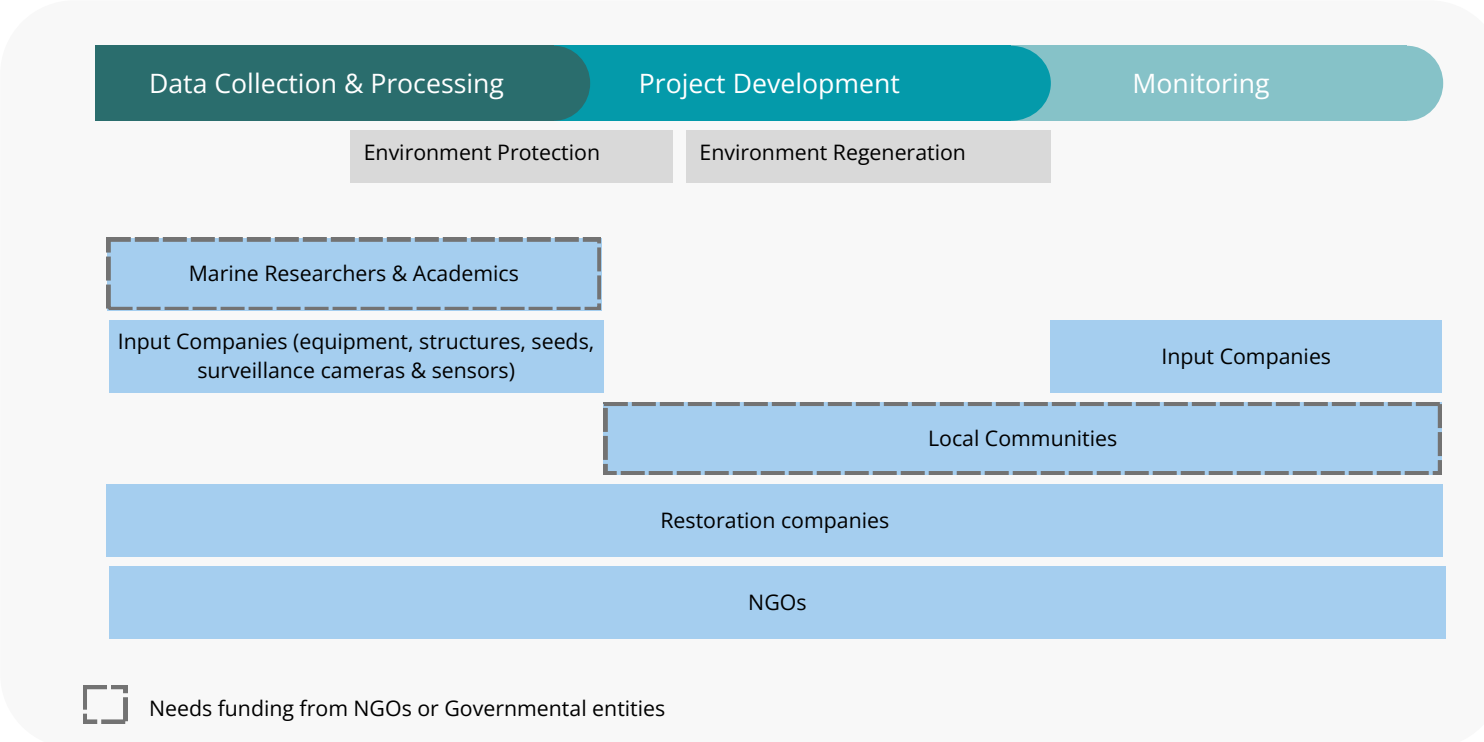
ii) Non-Living resources: Extraction from the ocean of non-living resources (oil, gas, minerals), generation of marine renewable energy (waves & tides), and water management.

b) Indirect exploitation of ocean resources: Offshore energy generation (wind & solar), Shipping & port activities and coastal tourism.

c) Conservation & Restoration of ocean resources*:
In recent times, there has been an increased interest in activities related to the study, observation, conservation and restoration of ocean resources. This is due to increased public and government awareness, as well as increased regulatory pressures focused on promoting sustainable exploitation of ocean resources.

For an ocean resource restoration project to be effective and therefore successful, it is crucial that ocean resources are protected from the damage that led to their need for restoration, both before and after the restoration process. Ensuring that the area is protected from previous threats throughout the restoration process ensures the long-term sustainability and effectiveness of the restoration efforts. Such protection can include cleanups, recurrent monitoring, education and awareness, and the implementation of protective regulations and legislation.

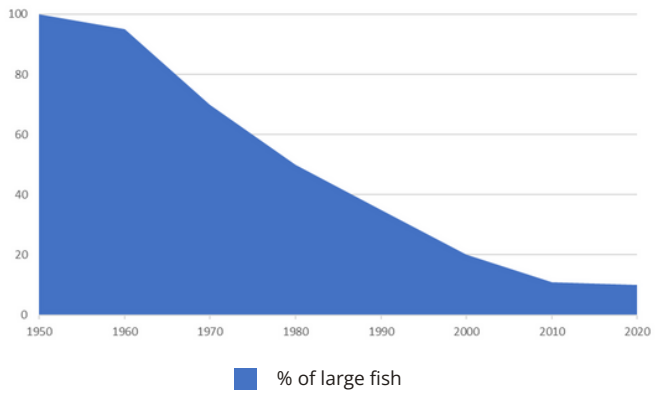
The standard process undertaken by players and activities dedicated to conservation efforts shapes the subsequent value chain:



CLIMATE IMPACT AND MAIN CHALLENGES

Understanding the climate impact of Blue Economy activities on the ocean, requires understanding it as a **network of complex and interconnected ecosystems, rich in resources and sub-ecosystems that depend on the biodiversity they harbor** [5]. Economic growth driven by the Blue Economy has led to the overexploitation of marine resources, based on the false premise of their inexhaustibility. In this scenario, industrial fishing stands out as one of the most harmful practices, not only because of its greenhouse gas emissions but also because of its direct impact on marine biodiversity.

Fishing has eliminated 90% of the world's large fish [6], an alarming sign that underscores the seriousness of the situation. This practice is considered the greatest threat to marine life, destabilizing food chains and entire ecosystems. Techniques such as longline fishing, with the ability to deploy lines that would circle the Earth 500 times in a single day, and bottom trawling, which emits enormous amounts of GHG, worsen the situation. These activities not only threaten ocean wildlife with bycatch of non-target species, but are also responsible for plastic pollution, as up to 70% (by weight) of the macroplastics found floating on the ocean surface are related to fishing.



[5] [6] Data from the United Nations (UN)

It is crucial to emphasize the loss of biodiversity because of its fundamental importance in maintaining ocean balance, which directly impacts CO_2 uptake by large marine animals such as whales and supports vital processes such as photosynthesis and oxygen production carried out by phytoplankton. These microscopic plants depend on a diverse marine ecosystem to thrive, which in turn contributes to the "biological pump". This process involves the absorption of CO_2 during photosynthesis and the subsequent sinking of dead organic matter in the deep ocean, effectively sequestering carbon. In addition, dissolved CO_2 participates in chemical processes that regulate the ocean's carbon cycle and influence its acidity. **The depletion of marine biodiversity, therefore, threatens key processes such as carbon sequestration and oxygen production**, crucial to the health of our planet and our survival. Thus, it is imperative to mitigate the negative impact of fishing on the ocean, and sustainability must become a priority in blue economy policies.

With the above in mind, the Blue Economy faces a number of challenges that need to be addressed. The most impactful are: Socio-demographic challenge and Climate change.

1. Socio-demographic challenge: feeding a growing population sustainably

Today, **+3 billion people rely on seafood as their main source of protein** [7]. With a projected population of 10 billion by 2050 on our planet, the demand for these resources can only be expected to increase. This growing demand intensifies pressures on the oceans and exacerbates the scarcity of natural resources, putting additional pressure on marine species, a third of which are already overfished. In addition, due to unsustainable fisheries management, **72 million people are unable to feed themselves with the 16 million tons of seafood per year that could be caught through the adoption of sustainable fishing practices** [8].

The situation is exacerbated by pollution and the effects of climate change, which seriously threatens marine species and their ecosystems. **In 2019, one third (35.4%) of global fish stocks were overexploited** [9], indicating unsustainable management of marine resources. The alarming scarcity of these resources is manifested, for example, in the disappearance of 90% of large predatory fish such as sharks, tuna, marlin and swordfish in recent decades and that more than half of Mediterranean shark and ray species are at risk of extinction. If the current course is not changed, it is projected that by 2050 there will be more plastics than fish in the sea.

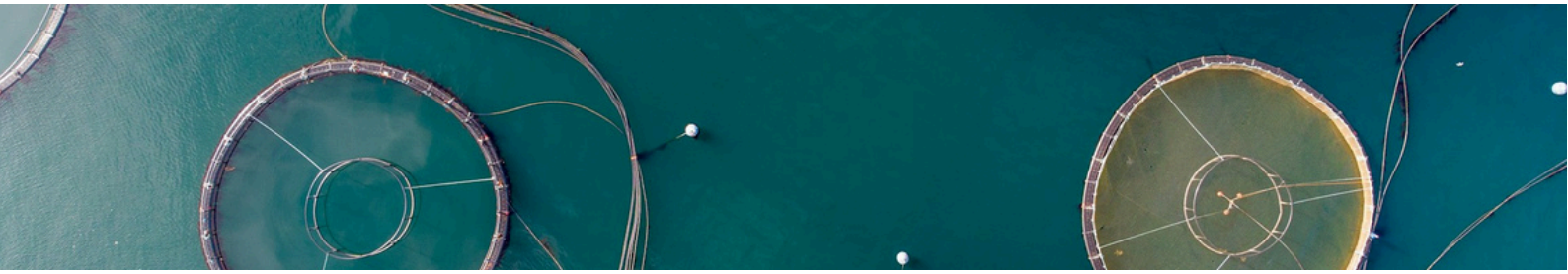
The overexploitation of national waters in developed countries has in recent years driven the rise of what is called "neo-colonial fishing". This practice involves large fishing fleets, generally subsidized by their countries of origin, traveling long distances to the exclusive economic zones of African countries to exploit their not yet overexploited fishery resources.

This phenomenon has devastating socio-economic consequences for the countries concerned and their coastal communities. The presence of these massive fleets depletes local fish stocks, severely affecting the local economy and food security of these communities, which are mostly represented by artisanal fishermen and poor people.

2. Climate change: protect and restore marine ecosystems to preserve the ocean as a carbon sink

The changes that climate change is causing in the ocean fall into two main categories: physical and chemical changes [10]. First, physical changes include ocean warming, climate velocities and marine heat waves; sea level rise; changes in ocean circulation, stratification and coastal upwelling; and modifications in sea ice. On the other hand, chemical effects include ocean acidification, ocean deoxygenation and changes in nutrient availability.

The physical impacts of climate change are widespread and profound. Ocean warming is causing poleward shifts of marine species, altering ecosystems and food chains. Climate velocities, which indicate the speed and direction of change in ocean habitats, force species to adapt, migrate or face possible extinction. In addition, marine heat waves are becoming more frequent and severe, causing coral bleaching on an unprecedented scale. Rising sea levels threaten coastal communities, eroding beaches and increasing the salinity of aquifers. Changes in ocean circulation, stratification and coastal upwelling alter nutrient distribution, impacting primary productivity and fish stocks. Likewise, changes in sea ice, especially in polar regions, not only affect dependent species such as polar bears and seals, but also modify atmospheric and oceanic circulation patterns, influencing global climate.



[7] Data form the World Wildlife Fund (WWF)
[8] Data from the Marine Stewardship Council (MSC)
[9] Data from the United Nations (UN)
[10] Data from Intergovernmental Panel on Climate Change (IPCC)

In terms of chemical changes, ocean acidification, caused by the absorption of atmospheric carbon dioxide, is lowering the pH of the water (acidification) and complicating the formation of skeletons and shells in organisms such as corals and mollusks. Deoxygenation is creating dead zones that cannot support aquatic life, negatively impacting biodiversity and fisheries. In addition, changes in nutrient availability, driven by both warming waters and altered currents, could reduce ocean productivity and alter species composition, thus affecting human food security and the global economy.

A recent study indicates that trawling, considered the most destructive method for marine biodiversity, is also one of the largest sources of greenhouse gas (GHG) emissions, contributing approximately 1% of total annual global emissions [11]. Although CO2 emissions from industries directly related to the exploitation of marine resources are not the most significant globally, the combination of these emissions with extractive activities presents a considerable environmental challenge. To move towards a goal of net zero emissions and simultaneously preserve marine ecosystems, ensure food security and safeguard human health, it is crucial to focus on the following main objectives:

2.1. Conservation and Restoration of Marine Ecosystems → 8.37-11.54 Gt CO2-eq reduced/sequestered (2020-2050)

Restoration and protection of coastal wetlands, including mangroves, salt marshes and seagrass beds, are crucial to reactivate and preserve their carbon sequestration functions.

Similarly, protection and restoration of macroalgal forests enhance seafloor carbon sequestration. Protecting the seafloor by restricting trawling and creating marine protected areas is essential to maintain carbon-rich sediments. These integrated strategies are vital to mitigate climate change through sustainable management of marine ecosystems.

2.2. Reduce, Recycle and Replace Plastics → 5.61-9.57 Gt CO2-eq reduced/sequestered (2020-2050)

Bioplastics represent an innovative approach to traditional plastics production, as they use plant-based raw materials instead of fossil fuels. This alternative not only tends to generate fewer emissions, but can also result in biodegradable products. Similarly, plastics recycling saves energy compared to the production of new materials, reduces dependence on fossil fuel-derived raw materials and contributes to waste reduction. In addition, the production of plastics has increased considerably in the last century, especially for short-term applications. By reducing the use of plastics in non-durable goods, significant progress can be made in reducing both greenhouse gas emissions and the accumulation of plastic waste.

2.3. Improvement of Aquaculture and Fisheries Practices → 4.01-7.04 Gt CO2-eq reduced/sequestered (2020-2050)

Aquaculture, fisheries and seaweed farming are key to sustainability in marine resource management. In the aquaculture sector, where 57% of greenhouse gas emissions come from feed raw material production, fishmeal production, feed mixing and transportation [12], it is crucial to seek more sustainable alternatives. Fisheries management reform focuses on combating overfishing and preserving ecosystems, thereby improving carbon sequestration. In addition, the expansion of algae cultivation not only facilitates carbon sequestration, but also increases biomass production for various uses, such as biomass for biofuels, bioplastics, livestock feed and human consumption.

[11] Data from Frontiers in Marine Science
[12] Data from Project Drawdown (PD)

TARGETED SOLUTIONS AND STARTUPS OF INTEREST

In this section, we present a list of targeted solutions in the Blue Economy sorted by the Total Addressable Impact ("TAI"). The TAI is based on the projected emissions impact globally and measured by the Gigatons CO2-eq reduced/sequestered (2020-2050). This list is extensive but not exhaustive, and we continue to add to it as a living project.

Furthermore, we have identified a bunch of startups, both local and globally, that are contributing to these solutions.

Targeted Solutions	Problem	Key industry challenges				TAI (Gt CO2e)	Startups of interest	
		Socio-demographic	Climate change					
			Conservation and Restoration of Marine Ecosystems	Reduce, Recycle and Replace Plastics	Improvement of Aquaculture and Fisheries Practices		Global	Local
Seafloor Protection	Bottom trawling releases enormous amounts of carbon stored in seafloor sediments. The prohibition of bottom trawling and the creation of MPAs protect this important carbon store.	✓	✓✓✓	✓	✓✓	5.14	Bedrock Ocean Exploration, Ava Ocean	
Macroalgae Protection and Restoration	Macroalgal forests enhance deep sea carbon sequestration but require restoration due to inevitable degradation, despite protection efforts.	✓✓	✓✓✓		✓✓	3.78	Urchinomics, 12 Tides	
Coastal Wetland Protection	Only about 24% of the world's coastal wetlands are protected, and disturbances to these areas contribute between 1% and 10% of human-caused greenhouse gas emissions.	✓✓	✓✓✓		✓✓	1.62	Upstream Tech	Seabots, DES
Coastal Wetland Restoration	Agriculture, development and natural disasters have degraded many coastal wetlands. Restoring ecosystems such as mangroves, salt marshes and seagrass beds enhances carbon sequestration.	✓✓	✓✓✓		✓✓	1.00	Blue Carbon Lab, Rreefs, Arc Marine	Ocean Ecostructures, Underwater Gardens
Reduced Plastics	Reducing the amount of plastic used in nondurable goods can achieve significant reductions in both greenhouse gas emissions and plastic waste.		✓	✓✓✓	✓	5.40	Ichtion	Universal Plastic,
Bioplastics	Plastics production is estimated to increase by about 155% from 2014 to 2050. Bioplastics, plant-derived instead of fossil fuels, provide lower emissions and are sometimes biodegradable, significantly reducing greenhouse gas emissions.		✓	✓✓✓	✓	2.48	Sway	Dan*na, Venvirotech
Recycled Plastics	Recycling plastics not only reduces the carbon footprint and energy use compared to producing new ones, but also decreases the demand for fossil raw materials, saves landfill space and reduces environmental pollution.		✓	✓✓✓	✓	1.69	The Ocean Clean Up	Gravity Wave
Seaweed Farming	Increased algae cultivation improves carbon sequestration and produces valuable biomass for biofuels, bioplastics and animal feed by taking advantage of the rapid growth and high CO2 absorption of macroalgae.	✓	✓	✓	✓✓✓	4.72	Carbonwave	Macrocarbon
Improved Fisheries	Reforming fisheries management is essential to reduce overfishing and overcapitalization, reducing fuel consumption and helping fish stocks to recover. This enhances carbon sequestration in marine environments.	✓✓✓	✓✓	✓	✓✓✓	1.54	Ava Ocean, Atlas Space	
Improved Aquaculture	The rapid growth of aquaculture contributes significantly to greenhouse gas emissions, mainly from feed production and on-farm energy use. The adoption of renewable energy can substantially reduce these emissions.	✓✓✓	✓✓✓		✓✓✓	0.78	Lisagus, Itinsect	KOA Biotech, Norsy Seafood

BLUE ECONOMY TECH

Blue Economy Tech encompasses all startups operating in the 10 value chains of the segments mentioned in the following section 5 “ClimateTech and Blue Economy Tech Investment Landscape”. However, we focus on the 5 segments we encompass in:

i) Direct exploitation of living ocean resources and ii) Conservation & restoration of ocean resources, either upstream or downstream, which are (Aquaculture, Blue Biotechnology, Blue Tech & Ocean observation, Environmental protection and regeneration and, Fisheries).

Direct Exploitation of Living Ocean Resources

IMPROVED FISHERIES

CageEye, SafetyNet Te..., FlyWire Cam..., Savewave, Trademodo, Smart Ocean, Fishency Inn..., Quantidoc

IMPROVED AQUACULTIURE

Sea Harmony, Matorka, MonitorFish, MicroTERRA, EFishery, Watergenics, Blue Lice, Aquabyte, Gårdsfisk, The Kingfish Co, Running Tide, Vegafish, Gigante Salm..., Ocean Rainfo..., Sea Forest

Alternative Seafood

PLANT BASED

Tofuna Fysh, Good Catch, Revo Foods, Sophie's Kitche, The Better M..., The Van Cleve S, Ocean Hugge..., Hooked Foods, New Wave Fo..., Yam Chops, The Plant Ba..., Akua

LAB GROWN

Seafuture, Avant Meats, BlueNalu, Shiok Meats, Finless Foods, Wildtype

Conservation and Restoration of Ocean Resources

BIOPLASTICS & RECYCLED PLASTICS

Notpla, Pinovo AS, Swedish Alga..., Oceanium, Xampla, Biofiber Tech, Kelpi, Dopper, Oceanworks, Ogoori, The Ocean B..., WEP Circular

Sinay, Sea Defence ..., Eomap, Coral Vita, BIOCEANOR, Undersee, RanMarine T..., ARC Marine, Aquaai, Greenarc Sp/F, River Cleaning, The Great Bu..., Reef Support, Whale Seeker, Kelp Blue Holdf, Oc-tech, SurfCleaner, The Ocean Cl...

BLUETECH AND OCEAN OBSERVATION

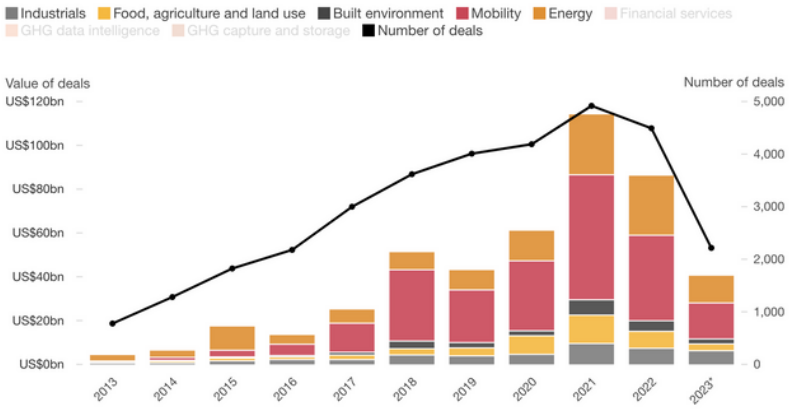
Open ocean, La Barchetta ..., Dana Dynamics, Bedrock Oce..., Sea Proven

Source: Dealroom

CLIMATE TECH AND BLUE ECONOMY TECH INVESTMENT LANDSCAPE

Clarification: ClimateTech encompasses the technologies that are explicitly focused on reducing GHG emissions across the 5 grand challenge areas: Industrial Manufacturing, Energy, Agrifood, Mobility and Transport and Buildings. Blue Economy Tech, however, does not fall into this group as its primary goal is not to reduce GHG emissions nor does it generate as many emissions as these industries. Instead, it is focused on protecting and restoring the health of ocean resources and sustainably exploiting them

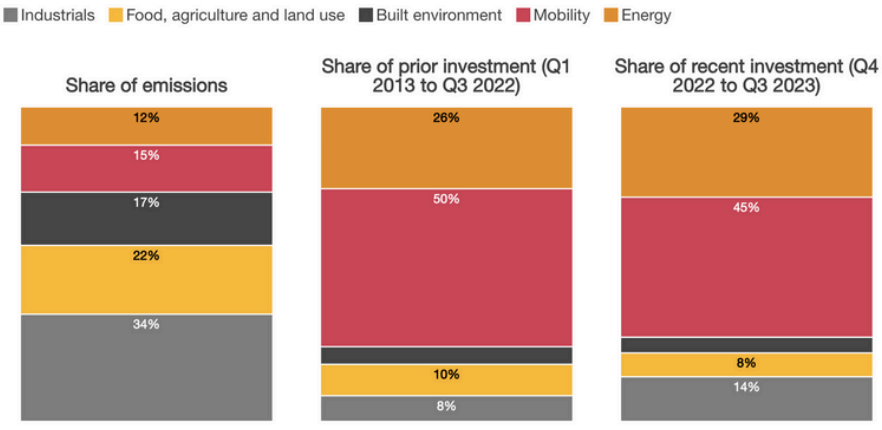
In the current context, total investment in Venture Capital and Private Equity experienced a significant decrease of 50.2% (year-over-year), reaching US$638 billion in 2023. However, specific investment in ClimateTech startups decreased by 40.5% during the same period. Despite this reduction, the proportion of ClimateTech investment within total private market equity and grant investment increased to 11.4% in Q3 2023, showing a 10% year-over-year growth.



Data for 2023 is current through the third quarter of the year.
Source: Pitchbook, PwC analysis.

There is an increase in investment in sectors with high environmental impact, especially in industrial manufacturing. This year, ClimateTech investors invested a larger share of funds to startups focused on industrial emissions, reaching 14% between Q4 2022 and Q3 2023, compared to less than 8% in previous periods. In addition, CO2 capture, utilization, and storage is one of the few areas of ClimateTech that has seen an increase in investment.

Notably, the energy sector, which is the principal emitter accounting for 34% of emissions, continues to see disproportionate investment relative to its environmental impact, with recent investments making up about 29%. This indicates ongoing underinvestment. In contrast, the mobility sector experiences substantial overinvestment, receiving around 45-50% of funding despite contributing 17% to emissions.



Note: Sumes may not total 100 due to rounding. Sectoral emissions are allocated to the end-use sector.
Source: IPCC, Pitchbook, PwC analysis.

Despite the decline in early stage deals, the Climate Tech sector continues to attract new investors and, even with the decline in investment, the current market is perceived as an opportunity for savvy investors due to lower valuations and a wider selection of investment opportunities.

Blue Economy Tech Investment Landscape in 2023

Clarification: For the Blue Economy Tech Investment Landscape in 2023 study, we will consider the following 10 sectors (even though our Blue Economy investment thesis is not focused on some of them as explained above):

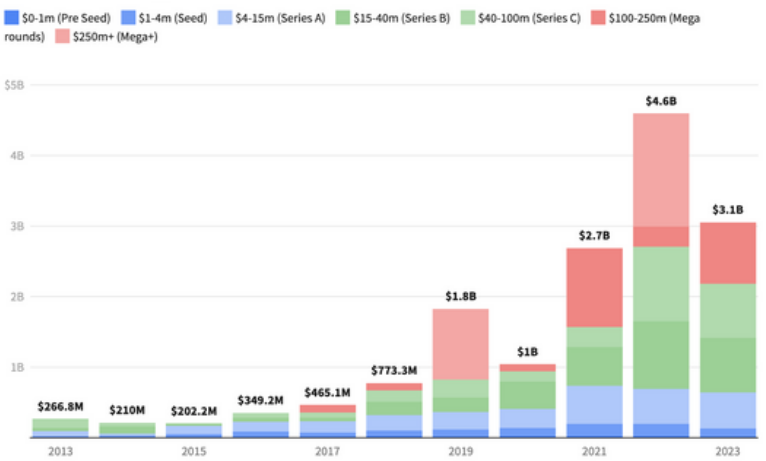
Key sectors	Short Definition
Aquaculture	The cultivation and farming of aquatic organisms in a way that has minimal impact on air, water, quality and on fish welfare.
Blue biotechnology	The application of science and technology to aquatic organisms in order to produce knowledge, goods, and services, in compliance with sustainability practices.
Blue renewable energy	The offshore, inshore, and nearshore generation of clean and renewable power from natural sources, including wind, wave, tidal and solar
Blue tech and ocean observation	The activities, technologies and infrastructure involved in ocean data collection, modelling and prediction, including for maritime security and defence.
Coastal and maritime tourism	The activities involved in providing services four tourism in and around coastal or marine environments that contribute to sustainable development in the local area
Environmental protection and regeneration	The protection and regeneration of marine ecosystems, including activities to prevent ocean pollution and restore and strenghten biodiversity in coastal areas.
Fisheries	The sustainable harvesting of naturally occurring living resources in both marine and freshwater environments.
Shipbuilding and refit	The products and services required for building, maintenance, repair and refitting of vessels for environmentally responsible water transport.
Shipping and ports	The activities associated with ensuring sustainable maritime transport ecosystem, including the transportation of freight and passengers by water and port services.
Water management	The services and infrastructure required for sustainable water collection, purification, desalination, decontamination and distribution, as well as for sewage and waste treatment.

Source: Blue Invest Investor Report: Unlocking the potential of the Blue Economy

In the last 10 years, the Blue Economy has experienced impressive growth, multiplying its investments by almost x10. According to recent data, 2023 closed with $3.1 billion of investment in the Blue Economy startups, positioning it as the second best year in its history, second only to 2022.

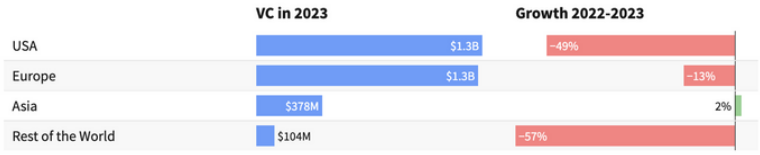
Despite this strong growth track record, investment in the Blue Economy saw a 32% decline from 2022 to 2023. However, this decline is considerably smaller compared to other sectors, such as the entire startup industry or Climate Tech, which experienced steeper declines over the same period. This phenomenon reflects a consolidation in the Blue Economy after years of accelerated expansion.

Blue Economy VC funding globally



Source:Dealroom

In 2023, the United States and Europe led investments in the Blue Economy, each with $1.3 billion. Asia experienced modest growth of 2%. However, there were significant declines in investment, with a 49% drop in the U.S. and a 57% drop in other regions.



Source:Dealroom

Comparatively, the Blue Economy has shown growth of nearly 300% in the last five years, surpassing other sectors such as ClimateTech and Fintech, highlighting its emerging importance within the technological and sustainable landscape. The Blue Economy is currently valued at $3 billion in 2023.

Despite a significant 33% decrease in value from 2022 to 2023, indicating a recent market contraction, the sector has demonstrated explosive long-term growth from a possibly low base. This suggests that while it faces short-term volatility, there is a growing interest in its potential for sustainable development.

Sector	2023 VALUE	% 2023-2022	% last 5 years
Blue economy	$3B	-33%	298%
Deep tech	$77B	-21%	37%
Health	$61B	-32%	5%
Enterprise software	$53B	-35%	16%
Climate tech	$48B	-33%	43%
Fintech	$42B	-53%	-28%
Energy	$39B	-20%	159%
Transportation	$33B	-42%	-36%
Food	$14B	-54%	-56%
Security	$12B	-52%	22%

Source:Dealroom

In conclusion, the Blue Economy ecosystem is still at an early stage of development relative to more mature Venture Capital markets, such as Fintech or even the broader ClimateTech space, indicating ample opportunity for innovation and investment as it continues to evolve.

As our Investment Thesis focuses on the Direct Sustainable Exploitation of Ocean Living Resources and the Conservation & Restoration of Ocean Resources, within these two value chains, the following sectors are found:

Aquaculture → $556M of investment in 2023

VC funding in aquaculture startups has reached a record level in 2023, growing 3x since 2021. The major innovations in the sector to make these practices more sustainable are:

- Recirculating Aquaculture Systems (RAS): Reduces environmental footprint significantly by recycling water and optimizing resources, with great scalability and adaptability.

- Aquaculture Digitalisation: Enhances monitoring and management of aquaculture environments, improving operational precision and reducing waste. Significantly aids in the early detection and prevention of diseases, increasing fish health and reducing mortality rates.

- Genetic Improvement of Species: Boosts productivity and sustainability per species with disease resistance and feed efficiency improvements, but carries ethical considerations.

Blue Biotechnology → $204M of investment in 2023

VC funding in Blue Biotechnology peaked at almost $300M in 2022, then dropped 1/3 in 2023. Almost $900M have been invested since 2016. The major innovations in the sector to make these practices more sustainable are:

- Photobioreactors: Enable controlled cultivation of photosynthetic organisms, providing a sustainable source of biomass for bioenergy, CO2 capture, and valuable bioproducts. Their efficient use of space and reduction of contamination risks make them pivotal for environmental sustainability efforts.

- Microalgae-based Nutrients & Supplements: These products harness microalgae's rich nutritional profile, including proteins, vitamins, and essential nutrients. They offer sustainable protein sources essential for global food security and nutritional needs, especially where arable land is scarce.

- Biofuels from Marine Resources: Marine-based biofuels provide cleaner, sustainable alternatives to fossil fuels, reducing environmental pollution and dependency on non-renewable resources. This innovation is key to the global energy transition and environmental conservation.

Blue Tech & Ocean observation→ $155M of investment in 2023

VC funding in Bluetech and ocean observation peaked at $255M in 2022, then dropped 40% in 2023. Over $1B has been invested since 2016. The major innovations in the sector to make these practices more sustainable are:

- Smart Sensors for Ocean Monitoring and Vessel Recognition: Utilizing advanced sensor technology, these systems collect real-time environmental data such as ocean salt content and temperature. They provide comprehensive insights into underwater ecosystems and vessel conditions.

- Unmanned Sea Systems for Data Collection and Surveillance: Employing drones, underwater robots, and other automated systems, these technologies gather real-time data from the ocean. They are used for various purposes including environmental monitoring, rescue missions, and enforcement of maritime laws.

- Digital Technologies for Ocean Observation: This solution incorporates high-performance computing, AI, big data, and the Internet of Underwater Things (IoUT). These technologies enhance the connectivity and data processing capabilities of underwater monitoring systems.

Environmental protection and regeneration→ $108M of investment in 2023

VC funding in Ocean environmental protection and regeneration has increased strongly in the last two years. Over $300M have been invested since 2016. The major innovations in the sector to make these practices more sustainable are:

- Solutions to Prevent Ocean Plastic Pollution: These innovations use artificial shorelines and floating devices to capture plastic waste before it enters the oceans, significantly reducing pollution and protecting marine life from harm.

- Carbon Removal Technologies: This approach includes sequestering carbon on the deep-sea floor and transforming CO_2 into valuable products, effectively reducing greenhouse gas emissions and promoting sustainable industry practices.

- Nature-based Solutions (NBS) to Restore and Regenerate Marine Environments: These solutions involve constructing protective structures and regenerating vital habitats like coral reefs, helping to preserve biodiversity and tackle global challenges like climate change through natural methods.

Fisheries→ $38M of investment in 2023

The fisheries startup sector is very nascent, having attracted just over $250M since 2016. The major innovations in the sector to make these practices more sustainable are:

- Bycatch Reduction Devices: These devices use advanced technologies like lasers, LEDs, sensors, and IoT to selectively target desired species while deterring others, significantly reducing bycatch and improving fishing sustainability.

- Electronic Monitoring Systems: These systems utilize sensors, computer vision, and machine learning to monitor and record detailed information about fish catches, helping to manage quotas and improve the survival rates of bycatch through rapid return to the ocean.

- Maritime Surveillance Technologies to Prevent IUU Fisheries: These technologies include drones and advanced sensors that provide real-time monitoring of fishing activities, enhancing the ability to prevent illegal fishing practices and support sustainable fishery management.

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