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The Blue Economy 2023 Whitepaper

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BLUE ECONOMY

The blue economy is an approach to economic development that focuses on the sustainable use of ocean resources while promoting economic growth, social inclusion, and the preservation of marine and coastal ecosystems. The ocean, or the global "blue economy," generates **USD 2.5 trillion (tn)** in economic output every year[1] - comparable to the world's seventh-largest economy by GDP - and is predicted to grow at double the rate of the mainstream economy, reaching **USD 3tn** by 2030.[2] The blue economy is closely linked to SDG 14 "Life Below Water", but contributes to multiple SDGs, highlighting the interconnectedness of sustainable development.

71% of the earth is covered by the ocean[21]

30% of CO_2 is absorbed by the ocean[4]

350m jobs created worldwide by 2030[8]

50% of the oxygen we breathe is produced by the ocean[22]

90% of international goods are transported by sea[23]

Key problem areas

Overfishing and unsustainable use of marine resources

Fish stock depletion and biodiversity loss are results of destructive and illegal fishing methods. Shockingly, the Food and Agriculture Organisation of the United Nations reports that **60%** of fish populations are now being fished at maximum sustainable levels, while a staggering **34%** of fish stocks are overfished.[3] Nonetheless, the Blue Economy offers a chance to encourage sustainable fishing methods. This might be accomplished by taking steps like using selective fishing gear, setting fishing quotas, and creating marine protected zones.

Ocean acidification and warming

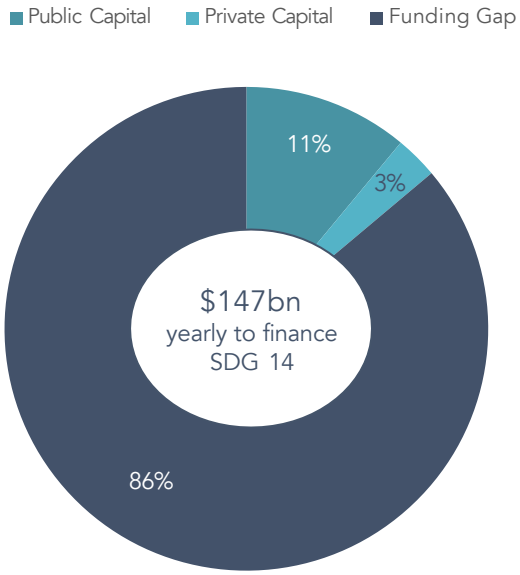
The ocean has absorbed **30%** of the carbon dioxide since 1980, which is the main reason for the global ocean acidification and warming.[4] The CO_2 gradually dissolves in the water, producing carbonic acidic, which reduces the pH of the water. Among other negative consequences, this has significant effects on the marine biodiversity, plankton, and corals.[5] The Blue Economy aims to address these impacts through measures such as the development of renewable energy, coastal protection, and the implementation of ecosystem- based approaches to adaptation.

Marine pollution

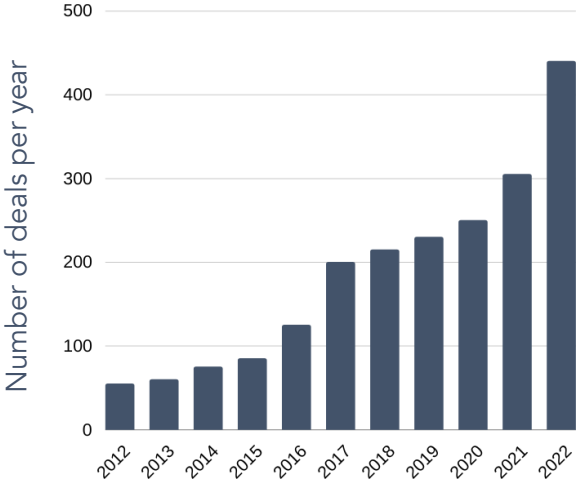
Marine pollution can be defined as a mixture of chemicals and trash that originates on land and is washed or blown into the ocean. This pollution harms the ecosystem, the health of all species, and global economic systems.[6] The Ellen MacArthur Foundation estimates that there will be more plastic than fish in the ocean by **2050** if current trends continue.[7] The Blue Economy strives to reduce marine pollution through efforts such as better waste management, stricter shipping restrictions, and the development of cutting-edge technology to reduce marine litter.

Unmet financing needs for SDG 14

It is anticipated that EUR 147 billion (bn) per year are required globally to meet SDG 14 "Life Below Water" by 2030. Only EUR 21bn is currently available, of which EUR 17bn is provided by public sources on a national and international level and EUR 4bn is provided by private investors. There is still a **EUR 126bn** finance shortfall that needs to be filled. To close the gap, private capital mobilization is essential.[8]



Investing activity in the blue economy



Through the most recent global developments, the investing activity in the blue economy proved itself to be resilient. In 2022, funding reached pre-pandemic levels in terms of value and the deal activity peaked with over **440** completed deals. Among the factors influencing this growth are increasing worries about energy security, environmental protection, defence, and EU autonomy. Increased transaction activity in areas such as blue renewable energy and blue tech and ocean observation is one evidence of this.[8]

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Sectors of the blue economy

In terms of sectors, fisheries, aquaculture, and shipping come to mind quickly. These sectors urgently need to change their current business practices toward more sustainable solutions to sustain the blue economy in the future. In its BlueInvest investor report, the European Commission has recently defined the following ten key sectors as part of the blue economy.[8]

Sector	Short definition
Aquaculture	Aquaculture refers to the sustainable growing, breeding, and harvesting of freshwater, brackish water, and saltwater populations under regulated or semi-controlled circumstances.[9]
Blue Biotechnology	Blue biotechnology refers to the application of biotechnological tools to marine and aquatic resources for the development of products and processes of economic and social value in compliance with sustainability practices.[10]
Blue Renewable Energy	Blue renewable energy refers to the development of marine and ocean-based renewable energy sources, including wave, tidal, ocean thermal, and offshore wind energy.[11]
Blue Tech & Ocean Observation	Blue tech is the use of innovative technologies to manage and utilize marine resources in a sustainable manner. This includes ocean observation, which entails collecting and analysing data from the ocean to better understand ocean dynamics, climate change, and the influence of human activities on marine ecosystems.[12]
Coastal & Maritime Tourism	Coastal and maritime tourism refers to the social, cultural, and economic activities involved in offering tourism services in, or near to coastal or marine regions.[13]
Environmental Protection & Regeneration	Marine environment protection and regeneration, includes activities to reduce ocean pollution and restore and strengthen biodiversity in coastal areas.[14]
Fisheries	Refers to the sustainable harvesting of naturally occurring biological resources in both marine and freshwater environments.[13]
Shipbuilding & Refit	Products and services needed for the construction, maintenance, repair, and refitting of vessels for environmentally friendly water transportation.[13]
Shipping & Ports	Refers to the operations connected with supporting a sustainable maritime transport ecology, including the transportation of freight and passengers by water and port services.[13]
Water Management	Focuses on actions to avoid and/or restore the damage caused by pollution or contamination to our water supplies.[15] This sector covers the services and infrastructure required for the water usage cycle.[13]

On the following page, we provide you with a detailed description of two promising sectors. The first deep dive provides insights into aquaculture, while the second deep dive highlights the blue tech and ocean observation sector. The deep dives uncover the impact potential and present fields of investment opportunity in these two sectors. According to research made by the European Commission, both sectors had a high deal activity in 2022, with aquaculture making up 16% of the total deals and blue tech and ocean observation reaching 31%.[8]

Deep dive: Aquaculture

Definition

Aquaculture refers to the farming of aquatic species such as fish, molluscs, crustaceans, and plants. It can be carried out in marine, brackish, or freshwater environments, and it can be combined with other types of food production systems. Many people around the world rely on aquaculture for protein. It can provide economic benefits to coastal towns, as well as a more sustainable alternative to wild-caught seafood. Meaning, aquaculture may also benefit the ecosystem by lowering pressure on wild fish populations and increasing water quality.[9]

Impact Context

In general, sustainable aquaculture is used to produce food. However, it may also be used to replace natural stocks and re-establish populations of endangered animals. More specifically, sustainable aquaculture is the farming of aquatic species in a way that reduces emissions, mitigates pollution, uses less plastic and more renewable energies, is more energy and water efficient, puts less strain on supply chains, uses fewer chemicals and medicines like antibiotics, better respects fish welfare, and creates future-proof jobs, all while producing high-quality, nutritious seafood and aquatic plants.[8]

Investment Opportunities

- Disease prevention
- Closed-loop farming
- Oral vaccines

Fish farming in Norway[18]

Deep dive: Blue Tech & Ocean Observation

Definition

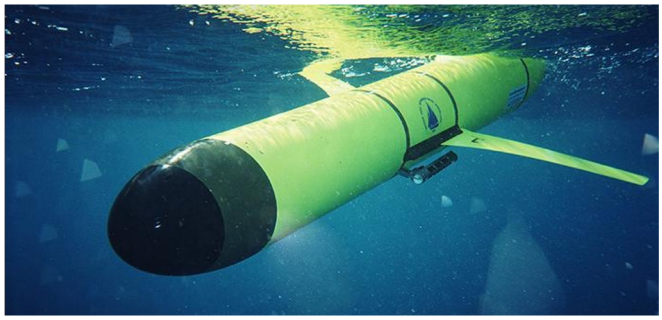
Blue tech refers to the sustainable use of innovative technologies to manage and utilize marine resources. This includes ocean observation, which entails collecting and analysing data from the ocean to better understand ocean dynamics, climate change, and the influence of human activities on marine ecosystems. Remote sensing, acoustic sensors, autonomous underwater vehicles, and mooring systems are examples of ocean observation technology. These technologies have the potential to deliver crucial data for a variety of applications such as oceanography, fisheries management, and marine security.[12]

Impact context

The sector's digital transformation and the data it creates improve our understanding of ocean processes and the effects of human activities on other ocean-related sectors. This knowledge enables more targeted measures to improve ocean ecosystem health, predict the effects of climate change, and boost resilience and adaptation.[16, 17]

Investment opportunities

- Ocean gliders
- Digital twin
- Smart sensors for ocean monitoring



Ocean glider[19]

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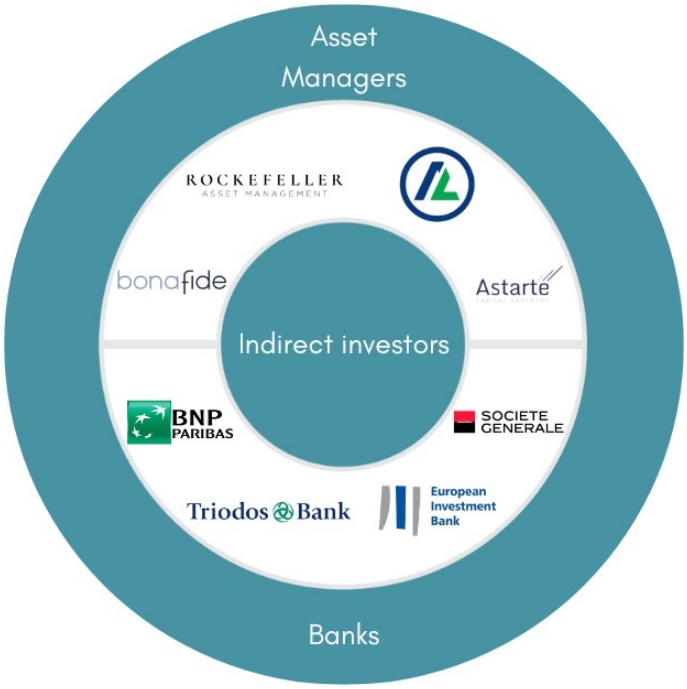
Key players in the industry



Challenges for the blue economy

It has to be mentioned that not all countries have access to the same resources as European countries, and some components of the Blue Economy are frequently overlooked. This poses particular difficulties for developing countries in terms of implementation. Among others, the United Nations (UN) has identified the following key challenges for the blue economy on a global level.

Financial barriers

Creating a Blue Economy demands a stable economy and long-term financial policies, both of which have become substantial impediments for numerous countries as a result of COVID-19. Financial barriers are a significant deterrent to the adoption of the Blue Economy. Typically, developing countries are the ones that pay the price. Developing countries tend to focus on other areas of the economy, instead of investing in the development of a sustainable agriculture. According to the UN, one driving factor of this are high foreign debt levels. Due to a lack of capacity and technology, several countries are finding the transition challenging. Furthermore, the government requires a skilled staff, which involves field training.[20]

Social justice

The UN highlights the need of fairness through promoting a blue economy. Land and resources typically belong to communities, and the interests of towns reliant on the ocean are frequently overlooked since large sectors such as coastal tourism are considered to be profitable. This means that the Blue Economy must contribute to SDG 14 while not jeopardizing other 2030 Agenda targets.[20]

The road ahead

The blue economy is predicted to further expand in the coming years as demand for seafood, minerals, energy, and other resources rises. There is a growing awareness on the importance of managing marine resources in a sustainable manner. This is projected to result in the development of new technologies and practices that reduce the negative environmental impact of commercial operations. To ensure a sustainable blue economy, governments and industries have to impose stronger laws and improve standards. It will take investments in innovation, careful management, and long-term policies to ensure a sustainable development and growth of this sector. Investing in the Blue Economy today is highly promising, due to its high growth potential and its importance to the planet.

Sources

1 Ove, H.-G. (2015, April 22). Reviving the Ocean Economy The Case for Action. Retrieved 2023, from worldwildlife.org: https://www.worldwildlife.org/publications/reviving-the-oceans-economy-the-case-for-action-2015

2 Mark, W., & Ian, B. (2018). Foresight Future of the Sea: a Report From the Government Chief Scientific Adviser. Retrieved 2023, from gov.uk:https://assets.publishing.service.gov.uk/ government/ uploads/system/uploads/attachment_data/file/706956/foresight-future-of-the-sea-report.pdf

3 Food and Agriculture Organization of the United Nations. (2022). The State of World Fisheries and Aquaculture 2022. Retrieved 2023, from fao.org: https://www.fao.org/3/cc0461en/online/ sofia/2022/status-of-fishery-resources.html

4 Ocean Acidification. (2020, April 1). Retrieved 2023, from National Oceanic and Atmospheric Administration: https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification

5 Ocean Acidification Definition – What Are Its Consequences And Solutions? (2020, January 14). Retrieved 2023, from youmatter: https://youmatter.world/en/definition/ definitions-ocean-acidification/

6 Marine Pollution. (n.d.). Retrieved 2023, from National Geographic: https://education.nationalgeographic.org/resource/marine-pollution/

7 Designing out plastic pollution. (2020, October 4). Retrieved 2023, from Ellen MacArthur Foundation: https://ellenmacarthurfoundation.org/topics/plastics/overview

8 European Commission. (2023, March 8). Investor Report: An Ocean of Opportunities. Retrieved 2023, from Europa.eu:https://oceans-and-fisheries.ec.europa.eu/publications/blueinvest-investor-report-ocean-opportunities_en

9 States, F. a. (2020). The State of World Fisheries and Aquaculture 2020. Retrieved 2023, from Fao.org: https://www.fao.org/documents/card/en/c/ca9229en

10 Lucy, G., John, D., & Michele, S. (2016, September 30). Blue Biotechnology. Retrieved 2023, from oecd-ilibrary.org: https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/blue-bioeconomy-and-blue-biotechnology_en

11 European Commission. (2021). Blue Renewable Energy. Retrieved from europa.eu: https://maritime-forum.ec.europa.eu/en/system/files/market_opportunity_snapshot-blue_renewable_energy.pdf

12 Eric, L., John, G., Albert, F., Andrea, M., & and L.K., G. (2012). A Framework for Ocean Observing. Retrieved 2023, from Unesco.org: https://unesdoc.unesco.org/ark:/48223/pf0000211260

13 European Commission. (2022). The EU Blue Economy Report 2022. Retrieved 2023, from Europa.eu: https://op.europa.eu/es/publication-detail/-/publication/156eecbd-d7eb-11ec-a95f-01aa75ed71a1

14 Paula, S. (2022). Oceano de Plástico. Fundação Francisco Manuel dos Santos. Retrieved 2023, from ffms.pt: https://www.ffms.pt/pt-pt/livraria/oceano-de-plastico

15 Global Industrial Wastewater Treatment Equipment Market 2021-2025. (2021, May 21). Retrieved 2023, from Giiresearch: https://www.giiresearch.com/report/infi1017145-global-industrial-wastewater-treatment-equipment.html

16 European Marine Board. (2021, June 9). Sustaining in situ Ocean Observations. Retrieved from marineboard.eu: https://www.marineboard.eu/sites/marineboard.eu/files/public/publication/EMB_PB9_Sustaining_OO_web_HQ.pdf

17 Sander, v. d., Maarten, V., Anne, S., Benoit, B., Lara, J., Fraser, S., . . . Marion, B. (2021, April). Uptake of New Technology for Ocean Observation. Retrieved 2023, from europa.eu: https://op.europa.eu/en/publication-detail/-/publication/af4bd5c5-b84c-11eb-8aca-01aa75ed71a1

18 Merete, S., & Moe, E. (2022, March). EY and NCE Seafood Innovation – The latest Trends Shaping the Future of Aquaculture. Retrieved from ey.com: https://www.ey.com/en_no/webcasts/2022/03/ey-and-nce-seafood-innovation-latest-trends-shaping-future-aquaculture

19 Ocean Robots. (n.d.). Gliders. Retrieved 2023, from whoi.edu: https://www.whoi.edu/oceanrobots/index.html

20 United Nations. (2022, March 14). Blue Economy: Oceans as the Next Great Economic Frontier. Retrieved from unric.org: https://unric.org/en/blue-economy-oceans-as-the-next-great-economic-frontier/#:~:text=10%20min.&text=40%25%20of%20the%20world%27s%20population,is%20achieved%20using%20the%20seas

Sources

21 Water Science School. (2019, November 13). How Much Water is There on Earth? Retrieved 2023, from usgs.org: https://www.usgs.gov/special-topics/water-science-school/science/how-much-water-there-earth#:~:text=About%2071%20percent%20of%20the,in%20you%20and%20your%20dog

22 National Ocean Service. (2023, February 1). How much Oxygen Comes from the Ocean? Retrieved 2023, from oceanservice.noaa.gov: https://oceanservice.noaa.gov/facts/ocean-oxygen.html#:~:text=About%20half%20of%20Earth%27s%20oxygen,oxygen%20than%20the%20largest%20redwoods

23 OECD. (n.d.). Ocean Shipping and Shipbuilding. Retrieved 2023, from oecd.org: https://www.oecd.org/ocean/topics/ocean-shipping

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