



Ensuring a Sustainable Blue Economy

What we need to change and why

Index

1

Why change is needed

P. 03

- A. The Triple Planetary Crisis
- B. Healthy Ocean: what it gives us
- C. Definition: The Sustainable Blue Economy

2

Implementing the Sustainable Blue Economy

P. 20

- D. Knowledge
Ocean processes and value chains, natural capital, definitions and measurement
- E. Agreement
Global and regional targets, supply chain improvement, blue economy metrics
- F. Investment
Status Quo, financing possibilities, needs and opportunities, ecosystem services, why we need to invest

3

Appendix

P. 56



1

Why change is needed

The Triple Planetary Crisis

A

In the course of the earth's history, ecosystems (terrestrial and Oceanic) and species have had to adapt to changes to the world's climate. Yet rapid climate change may make it more difficult for ecosystems to adapt, such that biological diversity (biodiversity) is directly affected.

The Ocean is being massively impacted by the Triple Planetary crisis, represented by climate change, pollution and biodiversity loss. Extensive and destructive fishing, as well as pollution from land-based sources such as plastics (among others) are risk multipliers enhancing the vulnerability and exposure of this critical Earth system to emerging climate change-driven hazards.



Ocean in peril

55%

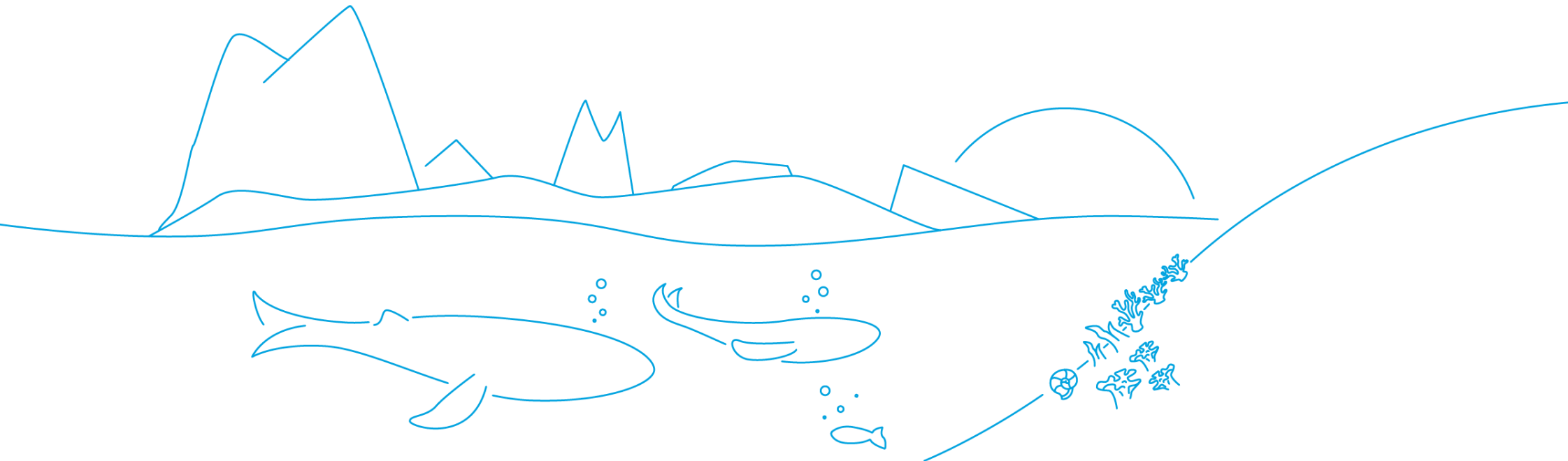
of Ocean area is covered by industrial fishing¹

90%

of the world's marine fish stocks are now fully exploited, overexploited or depleted ²

50%

of the world's coral reef system has been destroyed³



Source: IPBES, WWF, Deutsche Bank AG. Data as of July 2022.

State of global biodiversity

83%

decline across freshwater species⁴

~50%

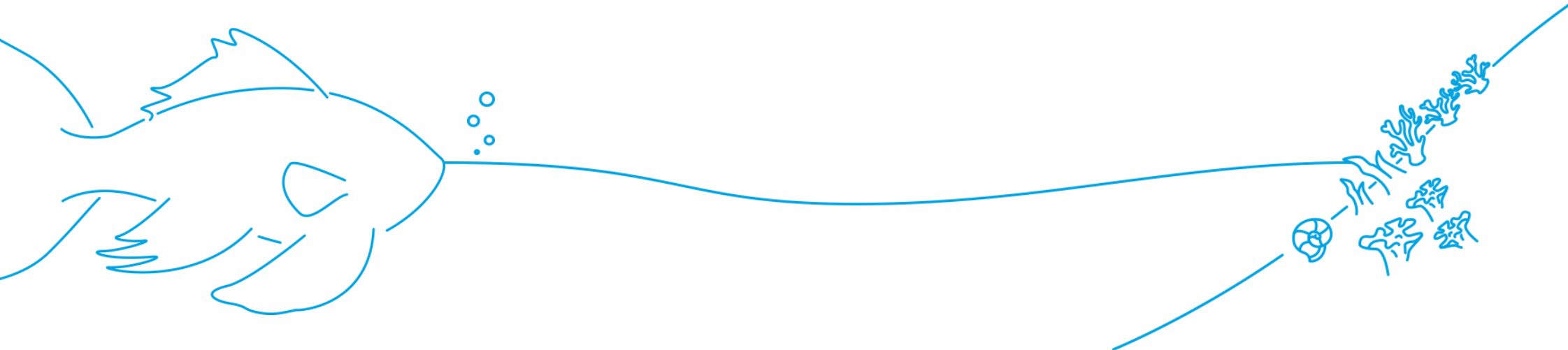
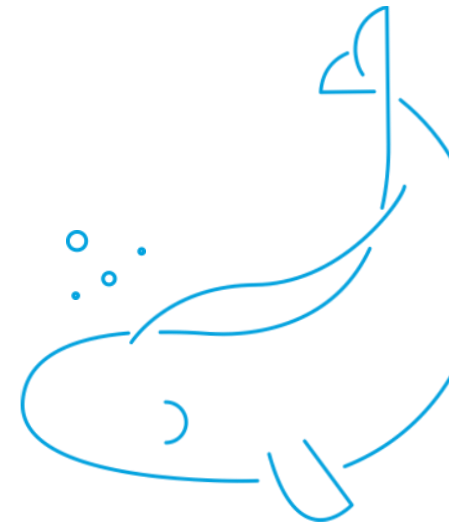
Of all species at risk of extinction by 2100⁵

33%

of worldwide forest areas have been destroyed⁶

+85%

of wetlands have been lost⁷



Source: IPBES, WWF, Deutsche Bank AG. Data as of July, 2022.

Healthy Ocean: what they give us

B

The Ocean regulates the climate, is a gigantic biodiversity reservoir and absorbs around 30% of the world's total carbon emissions, causing it to warm up and acidify with significant negative impacts on marine life.

The Ocean provides key ecosystem services and benefits that are crucial for human wellbeing and the prosperity of the global economy, but these services are at risk from multiple stressors.



Why we need healthy Ocean 1/2



The air we breathe

The Ocean stores **50 times** more carbon dioxide than the atmosphere and produces over **50%** of the world's oxygen.⁸



Climate regulation

Covering **71%** of the Earth's surface, Ocean absorbs **93%** of heat from carbon emissions and regulate climate weather patterns.¹¹



Food

3 billion people in the world depend on wild-caught and farmed seafood as a primary source of protein.⁹



Medicine

Ocean provides ingredients for many medicinal products.



Transportation

More than **90%** of international commerce (by volume) is nowadays transported by sea.¹⁰



Recreation

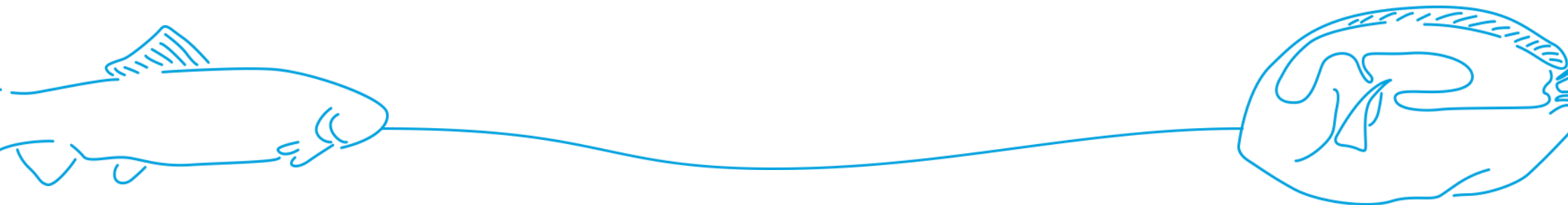
The Ocean provides many unique activities (e.g. kayaking, scuba diving, etc.).

Why we need healthy Ocean 2/2

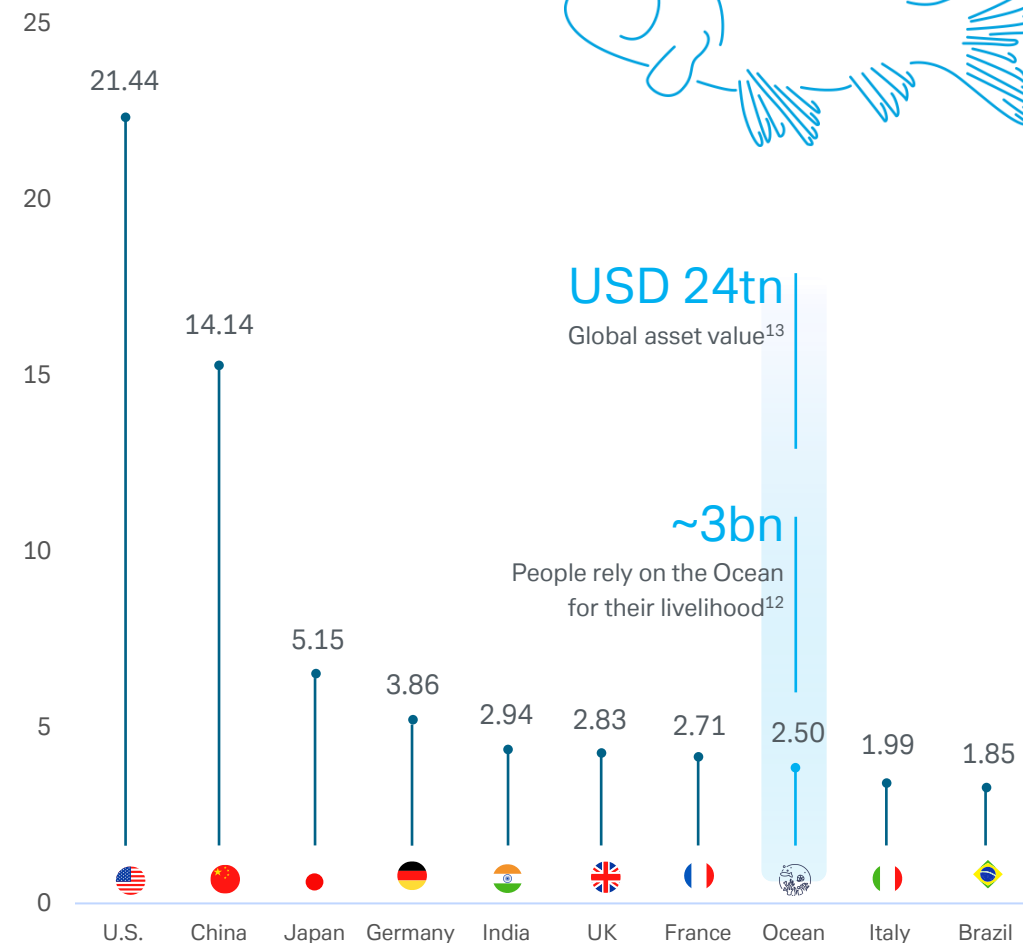
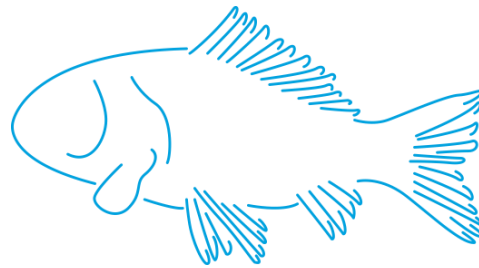
Ocean change will worsen considerably if global temperatures exceed **1.5°C above pre-industrial levels**.

Major Ocean tipping points represent a clear example of **market failure** and will have system-wide effects that could be sudden, catastrophic and almost irreversible.

These are called **regime shifts**, large, abrupt, persistent changes in the structure and function of ecosystems.



Ocean health: the value of ecosystem services



Source: Deutsche Bank AG. Data as of September 2022.

USD 2.5tn

Goods and services¹³

Ocean's contribution to global economic development¹³

38% Developing sectors

30% Trade and shipping

17% Direct benefit

15% Services

Ocean health: the Coral Reefs example

Coral Reefs are considered a Nature-based Solution, i.e. actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.



Livihoods

- Providing food, tourism and other economic opportunities to **more than 500 million** people globally.¹⁴
- Climate-related loss of reef ecosystem services estimated to cost **USD500bn** annually by 2100.¹⁴
- According to a WWF analysis, coral reefs provide a net **USD30bn** in ecosystem services worldwide.¹⁵



Biodiversity

- Coral reefs support a higher concentration of species than any other marine environment, hosting more than **25% of all marine fish species**.¹⁶
- With about **4,000** species of fish, **800** species of hard corals and hundreds of other species, coral reefs can be considered the “rainforests of the sea”.¹⁷



Coastline protection

- Reefs defend coastlines from erosion and flooding with wave attenuation and the production/retention of sand.
- Healthy coral reefs reduce incoming wave energy by **~97%**.¹⁸
- Restoring a coral reef can provide flood protection at a **15th of the cost** of a tropical breakwater.

Ocean health: the Mangroves example



Blue carbon

- Less than **0.5%** of the Ocean's seabed is covered by vegetated habitats, but they account for **50% to 70%** of the carbon that is stored in those sediments.¹⁹
- Mangroves forests are estimated to be **5x** more effective in storing carbon compared to terrestrial forests.
- Mangroves provide ecosystem services worth at least **USD1.6bn** annually that support populations and coastal livelihoods globally.²⁰

Carbon emissions from mangrove deforestation account for 10% of deforestation emissions globally, despite a land coverage of 0.7%.²¹



Biodiversity

- Mangrove forests provide habitats to a wide array of wildlife such as birds, fish, invertebrates, mammals, plants and an important spawning and nursery territory for juvenile marine species.
- It is estimated that over **80%** of global fish catches are reliant on mangrove forests.²²
- If mangrove forests are restored to their original state, it is estimated that fish populations would increase by half.

50,000 kg of fish are lost per year when one square kilometer of mangroves is deforested.²³



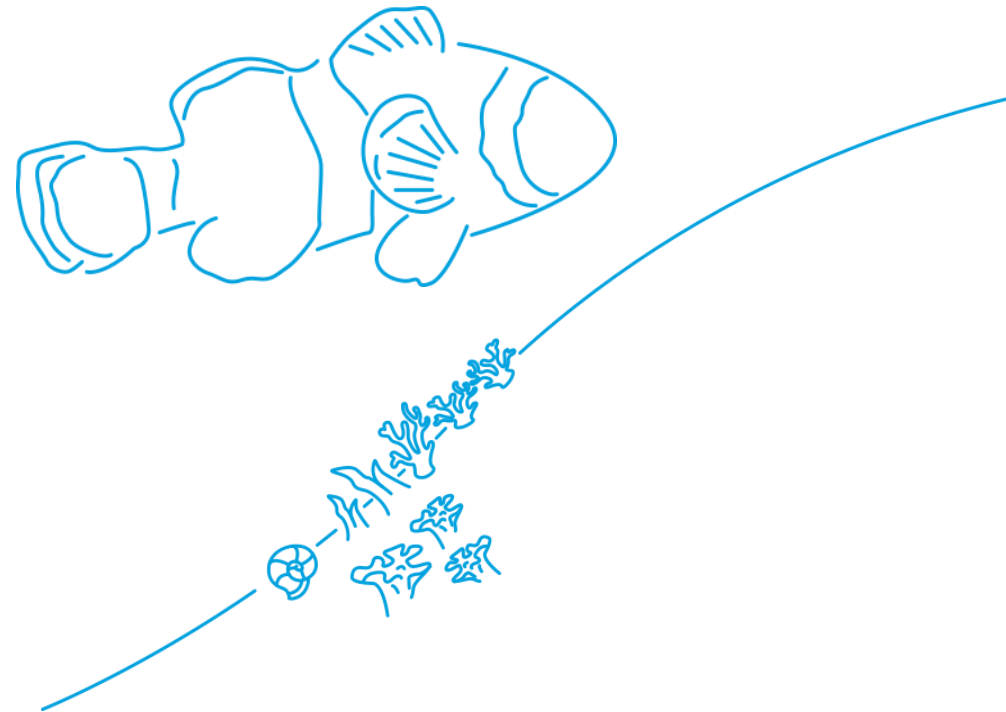
Risk reduction

- A study finds that mangroves significantly reduce annual and catastrophic damages and are a strong first line of defence for coastal communities.
- Florida mangroves prevented **USD1.5bn** in direct flood damages and protected over half a million people during Hurricane Irma in 2017, reducing damages by nearly **25%**.²⁴

Despite being a vulnerable species, mangroves have significant benefits for coastal areas in terms of flood protection and risk reduction.

Seafood sector landscape

- Currently, 50% of fish stocks are thought to be fully exploited and 30% of fish stocks to be overexploited.²⁵
- Seafood consumption continues to exceed population growth and growth in the consumption of all types of meat from terrestrial sources.
- However, the seafood industry is historically underinvested and suffered from significant environmental and social externalities as a result of its development.
- According to the World Bank, fish harvest might increase by 13% and be worth an additional USD85bn annually if they were managed sustainably.²⁶
- As a result, the industry's long-term profitability, stability, and sustainability have been neglected.



Risks and costs in the seafood sector



Operational

- The financial effects of resource degradation related to poor management are already becoming apparent in the form of supply and price fluctuation for companies active in the seafood sector.
- Disease outbreaks in aquaculture have cost the sector more than **USD20bn** over the previous ten years due to unsustainable management of farms, in addition to significant coastal pollution.



Reputational

- Political and media agendas are increasingly focused on **illegality, human rights violations, and seafood fraud**, which poses significant **reputational risks**, particularly for businesses with intricate supply networks.
- For instance, seafood supply chains in 55 nations across 5 continents have been discovered to use **forced labor**. Another study estimated that **20% of seafood has incorrect labels**.²⁷

Risks and costs in the seafood sector



Market

- Due to growing consumer awareness of environmental and social issues, seafood end markets are evolving.
- One indication is the increase in sales of certified seafood, which is now **10x** more popular than conventional seafood and reached **23mn tonnes** in 2016 compared to just **500,000 tonnes** in 2005.²⁸
- Businesses will lose market share if they are unable to provide seafood items that satisfy consumer demands.



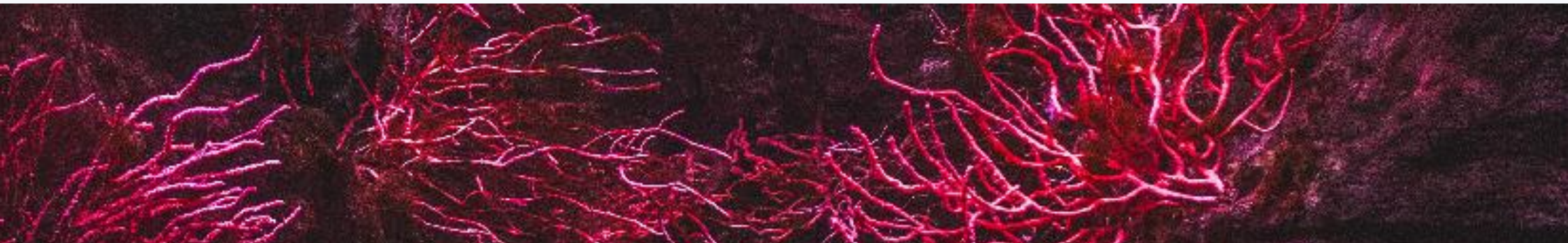
Regulatory

- Governments in major fish-consuming markets are acting in response to growing public outrage over problems with the seafood industry, including **illegality**, **labor**, and **human rights violations**.
- Regulations in the EU and the U.S. are becoming more stringent, and manufacturing or exporting nations are subject to sanctions if they fail to comply with the new regulations.

Definition: The Sustainable Blue Economy

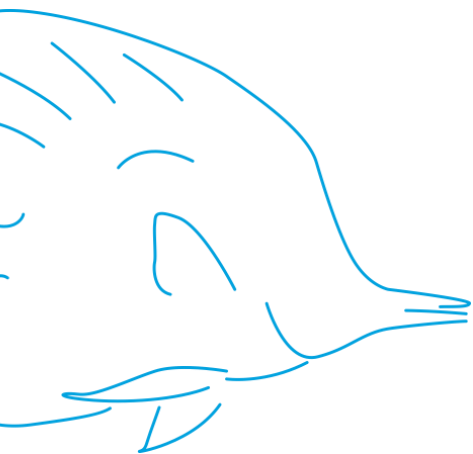
C

There are preconditions for the Sustainable Blue Economy: a transition of current Ocean activities and the inclusion of all stakeholders (particularly the Global South) in the development of new solutions and adaptation strategies.



Definition: Blue Economy

- The sum of the economic activities of Ocean-based industries, together with the assets, goods and services provided by marine ecosystems.
- This would include everything from shipping to coastal real estate to waste management. It includes sectors that are not sustainable in their current state.



Blue Economy sectors include



Tourism



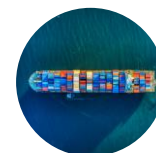
Coastal Protection



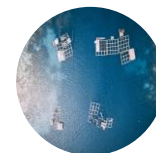
Consumer Goods



Energy & Resources



Shipping & Ports



Aquaculture & Wild catch fishery

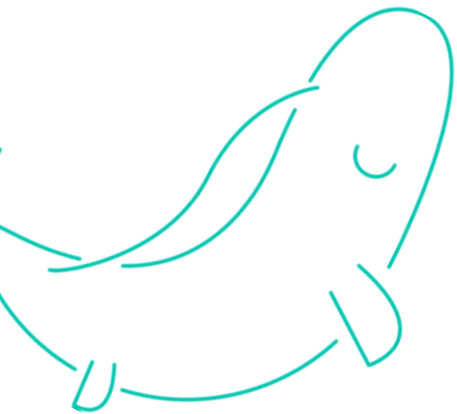
Definition: Blue Economy Transition

- A blue economy transition, where investors are encouraged to support changes in firms' activities and behaviors as they move towards sustainability.
- In order to get to a sustainable blue economy, most businesses will need to reconsider their value chains while some will have to change them completely.
- Sustainable transformation will require both a stable regulatory environment and suitable financing conditions for the sectors.
- This phase entails a gradual reduction of principal adverse impacts on the Ocean and global emissions, moving towards nature positive outcomes, for businesses that are currently not sustainable.



Definition: Sustainable Blue Economy

- A Sustainable Blue Economy provides social and economic benefits for current and future generations; restores, protects and maintains diverse, productive and resilient ecosystems; and is based on clean technologies, renewable energy and circular material flows.
- It represents a subset of the broad Ocean economy with a focus on not harming the Ocean.
- A Sustainable Blue Economy will be an equitable one too, where individuals and Global South economies benefit fairly from Ocean conservation, development and investment.
- This concept takes into account a fair reallocation of costs of externalities created by Ocean use impacts but also a fair distribution of Ocean benefits and resources.





2

Implementing a Sustainable Blue Economy

Knowledge

Ocean processes and value chains, natural capital, definitions and measurement

D

04.1

The natural capital value chain

04.2

Understanding natural capital

04.3

Ocean processes

04.4

Rethinking Ocean value chains

The natural capital value chain

Linear economy

Unsustainable model based on “take – make – waste” which is pushing us towards our planetary boundaries



Take



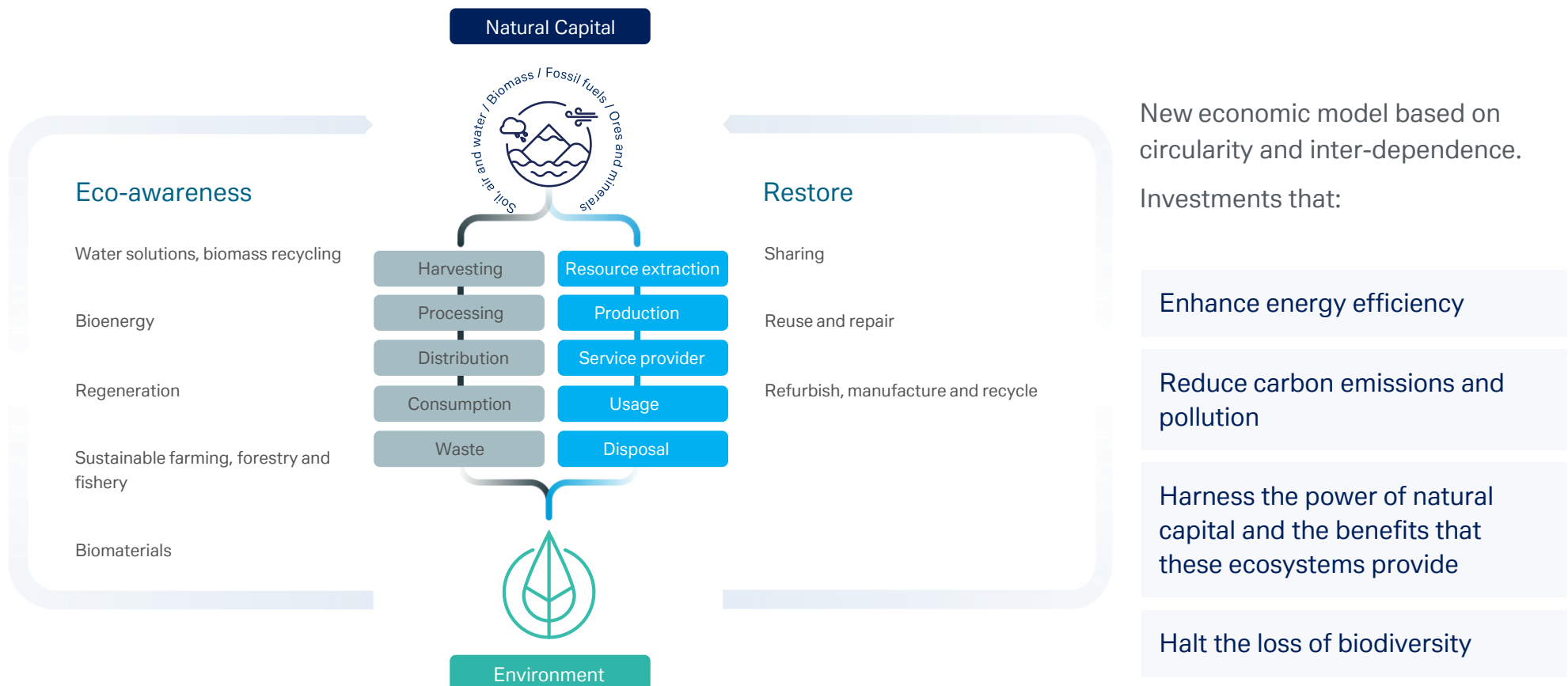
Make



Waste

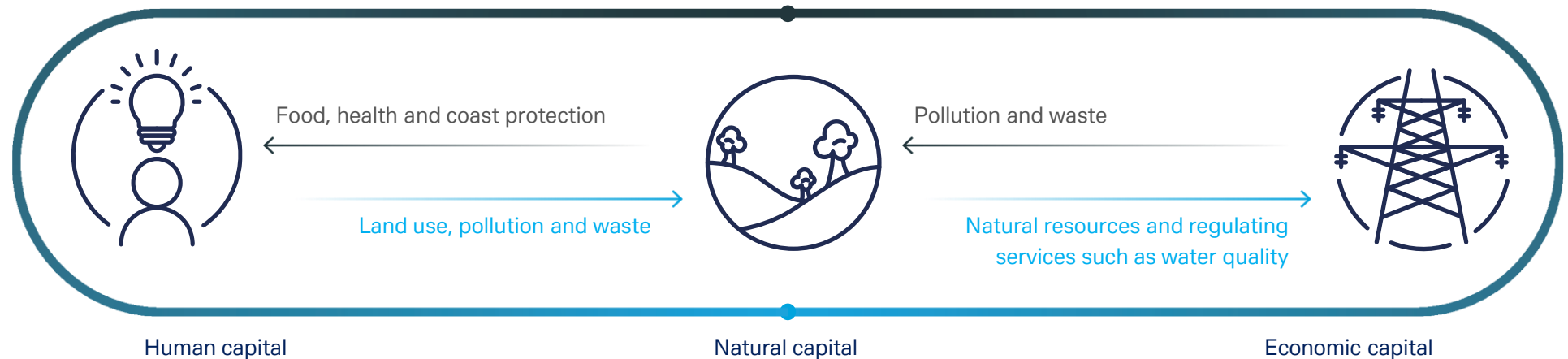
The natural capital value chain

Circular economy



Understanding natural capital

Interaction between the different kinds of capital



Natural capital

It involves understanding natural processes as both assets and inputs in our production.

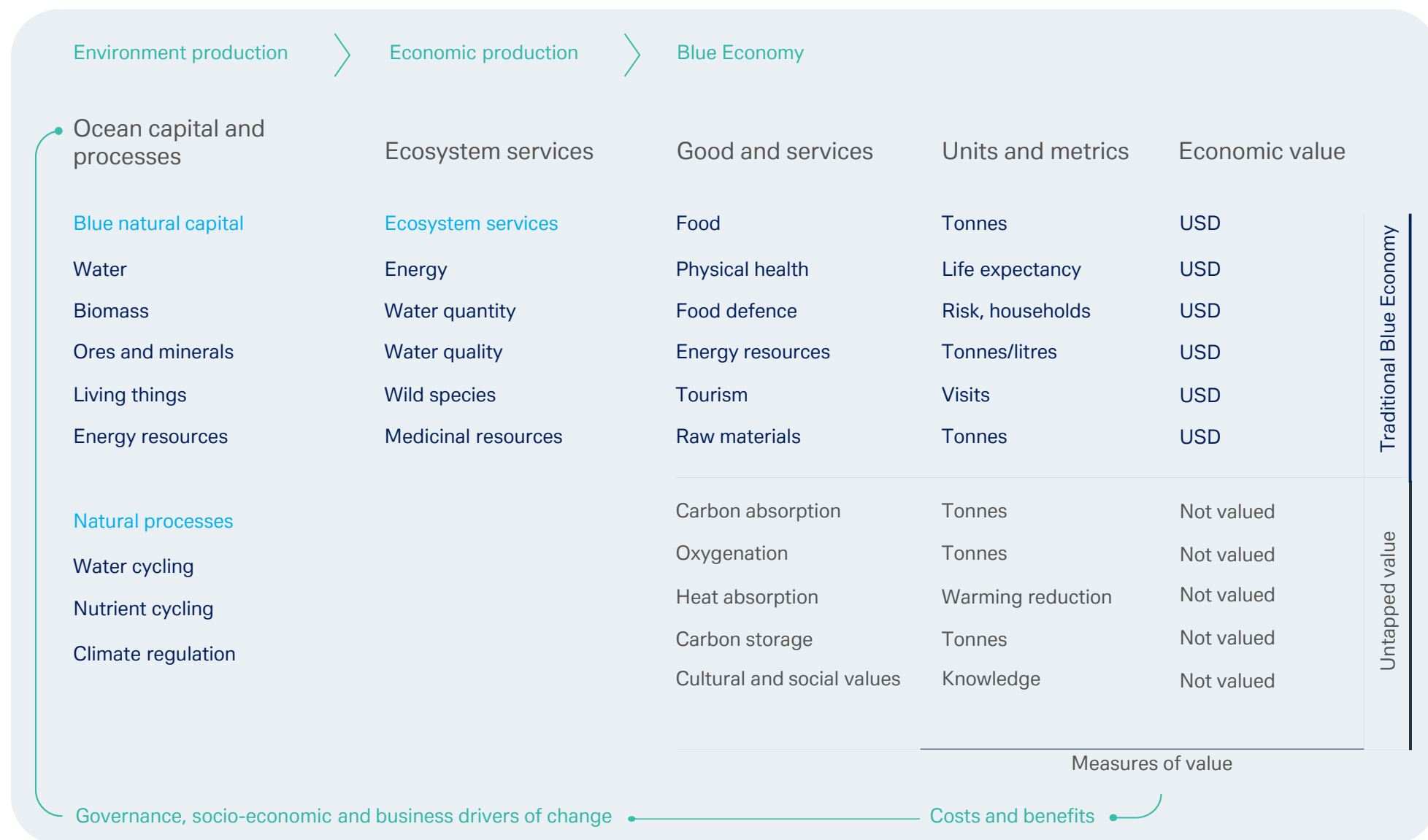
It is generally considered to comprise three principal categories: natural resource stocks, land and ecosystems.

Ecosystem services

Ecosystem services are the multitude of benefits that nature provides to society.

There are four major categories of ecosystem services: provisioning, regulating, cultural and supporting services.

Ocean processes



Rethinking Ocean value chains

We need to think about Sustainable Blue Economy businesses from 3 different angles, closely linked to one another.



Conservation

Making pure conservation an alternative



Innovation

Improving current value chains



Development

Disrupting the status quo completely

Rethinking Ocean value Conservation



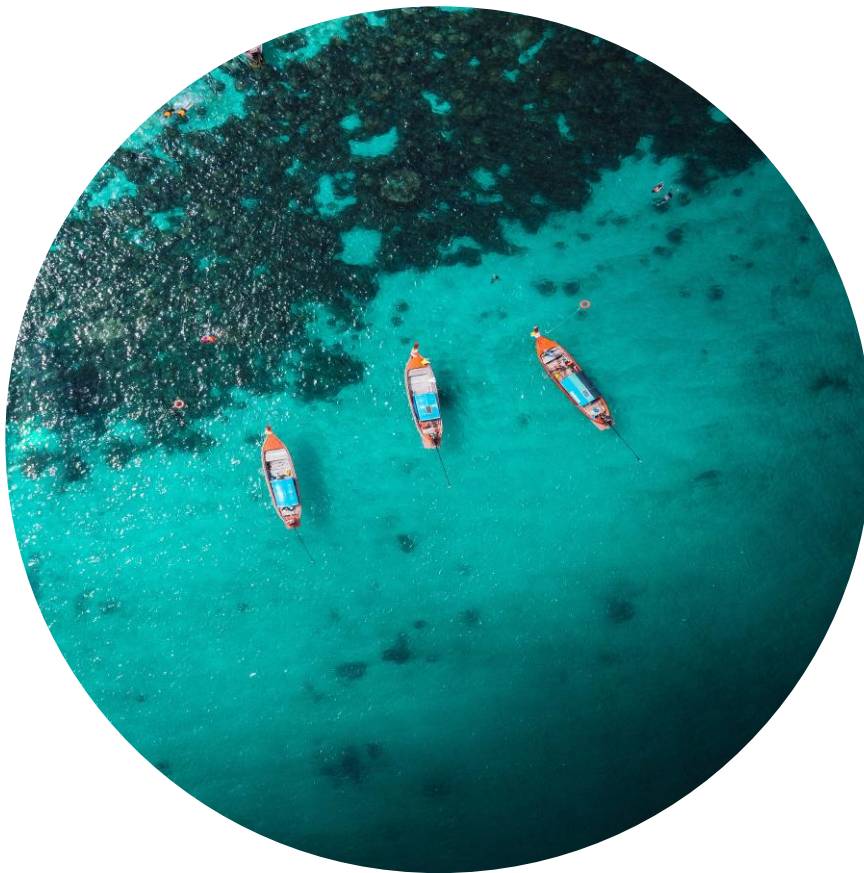
Grey Infrastructure

VS

Nature based solutions

- The concept of Natural capital highlights the importance of conserving the stock of natural assets and the consequent social and environmental benefits.
- Monetizing ecosystems services provided by nature and biodiversity (such as carbon absorption or increase in fish stocks for fisheries) would add the currently missing economic dimension.
- Pure conservation has to become an economic alternative in itself, i.e. it should be considered as a standalone sector.

Rethinking Ocean value Innovation



Aquaculture / Wild catch fishery

VS

Sustainable fishing and aquaculture

- Most Ocean businesses strongly rely directly on natural resources, like fishing and tourism.
- Across the whole spectrum of Ocean activities, sustainability efforts should be driven by limiting impact (for ex. ships' emission reduction technologies), fostering environmental resilience (for ex. sustainable aquaculture) and encourage climate and nature positive outcomes.
- Adapting current value chains is innovation.

Rethinking Ocean value Development



Energy Resources

VS

Renewable Energy

- Certain sectors require a complete redefinition of value chain to be considered sustainable, with the emergence of new sectors in place of established ones.
- A case in point is the Energy sector, where sustainability implies moving away from oil and gas to renewables like tidal energy.
- Community resilience or lab based fish production are other examples of technologies and strategies that could have substantial impact.

Agreement

Global and regional targets,
supply chain improvement, blue
economy metrics

05

05.1

A complex global framework

05.2

Existing global agreements on Ocean
biodiversity

05.3

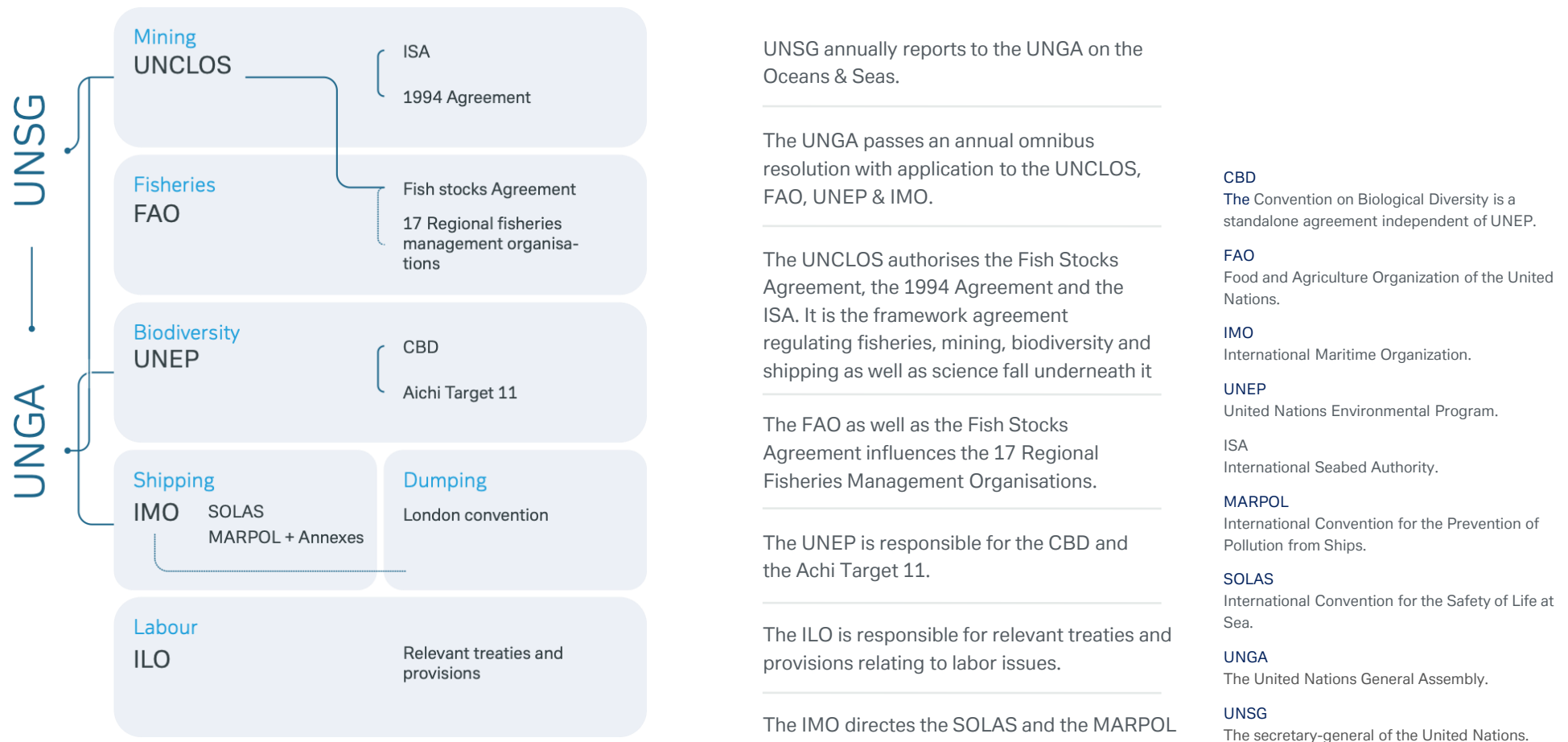
Establishing blue economy metrics

05.4

Reconsidering supply chain processes

A complex global framework

As seen in the graph below, there are various governing groups and institutions with objectives and ambitions established for navigating the blue acceleration. Ocean governance requires a paradigm change from a state-centric to a global approach that recognises the Ocean's and related players' embeddedness in the larger planetary system.



Source: GOC, Deutsche Bank AG. Data as of July, 2022.

Establishing blue economy metrics

One of the primary issues confronting the marine economy is the measurement and accessibility of data. Over 80% of our Ocean, according to NOAA, has not been mapped, observed, or otherwise studied.³⁰



Marine Spatial Planning

- Mapping marine areas is one of the most crucial considerations in making decisions to advance the Sustainable Blue Economy.
- In order to fulfil environmental, economic, and social goals—usually determined through a political process—the MSP is a public procedure for assessing and disseminating the spatial and temporal distribution of human activities in marine areas.



Reporting and Disclosure

- A noteworthy concern is that ocean-specific assessments are frequently missing from defined standards and data on ESG-related issues.
- The great majority of stakeholders and relevant parties do not provide valid information and statistics regarding adherence to environmental or social norms.

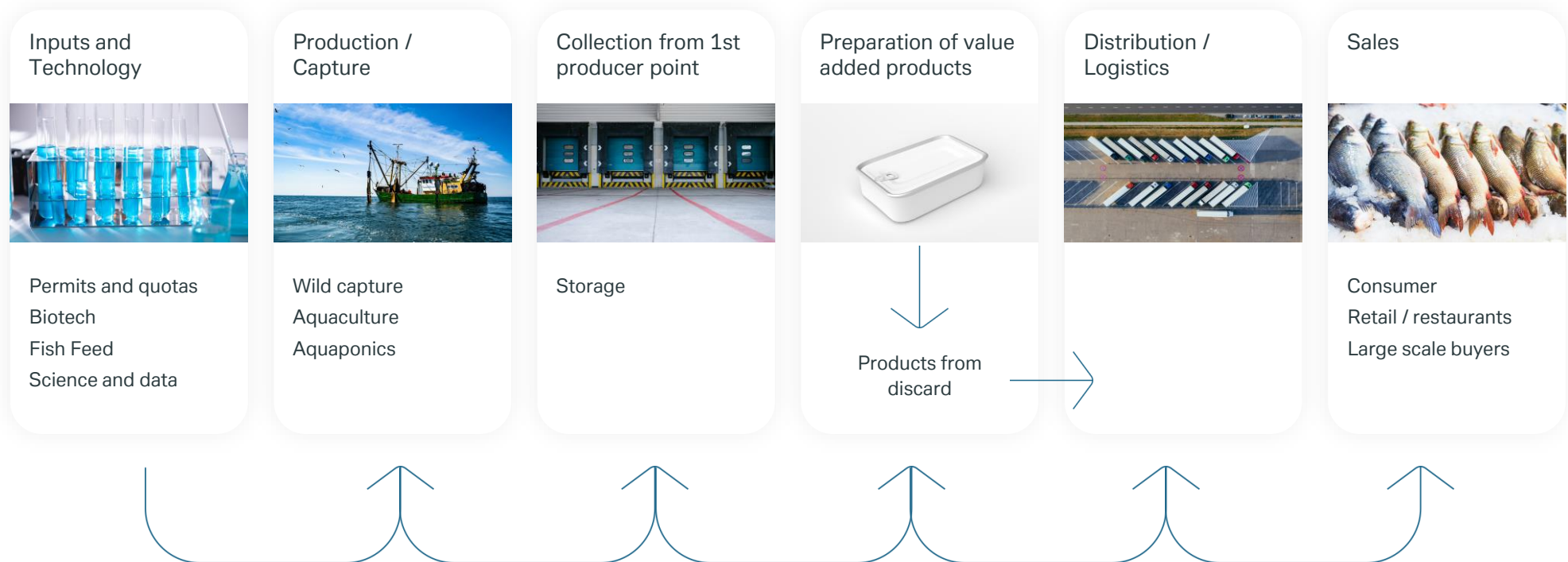


ESG and Impact Data

- Impact assessment necessitates taking the full value chain into account. Second order effects and complex linkages must be considered in this evaluation.
- A significant issue is that analyses particular to the Ocean are typically absent from the established criteria and data on ESG-related aspects.

Improving supply chain processes

The seafood products example



Improving supply chain processes

Sustainable practises examples



Implementing best practice

- Best practices should be established and supported at the supply chain's foundation. This can involve implementing enhancement initiatives and certification requirements that will reduce significant production risks.



Full-chain digital traceability

- Move to full-chain digital traceability to unlock quick and easy access to supply chain data to monitor compliance, reinforce management standards, and credibly prove sourcing claims in order to satisfy market demands.



Long-term contracts

- In order to minimize prices, strengthen the security of the supply of sustainable seafood, and support producers during the transition, long-term contracts should be introduced with suppliers and producers.

Investment

Status Quo, financing possibilities, needs and opportunities, ecosystem services, why we need to invest

06

06.1

Status Quo

06.2

Financing possibilities

06.3

Needs and opportunities

06.4

Ecosystem services

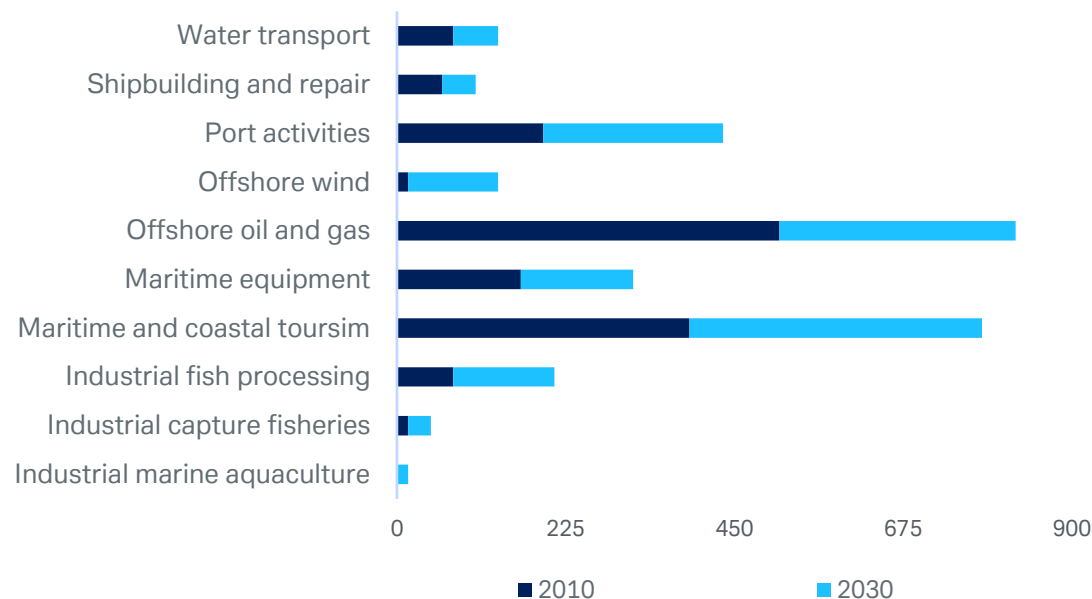
06.5

Why we need to invest

Status Quo limited progress so far

Investments to protect blue natural capital and to build resilience in vulnerable communities are small - despite the interconnectedness between a stable climate, a biodiversity-rich and healthy Ocean, and a resilient future.

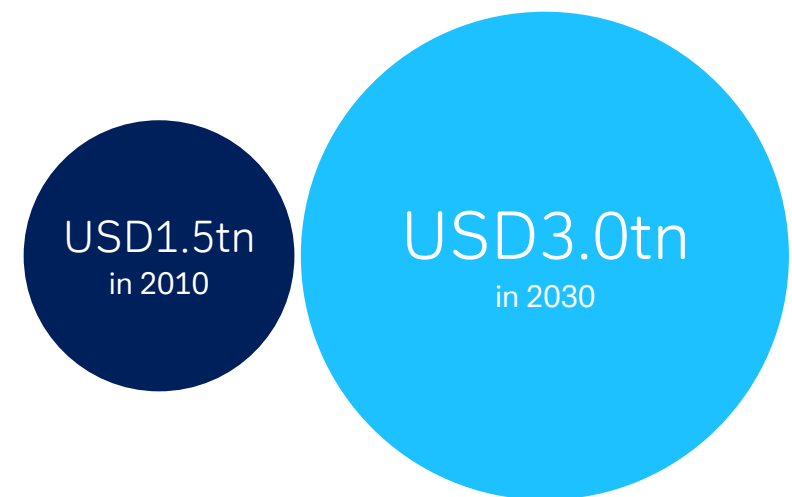
USD billion



Failures in other areas of development in the past should not be repeated in the future. Individual industries can indeed have a positive effect in the short term, but can cause serious damage to the blue economy.

Only 3-8% of climate finance is finding its way into nature, and by 2030, the total biodiversity financing gap could reach **USD600-800bn** per annum.³¹

The financing gap is even more pronounced for the Ocean. Less than **USD13bn** has been invested in sustainable projects, with minimal private sector financing.³²



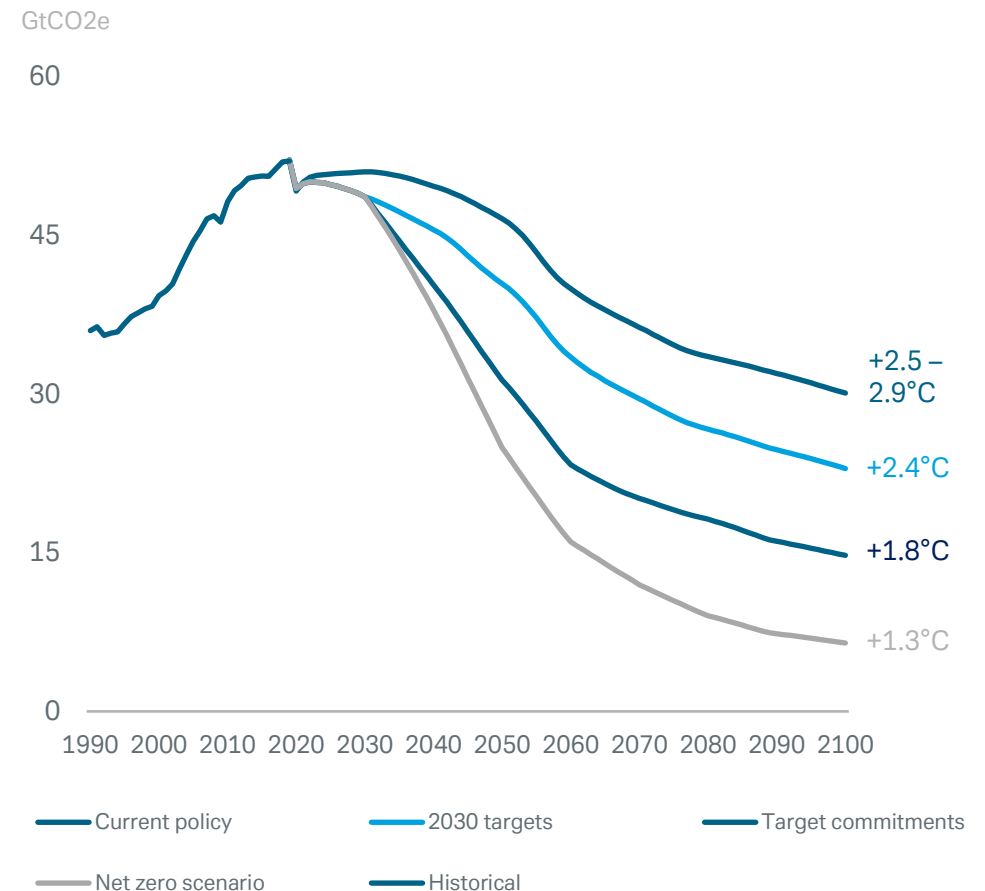
Source: Niehörster and Murnane (2018), Economist Intelligence Unit, Deutsche Bank AG. Data as of July 2022.

Financing possibilities

Blue Carbon Market

- Many businesses are using market-based strategies, particularly carbon credits, to lower their GHG emissions.
- According to 2021 McKinsey research, overall demand for carbon credits (hence including blue carbon) is anticipated to multiply 15-fold by 2030, increasing the market's worth to **USD50bn**.³¹
- There are now just four significant GHG crediting schemes that, following a stringent verification process, can grant carbon credits.
- Blue carbon credits can offer a market-based solution to climate change, but corporate investments must go beyond this technology to achieve net zero commitments.

Global Carbon Emission Output



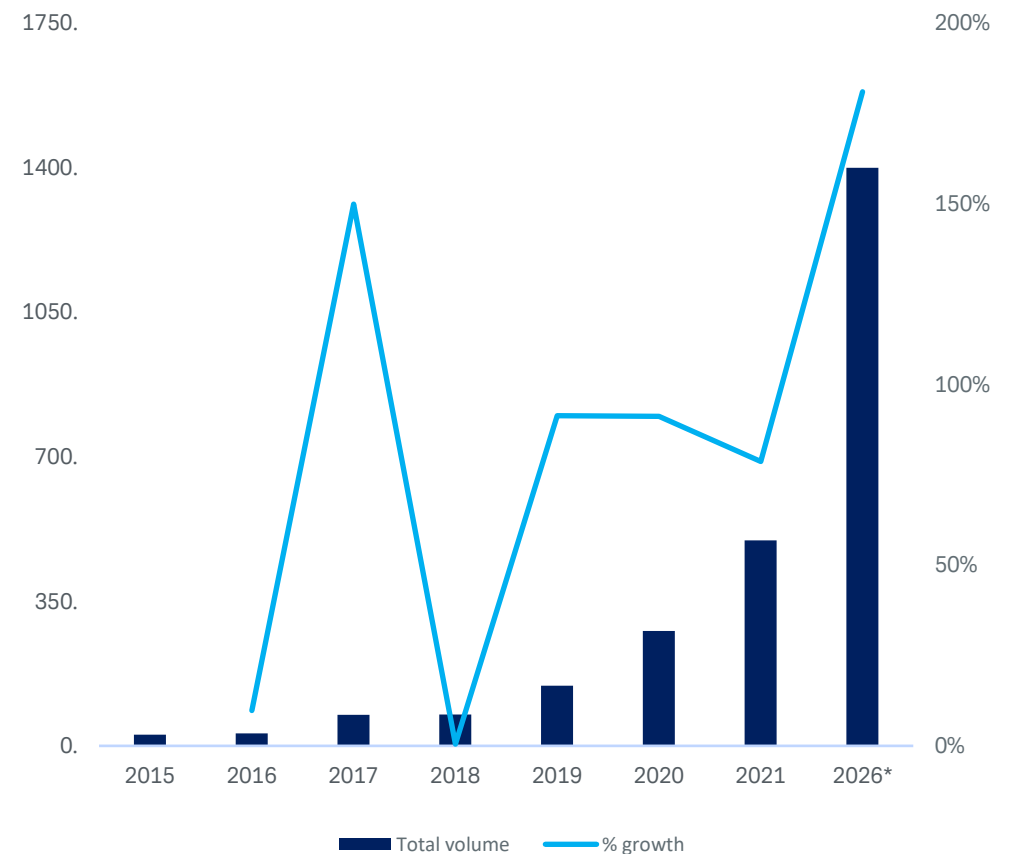
Source: Climate Analytics and New Climate Institute, Deutsche Bank AG. Data as of November 2021.

Financing possibilities

Fixed Income Market

- So-called "**Sustainable Bonds**" are a unique investment option that encourages large-scale financial flows towards a sustainable economy.
- Recently, **Blue Bonds** have become popular in this setting. Governments, development banks, and even private corporations can issue blue bonds, a subset of sustainability-linked bonds, to attract funds from private investors for marine and Ocean projects that benefit the environment, the economy, and the climate.
- Although the absence of uniform labels may cause confusion, the new sustainable bonds are demonstrating a significant beneficial development.

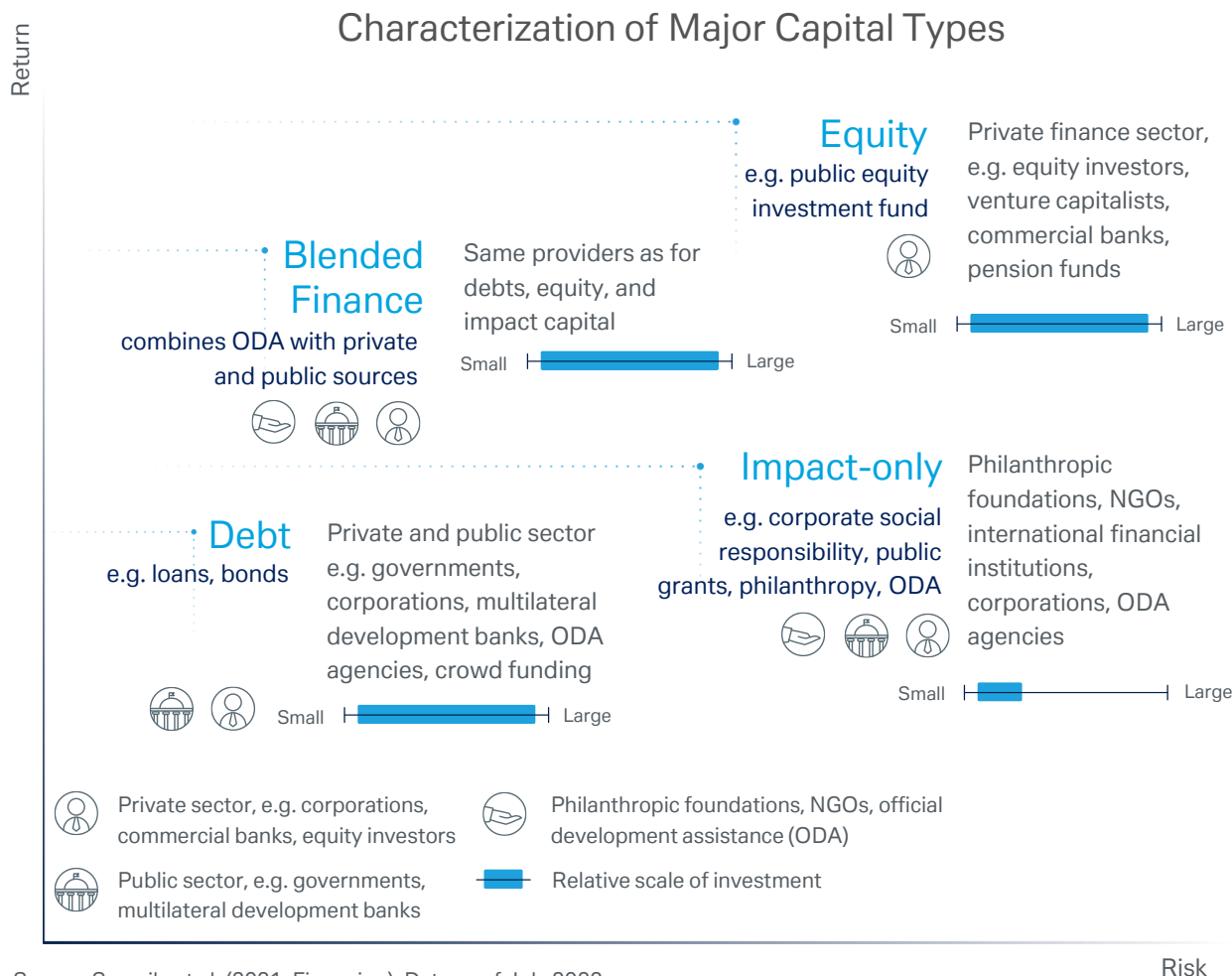
European Sustainable Bonds new issuance volume
In EURbn



Source: PwC Market Research Center, Eikon, Deutsche Bank AG. Data as of May 2022.

Financing possibilities

Equity market



- There are very few products that explicitly address the Sustainable Blue Economy.
- Actively managed equities funds and ETFs are among the accessible options for investors. The majority of them were introduced between 2020 and 2021, and some already manage between **USD300mn** and **USD600mn**.³³
- The Blue Economy sector's investment potential is still in its infancy. Despite a nearly unexplored investment theme, the early success of the first endeavours indicates that investor demand is very high.

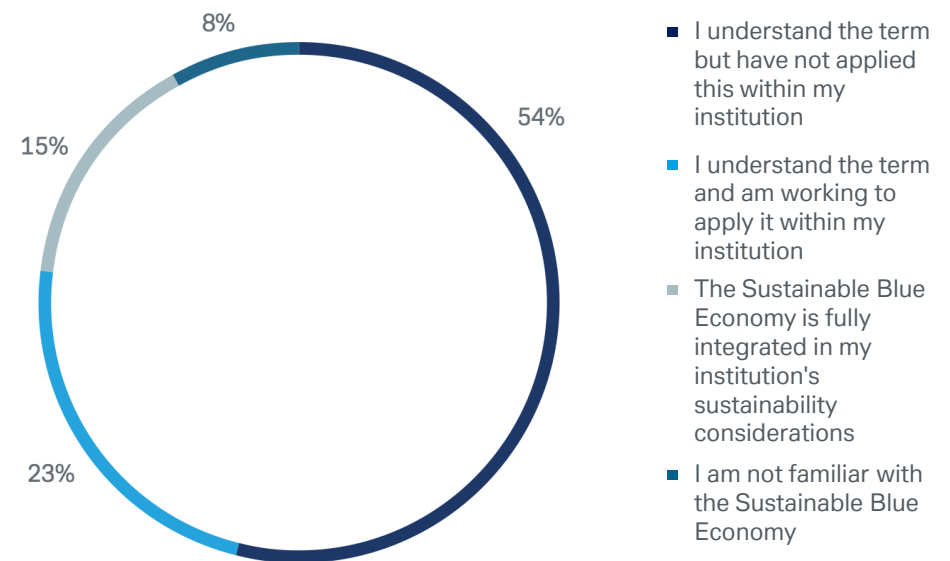
Source: Sumaila et al. (2021, Financing). Data as of July 2022.

Risk

Financing possibilities (1/2)

- The Sustainable Blue Economy investment universe within the liquid stock market is still extremely limited.
- It is currently hard to ascertain and quantify the actual contribution and influence of corporate economic activity on the maritime economy and Ocean. Furthermore, companies with a relationship to the Blue Economy only in tiny sub-segments of their service or product range are considered within this thematic investment landscape.
- While, as shown below, Blue Economy companies within the Euronext have been linked to a better financial performance relative to the broad market, developments like the EU Taxonomy will be necessary to set the guardrails for the investment universe. As we have Blue bonds, this could bring to the creation of “Blue equities”.

Familiarity with the Sustainable Blue Economy



Source: UN Environment Programme Finance Initiative (UNEP FI) Survey of Financial Professionals, Deutsche Bank AG. Data as of September 2022.

Financing possibilities (2/2)

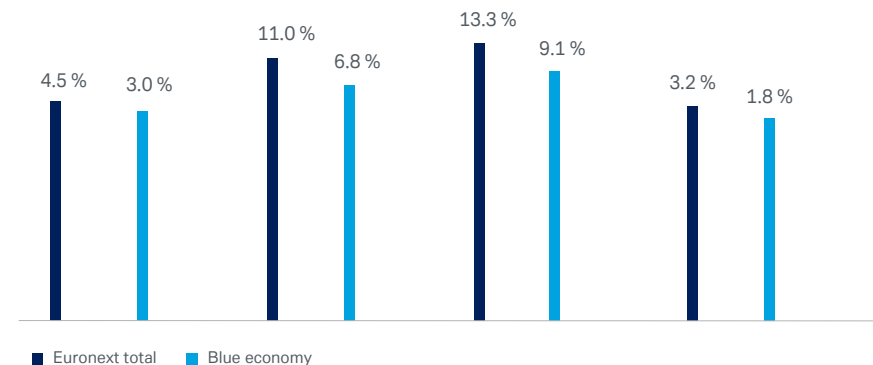
Regardless of their sustainability performance, there are 162 firms listed on Euronext markets in industries associated to the Blue Economy, i.e. that have a direct influence or reliance on oceans and water.

These firms have a market value of more than EUR675 billion, total sales of more than EUR840bn, and employ more than 1.4 million people.

Since 2015, there has been a 30% increase in the Blue Economy firms have been listed on Euronext marketplaces, a sum of 35 new companies. To put this sector into perspective, the Blue Economy's market capitalization on Euronext is just above the GDP of Belgium and close to the GDP of the Netherlands.

In the past years there has been improvement in sustainability reporting for large companies, with the number of companies disclosing sustainability indicators more than tripling from 2015 to 2019.

2015-2019 Compound Annual Growth Rate (CAGR)



Economic indicators for Blue Economy businesses are robust, and have grown significantly relative to the total economy. Over the period from 2015 to 2019, these companies saw:

- Growth in revenue at an annual growth rate of 4.5 %
- Growth in EBITDA at 11.3 %
- Growth in employment at 3.2 %

Source: Bloomberg; Euronext; Companies' Websites; Deutsche Bank AG. Data as of August 2022

Needs and opportunities regarding Ocean services (1/5)



Ocean services



Growth drivers

Source: Niehörster and Murnane (2018), Economist Intelligence Unit, Deutsche Bank AG. Data as of July 2022.

Needs and opportunities regarding Ocean services (2/5)

Main areas

Sustainable seafood

- Sustainable Fisheries.
- Sustainable Aquaculture/Mariculture.
- Seafood Processing.
- Marine biotechnology/alternatives to fish protein.

Ocean conservation

- Marine flora & fauna (coral reefs, mangroves).
- Marine Protected Areas.
- Marine spatial planning.
- Blue Carbon (carbon sequestration/storage).
- Ecotourism.
- Biodiversity and resilience credits.

Sustainable infrastructure

- Waste-water prevention and treatment.
- Sustainable Port Infrastructures.
- Maritime Traffic support and Advisory Systems.
- Maritime safety and surveillance.
- Coastal defence (seawalls).

Renewable Energy

- Offshore Wind.
- Tidal & Wave Energy.
- Sea Water Air Conditioning (SWAC).
- Ocean Thermal Energy Conversion (OTEC).
- Salinity Gradient.
- Floating solar.

Blue tech and circular economy

- Sustainable Vessels (decarbonisation, biofuels, ship repair and recycling).
- Chemical and plastic pollution prevention.
- Marine biotechnology.
- Hi-tech marine products and services.
- Green hydrogen.

Needs and opportunities regarding Ocean services (3/5)

Opportunities



- 20% growth of global fish demand by 2030 (30 million additional tons of fish per year).³⁴
- 7–20% growth per year of aquaculture economy.³⁵
- 80% of goods exchanged globally by shipping.³⁵
- For maritime shipping there is no known system-wide solution expected to halve emissions by 2050.
- Blue Biotech globally significant economic growth sector and viewed as one of the main pillars of bioeconomy.
- USD400bn–950bn socio-economic benefit of MPA regeneration.³⁵
- Market for carbon credits could be worth upward of USD50bn in 2030.³⁵
- Global Ocean-based electricity generation is still only 0.3%.³⁵
- 15x increase of global Offshore wind capacity to 2040, with floating overtaking fixed.³⁵



Needs and opportunities regarding Ocean services (4/5)

Blue Natural Capital is the natural capital found in coastal and marine environments. It provides ecosystem services that yield a flow of benefits to people and sustain life on earth.

More than **50% of global GDP**, USD44tn of economic value, depends on natural resources.³⁶

Ecosystem services have been estimated to be worth more than **one and half times global GDP**.³⁷



Source: Deutsche Bank AG. Data as of January 2022.

Needs and opportunities regarding Ocean services (5/5)

Coastal Blue Natural Capital



Source: Deutsche Bank AG. Data as of January 2022.

Ecosystem services Challenges (1/2)

The absence of future payment streams for ecosystem services with potential cash flows is one of the greatest hurdles to a Sustainable Blue Economy



- Future payment stream rights must be distilled based on research, verification, and regulation.
- Nature-based models need awareness, patient funding, a lot of testing, and technical assistance to develop and scale.
- Design a transactional framework.



For marine conservation specifically, it has been estimated that for every USD 1 invested in rebuilding marine life, around USD 10 are generated in economic return.³⁸

Ecosystem services Challenges (2/2)

The absence of future payment streams for ecosystem services with Potential Cash Flows is one of the greatest hurdles to a Sustainable Blue Economy



The investment case for ecosystem services

- The preservation and expansion of natural capital can become a shared objective and an investment opportunity for enterprises with the appropriate valuation and protection of ecosystem services.
- This would be accomplished by realizing the full value of the ecosystem products and services of natural assets through commercial transactions (in a way that does not harm the underlying stock) and channeling this revenue back to companies that are the custodians of these natural assets/have contributed to net positive environmental outcome.
- There has not been much investment flow into this field thus far. Nature-based models are not widely used due to a complicated web of information asymmetries and high transactions costs.

Ecosystem services Solution approach (1/2)



Asset ownership and fragmentation

- NbS frequently occur over large land and seascapes, spanning international borders.
- This makes their research and verification expensive, time-consuming, and perhaps dangerous.

“GDP does not include the depreciation of assets, for example, the degradation of the natural environment. We should remember that the ‘G’ in GDP stands for gross output of final goods and services, not output net of depreciation of assets.”

Sir Partha Dasgupta



Blue carbon focus and limitations

- Only a very small portion of natural assets' potential to store carbon has currently been given a value.
- Additional natural resources like tidal marshes and seagrass beds could be taken into consideration.
- To make ecosystem preservation truly sustainable, a wider range of ecosystem services must be recognised.

Monetisation of Ecosystem services does equal monetisation of Nature and natural assets. Potential cash streams would be extracted from the flow of services and not ownership of the underlying asset.

Ecosystem services Solution approach (2/2)



Standards and methodologies

- Landscape of project-specific validation procedures is difficult and expensive.
- Investors find it challenging to comprehend the impact and return standards in the blue sector, particularly the applicability of projects to their net-zero or ESG commitments.

“GDP does not include the depreciation of assets, for example, the degradation of the natural environment. We should remember that the ‘G’ in GDP stands for gross output of final goods and services, not output net of depreciation of assets.”

Sir Partha Dasgupta



Cost and availability of data

- Monitoring the preservation of natural capital requires laborious and time-consuming data collecting across a variety of metrics.
- Utilising remote sensors and data science can significantly improve project transparency, project integrity, and project accountability.

Monetisation of Ecosystem services does equal monetisation of Nature and natural assets. Potential cash streams would be extracted from the flow of services and not ownership of the underlying asset.

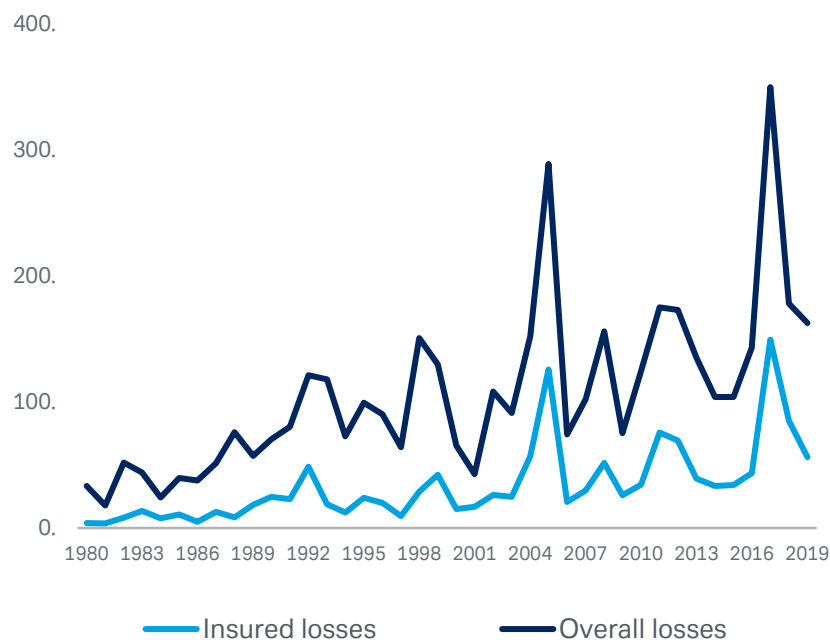
Why we need to invest

Rising risk of stranded Ocean assets (1/2)

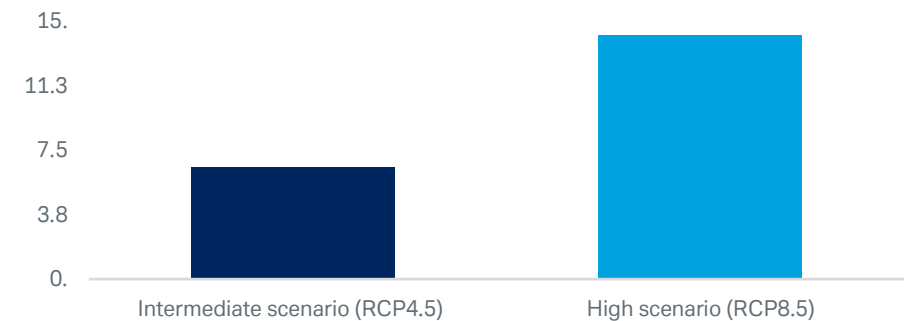
Ocean degradation is reflected in rising risks of stranded assets (due to for example increased extreme weather events or rising sea level) and disrupted fundamental economic activities (like the fishing industry due to overexploitation)

Rising costs from weather disasters

losses (inflation-adjusted, USDbn)



GDP loss due to rising sea level in different scenarios



Socioeconomic impact of rising sea levels:

- Expected economic cost of **USD14.2tn** in lost or stranded assets by end of the century³⁹
- **2 billion** people at risk to become refugees by 2100⁴⁰

Source: Munich Re, WWF, Deutsche Bank AG. Data as of September 2021.

Source: Hinkel et al. (2020). Projections of global-scale extreme sea levels and resulting episodic coastal flooding over the 21st Century. Nature Scientific Reports 10:11629. Deutsche Bank AG.

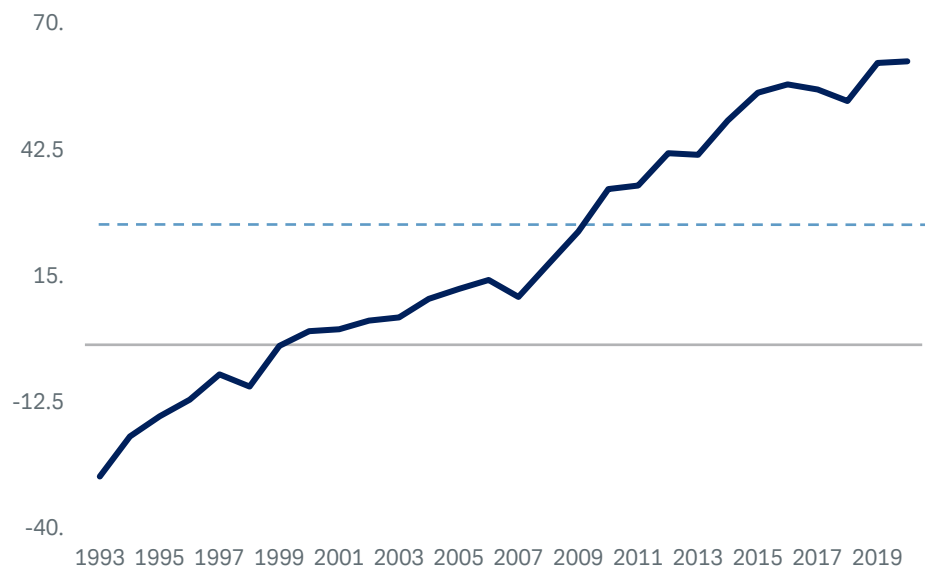
Why we need to invest

Rising risk of stranded Ocean assets (2/2)

Ocean degradation is reflected in rising risks of stranded assets (due to increased extreme weather events or rising sea level) and disrupted fundamental economic activities (like the fishing industry due to overexploitation)

Rising sea levels and economic damage

Change in sea level (mm) compared to the 1993-2008 average



The largest impact for sea level rise is due to melting.

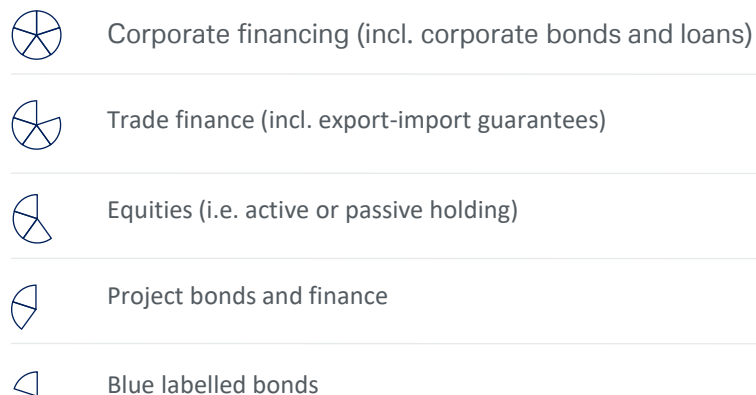
Rising atmosphere and Ocean temperatures have caused average sea levels to increase more than 21cm since the start of the 20th century.³⁹

Source: SNOAA, OECD, Deutsche Bank AG. Data as of August 2021.

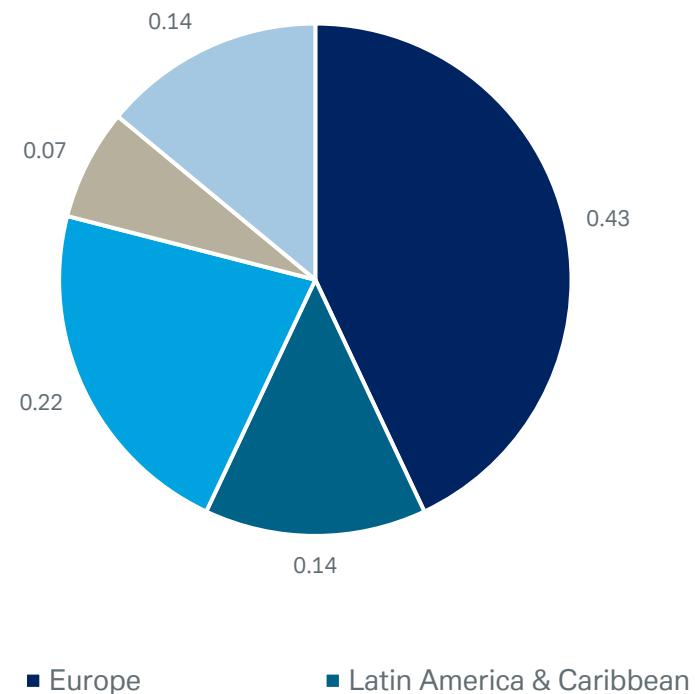
Why we need to invest

Valuable lessons from renewable energy (1/2)

Top 5 financial instruments



Marine renewable energy financing



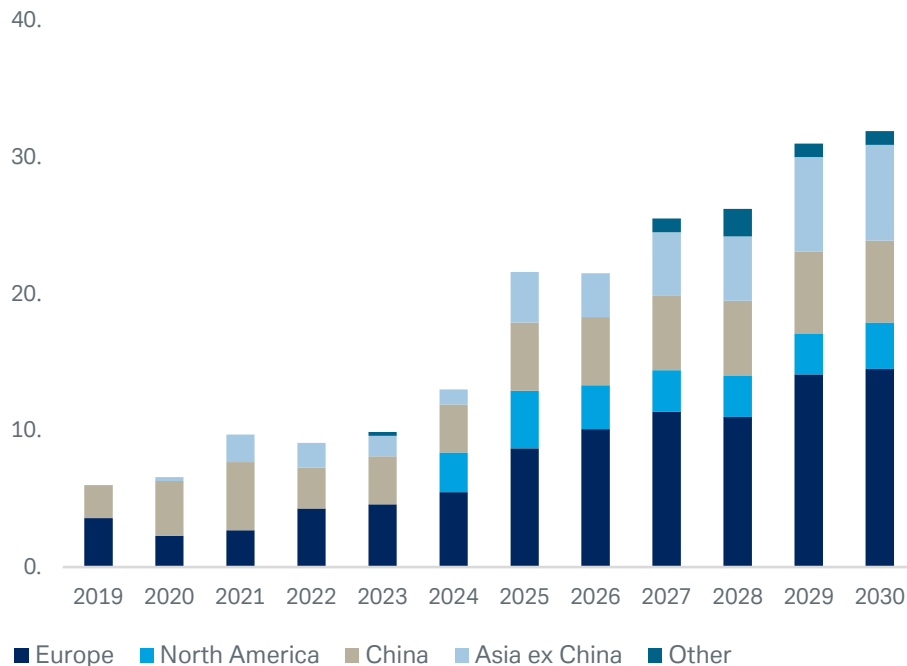
Source: UNEP FI, GWEC Market Intelligence, Deutsche Bank AG. Data as of September 2022.

Why we need to invest

Valuable lessons from renewable energy (2/2)

Global offshore wind growth

Net installations in GW



The average annual growth rate (CAGR) is **18.6%** until 2024 and **8.2%** to 2030

New annual installations will exceed the milestones of 20 GW in 2025 and **30 GW** in 2030

Offshore wind will contribute for around **20%** of total wind installations by 2025

Source: UNEP FI, GWEC Market Intelligence, Deutsche Bank AG. Data as of September 2022.

Key takeaways

1

The Ocean provides key ecosystem services that are crucial for human wellbeing and the prosperity of the global economy. Ocean degradation and approaching tipping points are a clear example of market failure.

3

For the Sustainable Blue Economy to prosper, several enabling conditions are necessary. A cooperative and dynamic legal and regulatory framework is a first step. Establishing blue economy metrics – measurement and availability of data are one of the biggest challenges facing the marine economy.

2

A circular economy is based on investments that reduce carbon emissions and pollution, enhance energy efficiency, harness the power of natural capital and the benefits that these ecosystems provide, and halt the loss of biodiversity.

4

Blue Economy companies show healthy economic indicators and significant growth compared to the overall economy. While climate change and Ocean degradation clearly represent a threat for our economies and society, the transition towards a more sustainable world brings about significant economic opportunities.



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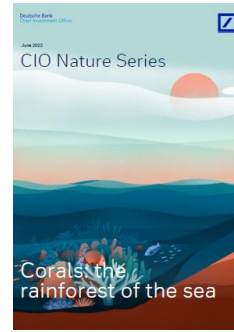
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In January 2019 Markus Müller published his first book under the title „Neo-Ordoliberalismus – Zukunftsmodell für die Soziale Marktwirtschaft“ at Springer-Gabler. His recent book he published in May 2021 under the title "Deutschland und China zwischen Kooperation und Konkurrenz".

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