BLUE INVEST

INVESTOR REPORT
UNLOCKING THE POTENTIAL OF THE BLUE ECONOMY

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#BlueInvest

Table of contents

Introduction

The Blue Economy, also known as the ocean economy, refers to the sustainable use and conservation of aquatic resources in both marine and freshwater environments.

It acknowledges the vast potential of marine and coastal ecosystems while underlining the need for their preservation and sustainable management. In terms of economic and environmental benefits, coastal populations globally contribute approximately to €1.5 trillion annually, with projections indicating an increase to €3 trillion by 2030.[1] The Blue Economy is predicted to outperform the global economy in the near future.[2]

The European Union (EU) Blue Economy generated a total turnover of €523 billion in 2020. It provides at least 4.5 million direct jobs and countless more indirect and sub-contracted forms of employment, many in regions where there are few alternatives.[3] However, the definition of the Blue Economy in statistical classifications often includes activities such as oil and gas extraction.

The Blue Economy has an enormous economic and transformational potential and significance for EU global competitiveness given the breadth of the sectors it covers,[4] the number of companies and jobs it supports, and the depth of its value chains.

Europe has strong capabilities in ocean technologies, which need to be preserved and reinforced. Keeping investing Continuous investment in ocean innovation and related EU capabilities is crucial to achieving EU Green Deal targets and maintaining European leadership and its competitiveness. Given the rapidly advancing use of autonomous platforms in security applications, the Blue Economy has also important implications for EU's security and strategic autonomy.

This evolving context frames the EU policymakers' perspective on the role of a sustainable Blue Economy as part of the EU Green Deal. Since May 2021,[5] the European Commission has adopted an approach to ensure a coherent agenda for the sector to transition from 'blue growth' to a sustainable Blue Economy, replacing expansion with clean, climate-proof and sustainable activities and fostering synergies between related initiatives.

The EU's commitment to supporting the Blue Economy is further demonstrated by the growing funding for this area. For instance, in its latest report, the EIB Group announced that its financing for the Blue Economy in 2018-2022 totalled €6.7 billion.[6]

BlueInvest, the initiative authoring this report, operates within this context. A flagship programme of the European Commission, its mandate is to boost investment and innovation in sustainable technologies for the Blue Economy. The BlueInvest platform supports investment readiness and access to finance for maritime and ocean start-ups, small and medium-sized enterprises (SMEs) and scale-ups, while simultaneously building capacities and promoting opportunities to investors. It is enabled by the European Maritime, Fisheries and Aquaculture Fund and driven by the Directorate General of Maritime Affairs and Fisheries (DG MARE) and the European Climate Infrastructure and Environment Executive Agency (CINEA).

Objective

This report is an update that complements the first edition of the BlueInvest Investor Report[7] released in 2023, which aimed to provide investors with market knowledge on the EU Blue Economy to support their investment decisions and targeted those actively engaged or interested in new prospects. The previous report offered a first complete understanding of the contours of the EU Blue Economy by providing an overview of the financial flows linked to the EU Blue Economy, and by displaying the results of a survey that was sent to investors asking them about their appetite and challenges regarding Blue Economy investments. Now, in the BlueInvest Report 2024, we delve into the Blue Economy's sectors, unravelling an in-depth analysis of the deals' landscape for each sector separately. We also offer an update on the financial landscape and on the key technologies that may shape the EU Blue Economy in the coming years. For optimal understanding and context, we recommend that both reports be read in tandem.[8]

The report features a market study of the same 10 BlueInvest priority sectors as in the first report. In addition, this report includes:

- an analysis of Blue Economy deals to identify sectors that currently receive attention from investors and those that are lagging;
- an update on key technologies shaping the Blue Economy, highlighting success stories as use cases; and
- additional information identified by BlueInvest investors as intelligence that would add value to their investment decision-making process.

1. Data source: United Nations. Department of Economic and Social Affairs and OCSE, 2016.
2. Cf. OECD, The Ocean Economy in 2030 (the report is from 2016 but an update is forthcoming)
3. The EU Blue Economy Report 2023. https://op.europa.eu/en/publication-detail/-/publication/9a345396-f9e9-11ed-a05c-01aa75ed71a1_
4. Fisheries and Aquaculture, Blue Renewable Energy, Blue Biotechnology, Blue Tech and Ocean Observation. Shipbuilding & Refit, Shipping & Ports, Coastal and Environmental Protection and Regeneration, Water Management and Coastal and Maritime Tourism.
5. https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/european-commission-adopts-new-communication-sustainable-blue-economy-2021-05-17_en
6. Source: Clean oceans and the Blue Economy Overview 2023, EIB
7. Investor Report: an ocean of opportunities, European COmmision available at: https://oceans-and-fisheries.ec.europa.eu/system/files/2023-03/Blueinvest-Investor-report-An-ocean-of-opportunities_0.pdf_
8. https://oceans-and-fisheries.ec.europa.eu/document/download/89b43a99-68e3-411c-9cab-6b656392e4c2_en

Figure 1. Overview of the report

Chapter 1

A brief update on how the financial landscape has changed, highlighting the diversification of financial vehicles linked to the Blue Economy.

Chapter 2

An in-depth analysis of deals activity in Europe for 10 priority sectors (see below), including their development over time and their distribution across countries and investment stages.

Chapter 3

An update on the key innovations for the sectors for which major changes were observed, with examples of success stories from the 10 sectors.

Annex

This provides the methodological note for the analysis presented in Chapter 2.

BlueInvest priority sectors: a recap

This update retains the definitions of the 10 priority sectors in the EU Blue Economy that were identified by BlueInvest as crucial to green and digital transition. Therefore, it focuses on sustainable activities and excludes activities such as oil and gas extraction.

Table 1. Key Blue Economy sectors*

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 for 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 strengthen 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 a 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.

*When analysing the deals' landscape per sector, fisheries and aquaculture have been grouped together.

1.

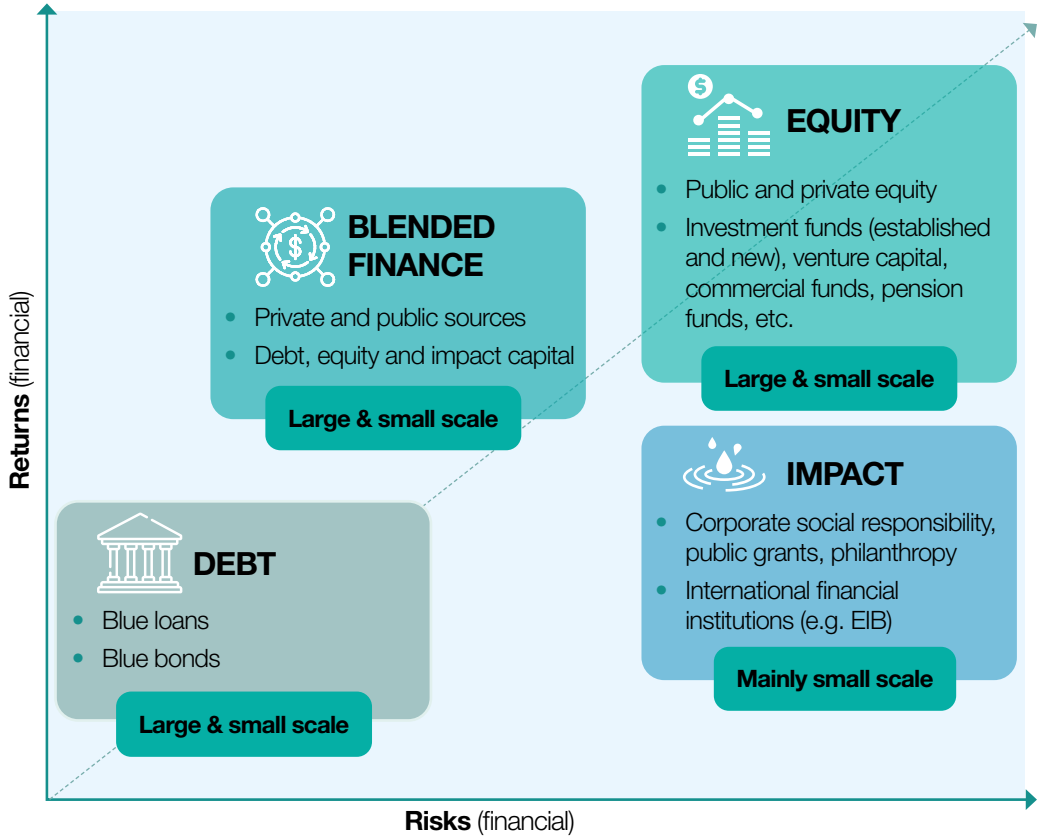
Developments in the blue financial landscape

The first edition of this report showed that financial institutions and intermediaries may also opt for debt strategies or impact-investing funds, going beyond direct and indirect equity investments. The past months have seen an expansion in the number and diversity of financial vehicles related to the Blue Economy, and it is important to reflect on how and why the landscape has changed.

Analysis reveals that investor preferences have changed, and this has driven the diversification and expansion of financing. The diversification process has been driven by a change in the preferences of younger investors,[9] high-net-worth individuals[10] and institutional investors.[11] The different financial products also reflect diverse preferences on company maturity, investor risk tolerance, investment volumes, and desired impacts. These instruments address a spectrum of the ecosystem, from nascent start-ups to well-established enterprises.

An understanding the distribution of capital types across various risk-to-return profiles is also essential. This provides valuable insights to support the strategic allocation of resources. It will also enable informed decision-making, as risk tolerance can be aligned with potential returns. Figure 2 below shows the major capital types and their risk-to-return profile.

Figure 2. The different major capital types and their risk-to-return ratio



Source: PwC analysis

9. Schroders Global Investor Study. 2020. https://publications.schroders.com/view/1010922180/
10. Wealth Report 2023. Capgemini Research Institute. https://prod.ucwe.capgemini.com/wp-content/uploads/2023/05/WWR-2023_web.pdf
11. The Monaco Sovereign Wealth Fund has embraced the Ocean 14 Capital fund to advance its goal of financing sustainable initiatives for the ocean: https://ocean14capital.com/2022/09/07/ocean-14-capital-receives-10-million-euros/

Private Markets

By 2025, Environmental, Social and Governance (ESG) assets are expected to account for up to two fifths of industry assets.[12] **The increasing adoption of ESG criteria by private equity and venture capital funds reflects a larger appetite for blue strategies as a sub-set of ESG investments.** Nevertheless, amidst ongoing discussions within the financial market that signal potential scepticism towards ESG, it is anticipated that ESG considerations will continue to be paramount for investors, albeit amid changing sentiments and priorities.

The table below showcases some Private Equity/Venture Capital funds with a clear and distinctive Blue Economy focus (although in some cases, this may include some broader environmental considerations).

This list, while non-exhaustive, shows diversification at play in terms of strategy and capital sources. Some funds are clearly backed by major institutional investors (e.g. ReOcean fund), some have gained global presence and recognition (e.g. Ocean 14 Capital), some are backed by the European Investment Bank/European Investment Fund (e.g. Faber), while others have attracted mostly private sources of capital (e.g. XPV Water Partners).

Table 2. Non-exhaustive list of Blue Economy funds

Asset Manager	Fund	Main focus	Target fund size	Ticket size: range, average, etc.	Additional info
Katapult Ocean	Katapult Ocean	Investing in ocean impact companies that solve climate and biodiversity challenges, and provide food and water globally.	€75 million	€150,000 - €4.5million (first ticket €150,000-€500,000 with the remainder reserved for follow on)	WEF Top Innovative Fund and the world's most active ocean impact venture fund manager, with 64 impact investments since 2019.
SARSIA	SARSIA	Electrification, Green shipping, Aquaculture and fishing, Biotech, Monitoring the ocean.	€75 million	€500,000 - €1 million – ambition to invest €3-4 million in successful companies	Focus on science-based technologies in the Blue Economy.
Morningside Hill Capital Management	Morningside Hill Blue Horizons	Sustainable aquaculture, water management, industrial IoT and automation, and agricultural efficiency.	€40 million	€1 – €3 million (seed and series A)	VC fund launched in 2019 focusing on Bulgarian startups. It comprises public funds of €33.3 million under the operational programme "Innovation and Competitiveness"
OCEAN14 CAPITAL	Ocean 14 Capital Fund 1	Aquaculture, sustainable fisheries, alternative protein, marine flora, and circular plastics.	€200 million	€5 - €15 million for growth, €1 - €5 million for venture	A leading Blue PE fund backed by the EIF and global institutional investors.
Growth Partners Capital	Growth Blue Fund I[13]	Aquaculture, blue bioeconomy, and offshore energy.	€50 million		Born in 2022 from the collaboration of the Portuguese government and EIF.
Meridiam for people and the planet	Sustainable Water and Waste Fund[14]	Sustainable waste solutions.	€1.7 million		Invests also in infrastructure and tech

12. EU Private Markets: ESG reboot, PwC Luxembourg, https://www.pwc.lu/en/sustainable-finance/eu-private-markets-esg-reboot.html
13. https://investeu.europa.eu/investeu-operations-0/investeu-operations-list/growth-blue-fund-i_en
14. https://www.meridiam.com/news/meridiam-successfully-raises-over-6-billion-e5-billion-of-new-capital-to-fuel-future-sustainable-and-impact-investments/
15. https://www.faber.vc/files/Faber%20Blue%20Pioneers%20II%20SFDR%20Statement.pdf
16. https://www.eib.org/en/products/equity/funds/sustainable-ocean-fund

Asset Manager	Fund	Main focus	Target fund size	Ticket size: range, average, etc.	Additional info
faber	Faber Blue Pioneers I Fund[15]	Early-stage deep-tech impact driven start-ups for ocean sustainability and decarbonisation.	€35 million	€100,000 - €1.5 million (from pre-seed to series A)	EIF as anchor LP
mirova	Sustainable Ocean Fund[16]	Sustainable marine resource use and marine pollution mitigation.	First fund closed at $132 million (second fund target: $250 million)	First fund: USD 4 -12 million Second fund: USD 8 -12 million	First fund received a $20 million investment from EIB
Susterra	Water Impact Fund	Access to clean drinking water and sewage system.	€200 million		First European water fund
XPV WATER PARTNERS	XPV Water Fund I, XPV Water Fund II, and XPV Water Fund III[17]	Growth capital investments in companies that directly or indirectly make a positive impact on water resources and the related processes, applications, and industries that water enables.	$900 million		Already made 27 investments, 30+ follow-on acquisitions and performed 15 exits.
sciens Capital Management	Sciens Water Opportunities[18]	Water infrastructure, wastewater treatment and recycling.	$850 million		Backed by private and public institutions, such as cities and federal states.
SWEN Capital Partners	Blue Ocean	Innovation for ocean health.	€170 million	€1 – 6 million (series A initial investment)	As of end of 2023, Blue Ocean has invested in 14 innovative start-ups bringing solutions to overfishing, solutions to marine pollution and marine solutions to climate change.
Schulte Group	Innoport	Global maritime and logistics sectors.	N/A		Venture capital arm of the, a major German company.
NavigareCapital	Maritie Investment Fund I, II[19]	Sea and coastal freight water transport, vessels for port operations and auxiliary activities.	$760 million (both funds)		Large participation of Danish pension funds
ASTANOR VENTURES	Astanor Ventures	Food system, water, and biodiversity.	€360 million	Average: €10-15 million	Focusing on Blue Economy and bioeconomy. Received funds from the EIF.
INDICO	Indico Blue Fund	Blue Clean Tech, Blue BioTech, Digital Ocean, Green Shipping, Water and Waste Management, Sustainable Aquaculture, Renewable Energy.	€50 million	€100,000 - €5 million (average deal size €1.4 million)	Fully privately funded with a focus on R&D deployment in Portugal, and SDG impact measurement.
FUTURE PLANET CAPITAL	Future Planet Blue Ocean Limited	Seed to series B technology companies at the intersect of climate and ocean.	$23 million	$300,000 - $2 million	Future Planet Capital is an impact-led venture capital firm, managing ~$400million of assets from Pre-seed to Growth.

17. https://xpvwaterpartners.com/
18. https://scienswater.com/about-us/
19. https://www.navigarecapital.com/

Asset Manager	Fund	Main focus	Target fund size	Ticket size: range, average, etc.	Additional info
INFINITY RECYCLING	Infinity Recycling's Circular Plastics Fund I SCSp	Recycling of plastics.	€150 million	€5 – €15 million	Backed by the EIF: €50 million participation in August 2023
HATCH Blue Revolution Fund	Hatch Fund I, II, Blue Revolution Fund	Sustainable and regenerative aquaculture industry.	€75 million	€2 – €5 million (seed and series A)	Blue Revolution Fund in partner with The Nature Conservancy as conservation manager.
AquaSpark	Aqua-Spark	Sustainable aquaculture.	€500 million (open-ended structure)		Global community of 347 investors from 33 countries.
s2g ventures	Special Opportunity Fund	Ocean health, climate resilience, and food security.	€300 million		Institutional Investor: Walmart heir Lucas Wallen
MEIDLINGER PARTNERS	Meidlinger Partners Sustainable Investments	Water technologies, water, and wastewater utilities.	$100 million		One of the first examples of sustainable funds focusing on water investments.
RRG	Renewable Resources Group LLC	Water, agriculture, land, renewable energy, and conservation values.	$130 million		Focus on US and international markets
Thomas Schumann Capital®	Thomas Schumann Water Security Fund	"Water Security" vs. "Water Risk".	$10 billion	n.a.	Focus on UN SDG 6.
olaisen blue rogn	Olaisen Blue Rogn	Sustainable Blue food industry.	n.a.	€90,000 – €350,000	Focus on start-ups that use innovative technology and business models
CIRCULATE CAPITAL	Circulate Capital / Ocean Fund	Plastic waste and related discharge to oceans.	€85 million		Funded by private companies and public sector (EIB).
Vala	United Ocean Fund	Blue technologies	$100 million	ticket size up to $5 milion	Focus on investments that contribute directly to the Sustainable Development Goal 14.
GO CAPITAL	Impact Ocean Capital	Blue technologies Sustainable fishing Shipping	€70 million	€500,000 - €3 million (average deal size €3 million)	They have invested more than 40 companies in the Blue Economy in the last 5 years. GO Capital also manages 2 other Blue Economy funds: Mer Invest (€15) and Sud Mer Invest (€7,5M).
M A M	ReOcean Fund	Ocean pollution, sustainable seafood, and transforming maritime travel.	€100 million		The Prince Albert II of Monaco Foundation co-manages and advises the fund.
Planet Ocean Fund	Planet Ocean Fund	Alternative aquatic nutritional sources & plant, precision mariculture and robotics, sustainable fishing, Energy & Carbon Capture, plastic alternatives & reusables, ocean and earth data generation.	€30 million	€15 - €100 million (investments in funds)	Europe's first venture capital fund of funds solely investing into ocean-related climate tech.

Blue bonds and Blue loans

Blue bonds and Blue loans are innovative financing instruments that raise and earmark funds for sustainable investments in blue sectors. These have included water and wastewater management, reducing ocean plastic pollution, marine ecosystem restoration, sustainable shipping, eco-friendly tourism and offshore renewable energy.[20]

Blue bonds and Blue loans recently benefited from new guidelines released in 2023. Developed by the International Finance Corporation (IFC) in cooperation with International Capital Market Association (ICMA), UN Global Compact, ADB and UNEP FI,[21] the voluntary guidance provides market participants with clear criteria, practices, and examples for lending and issuances, defining typology and eligibility criteria, suggesting key performance indicators, and showcasing latest case studies from the field.

These clearer definitions on Blue Economy activities have supported banks in developing portfolios of Blue loans. The increase in "blue funding" by EU banks reflect the incentives offered by these guidelines, particularly for institutions that are now required to assess the climate risk associated to their lending practice.

Use cases in perspective

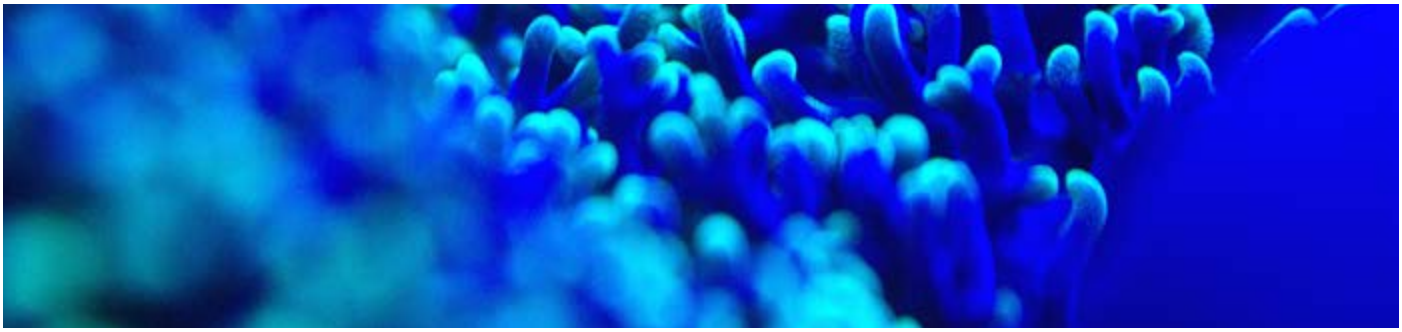
The Bank of Ireland, the European Investment Fund and the European Commission set up the Growth and Sustainability Loan Scheme, a long-term low-cost scheme investing in climate action and environmental sustainability.[22]

The IFC has provided Banca Transilvania with €100 million to increase blue loans for sustainable water use in Romania and will help the bank establish a blue finance product to extend loans to micro, small and medium-sized enterprises.[23]

The figure below provides a sample of other well-established banks with large loan operations in the Blue Economy.

Figure 3. Banks active in the Blue Economy

Source: PwC analysis



20. https://www.ifc.org/en/what-we-do/sector-expertise/financial-institutions/climate-finance/blue-finance#:~:text=Specifically%2C%20Blue%20Bonds%20and%20Blue%20Loans%20are%20innovative,sustainable%20shipping%2C%20eco-friendly%20tourism%2C%20or%20offshore%20renewable%20energy.
21. Bonds to Finance the Sustainable Blue Economy. 2023. https://www.icmagroup.org/assets/documents/Sustainable-finance/Bonds-to-Finance-the-Sustainable-Blue-Economy-a-Practitioners-Guide-September-2023.pdf
22. https://businessbanking.bankofireland.com/credit/business-loans/growth-and-sustainability-loan-scheme-gsls/#tabpanel_5
23. https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=27045

Similarly, the latest guidance from the International Capital Market Association (ICMA) – a global trade association for financial institutions involved in the debt capital markets – will have an impact on Blue bonds. The new guidance places significant emphasis on ocean-based marine ecosystems, holding relevance for numerous EU countries with access to the sea or ocean. The Europe, Middle East and Africa (EMEA) region has accounted for 2% of total cumulative volume of Blue bonds since 2018.

Use cases in perspective

Ørsted, the Danish global leader in offshore wind power, has become the world's first energy company to issue Blue bonds.[24]

Mowi, a Norwegian seafood company, is the first ever seafood company to issue green and Blue bonds.[26]

It is anticipated that sovereign Blue bonds issued by EU countries are foreseen[27] in the near future, mirroring the lead of Indonesia in 2023 with the issuance of the world's first publicly offered sovereign Blue bond, raising $150 million[28] with the help of the United Nations Development Programme (UNDP). This development aligns with the growing global recognition of the importance of sustainable financing and is a natural consequence of increasing awareness and influence in the realm of Blue Economy initiatives.

Blended finance

Blended finance uses catalytic capital from public or philanthropic sources to increase private-sector investment in sustainable development.[29] This provides the support that is particularly necessary for sustainable ocean businesses, which tend to be categorised as high risk because they are often early-stage and small to medium-sized enterprises with low maturity project models. Such projects benefit most from blended finance because they achieve commercial viability and demonstrate successful investments and exits.

Capital models under blended finance take different forms such as direct subsidies, concessional or preferential loans, and they may include de-risking tools like loan guarantees and first-loss facilities. Deploying such models allow projects to take off while reducing the risk for private investors. The sections below showcase a multiplier effect of blended finance for the Blue Economy.

The December 2023 report issued by Covergence, the global network for blended finance, shows that from one blended finance transaction on the Blue Economy, 16 transactions surged in 2023 totalling about $2.5 billion of financing, of which funds accounted for 56% of blended transactions worldwide. Some notable instances of international new blended finance are facilities like the Global Coral Reef Fund (GFCR).[30] This now consists of 51 organisations and countries that have collected around $125 million in donor funds deployed by the Grant Fund and $500 million in investment deployed by the Investment Fund.

The European Investment Fund and the European Commission have also jointly developed solutions for equity and guarantee funding by providing Member States' managing authorities with ways of matching their national resources with funding from relevant European funds through financial instruments and blending operations. A pertinent example is the dedicated blending instrument for the Blue Economy under InvestEU, which was launched in 2022 supported by contributions from the European Maritime Fisheries and Aquaculture Fund, the InvestEU fund and the EIB Group. The instrument provides equity funding for Blue Economy SMEs and start-ups via financial intermediaries.[31]

Last but not least is Climate Investor One (CI1), an innovative hybrid financial initiative supported by the European Union. CI1 is anticipated to initiate approximately 30 renewable energy projects, with an estimated total capacity of around 1 700 MW. It is expected to attract ~$2.5 billion from private-sector investments and generate approximately 1 000 job opportunities.

24. https://orsted.com/en/media/news/2023/06/20230608684811
25. https://www.eif.org/InvestEU/news/2023/investeu-eif-and-banco-bpi-sign-agreement-to-guarantee-eur-155-million-for-green-and-digital-transition-of-portuguese-companies.htm
26. https://mowi.com/blog/first-ever-green-bond-issue-from-a-seafood-company/
27. 'Blue bonds': New ICMA guidance aims to bolster credibility and activity, Nordea, available at: https://www.nordea.com/en/news/blue-bonds-new-icma-guidance-aims-to-bolster-credibility-and-activity
28. Indonesia Launches the World's First Publicly Offered Sovereign Blue Bond. 2023. https://www.undp.org/indonesia/blog/indonesia-launches-worlds-first-publicly-offered-sovereign-blue-bond-undps-support
29. Convergence. https://www.convergence.finance/blended-finance
30. To know more; https://globalfundcoralreefs.org/
31. InvestEU equity call for interest: https://www.eif.org/InvestEU/equity_products_calls/index.htm

Public Markets

The mutual fund industry has also emerged as an investor in the Blue Economy. An analysis from Morningstar finds that in 2022, nearly 500 equity funds had an average exposure of more than 3% to the UN SDG 14, with more than 100 of those funds' exposures at 10% or more. Some of these funds are dedicated solely to blue activities, while others fall under broader themes in which healthy oceans play a crucial role, such as the future of food production or clean energy transition.[32] Illustrating this is a list of examples of mutual funds with a focus on the Blue Economy.

- **Global Impact Fund by BlackRock.** Launched in 2020, it targets ESG projects but also invests in resources to address critical issues affecting the oceans.
- **KBI Aqua ISR Fund by Amundi.** Dedicated to investing in companies that align with environmentally responsible practices, particularly those related to water conservation and management.
- **Aqua Classic Fund by BNP Paribas.** Focuses on the Blue Economy's conservation goals.
- **Rockefeller Credit Suisse Ocean Engagement Fund.** Launched in September 2020 with $780 million in assets under management, it is a substantial commitment to financing ocean-centric solutions.
- **Rockefeller Climate Solutions Fund.** Launched in 2012, it has evolved into a mutual fund in the USA and a UCITS in Europe with a focus on ocean-related climate solutions.
- Other mutual funds include DWS Concept ESG Blue Economy LC, CPR Invest and Covea Aqua.

In addition, exchange-traded funds (ETF) with a Blue Economy focus have also emerged. Three ETFs have been identified:

- **IQ Clean Oceans ETF**, which was launched nearly 2 years ago, now has $4.6 million in assets and is the largest ETF according to Morningstar.
- **Rockefeller Asset Management** has launched an ETF on Ocean Engagement Strategy through Krane shares. This ETF provides access to the U.S. market audience to invest in the Ocean Engagement Strategy.
- **Newday Ocean Health ETF** (AHOY.P) made its debut in June 2022, and has some $2 million in assets.

32. Based on Morninsar data analysis. https://www.morganstanley.com/ideas/blue-economy-investing-ocean-priorities#F8https://www.cbinsights.com/?utm_content=spiralyze_homepage_form_variant




2.

In-depth analysis of the deals' landcape

2.1. Objectives

Innovation and business expansion in the different sectors of the Blue Economy continue to provide new technologies, products, and services. However, developments are uneven across the 10 sectors of the Blue Economy in terms of market outreach and their ability to attract investment.

This chapter analyses the investment landscape of each sector of the Blue Economy. It will build on and update the analysis of the deal landscape in the first edition of the Investor Report, providing a deeper level of disaggregation and detail.

The aims of the analysis are follows:

1. Bridge the knowledge gap on Blue Economy deal activity
2. Identify the sectors currently receiving the most attention from investors, and the ones lagging behind in terms of the deals dynamics,
3. Assess the sectors' degree of maturity through a detailed analysis of the deals by size, stage, and investor types,
4. Provide investors with additional information and intelligence in order to feed their investment decision-making process.

By raising further awareness on the Blue Economy investment landscape, this update aims to attract more public and private sector finance for key innovations and technologies for the sustainable Blue Economy, supporting start-ups, SMEs and the larger companies that are scaling up these sustainable solutions, creating jobs, growing the local economy and generating a positive social and economic impact.

2.2. The evolving investment landscape

The overview below summarises deals activity in the Blue Economy to provide the reader with an understanding of the overall investment landscape. It will then dive into the specifics of each sector.

Our analysis is based on a dataset of deals occurring over the period 2000-2023. These have been sourced from CB Insights, a business analytics platform and global database with market intelligence on private companies and investor activities.[33]

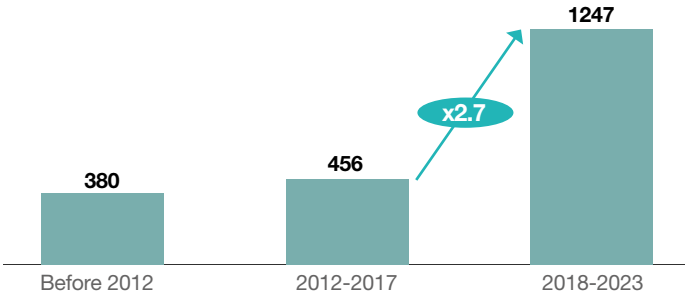
Deals have been identified based on the characteristics of the company that closed a deal. The companies selected are (1) active in one of the 10 sectors of the Blue Economy[34] and (2) provide innovative and/or technological solutions in line with the descriptions of the sectors. Only European companies have been considered for the deals analysis. Conversely, the investor analysis has full geographic coverage, including outside of Europe. The full methodology is available in the Annex to this report. Finally, companies with a singular focus on oil & gas were excluded, with the exception of relevant solutions with multiple offshore applications that may also apply to oil & gas.

Increase in the number of deals over time. Blue Economy deals, which numbered 380 between 2000 and 2012, increased to 456 deals between 2012 and 2017, and then tripled to 1 347 deals for the period 2018-2023.

80 deals per year were closed on average between 2012 and 2017, compared to 230 deals per year between 2018 and 2023. This number has since increased to almost 270 deals per year between 2021 and 2023.

33. https://www.cbinsights.com/?utm_content=spiralyze_homepage_form_variant
34. The 10 sectors are aquaculture, blue biotechnology, blue renewable energy, blue tech and ocean observation, coastal and maritime tourism, environmental protection and regeneration, fisheries, shipbuilding and refit, shipping and ports, water management.
35. Moreover, 2023 includes only the deals from January 2023 to July 2023 at the latest.

Figure 4. Change in the total number of deals in the Blue Economy

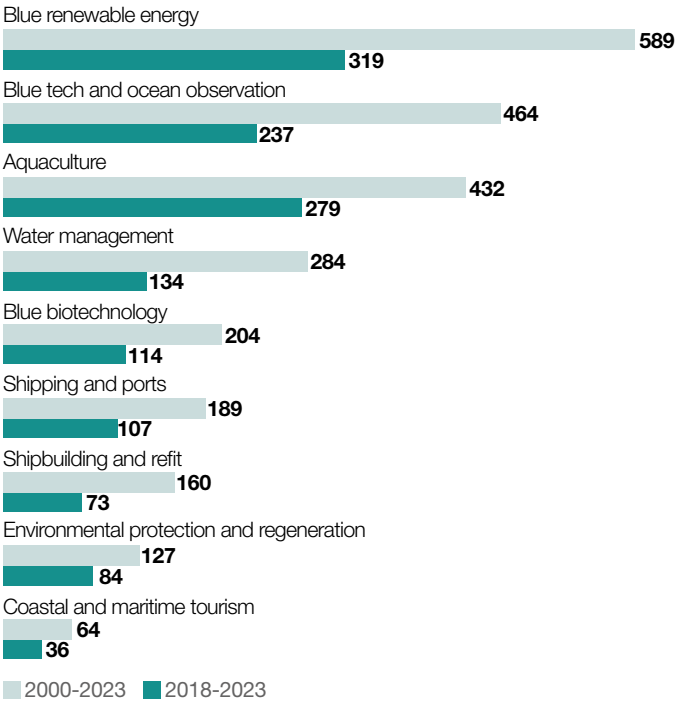


Source: CB Insights. PwC analysis

Significant variance between sectors. The strong overall dynamics of the Blue Economy hide significant discrepancies between sectors. These variances have been exposed in a closer analysis per sector, and are presented in the subsequent sections. While these differences are partly due to some unevenness in data coverage, they also reflect different levels of maturity of the sectors and their attractiveness to investors.

Three sectors dominate in terms of the number of deals closed: (1) Blue Renewable Energy, (2) Blue Tech and Ocean Observation and (3) Aquaculture. At the other end of the spectrum, Sustainable Coastal and Maritime Tourism and Environmental Protection & Regeneration appear to have closed less deals, even though the evolution of the number of deals remains positive over time.

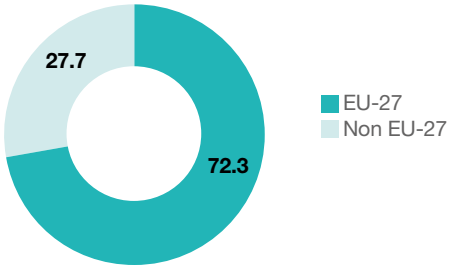
Figure 5. Number of deals per sector



Source: CB Insights. PwC analysis

Based on the location of company headquarters, most of the deals occurring across Europe are in the EU (72.2%). However, some discrepancies prevail across sectors, with the EU share at the lower end for Blue Tech & Ocean Observation (64%) and at the higher end for Coastal & Maritime Tourism (87%).

Figure 6. Share of deals in Europe (2000-2023)

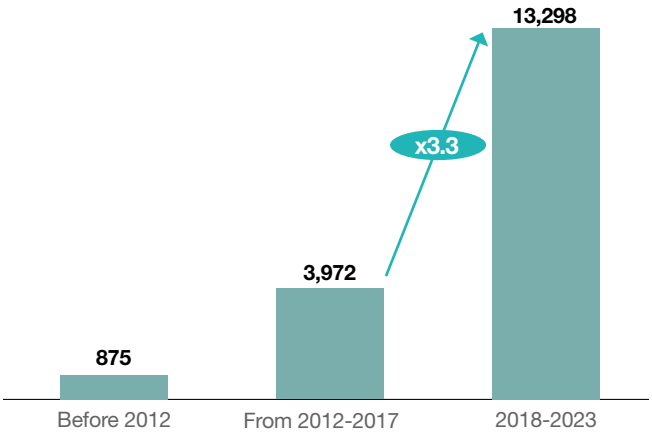


Source: CB Insights. PwC analysis

The total monetary value of the deals might be underrepresented due to data limitations. Only EU deals were considered, given the scope of BlueInvest. Even so, the data on deal size is incomplete; two thirds of the deals listed have not disclosed this information. The total amount of EU Blue Economy investments is therefore underestimated. Nonetheless, the available data constitutes a first interesting estimation of the overall investment volume.

Overall, the total volume of investments with available information rose from about €900 million between 2000 and 2012 to over €13 billion between 2018 and 2023. In the last 10 years, investments have more than tripled from €4 billion to more than €13 billion. This volume includes mergers and acquisitions, other financial inflows (grants, debt financing, and early-stage and growth-stage equity investments, as well as Initial Public Offers (IPOs)). The figure below presents the volume of disclosed investments in the EU.

Figure 7. Volume of total disclosed investments in the EU Blue Economy, in million €

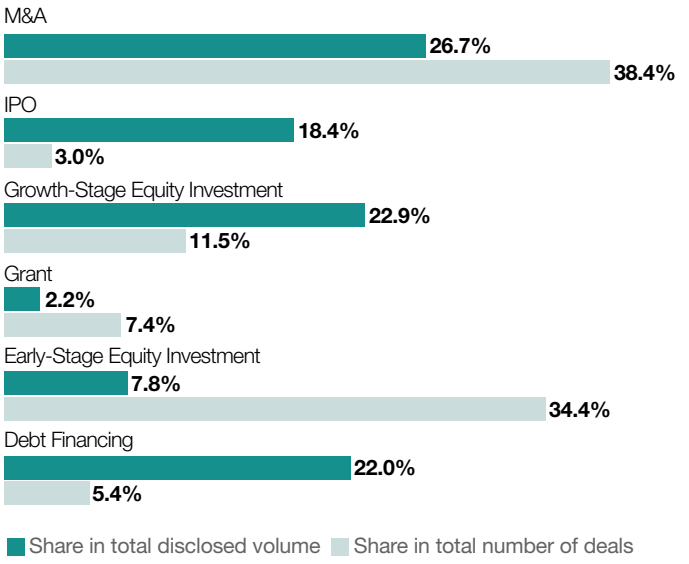


Source: CB Insights. PwC analysis

Overall, the share of M&As represents about 26% of the volume in the period 2018-2023. Early-stage and growth-stage equity investments represent about 30% and grants another 2.2%. The rest (debt financing, IPOs) represents about 40% of the volume, as shown below.

In terms of the number of deals, the picture is slightly different: M&As represent about 38% of the number of deals, followed by early-stage equity investments at 34%, ahead of growth-equity investments (11%), and grants (7%).

Figure 8. Share of deals per investment category (2000-2023)



Source: CB Insights. PwC analysis

This may suggest a limited average level of maturity of the Blue Economy sectors overall, given the relatively modest amount being invested into growth-stage companies. However, such numbers need to be considered with caution. M&A deals, for which information was less available, tend to be larger in size – data showed an average deal size of €128 million for M&As – compared to early-stage equity investments. For the latter, data is more available and tends to be smaller – (an average of €4 million).

Having this in mind, the sectoral analyses in the next sections will cover not only the disclosed deal volume (noting the proportion of disclosed deals), but also the total number of deals over time and focus on the share of each investment stage.

Finally, the median deal size stands at about €1.9 million, with the average deal size at about €24 million, and there are large discrepancies across sectors. In other words, most of the deals remain quite small, reflecting the overall immaturity of the Blue Economy sectors, but also the generally small size of companies, overall investor appetite and the likely risk perception of the sector. The table below summarises key statistics on each of the sectors.

Table3. Key statistics on the 10 Blue Economy sectors

	Total number of deals 2000-2023	Average number of deals/year since 2018	Deal Volume EU 2000-2023, in million €	Average deal size per transaction, in million €	Median deal size, in million €
Aquaculture & fisheries	432	47	1 459	13.7	1.4
Blue biotechnology	204	19	405	5.1	1.3
Blue renewable energy	589	53	10 094	47	4.4
Blue tech and ocean observation	464	40	512	8.0	1.2
Coastal and maritime tourism	64	6	657	29.0	2.1
Environmental protection and regeneration	127	14	81	4.0	0.9
Shipbuilding and refit	160	12	1 549	37.4	0.9
Shipping and ports	189	18	664	20.5	2.0
Water management	284	22	2 724	31.7	1.1
Average All sectors combined	**2 513**	**26**	**1 400**	**24.6**	**1.9**

Source: CB Insights. PwC analysis

KEY INSIGHTS

The volume of disclosed investments in the Blue Economy is three times larger than it was 10 years ago, reaching more than €13 billion over the five-year period between 2018 to 2023. Since 2018, about 270 deals are closed every year in the Blue Economy. There is no similar study on other sectors to allow for a comparison, but this trend indicates a positive outlook and a strong growth pattern for the sector.

About three quarters of the European Blue Economy deals occur within the EU. Half of the investors come from non-EU countries. This shows how EU companies create substantial business opportunities that attract investors from other regions.

In terms of number of deals, mergers & acquisitions represent about 38% of the total number of deals, followed by early-stage equity investments that represent 34% of the total number of deals, ahead of growth-equity investments (11%), and grants (7%). This suggests **a limited average level of maturity of the Blue Economy sector overall, particularly given the relatively modest amount being invested into growth-stage companies.**

The 10 sectors of the Blue Economy present huge disparities in terms of maturity, size of investments and attractiveness to investors. **The three most dynamic sectors in terms of deals activity are blue renewable energy, blue tech & ocean observation, and aquaculture.** At the other end of the spectrum, Sustainable Coastal and Maritime Tourism as well as Environmental Protection & Regeneration appear to close fewer deals.

Aquaculture

appears to be one of the most dynamic sectors of the Blue Economy.[36] It generated a relatively high number of deals and receives more growth-stage investments aligned with the recognised growth potential of SMEs in this high-profile sector. It also gathers the second highest number of investors. Due to its strong potential, the sector is seeing an encouraging influx of young companies, which is reflected in the growing share of early-stage financing.

Blue biotechnology

is currently one of the least developed sectors, but the number of deals has increased over time and investors often follow their investments from seed to more advanced stages, showing a clear potential of this market. This sector still lacks maturity with a higher share of grants and early-stage investments. **It is predominantly composed of early growth-stage companies with technologies that are not yet considered sufficiently mature for larger scale market roll-out by growth equity investors. Emerging success stories amongst European companies will be crucial catalysts for ramping up overall investor interest, investment volume in the sector and increasing deal size.**

Blue renewable energy

is the most dynamic sector in terms of total number and volume of deals, reflecting the size and established nature of the renewable energy market. Deal sizes are bigger than in other sectors: the average deal size in this sector amounts to €46 million, whereas the average across all the sectors is €24 million due to the larger investment needs required to deploy blue renewable energy projects. **The vibrancy of the sector is also reflected through the number of investors, which has increased rapidly in the last period. The increased M&A activity in blue renewable energy reflects a strategic response to evolving market dynamics and a desire to capitalise on the growing importance of blue renewable energy in the EU and global energy landscape.**

36. Disclaimer: while fisheries and aquaculture are considered as one sector here, it is important to underline that most deals occur in aquaculture.

Blue tech & ocean observation

is the second highest sector in terms of the number of deals. Since 2018, the sector closed an average of 40 deals per year compared to 26 of all sectors combined. But investment volume remains low - cumulative investments in the sector have reached €500 million - due to the prevalence of small deals. Deals are concentrated at early and growth stage showing a clear growth potential for companies in this sector. Corporations and private equity players have provided a particularly substantial amount of investment in this sector. The business case that companies in this sector can put forward is fast evolving and given the huge and growing value of underwater assets, a maturing and faster development of this sector is likely to follow.

Coastal & maritime tourism

has low traction, indicating that it is a relatively specialised sector from an investor's perspective. Investments in the last period were concentrated with a higher proportion of angel investors. The investors come mostly from the EU as opportunities may be more local in character. Although coastal and maritime tourism employs almost 3.2 million people, the relatively lower deal activity is not completely surprising because of the specifics of this sector, **which has a significant infrastructure and real estate component, lending it the perception of having a lower technological dimension compared to other Blue Economy sectors.**

Environmental protection & regeneration

is the least developed sector in terms of number of deals and volume: the total amount of investments reached €87 million in the EU, the smallest sector in the Blue Economy on this criterion. **The dominance of 'public good' objectives in this sector and the fact that many of the business models might not be considered investable by the private sector may explain the small number of deals.** Early-stage investors and grants are relatively more present, showing potential but lacking substantial commercial drivers in relative terms. Fewer investors have made repeated investments in this sector compared to others. **As public awareness grows and obligations for companies to preserve and regenerate the environment broaden, the ability of businesses to build valuable, defendable projects that are attractive to investors should progressively increase.**

Shipbuilding & refit

shows a comparatively lower level of activity, but it presents especially large deals, compared to the other sectors, due to larger costs for developing new projects. In the past 20 years, France, Denmark, the Netherlands, and Germany represented more than 50% of the deals. This is a more mature sector with a higher share of M&A and **where debt is a significant option due to the scale and maturity of many of the operators. The shipbuilding and refit industries are generally not a sector of interest for early and growth-stage equity investors because of their scale and maturity. The risk-to-return profile of most investments is more suited to larger scale corporate investments or debt.** On the investor side, France, Denmark, Germany, and the Netherlands have a strong presence. Furthermore, since shipbuilding tends to be located by default in very specific geographic locations, it is natural majority of its investors come from the host country.

Shipping & ports

show relatively less deals' dynamics, with a number of deals that doubled in the last 10 years (compared to a three-fold increasefor the overall Blue Economy). **The share of EU companies in this sector is higher compared to the rest of the Blue Economy due to the economic activity of the EU ports in Europe.** In terms of investment type, early-stage and growth-stage equity are rare compared to M&A. This is consistent with the maturity of this sector, **hence the investors' perspectives on limited opportunities for ready-to-market innovations.** Finally, countries such as the Netherlands and Belgium have relatively high degrees of investment activity due to the presence of international ports in these countries. Creating a stronger ecosystem of young companies and connecting them to opportunities in this sector will help attract greater investment from angel and early-stage investors.

Water management

is another established sector of the Blue Economy, with a high number of deals and strong recent growth. Around **€2.7 billion of capital was deployed, making this the 2nd largest sector in terms of the total capital volume in the Blue Economy.** Among these investments, we observe that early-stage and growth-stage capital make almost 50% of the number of deals, which may indicate strong innovation possibilities. It is also a sector where the average deal size (€31 million) is higher than the average deal size across all the sectors (€24 million). This may be due to higher cost of deploying large scale infrastructure-based solutions. There are two distinct segments: large corporations active in M&A and smaller companies that receive a significant amount of early-stage investment but lack growth equity investment. This sector also attracts relatively more asset managers seeking lower risk investments compared to other sectors, likely due to its stable, established nature.

2.3. Deal trends in aquaculture & fisheries

Aquaculture is the cultivation and farming of aquatic organisms. In relation to the green transition, sustainable aquaculture produces sustainable food and serves to replenish wild stocks and rebuild populations of endangered species. A wide range of innovations in aquaculture aims at farming with reduced emissions, mitigating pollution, using less plastic and more renewable energy sources, being energy and water efficient, considering fish welfare and putting less strain on supply chains. The fact that aquaculture by-products can be re-used in several ways also promotes higher circularity in the sector.

On the other hand, **capture fishery is the harvesting of naturally occurring living resources in both marine and freshwater environments.** Also called wild catches, the sector covers the harvesting of aquatic plants, fish, molluscs, crustaceans, and other marine species. Sustainable fishing aims to leave enough fish in the ocean to enable species regeneration and protect marine habitats. It translates into taking care not to overfish, minimising any negative environmental and social impacts.

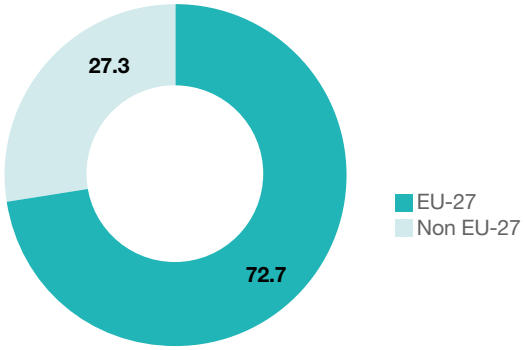
For the purpose of this analysis, Aquaculture and Fisheries deals were merged because many applications related to processing can apply both to aquaculture and fisheries, making it difficult to disentangle these sectors. It must be noted that within these merged sectors, **purely fisheries-related deals with a sustainable dimension are relatively scarce (about 60 out of about 430 deals) which may reflect a weak innovation dynamic and lower investor interest compared to aquaculture.** Aquaculture encompasses a wide range of innovations (planning systems, feeding improvements, management tools, etc.) while fisheries-related deals relate mostly to catch innovations.

2.3.1. Geographical overview

This section provides an in-depth analysis of deal activity in Aquaculture and Fisheries in Europe, with a particular focus on the EU. It provides a historical perspective over the last 20 years, but it also offers a more recent picture of the evolution of deals in the sector over the last two to five years.

This sector appears to be one of the most dynamic sectors of the Blue Economy, mostly due to aquaculture rather than fisheries. 432 deals were identified compared to an average of 251 for all sectors combined. Since 2018, about 47 deals per year have been closed in this sector compared to an average of 26 for the entire Blue Economy. In terms of volume, disclosed deals represented about 10% of the total capital invested in the Blue Economy and this proportion has remained the same over the last five years. Finally, this sector receives relatively more growth-stage investments compared to other sectors, indicating investor confidence in the strong track record and prospects for the sector as well as the presence of more mature companies.

Figure 9. Location of deals in Europe (% total number of deals)



Source: CB Insights. PwC analysis

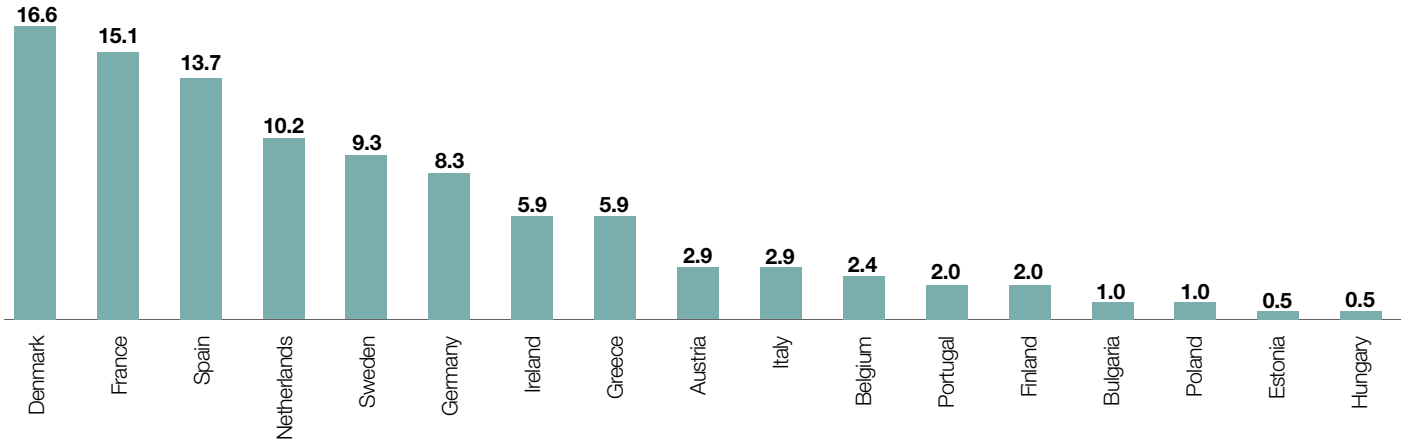
Aquaculture and Fisheries is the third largest sector in the EU Blue Economy in terms of number of deals identified. Most of the deals occurred over the past five years, with a third taking place as from 2021. Given the role of aquaculture in feeding the population and in meeting changing consumption patterns across populations, it is predicted that the aquaculture market will grow through to 2030 at a compound annual growth rate of 5.5%.[37]

Over the past 20 years, the vast majority of deals in Aquaculture and Fisheries occurred in the EU (72.7%), in line with the other sectors. 27.3% of deals were closed in non-EU countries, mostly in Norway, a global leader in aquaculture, followed by the UK. Norway's strong Aquaculture and Fishery ecosystem explains why this country represents 20% of deal activity on its own over the past five years.

If we consider the most recent period as of 2018 and the EU only, the majority of deals are concentrated in four countries: Denmark, France, Spain, and the Netherlands, all of which have a strong historical presence in the sector. Overall, the EU remains the 5th largest fisheries & aquaculture producer worldwide, accounting for 3% of global production, out of which 22% come from aquaculture.[38] This remains far behind China, which is ranked first with a share of 39%.

37. Source: Vantage Market Research, Aquaculture Market, 16 March 2023 at: https://www.vantagemarketresearch.com/toc/aquaculture-market-2032
38. Fisheries and Aquaculture production, EU Commission: https://oceans-and-fisheries.ec.europa.eu/facts-and-figures/facts-and-figures-common-fisheries-policy/fisheries-and-aquaculture-production_en

Figure 10. Distribution of deals (% total number of deals) within the EU as from 2018 (aquaculture & fisheries)



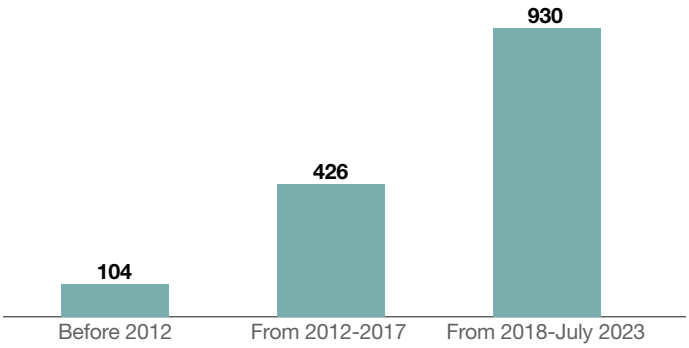
Source: CB Insights. PwC analysis

2.3.2. Deals and investment dynamics

Over the last 20 years, disclosed investments in the sector have reached €1.5 billion for the Aquaculture sector, representing 10% of capital deployed in the Blue Economy. Of note, 31% of deals have disclosed information on deal size, which is similar to the average for the entire Blue Economy (36%). **It is the fourth sector in terms of deal volume, after blue renewable energy (which alone concentrates 50% of the deal volume), water management, and shipbuilding and refit.** Activity has been picking up over the most recent period in line with the other sectors of the Blue Economy. In fact, across the period 2018 to 2023, this sector has retained its place as the fourth in terms of total deal volume.

The strong profile of the sector can be attributed to aquaculture currently being the fastest growing food production activity in the world. Sustainable aquaculture is seen as a solution to some of the most pressing issues, such as delivering nutritious and diverse food to a growing world population while often having a lower climate and environmental impact than other types of farming.[39] The sector is popular with investors due to these dynamics and the fact that aquaculture business models are well established and understood. **Aquaculture is one of the few Blue Economy sectors that has attracted several dedicated investment vehicles from fund managers who focus exclusively on this sector, whereas fisheries do not attract the same degree of investor interest.**

Figure 11. Disclosed investments in the EU in million €



Source: CB Insights. PwC analysis

The figure below shows the share of deals by financing type and stage. These numbers include both secondary capital flows (M&A) and growth capital inflows (such as grant, debt, early stage/growth stage equity investment, and IPO[40]) but offer a complementary perspective on the deals' structure for the sectors.

The healthy amount of M&A activity versus growth capital investment suggests a healthy market environment. It shows the presence of inflowing capital seeking growth and secondary capital that is seeking to acquire strategically valuable businesses going into the sector. The healthy level of M&A activity further encourages growth investors as it confirms the presence of successful exit strategies via M&A for investors.

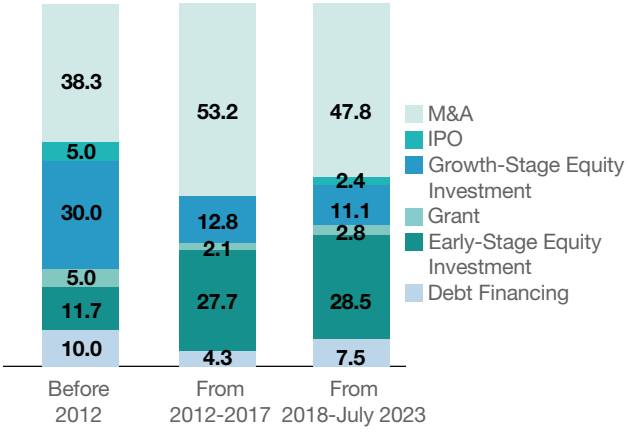
The share of M&A is close to 50% over the full period. However, in terms of volume, M&A has been declining over the last three years, accounting for about €300 million capital deployed since 2021 compared to about €350 million going to growth-stage equity and about €185 million going to early-stage growth investments.

39. European Commission, Directorate-General for Maritime Affairs and Fisheries, *A new strategic vision for sustainable aquaculture production and consumption in the European Union – Blue farming in the European Green Deal*, Publications Office of the European Union, 2021, https://data.europa.eu/doi/10.2771/961425
40. Some IPOs could still include some sales of secondary shares.

When looking at growth capital, about a third of investments are conducted at early-stage or growth-equity investment stage. Since 2012, early-stage investments represent a larger proportion of deals than growth equity investment and this share has increased to the detriment of growth stage equity deals. In fact, due to its strong potential, the sector is seeing an encouraging influx of young companies, which is reflected in the growing share of early-stage financing.

The picture in terms of volume is slightly different. Since 2021, aquaculture attracted €350 million of growth-stage equity investment, representing 15% of the capital deployed at this stage in all sectors combined. Furthermore, since 2021, financial inflows (in forms of debt, grant, early-stage equity, and growth-stage equity) amounted to €620 million, representing 16% of the total financial inflows to the Blue Economy. **The confidence that growth-stage investors show in the sector and a healthy level of M&A activity illustrate its growing maturity.** Additionally, grants represent a relatively small share of deals (2.8%) compared to the whole Blue Economy, indicating a relatively lower level of public support needed compared to other less developed sectors.

Figure 12. Deals per investment category (% total number of deals)

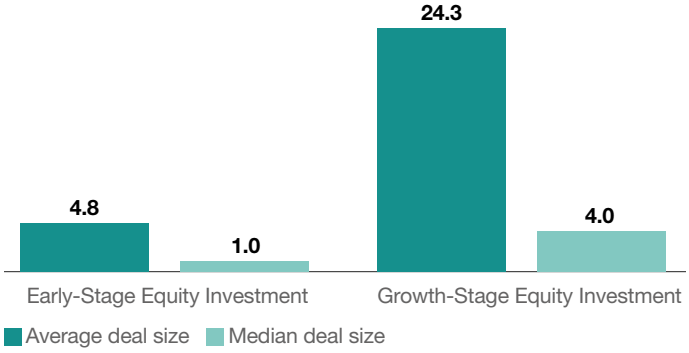


Source: CB Insights. PwC analysis

The average deal size in this sector[41] amounts to €13.7 million, below the average of all sectors combined (€24 million). However, this gap is decreasing over time: since 2021, the average deal size in aquaculture has risen to close to €20 million, whereas the overall average remained at about €24 million. The median deal size is also lower than for the rest of the sectors, with a median standing at €1.4 million compared to €1.9 million for all sectors combined.

Deal size in this sector varies significantly across the different types of investment. The figure below shows the average versus median deal size for selected investment categories.[42] Compared to the other sectors, **the average ticket size for growth capital investments is larger in this sector. For instance, the average deal size for growth equity is close to €22 million all sectors combined and reaches €24.3 million in aquaculture & fisheries.** The same applied for early-stage investments (€4.8 million in aquaculture & fisheries compared to €3.9 million overall). There are no 'mega-deals' to drive up the average deal size in this sector, as can be seen in some other sectors, but there is a substantial number of larger deals that have the same effect. This leads to a disparity between the average and median deal sizes, which suggests that the investments are characterised by a skewed distribution, while the median represents a more balanced measure of the typical deal size for the respective investment stages.

Figure 13. Average and median deal size for some investment types, in million €



Source: CB Insights. PwC analysis

2.3.3. Investor demographics

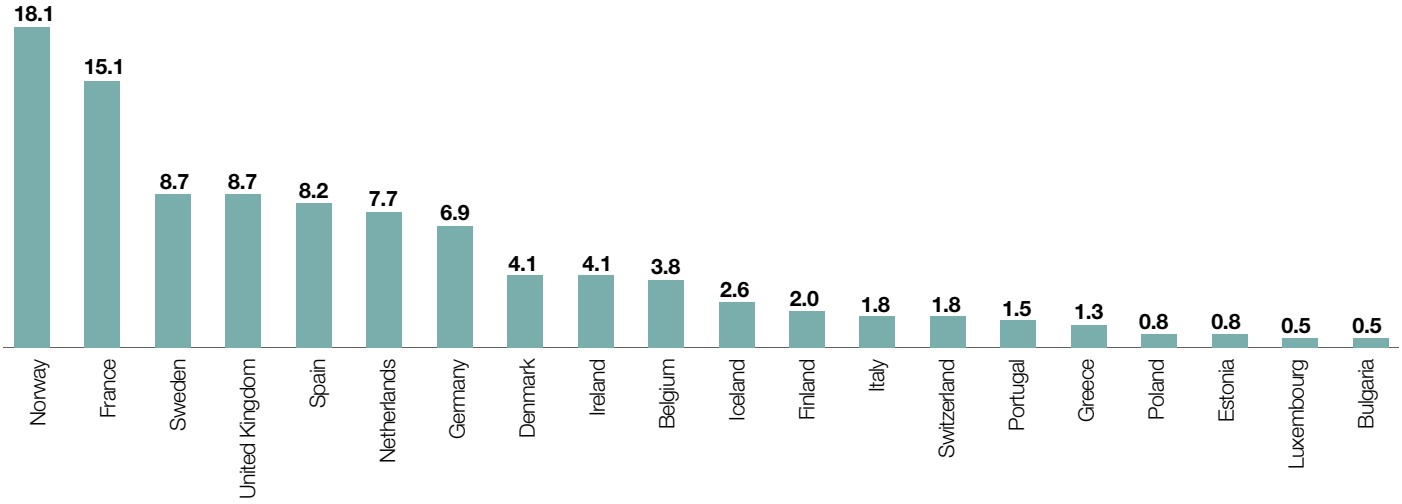
Looking at the investors' profiles, 56.4% are from the EU, followed by non-EU-27 countries (UK, Norway, Switzerland, and Iceland). The share of EU investors is slightly higher than for other sectors (the share being 51.9% for all sectors combined). **Outside Europe, Aquaculture and Fisheries investors are mostly based in North America, in particular the US, which is particularly strong in early-stage investing,** and to a lower extent Asian investors who invest more at growth-stage or through M&A. Given that the country classification of an investor corresponds to the location of the investor's headquarters, it should be noted that non-EU investors may still have operations in the EU. Asian investors are particularly strong in this sector because the global aquaculture industry is dominated by Asian businesses.

As shown in the figure below, Norway notably leads the list with the highest number of investors, followed by France, Sweden and the UK. The Norwegian concentration reflects the country's strong position in European aquaculture. However, **only about half of the deals concern companies with the same country of registration as that of the investors, indicating that, in general, investors are not highly biased toward their own country and feel comfortable investing in aquaculture companies in other countries, possibly due to the global and established nature of the sector.**

41. The dataset includes 110 deals with disclosed information on deals' size.

42. We display the average and median for the categories with a relative larger number of disclosed deals.

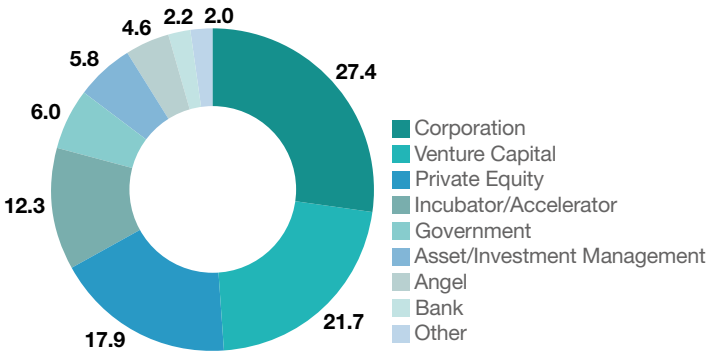
Figure 14. Distribution of European investors (% total number of investors)



Source: CB Insights. PwC analysis

Inside each country, a wide variety of investor categories are involved in deals, with no particular concentration by investor-type per country. In terms of type, **Corporations, Venture Capital, and Private Equity investors represent the substantial majority of the investor base, with around 67% of investors coming from these categories.** Corporations dominate this sector as they undertake a significant share of the M&A transactions. Venture Capitalists and Private Equity mostly focus on the early and growth-stage of investment and are very important actors; together they participate in about a third of the deals. Incubators as well as asset managers are less often involved in deals, but still represent more than 5% of the deals. Since 2021, the share of asset managers increased to close to 10%, suggesting a stronger interest from institutional investors. Overall, this paints a healthy and balanced picture for this sector, showing the presence of all key actors.

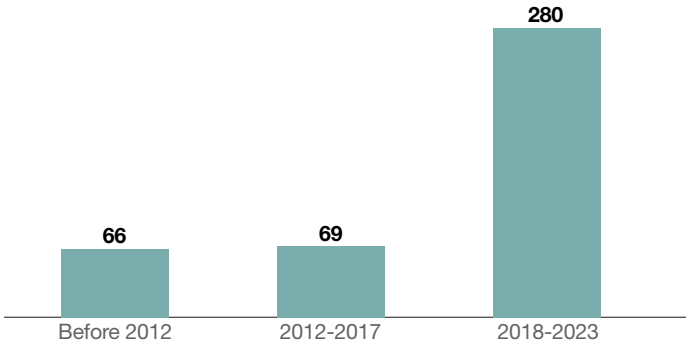
Figure 15. Type of investors (in % total number of investors)



Source: CB Insights. PwC analysis

Finally, the number of different investors has been steadily growing from 66 in the period prior to 2012 to reach 280 investors in the period 2018-2023.[43] The number of investors was quite stable up to 2017, and over the past years increased significantly. Among the 280 investors, we notice that about 70 investors invested before 2018 and were again involved in deals in the period 2018-2023. This confirms a growing interest and confidence in the sector's potential, fuelled by aquaculture being increasingly recognised as having substantial growth potential. Moreover, when compared to the other sectors, **aquaculture & fisheries (mostly aquaculture) gathers the second highest number of investors among the Blue Economy sectors for the last period 2018-2023.**

Figure 16. Number of active investors over time



Source: CB Insights. PwC analysis

43. From our dataset, we have information on all the investors involved in each deal. Moreover, each deal corresponds to one company, but several investors may have participated in that deal. This is why we may have more investors than deals.

2.4. Deal trends in blue biotechnology

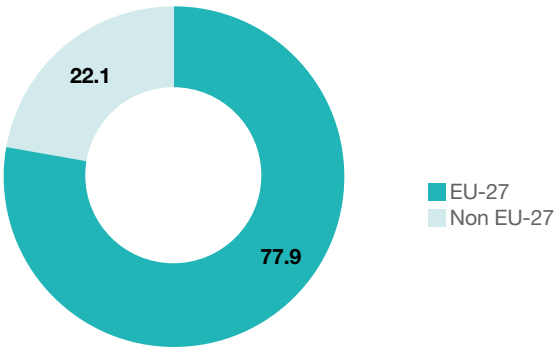
Blue biotechnology is the application of science and technology to aquatic organisms, using biological and chemical methods to produce knowledge, goods, and services. Organisms include microorganisms (bacteria, microalgae, and fungi), algae, vertebrates (fish) and invertebrates (e.g., sea cucumbers, sea urchins, sponges, shellfish, starfish, and jellyfish). **Applications include everything from extracting chemical products from living organisms, all the way through to optimising the production and processing of the chemical produced by these organisms into marine-derived products, often for commercial purposes.** These products may be destined for use in a diverse range of subsectors: cosmetics, food, feed and nutraceuticals, pharmaceuticals, energy and biofuels, enzymes, and biopolymers for packaging, clothing, etc.

2.4.1. Geographical overview

This sector appears to be among the least developed in several dimensions. On the one hand, 204 deals were identified over the full period, compared to an average of 251 deals all sectors combined. There has been an average of 19 deals per year since 2018 compared to an average of 26 across all sectors combined. Second, over the period 2018 to 2023, disclosed investments reached almost €200 million which is low compared to an average of €1.4 billion all sectors included. Finally, both the median and average deal size are lower than in most sectors (at €5.1million and €1.3 million respectively), and the share of M&A in the number of EU deals stands at only 14%, suggesting a low level of maturity of this sector. **Strong growth remains expected in this sector due to the tremendous technological possibilities and strong public sector support via grants which play an important role, representing more than 17% of the deals since 2018.** Globally, the blue biotechnology market is expected to reach about €5 billion by 2029, at an annual growth rate of about 7% since 2021.[44]

Finally, the sector is quite concentrated around four countries in the EU with particularly strong focus on scientific research and innovation: France, Italy, Spain, and Germany.

Figure 17. Share of deals in Europe (% total number of deals)



Source: CB Insights. PwC analysis

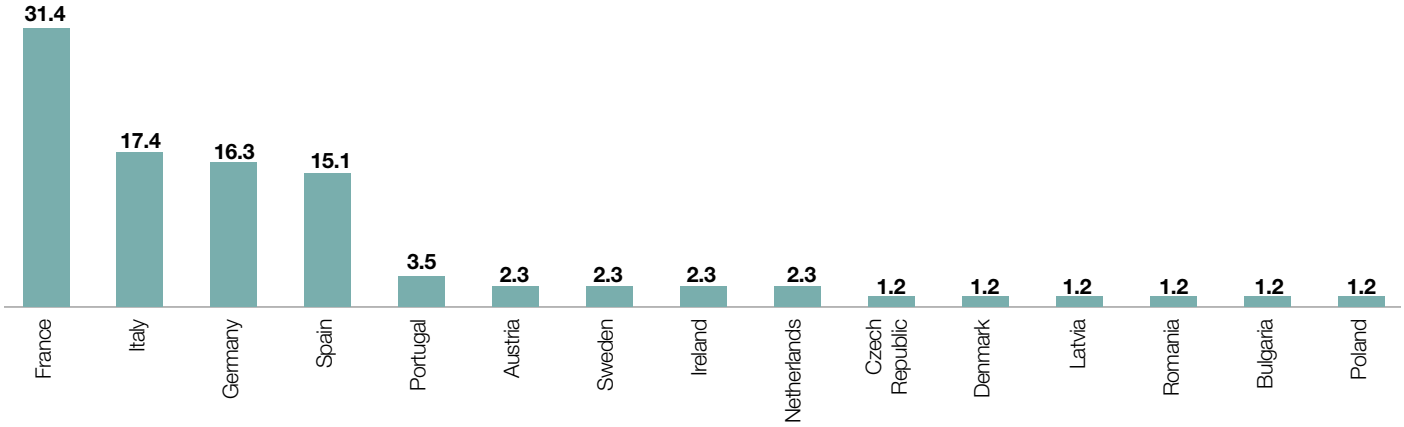
Over the past 20 years, the vast majority of European deals in the Blue Biotechnology sector occurred within the EU, with almost 78% of the total number of deals. 22% of the deals took place in the rest of Europe, mostly in the UK and to some extent Switzerland, both of which also have strong scientific traditions. The share of EU is slightly superior in this sector compared to other sectors. As with the rest of the Blue Economy, the UK is an important player in Europe, and Switzerland appears to have some activity in almost all sectors of the Blue Economy, especially since 2018.

Among the EU countries, France stands out as leading this sector, commanding a significant share of 31.4% of the EU deals. France possesses the world's second-largest maritime territory – its coastline spans nearly 20 000 kilometres including overseas territories – and has a large ocean resource for developing marine technologies, as well as a business environment that is strongly supportive of start-ups via a well-established network of seed and early fund managers.[45]

Italy, Spain, and Germany appear to host a significant proportion of companies as well: they collectively account for 48.8% of the total deals. This can be attributed to the robust research and innovation ecosystems flourishing within these nations, particularly in the realm of biotechnology. Furthermore, their abundant coastal regions and access to invaluable marine resources also bolster their attractiveness as prime destinations for blue biotechnology investment.

44. Blue Biotechnology Market- Global Industry Analysis and Forecast (2022-2029), https://www.maximizemarketresearch.com/market-report/blue-biotechnology-market/14327/#:~:text=and%20Forecast%202029-,Blue%20Biotechnology%20Market%2D%20Global%20Industry,and%20Forecast%20(2022%2D2029)&text=Blue%20Biotechnology%20Market%20is%20expected,7.11%25%20during%20the%20forecast%20period
45. Blue biotechnology: opportunities and challenges of a fast-growing sector, Boccard, https://www.boccard.com/blue-biotechnology-opportunities-and-challenges-of-a-fast-growing-sector/

Figure 18. Distribution of deals (% total number of deals) within the EU as from 2018 (Blue biotechnology)



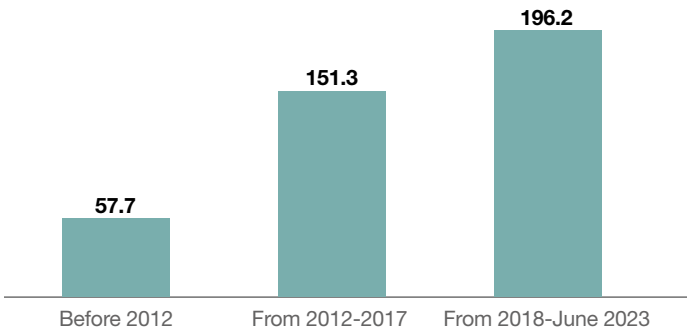
Source: CB Insights. PwC analysis

2.4.2. Deals and investment dynamics

In terms of volume of investments,[46] **the total disclosed investments in the sector increased to about €196 million over 2018-2023 in the EU,** of which about €50 million occurred since 2021. This remains low compared to the rest of the Blue Economy that on average accumulated €1.4 billion per sector since 2018. **Even in terms of the number of deals, this sector secured on average 19 deals/year since 2018 which makes it the 5th sector in terms of deals closed per year over this period.**

When compared to earlier periods, this may show a moderate entrance of new investors. Even though blue biotechnology benefits from strong research and stakeholder engagement and a growing ecosystem of innovative companies, it remains dominated by smaller companies and early-stage tech investors. And it is still unevenly spread across the EU, with significant concentration in a small number of countries. Nevertheless, there is **a positive trend in deal activity, with 26 deals per year since 2021, the same as for all sectors combined. It is likely that the number of investments will continue to increase as the industry matures.**

Figure 19. Disclosed investments in the EU in million €



Source: CB Insights. PwC analysis

The next figure shows the number of deals per investment type. Compared to other sectors, only a small share of deals occurs through M&A, which is characteristic of a sector dominated by smaller companies, and in which consolidation is not yet taking place.

Most of the deals are taking place at early stage. Within this sector, more than 50% of the deals occurring in the EU are early-stage deals. At present, the market is somewhat dominated by North American companies.[47] However, in Europe, thanks to the increasing focus on marine technology, European companies **could be expected to** emerge over the coming years, as companies emerge from the research and development phase (the share of grants represents about 17% of deals in the period 2018 – June 2023 which is **significantly above** the overall average of 7%). **Emerging success stories amongst European companies will be crucial catalysts for ramping up overall investor interest, investment volume in the sector and increasing deal size.**

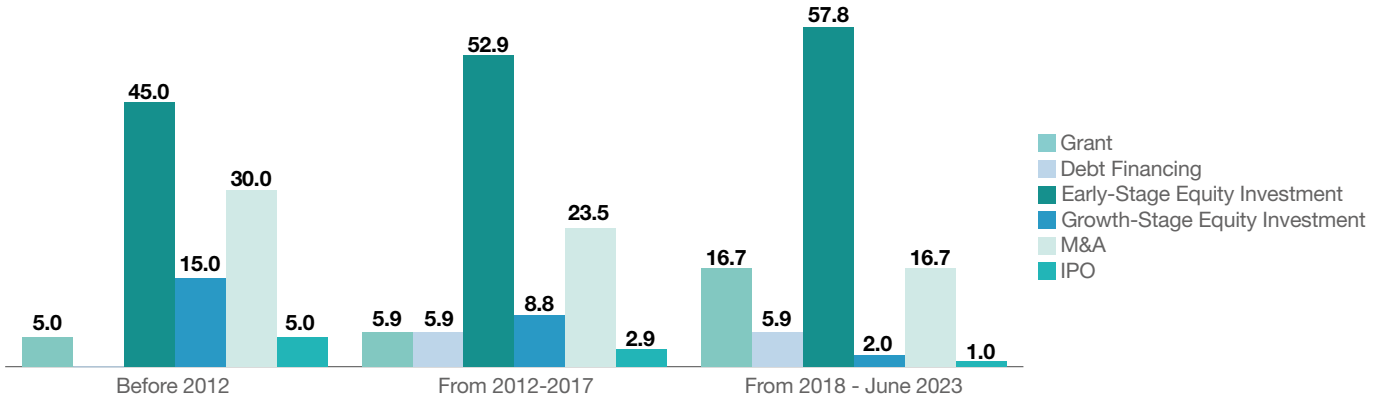
Meanwhile, growth-stage equity investments are seen to decline over the period studied. Since 2018, they have represented only 2% of all deals, well below the average of 7% across all Blue Economy sectors. This is because the total number of deals has significantly increased since 2017, and most of this growth is attributed to companies which have closed deals at early-stage. This feature reinforces the conclusion that **this sector is predominantly composed early growth stage companies with technologies that are not yet considered sufficiently mature for larger scale market roll-out by growth equity investors.** Unsurprisingly, for similar reasons, debt and IPO remain very small components of the overall funding spectrum.

The observed decline of growth stage/M&A and the increasing role of grants and early-stage overtime may be attributed to the transformation cycle of this sector: a wave of innovation may have turned into an end before 2012 (explain the higher share of growth stage/M&A), whereas a new wave of innovation has been introduced – still at early-stage of development – in the latest period.

46. Note that we have 57% with undisclosed information on deal size, a share that is slightly below the share of undisclosed deals all sectors combined (64%)

47. Blue Biotechnology market – Global Industry Analysis, Size, Share, Growth, Trends and Forecasts 2018-2026, Transparency Market Research https://www.transparencymarketresearch.com/blue-biotechnology-market.html

Figure 20. Share of deals per investment category in %

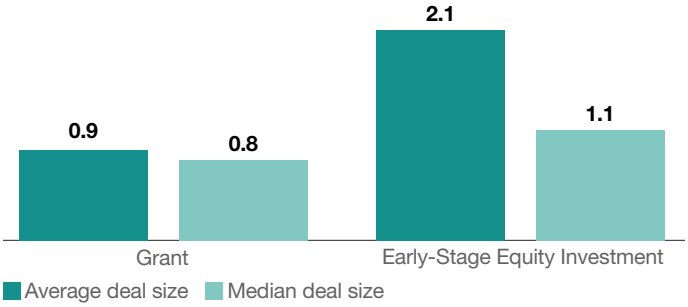


Source: CB Insights. PwC analysis

The average deal size in this sector,[48] is about €5 million, the second lowest among all sectors in this domain, and far below the average for all sectors combined, which stands at €24 million. **This sector ranks low in terms of the median, with median deal size at €1.3 million compared to almost €1.9 million all sectors combined. Again, this reflects the lack of mature companies in comparison to other Blue Economy sectors.**

The high share of early-stage equity investments may help to explain these small deal sizes. Early-stage equity investments tend to be small – €3.9 million on average all sectors combined – and the average deal size for early-stage equity investments in the blue biotechnology is even lower, at about €2 million. Grants are typically for small amounts, with both the median and average deal size standing at less than €1 million, lower than the average size of grants for all sectors combined (€4.8 million).

Figure 21. Average and median deal size for some investment types, in million €



Source: CB Insights. PwC analysis

2.4.3. Investor demographics

Looking investor locations, EU investors represent 63% of the total. European non-EU investors account for approximately 17% of investors, while investors from other continents represent about 14% and come mostly from the United States (almost exclusively providing early-stage equity investments) and Asia. The US figures strongly here because of its well-developed venture capital and accelerator/incubator community. Asian investors, while having some active venture capital investors, are mainly represented via corporates engaged in M&A transactions.

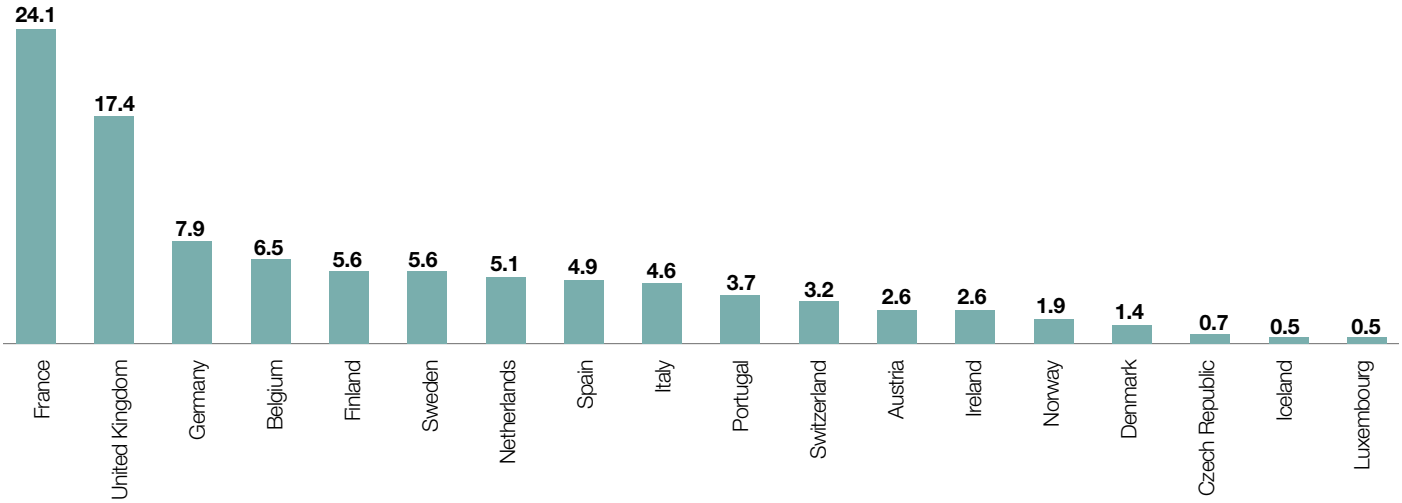
Within the EU,[49] majority of the investors come from France, which is the leading investor country in the majority of the other Blue Economy sectors. Capital flows from a broad range of investor types, illustrating the well-developed Blue Economy financing ecosystem that France enjoys. Investors from Germany and Belgium represent another 14.4% of the EU investors base.

Germany has a particularly active angel investment community in this sector. Belgian investors are also relatively more present in this sector compared to others: their share is at 6.5% compared to 3.3% all sectors combined. This is partly due to the EU grants that are assigned geographically to Belgium because of the EU Commission's HQ in Brussels, but it also shows the importance of the EU initiatives as a source of grant finance to the sector. UK investors alone contribute to another 17.4% of the investor base, which is also higher than what is observed in other sectors where they represent about 13% of investors on average.

48. The dataset includes 88 deals with disclosed information on deal size.

49. Countries with a share inferior to 0.5% are not displayed in the graph.

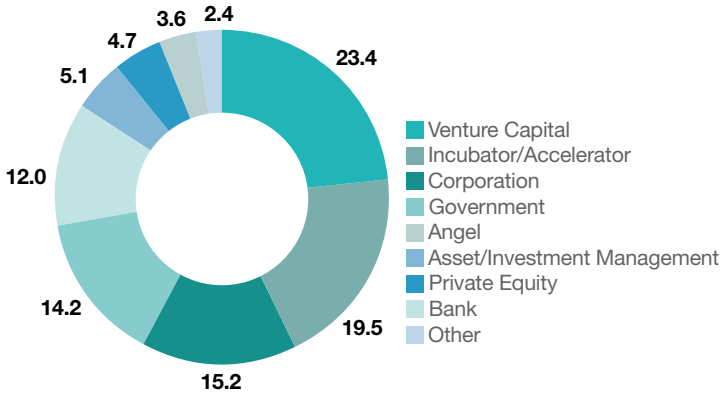
Figure 22. Distribution of European investors (% total number of investors)



Source: CB Insights. PwC analysis

As shown in the figure below, **Venture Capitalists and Incubator/Accelerators represent over 40% of the investor base.** This is to be expected in a sector where the emphasis remains on backing emerging technologies that investors hope will be able to achieve high growth rates once they secure substantial market acceptance. Significant presence of Venture Capital typically signals prevalence of start-ups and early-stage enterprises. Additionally, the significance of Incubators/Accelerators underscores once again the strong support for start-ups in the sector, with these entities providing crucial funding, mentorship, and resources to facilitate the growth and success of emerging blue biotechnology ventures. On average, **incubators/accelerators represent 12% of the investors' population while it stands at almost 20% in this sector. Reinforcing this observation, governments represent another 14% of the investor base.**

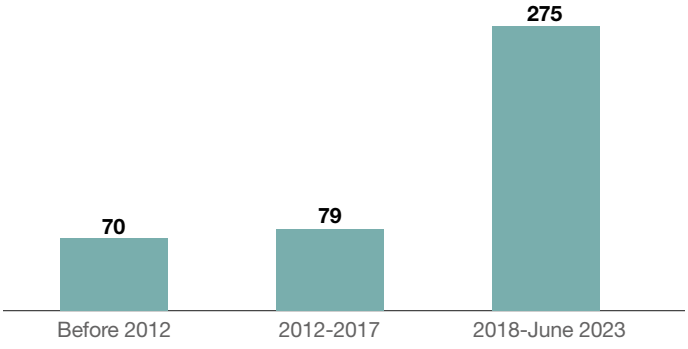
Figure 23. Type of investors (in % total number of investors)



Source: CB Insights. PwC analysis

Finally, **the number of active investors has increased significantly since 2018.** Prior to that period, the number of investors was relatively stable. The significant inflow of investors in the last five years indicates a fast-growing interest in blue biotechnology. It is also striking to observe that **many investors have followed their original investments through the different stages, from seed to series C.** This may be indicative of strong success which they want to remain part of, but it can also be due to a lack of new investors willing to participate in the financing of their investee companies. It does seem that deals very often involve more than one investor in this sector, explaining why we have a much higher number of investors than deals. It may also indicate that – due to the emerging stage of this industry – investors are not willing to take significant risks by placing large bets on individual companies, and companies need to find several investors to achieve sufficient scale. Overall, the recent surge in investor participation underscores the sector's dynamism and potential for growth in the coming years, even though these investors have been still investing low amounts compared to the other sectors.

Figure 24. Number of active investors over time



Source: CB Insights. PwC analysis

2.5. Deal trends in blue renewable energy

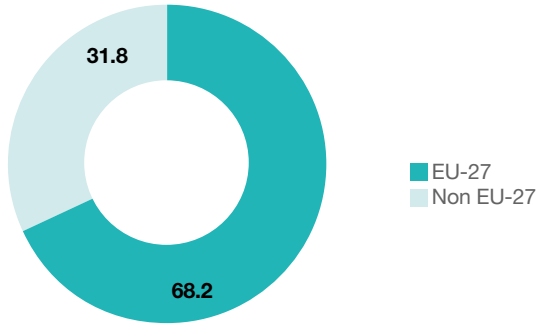
Blue renewable energy encompasses offshore, inshore, and nearshore generation of clean and renewable power from natural sources. It includes offshore wind energy, offshore photovoltaic production, and ocean energy technologies that harness tides, waves, geothermal gradients, and salinity gradients for power generation. **Blue renewable energy has the potential to significantly contribute to sustainability by offering a cleaner and quasi-infinite energy source with less pollution and greater spatial availability compared to fossil fuels and onshore renewables.**

2.5.1. Geographical overview

This sector has by far, the largest number of deals and total investments compared to the other sectors of the Blue Economy. It has the highest average number of deals per year (53 deals per year since 2018 compared to 26 all sectors combined) and gathers the highest volume of combined financial inflows (debt, grant, early-stage equity, and growth-stage equity investments). Since 2018 about €3 billion has been invested in this sector, compared to an average of about €830 million in all sectors combined. Finally, it is also a sector where the average deal size (€46 million) is by far higher than the average deal size across all the sectors (€24 million), but this is partially due to some M&A deals that drive up the average.

Within the sector, 589 deals were included in the dataset[50] compared to an average of 251 deals for all Blue Economy sectors, reflecting the vibrancy of this sector over the period in question. In terms of number of deals, blue renewable energy is just ahead of blue tech & ocean observation with 464 deals. This may be directly linked to the European commitment to develop alternative and renewable sources of energy, and the presence of highly suitable river and ocean environments (with offshore wind farms, tidal energy, etc.) to develop technologies for the energy transition.

Figure 25. Share of deals in Europe (% total total number of deals)



Source: CB Insights. PwC analysis

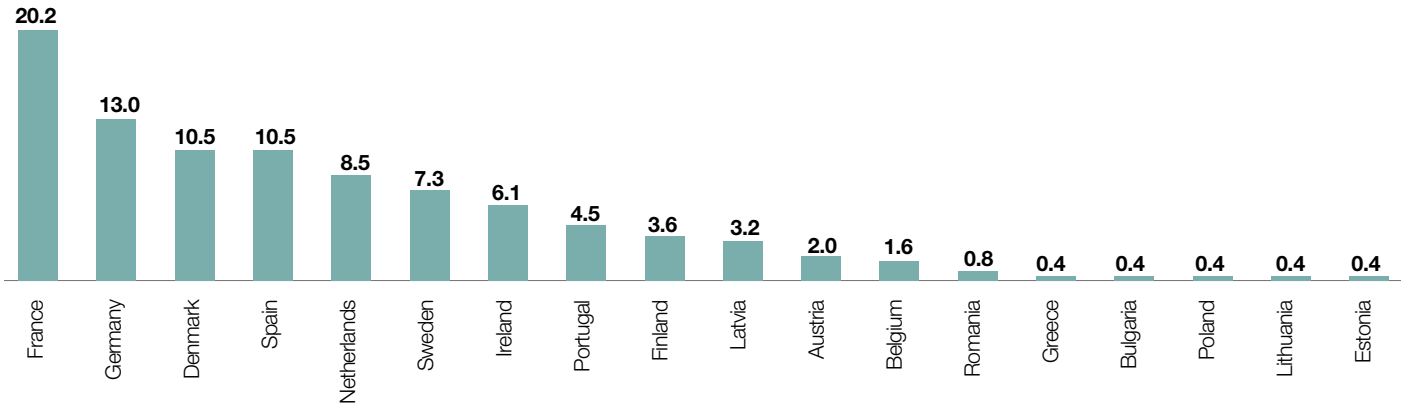
Moreover, more than half of the total number of deals have occurred over the most recent period (from 2018), showing continuous acceleration on its growth trajectory in recent years. Since 2018, 53 deals are made per year on average in this sector, far ahead of the cross-sector average that stands at 26 deals per year since 2018.

Over the past 20 years, the majority of European deals in the Blue Renewable Energy sector occurred within the EU. 32% of the deals took place in the rest of Europe. This proportion is slightly below the share of the EU deals in all sectors combined (72.2%), showing a slightly stronger role of non-EU European countries.

Among the non-EU countries, most of the deals relate to companies based in the United Kingdom or in Norway. The United Kingdom is particularly active in this sector - it has its largest share of deals in Blue Renewable Energy. Both Norway and the UK have advantageous access to strong wind resources, long coastlines and sea with high tidal and wave energy resources and give high priority to the development of Blue renewable energies to achieve their net zero plans (Norway is already a leader in renewable energy production). The UK has also recently announced significant higher subsidies for new offshore windfarms to support the sector.[51]

50. The full methodology is available in Annex
51. "UK to offer higher subsidies for offshore windfarms after crisis talks", The Guardian, 16 November 2023

Figure 26. Distribution of deals (% total numbers of deals) within the EU as from 2018 (blue renewable energy)



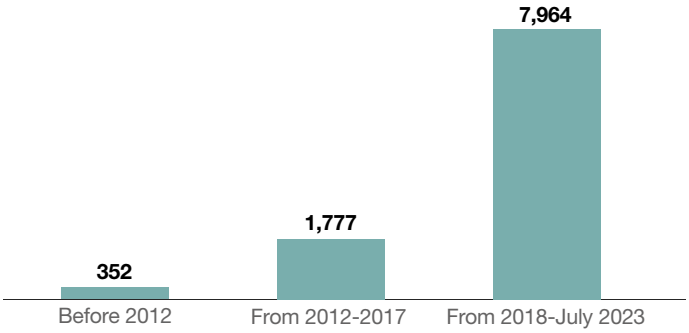
Source: CB Insights. PwC analysis

Concerning the EU countries only and looking at the more recent past, deals in the last five years are concentrated around five countries: France, Germany, Denmark, Spain, and the Netherlands, with more than 62% of the deals occurring in these five countries. These countries tend to have a more mature Blue Renewable energy sector, a higher number of projects under development, and a high number of device manufacturers in the field.[52] M&A features particularly strongly across the leading countries, with early-stage investing looking strongest in France and Spain. France also figures strongly in growth-stage renewable energy investing alongside Germany. These five countries are also the ones with a larger number of deals across all sectors of the Blue Economy.

2.5.2. Deals and investment dynamics

Over the full period, the cumulative investments reached more than €10 billion in this sector, representing more than 50% of total capital deployed in all sectors of the Blue Economy.[53] **Over the past five years, the cumulative investment amount in the EU (€7.9 billion, of which €3.3 billion correspond to debt, grants, and early stage, and growth equity stage investments) represents 58% of the total capital deployed in the EU Blue Economy. Likewise, the cumulative investment amount in the EU (€7.9 billion, of which €3.3 billion correspond to debt, grants, and early-stage and growth-stage equity investments) represents 58% of the total capital deployed in the EU Blue Economy. This is in part due to some large transactions in wind turbine and hydro-electricity generation that drive the investment amount to record high levels.**

Figure 27. Disclosed Investments in the EU in million €



Source: CB Insights. PwC analysis

The high number of transactions shows that this sector could be considered **the most dynamic and established sector. While challenges remain for more innovative technologies, the sector increasingly benefits from established renewable energy market opportunities** as technological advances lead to higher energy generation capacity and cost reduction. Blue renewable energy is expected to play a significant role in reaching Europe's Net Zero target, in the continued move away from traditional fossil fuels.[54]

In 2021 and 2022, annual investments in the EU reached on average €1 billion and in the first seven months of 2023, investments having already reached €2.2 billion for this sector. The recent energy crisis may have reinforced the interest, and the capital-intensive nature of many blue renewable energy projects has also driven upwards the amount of capital invested. In addition, some large IPOs and M&A have contributed to the large increase over the very recent period, but early-stage and growth-stage equity investments have also had positive dynamics.

The share of M&A has been increasing over time, in line with the other sectors of the Blue Economy, that is characteristic of a maturing sector. **This trend of increased M&A activity in blue renewable energy may reflect a strategic response**

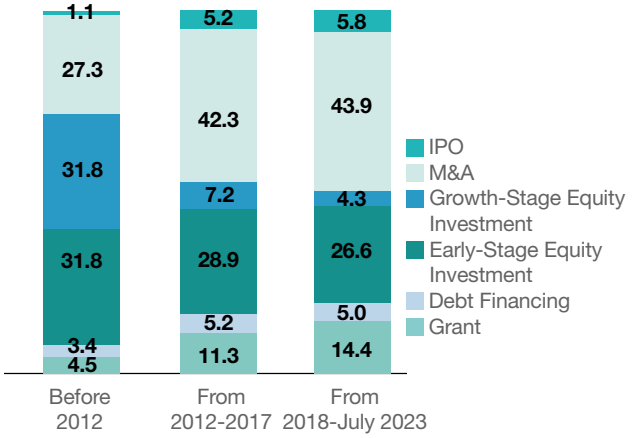
52. Fostering a Blue Economy: Offshore renewable energy (IRENA, 2020)
53. To be noted, this may be due to a better data coverage of this sector as the share of deals with undisclosed information on deal size is slightly inferior than other sectors (58% for blue renewable energy versus 64% for all Blue Economy sectors combined)
54. The EU Blue Economy Report, European Commission (2022). https://oceans-and-fisheries.ec.europa.eu/system/files/2022-05/2022-blue-economy-report_en.pdf

to evolving market dynamics and a desire to capitalise on its growing importance in the EU and the global energy landscape. This may also correlate to rising business opportunities in a context where the EU aims to multiply the capacity for offshore renewable energy by 7 until 2030 and at least by 20 by the year 2050.[55] Larger and more established players may seek opportunities to acquire or merge with smaller companies to expand their portfolios and gain a competitive edge.

The share of growth-stage equity investments has been falling, but the share of early-stage investment has been quite stable. This suggests that early-stage investors continue to try to find ways to invest, but growth capital remains reticent to truly commit to the sector, whilst entrepreneurs have to rely heavily on M&A activity as a means of opening up new horizons for their companies. **Even though this is a relatively large sector, the relative weakness of growth capital investment activity is a concern that requires continued attention if a truly technically diverse European renewable energy industry able to harness the full range of available energy sources is to become firmly established.** It continues to be challenging to grow some businesses to scale in this sector due to its capital intensity and limited number of blue renewable energy generation technologies that have reached the stage of commercial exploitation at scale, except for wind. If we take the EU only, and early-stage and growth-stage equity investments as from 2018, the sector collected about €1 billion of these investments, ranking second behind the water management sector.[56]

At the same time, the share of grants has been increasing quite substantially, representing about 14% of the total number of deals as from 2018 compared to about 7% on average for the whole Blue Economy, suggesting a public effort to achieve climate neutrality through the use of the ocean's power generation capacity. This also means that entrepreneurs continue to rely significantly on grants as they continue to seek to innovate and search for ways to access sources of investment to fuel their further growth. Finally, debt financing has remained at a low proportion (about 5% of the total number of deals) – banks may remain wary of some of the earlier-stage technologies that are still emerging in this sector – while IPO has been gradually growing (from 1.1% to 5.8% of the total number of deals). This is encouraging and shows that there is growing interest in investing in this highly visible and impactful sector.

Figure 28. Deals per investment category (% total number of deals)

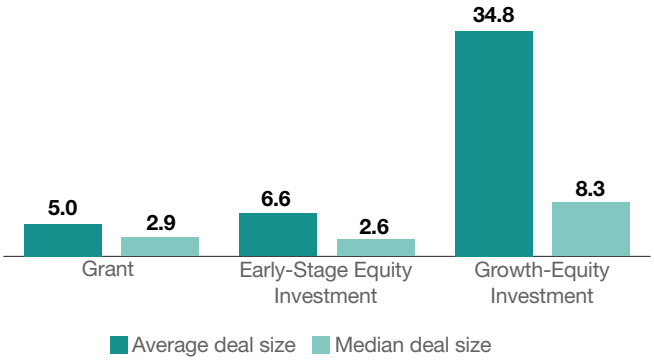


Source: CB Insights. PwC analysis

The average deal size in this sector[57] amounts to €46 million, compared to the average of €24 million across the other sectors. In terms of median, **the sector also ranks first with a median deal size of €4.4 million[58] compared to €1.9 million all sectors combined.** Deal size differs significantly across the different types of investment in line with expectations.

The figure below shows the average and median deal sizes for some investment categories.[59] Compared to the other sectors of the Blue Economy, the average deal sizes are higher in this sector irrespective of investment stage. For instance, the average deal size for growth equity investments amounts to €34.8 million in the sector compared to €22.0 million all sectors combined. This may indicate two forces at play: growing business opportunities that may attract larger investments, and on the other hand, the amount of investment required at each stage of a project due to the capital-intensive nature of many of these technologies, which may also require larger ticket sizes. The higher ticket size of these projects may also explain the falling share of growth equity investments as indicated above.

Figure 29. Average and median deal size for some investment types, in million €



Source: CB Insights. PwC analysis

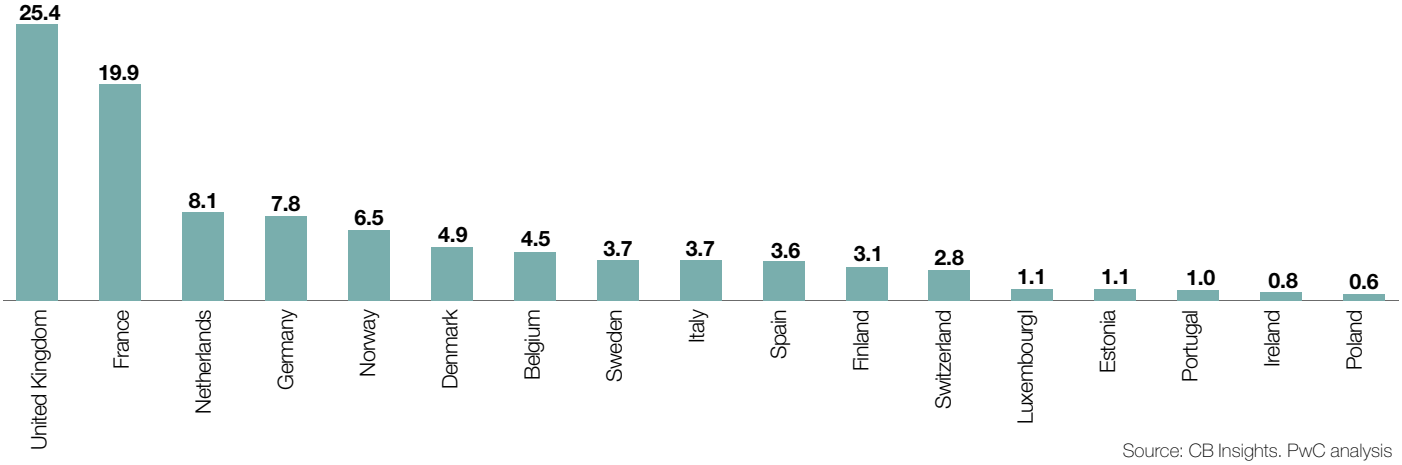
55. European Commission "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future" (19.11.2020): https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2096
56. Which is also partly due to one big deal (more than €1billion) at growth stage that occurred in water management
57. The dataset includes 249 deals with disclosed information on deals' size.
58. This means that 50% of deals have a deal size inferior to €4.4 million and 50% have a deal size superior to €4.4 million
59. We display the average and median for the categories with a relative larger number of disclosed deals.

2.5.3. Investor demographics

EU investors represent 53.3% of the total number of blue renewable energy investors over the full period. Outside the EU, the UK hosts the largest number of investors involved in deals related to Blue renewable energy, in line with the overall share of the UK for all sectors. This may be due to the large share of M&A deals and the specific role of London as a financial centre, but also to the relatively high profile of the technologically innovative renewable energy industry in the UK.

The US represents 7% of the total number of investors involved in European deals. France, the Netherlands, Germany, Norway, and Denmark host about 50% of the EU investors involved in Blue Renewable Energy deals.[60] These countries have well-developed financial services and industrial sectors, and a wide variety of investors are involved in deals (banks, government, asset managers, VC, PE, etc.). Given the high profile of this sector, the presence of investors from a broad range of countries and categories is not unsurprising.

Figure 30. Distribution of European investors (% total number of investors)

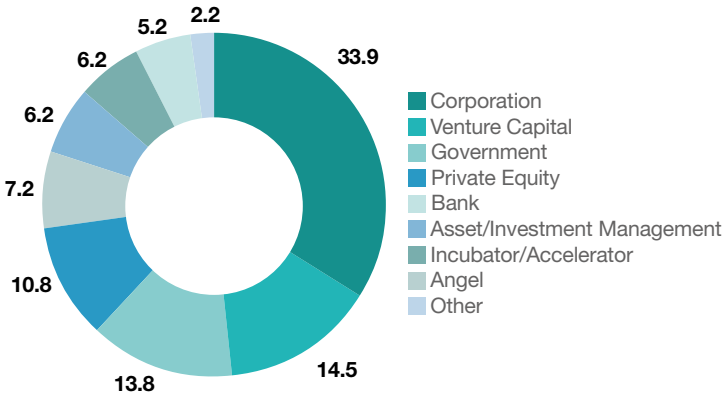


Source: CB Insights. PwC analysis

Figure 31 shows the different type of investors involved in the sector. Overall, corporations have the highest concentration of investors: they represent close to 34% of the total number of investors, driven by the prevalence of M&A activity in this sector. The second highest category of investors are venture capitalists, and then the government which is unsurprisingly linked to the weight of early-stage equity investments and grants mentioned above.

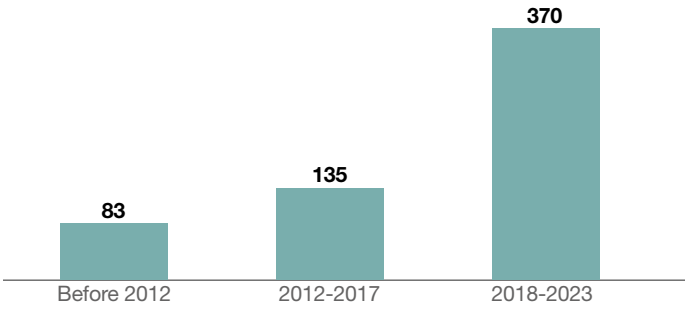
The vibrancy of the sector is also reflected through the number of investors, which has rapidly increased over the past period. Ten years ago, about 135 investors participated in Blue Renewable Energy deals. In the past five years, 370 investors were involved in such deals (note that a deal can attract multiple investors). This demonstrates that the sector is attractive to a wide spectrum of investors and is poised for growth, innovation, and collaboration between various stakeholders. Corporations will continue to be a significant feature in this sector as they seek to maintain market positions and expand into new markets. Government, incubators/ accelerators, and venture capital will also remain a strong feature given the exciting range of technologies and ongoing innovation that are part of the renewable energy landscape. The profile of private equity would be expected to grow over time as the extensive early-stage investment activity bears fruit and gives rise to growing numbers of early successes. The overall context for the sector is driven by strong EU and global commitment to transition to renewable energies, which is highly attractive to the overall investor landscape.

Figure 31. Type of investors (in % total number of investors)



Source: CB Insights. PwC analysis

Figure 32. Number of active investors over time



Source: CB Insights. PwC analysis

60. Countries for a share inferior to 0.5% are not displayed

2.6. Deal trends in blue tech & ocean observation

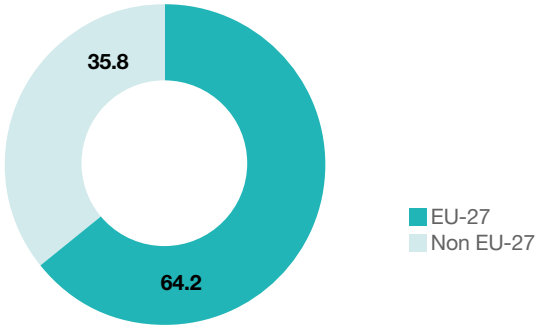
Blue tech & ocean observation involves turning ocean data into information for services, science, policymakers and management, and centres around data collection, modelling and prediction, as well as the supply of the associated instruments and infrastructure. Instruments include ocean sensing and imaging tools and new systems integration schemes, excluding oil and gas; infrastructure includes marine robots, undersea cable observation systems, sensor-equipped submarine telecommunication and power cables, float arrays, fixed and mobile platforms, and ocean-going research vessels. In addition to ocean observation, **this sector includes the observation of human activity in the ocean, carried out by subsectors such as maritime surveillance, security and defence, which are integral to EU and national agency efforts to safeguard European seas.** Maritime defence focuses mostly on navies, while maritime security and surveillance ensure the safety of navigation, the technological and operational safety of ships and the rescue of people in distress.

2.6.1. Geographical overview

This sector is second highest in terms of the number of deals – 464 deals compared to an average of 251. Since 2018, the sector closed an average of 40 deals per year compared to 26 across all sectors combined. But investment volume remains relatively low: it is seventh in terms of investment volume (only ahead of environmental protection and Blue Biotechnology), with about €500 million of disclosed investments in the EU for this sector.

Blue tech & ocean observation has been very dynamic in recent years in terms of deal activity but with less traction in terms of volume, with an average and median deal size standing at €8 million and €1.2 million respectively. This is also a sector with limited overall maturity, suggested by a low share of M&A deals, and with a majority of deals targeting early-stage or growth-stage equity investments. It is a sector where Northern European countries (such as Norway, Denmark, the Netherlands, and Sweden) appear to play a relatively larger role.

Figure 33. Share of deals in Europe (% total number of deals)



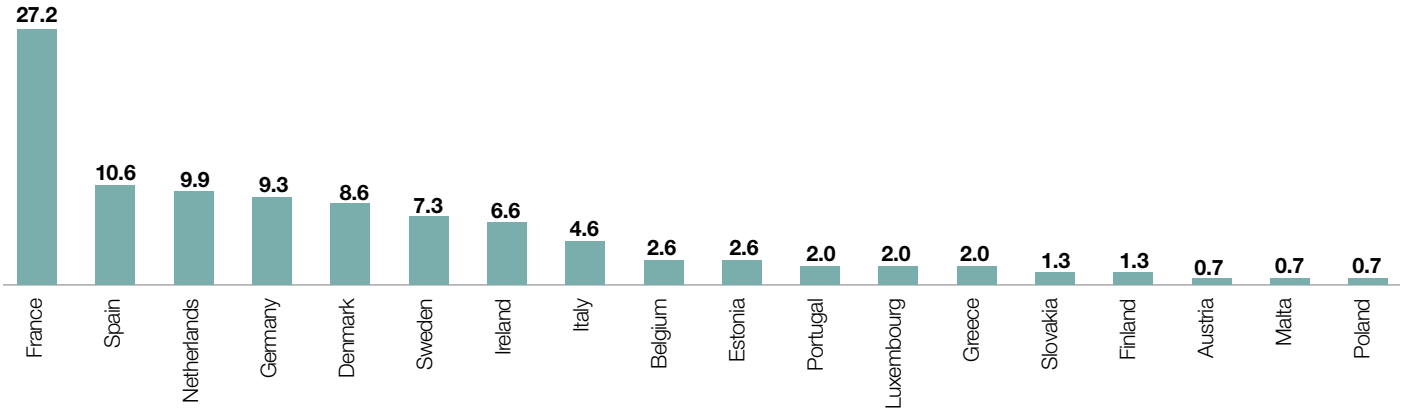
Source: CB Insights. PwC analysis

In Europe, 464 deals were analysed, showing important activity in the sector. About 50% of the deals occurred as from 2018 and a quarter since 2021. **This could be linked to the role of ocean observation in better understanding climate change and its consequences, as well as to defence and security, all of which will feed into future growth cycles.**

In the past 20 years, two thirds of the deals in this sector occurred within the EU-27, slightly inferior to the other sectors of the Blue Economy, where EU share is about 72% on average. Outside the EU, the UK alone gathers 25%, and Norway 8%, due to both their geographical location and their strong positioning in the field of coastal observation and monitoring technologies, in renewable energy (United Kingdom) and aquaculture (Norway), both sectors requiring strong monitoring capabilities.

Considering data from the most recent period (2018) and the EU only, the top five countries in terms of the deal activity are: France, Spain, the Netherlands, Germany, and Denmark. France has more than a quarter of the deals, reflecting a generally strongly supportive environment for funding innovation. This is also linked in part to a high number of companies in the defence sector that have developed innovative technologies for the ocean. Spain, the Netherlands, Germany, and Denmark each gather about 10% of the deals across a broad range of technologies, indicating a developed ecosystem for Ocean Tech in these countries.

Figure 34. Distribution of deals (% total number of deals) within the EU-27 as from 2018 (Blue tech & ocean observation)

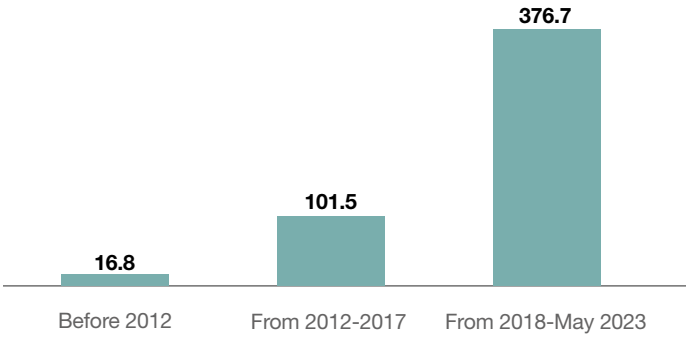


Source: CB Insights. PwC analysis

2.6.2. Deals and investment dynamics

Cumulative investment in the past 20 years reached €500 million,[61] ranking this sector as seventh in terms of cumulative deal volume and indicating room for growth. Compared to the 2012 to 2017, investments more than tripled between 2018 to 2023. This recent upswing in investment activity is also reflected in the positive dynamics on number of deals, with about 40 deals per year since 2018, after blue renewable energy (53 deals per year) and aquaculture & fisheries (47 deals per year).

Figure 35. Disclosed investments in the EU in million €



Source: CB Insights. PwC analysis

In terms of volume, this sector gathers only about 3% of the capital deployed in the Blue Economy. **On average, annual investments since 2021 reached about €80 million, which may still appear low given this sector's strategic role: a key enabler of European security and means of furthering ocean science as an essential input to understanding climate change.** The high number of deals, together with the modest investment volume, is representative of a sector that is undergoing intensive technology-based innovation and is currently mainly of interest to early-stage investors.

Although the environmental and social benefits of improving understanding of our oceans is clear, investment interest in this sector is still relatively low. **It should be noted, however, that business cases being developed in this sector are fast evolving. Given the huge and growing value of underwater assets, maturing and the rapid development of this sector is likely to follow. The UN[62] recently highlighted the lack of visibility of the market potential of this sector and the fragmented nature of its market, even as it holds significant potential**.

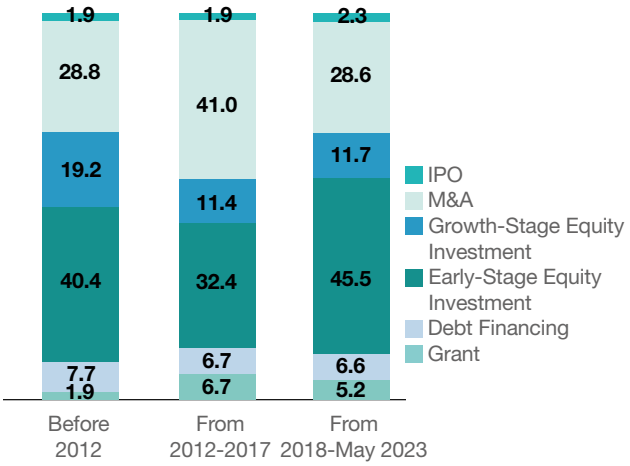
The figure below shows the share of deals by investment category. M&A is below average compared to other sectors of the Blue Economy. As from 2018, the share is 28.6% for this sector while for the same period, M&A stood at 38% for all sectors combined. This indicates a lack of later stage investment opportunities at present and an overall lack of maturity of the companies active in this sector.

Looking at growth capital over the full period, most of the deals occur at early-stage and this share has not decreased. Whereas the average size of growth-stage equity investments in this sector decreased, the share in number of growth-stage equity investments remained stable, at 11% of the total number of deals. This is one of the highest proportions amongst the Blue Economy sectors, reinforcing the interpretation that while **growth-stage equity investors are generally not investing large amounts, the sector is able to develop companies with solid products, customer bases and growth potential. Debt finance appears to be a relatively common option for this sector, representing about 7% of deals, compared to 4.5% across all sectors combined.** The growing adoption of drone and wireless communication technologies represent particularly interesting opportunities for the growth.

61. For this sector, 65% of deals have undisclosed deal size compared to 64% all sectors combined.

62. 23rd meeting of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea Panel: "New maritime technologies: the technologies, their uses and their contributions to sustainable development" United Nations Headquarters, New York, June 6th, 2023.

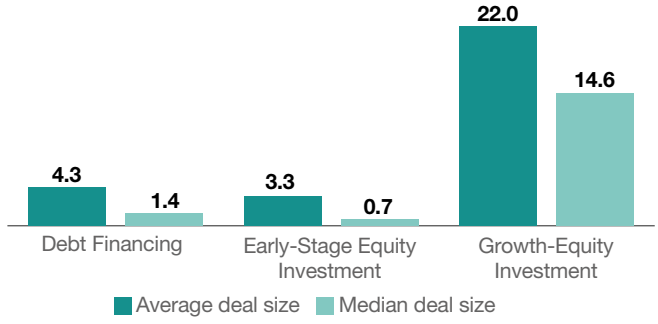
Figure 36. Share of deals per investment category (% total number of deals)



Source: CB Insights. PwC analysis

The average deal size in this sector[63] amounts to €8 million, below the average of all sectors combined (€24 million). This sector is characterised by the prevalence of small deals with a value inferior to €20 million and very few major deals above €100 million that could have driven up the average deal size. The median size value stands at €1.2 million compared to almost €2 million all sectors combined.

Figure 37. Average and median deal size for some investment types, in million €



Source: CB Insights. PwC analysis

As with the other sectors, deal size differs significantly across the different types of investments. The figure above shows the average versus median deal size for selected investment categories.[64] Compared to the other sectors, the average deal size for debt financing is €4.3 million, far below an average of €22 million for the whole Blue Economy. This correlates to the overall small number of large deals in this sector, which could suggest a limited level of risks taken by the investors.

Regarding early stage and growth-stage equity investments, average deal sizes amount to €3.3 million and €22 million respectively, in line with the other sectors of the Blue Economy.

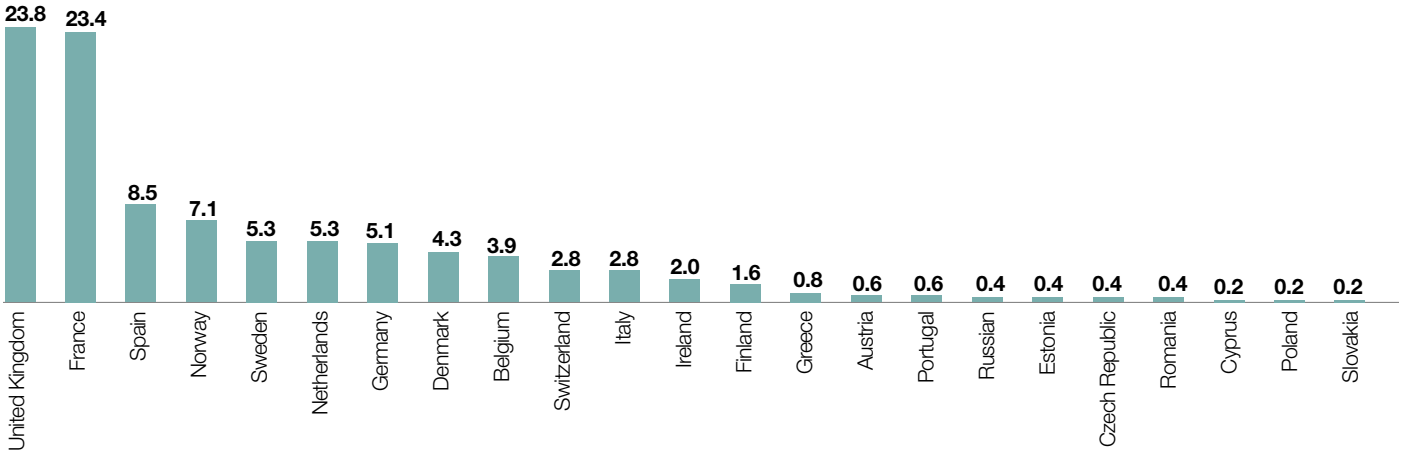
Overall, this sector attracts a relatively high number of smaller deals. For the time being, despite the clear potential, the investment community that is still working out how to engage with the sector on a larger scale.

2.6.3. Investor demographics

Based on investors' profiles,[65] European (EU and non-EU) investors represent 72% of the total. Investors from other continents come mostly from North America, with the others coming from Asia, Australia, and Gulf countries. **There is a more diversified investor base for this sector compared to other sectors of the Blue Economy, suggesting a wider range of investment possibilities for European companies and a signal that this is a market of global relevance and great potential.**

63. The dataset includes 154 deals with disclosed information on deal size.
64. We display the average and median for the categories with a relative larger number of disclosed deals.
65. The Figure does not include countries with a share inferior to 0.5% for readability purposes.

Figure 38. Distribution of European Investors (% total number of investors)



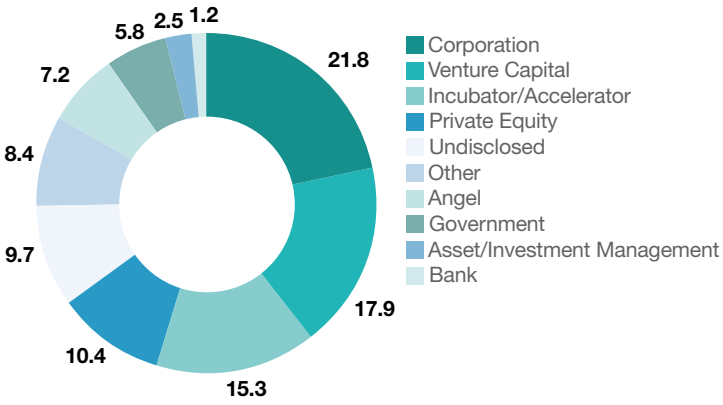
Source: CB Insights. PwC analysis

In terms of type, **Corporations, Venture Capital and Incubators/Accelerators represent more than half of investors, closely followed by private equity.** This reflects a financing ecosystem that remains substantially dependent on early-stage funding from these investor categories. It is clear that the amount of capital at growth equity stage and beyond could be strengthened, right through to M&A stage. Banks are quite under-represented with a share of 0.9% while debt financing amounts to 6%. In fact, we observe that private equity players, but also corporations and asset management entities, have provided significant amounts of debt to companies in this sector.

The number of investors increased massively over the period. Before 2012, 56 investors participated in deals. This number increased to 121 between 2012 and 2017, and then more than doubled in the latest period to reach 252 investors. Investor numbers grew highest in France, UK, US, Norway and Netherlands, countries that would be considered part of the mainstream investor community. This reinforces the notion that this sector is not supported by a special-interest investor group but is well established as an investment theme.

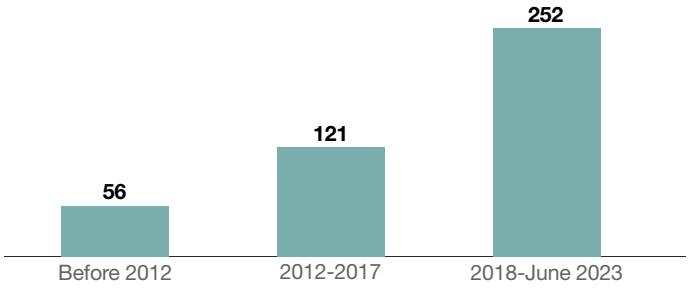
Given the context of security of infrastructure (such as cables) located in the sea/ocean, and the fact that ocean observations deliver critical data and can be the foundation of many downstream applications, it is expected that this sector will remain a highly strategic priority for innovators and investors in the coming years.

Figure 39. Type of Investors (in % total number of investors)



Source: CB Insights. PwC analysis

Figure 40. Number of active investors over time



Source: CB Insights. PwC analysis

2.7. Deal trends in coastal & maritime tourism

Coastal and maritime tourism encompasses social, cultural, and economic activities that provide services for tourism in coastal or marine environments. It includes beach-based recreational activities, non-beach land-based activities, water-based recreational activities, the cruising industry (including eco boats for recreational purposes), and the manufacturing and supply of related equipment and services. The sector is dependent on the quality of coastal and marine ecosystems, and vulnerable to threats such as climate change and biodiversity loss. Well-managed tourism can support conservation, contribute to sustainable development, and provide income opportunities for coastal communities.

2.7.1. Geographical overview

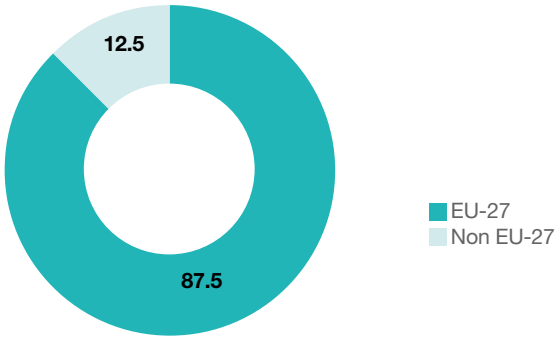
This sector presents the lowest deal activity. 64 deals were analysed, compared to an average of 251 deals all sectors combined. **Since 2018, this sector gathered six deals per year on average, compared to 26 deals per year across all sectors combined. This indicates a lower level of traction for this sector.**

In terms of volume, a total of €650 million of disclosed capital has been deployed since 2018, marking this sector as fifth in terms of disclosed investments for this period. This remains low compared to an average of €1.4 billion across all sectors. Finally, disclosed deals tend to be slightly larger, with average and median deal sizes standing at €29 million, and €2.1 million respectively (compared to €24 and €1.9 million all sectors combined) which may be due to larger required investments.

Coastal and maritime tourism employs almost 3.2 million people, generating €183 billion in gross value as of 2020.[66] Nonetheless, the relatively lower deal activity is not surprising given the specifics of this sector, which has a significant infrastructure and real estate component and may be perceived as having a lower technological dimension compared to the other Blue Economy sectors.

Despite a huge potential for sustainable tourism and investment into nature-based solutions, the lower level of deal activity may also reflect the limited availability of investments and projects that would be considered sustainable in this sector.[67] Due to the importance of creating a more sustainable tourism industry, we should expect that investment activity with a sustainability dimension in this sector will expand in the coming years.

Figure 41. Share of deals in Europe (% total number of deals)



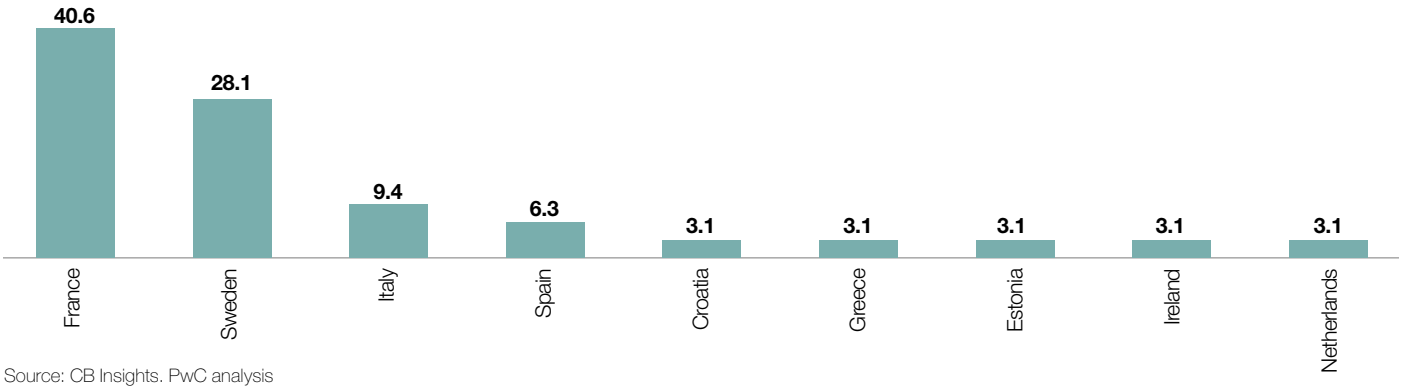
Source: CB Insights. PwC analysis

In Europe, the vast majority of the deals in the Coastal and Maritime Tourism sector occurred within the EU. 12.5% of the deals took place in the rest of Europe. The proportion of EU-based deals is significantly higher than for the other sectors (the overall average being 72.3%) which may be explained by the fact that in Europe, countries with some of the largest tourism industries are located within the EU, especially around the Mediterranean Sea.

Within the EU-27, France and Sweden have stood out on coastal tourism investment over the past five years. France leads the way with 40.6% of the deals. It has been the world's leading tourist destination for more than 30 years[68] and the country did not experience a major dip in coastal and maritime tourism due to Covid-19. While many countries relying on coastal tourism were affected by the pandemic, France managed to maintain and even exceed its expected activity, especially with domestic tourists.[69] Following France, Sweden has 28.1% of the deals in this sector. It offers recreational activities along its coastline and near coastal areas, especially around larger cities. While the pandemic hit foreign tourism hard, one segment that saw growth in Sweden was nature tourism with a sustainability dimension, as more people chose to have vacations within their country, commonly referred to as "staycations."[70]

66. A European strategy for more growth ans jobs in coastal and maritime tourism Eu Commission, available at: https://maritime-spatial-planning.ec.europa.eu/sites/default/files/doc_1.en__0.pdf
67. To be noted, it was not possible to find deals related to infrastructure projects such as eco-friendly tourism hotels which may create an underestimation of the deals' activity.
68. Ministry for Europe and Foreign affairs, Tourism, https://www.diplomatie.gouv.fr/en/french-foreign-policy/tourism/
69. Bridge Black Sea, Coastal and Maritime Tourism, https://bridgeblacksea.org/index.php/coastal-and-maritime-tourism/
70. Stockholm Environment Institute, Towards a sustainable Blue Economy in Sweden, https://www.sei.org/wp-content/uploads/2023/03/blue-economy-sweden-sei2023.014.pdf

Figure 42. Distribution of deals (% total number of deals) within the EU-27 as from 2018 (Coastal & maritime tourism)



Source: CB Insights. PwC analysis

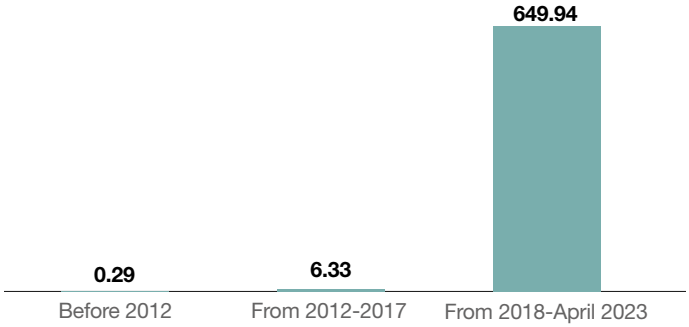
The presence of Croatia and Estonia, countries with a more modest presence in other sectors, in the top 10 countries is noteworthy.

2.7.2. Deals and investment dynamics

The cumulative disclosed investment in the sector is heavily concentrated in the past five years. Before 2018, the investment activity appears to be very limited. However, with almost €650 million of investments since 2018, it is the fifth ranked Blue Economy sector in terms of investments in the last five years. **The number of deals at the same time remains the lowest, with an average of six deals/year since 2018.** In terms of size, the average deal size stands at €29 million, which is superior to the average all sectors combined due to higher infrastructure costs. Furthermore, some infrastructure deals such as eco-hotels, may not appear as they may be covered in overall real estate activities, hence the average deal size may be underestimated.

The coastal tourism industry, some aspects of which have been subject by negative press during 2023, faces challenges such as overcrowding, pollution, coastal erosion, and changes in client preferences. These challenges are also an opportunity for the industry, which has growing incentives to develop more sustainable innovations that address these issues.

Figure 43. Cumulative disclosed Investments in the EU in million €



Source: CB Insights. PwC analysis

In annual terms, between 2018 and 2023 investments amounted on average to €100 million, slightly less than a tenth of the amount invested in Blue Renewable Energy, the top sector in terms of investment amount. This also shows the substantial scope for growth of this sector given its weight in the EU economy.

The EU sees this sector as having great potential to promote a smart, sustainable, and inclusive Europe. In late 2022, the Council of the European Union adopted the European agenda for tourism 2030. The agenda is based on the Commission's transition pathway for tourism and includes a multi-annual work plan with actions to be taken by the EU countries, the Commission and tourism stakeholders. This new set of policies are recognising the potential and importance of the sector (Europe being the world number 1 tourist destination), which can further help to develop a strong increase in investments in the coming years.

The figure below indicates the share of the total number of deals per type of investment. Given the high concentration of deals over the last five years, we place particular emphasis on analysing deals as from 2018.

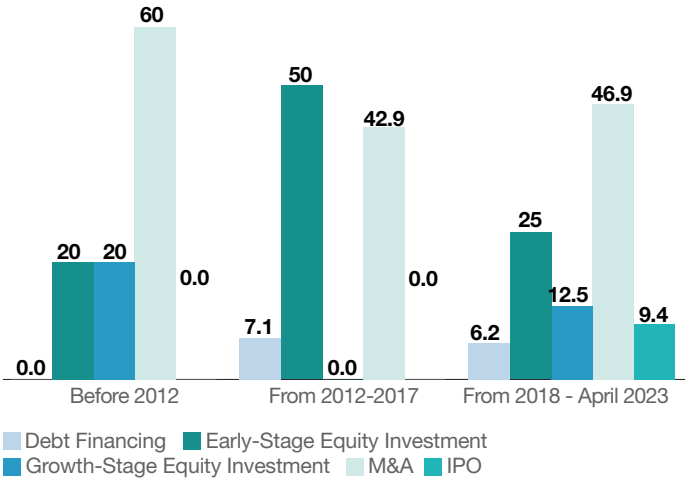
First, M&A represent almost half of the deals, which indicates a healthy and mature environment. **The coastal touristic sector being quite a traditional industry, in which professional venture capital and private equity investors have played only a small part to date, it is not surprising to have such a significant share of M&A. In fact, the share is higher than the average for the rest of the sectors** (38% all sectors combined in terms of the total number of deals). We also see signs of a gradual diversification of investor-types in this sector, with the full range of players being present for the first time in the most recent period studied.

As regards the types of financial inflows, the absence of grants is notable, suggesting **few grants being awarded to companies in this sector whereas the share of grants is 7% on average for all sectors combined.** On the contrary, debt plays a slightly more substantial role in the sector with a share of debt financing being at 6.2% in terms of the number of deals (compared to 4.6% for the Blue Economy as a whole). **Debt financing represents**

about 27% in terms of the volume of capital deployed since 2018 in coastal tourism. This may reflect the easier availability of collateral in the form of fixed assets or concession rights that are owned by companies in this sector.

Early-stage equity and growth-stage equity investments remain low in terms of the number of deals compared to most other sectors. As highlighted above, this may reflect the fact that this sector has, to date, not been targeted by mainstream professional investors. It also explains the relative importance of M&A transactions, which compensate to some extent the lack of capital available to fund organic growth of businesses in this sector.

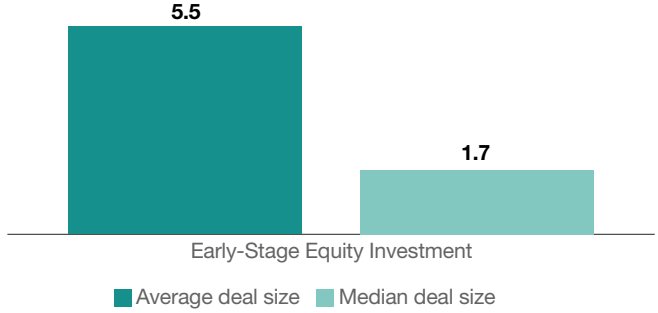
Figure 44. Share of deals per investment category in %



Source: CB Insights. PwC analysis

The analysis on the average deal size for coastal and maritime tourism is limited by the fact that information on deal size is available for 23 deals only, among which 13 relate to early-stage investments which explains why the average and median deal size are displayed for this stage only. Hence, these numbers must be taken with caution and are more illustrative than representative of the whole sample.

Figure 45. Average and median deal size for some investment types, in million €



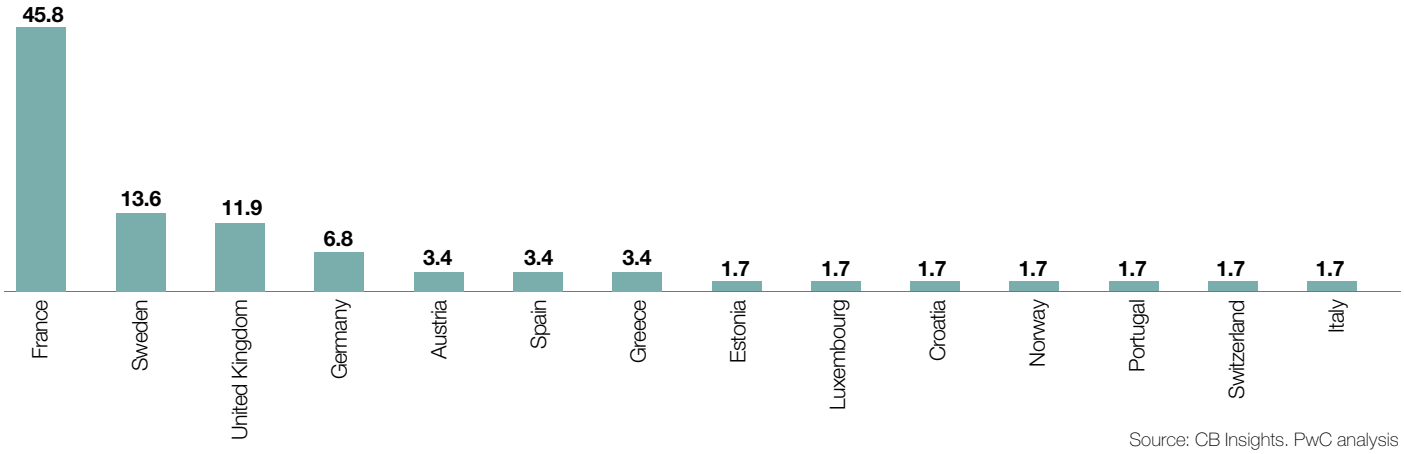
Source: CB Insights. PwC analysis

All investment stages combined; the average deal size is €29 million, which is higher than the average for the entire Blue Economy (€24 million). This may reflect some infrastructure component and larger debt deals. **In addition, the average deal size for early-stage investments stands at €5.5 million whereas the median deal size for early-stage equity is €1.7 million which is due to a small portion of larger deals (2 out of 13 deals are above €17 million) that drives the average up. Again, compared to the other sectors, average deal size at early stage is higher for this sector, reflecting higher infrastructure-related investments.**

2.7.3. Investor demographics

When looking at the investors' profiles, we note that **64.3% of investors are from the EU,** with those coming from other continents and non-EU European countries contributing a total of 24.3%, mostly from the US the UK and some from Switzerland and Norway. The proportion of the EU investors is significantly higher than for other sectors (48.1% all sectors combined). **Investors from other continents come exclusively from the United States of America.** The highest investor base growth has taken place in France, which is in line with the high total share of French deals in the sector, and the share of French investors since 2021 remains high at about 40%. **The investment opportunities in this sector would typically be local in character, hence it is not surprising that the share of non-EU investment is relatively low.**

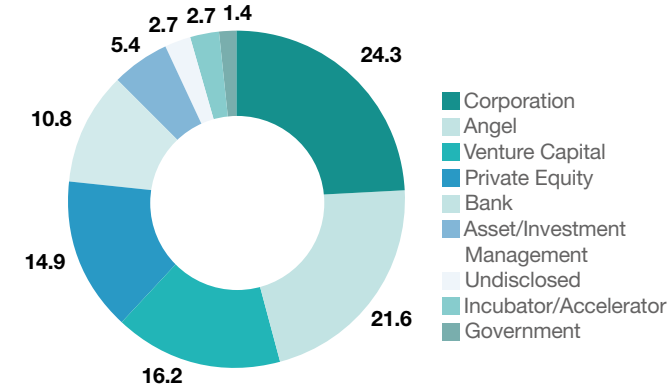
Figure 46. Distribution of European Investors (% total number of investors)



Source: CB Insights. PwC analysis

The figure below shows the different types of investors involved in the sector. **Corporations represent a large share of the total investors base with 24.3%, which is linked to the amount of M&A deals and is in line with the other sectors.** The relatively large presence of corporations can also be explained by the appetite of well-established companies to make substantial investments in the coastal and maritime tourism sector, such as sustainable ships for recreational purposes, and marine floating modules to adapt to the rise of sustainability considerations within the tourism industry.

Figure 47. Type of investors (in % total number of investors)



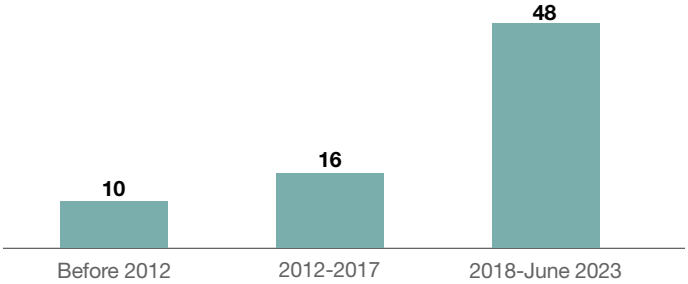
Source: CB Insights. PwC analysis

There is also a **significant share of angel investors (21.6%) whereas angel investors represent only 3.3% of investors on average in all sectors combined.** Angel investors may be motivated by factors beyond pure financial returns, including personal interest in the ocean, environmental preservation, or a desire to contribute to the growth of the sustainable tourism industry in their locality. Unsurprisingly, most of them participate at early stage.

The share of venture capitalists and private equity is quite balanced at about 15%, while banks represent a higher share than in other sectors: they account for 10% of the investor base in this sector compared to about 4% for the Blue Economy as a whole, which is linked to the relatively higher share of debt financing in this sector.

Finally, the coastal and marine tourism sector has seen a slow but steady increase in the number of investors. Between 2012 and 2017, only 16 investors were logged, whereas for the last period we see an increase to 48 investors. The relatively slow growth in the number of investors compared to other sectors could be attributed to this sector not being a traditional target for professional investors who tend to prefer more technology-driven sectors. It may also be due to the still nascent market demand and consumer awareness for sustainable tourism. **While there is a growing interest in environmentally conscious tourism, mainstream consumer demand and willingness to pay a premium for sustainable experiences may still be limited. Investors may continue to closely evaluate market dynamics and demand trends before committing significant resources to sustainable businesses and projects in the tourism sector.** However, as the markets for sustainable tourism grow and business models that leverage the potential for nature-based solutions and revenues from biodiversity and ecosystem services become more concrete, investor interest in the sector is certainly expected to grow.

Figure 48. Number of active investors over time



Source: CB Insights. PwC analysis

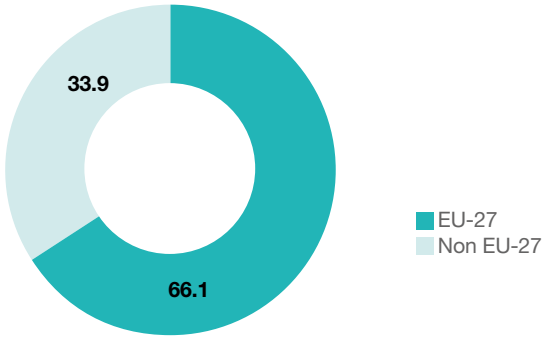
2.8. Deal trends in environmental protection & regeneration

The sector focusing on environmental protection and regeneration of marine environments involves the use of technologies such as monitoring water environment conditions related to, for example, pollution, noise, or sources of litter that may harm the environment. An important focus is the regeneration and restoration of biodiversity to improve the health and resilience of coastal ecosystems. **Green transition for this sector refers to the integration of marine ecosystem preservation and ocean pollution control within all economic activities.**

2.8.1. Geographical overview

Overall, **this sector appears to be one of the least developed both in terms of deal numbers and volume.** Firstly, within the sector, a total of 127 deals were identified compared to an average of 251 deals all sectors combined. Moreover, **since 2018, deal activity remains limited with 14 deals/ year (compared to 26 deals/year for the whole Blue Economy).** This makes it one of the least active Blue Economy sectors in terms of the number of deals, ranking 8th, only ahead of coastal & maritime tourism. In terms of volume, deals are relatively small with an average of €4 million only, and a median deal size at €0.9 million. **In total, based on disclosed amounts, the total amount of investments reached about €87 million in the EU, the smallest sector in the Blue Economy on this criterion. The dominance of 'public good' objectives in this sector and the fact that many of the business models might not be considered investable by the private sector may explain the small number of deals in this sector.** However, as the number of environment protection regulations applicable to European companies increases, the market for related innovations is likely to grow substantially, attracting investment on a much larger scale in the coming years.

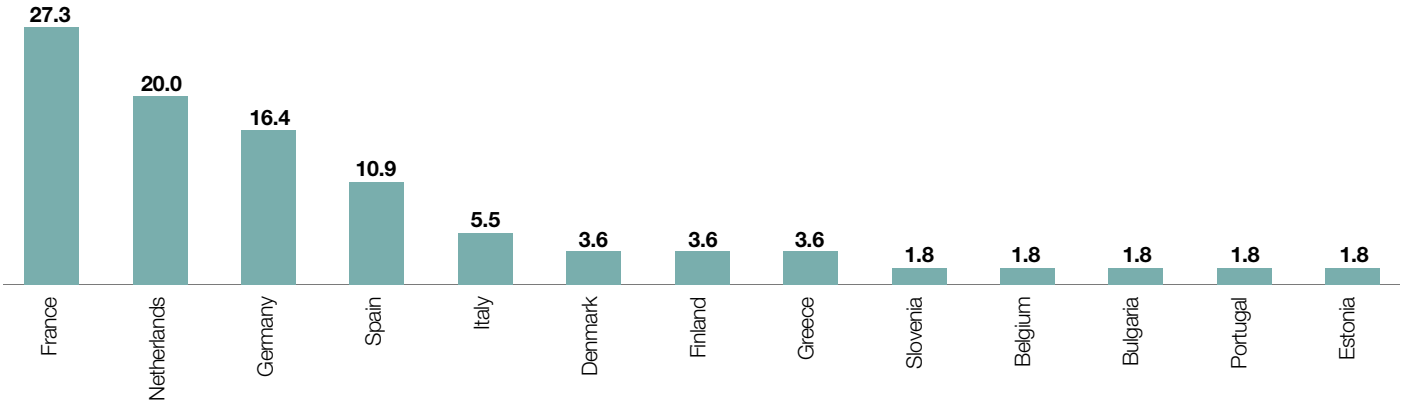
Figure 49. Share of deals in Europe (% total number of deals)



Source: CB Insights. PwC analysis

In Europe, the majority of the deals in the Environmental Protection and Regeneration sector occurred within the EU-27, while about 34% of deals took place in the rest of Europe. The share of EU-27 deals is slightly below the average for all sectors combined, which indicates a lower presence of EU companies within this sector and reflects a particularly vibrant investment dynamic in the United Kingdom and Norway. Within the EU-27, deals in the past five years are concentrated in France, with 27.3% of the deals. The next tier of countries, the Netherlands (20%), Germany (16.4%) and Spain (10.9%), make up a further 40% of the deals. This can be attributed to the particularly immediate threats posed by climate change in countries such as the Netherlands and Spain, whereas in Germany, environmental protection has for decades been a high policy priority due to pressures on the environment resulting from its high population density, level of industrialisation and strong dependence on fossil fuels. Finally, the list of countries that make it into the top 10 ranking also reflects the considerable access of these countries to the sea/ocean coastline and hence, the importance of the Blue Economy and the preservation of the ocean environment.

Figure 50. Distribution of deals (% total number of deals) within the EU-27 as from 2018 (Environmental Protection & Regeneration)



Source: CB Insights. PwC analysis

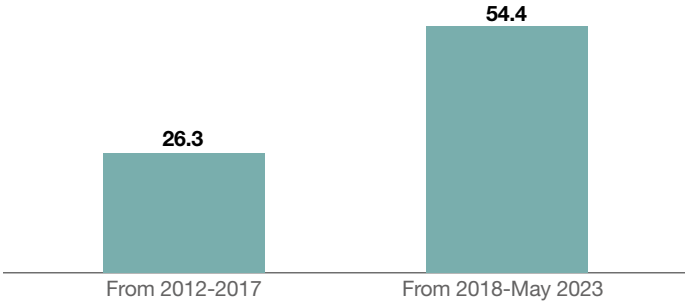
2.8.2. Deals and investment dynamics

Over the full period, **total disclosed investments reached around €80 million in this sector,** which represents the lowest amount of investment among all sectors in the Blue Economy. Since 2018, this trend prevails, with about €55 million investment made in this sector compared to an average of €1.4 billion all sectors combined. **This is coherent with the number of deals which is also low compared to other sectors: 14 deals/ year since 2018 compared to 26 deals/year all sectors combined.**

In the longer term, the sector should benefit from an emerging ecosystem of innovative companies that will address the undoubtedly significant market opportunity available to players in this sector in response to both public incentives (particularly regulation), development of innovative financial instruments and the growing awareness of the importance of environmental protection and regeneration among a broad range of stakeholders.

However, in the short term, in this emerging sector investors will still need to better understand business value propositions and the potential market demand for the environmental services. **As public awareness grows and obligations for companies to preserve and regenerate the environment broaden, the ability of businesses to build valuable, defendable projects that are attractive to investors should increase progressively.**

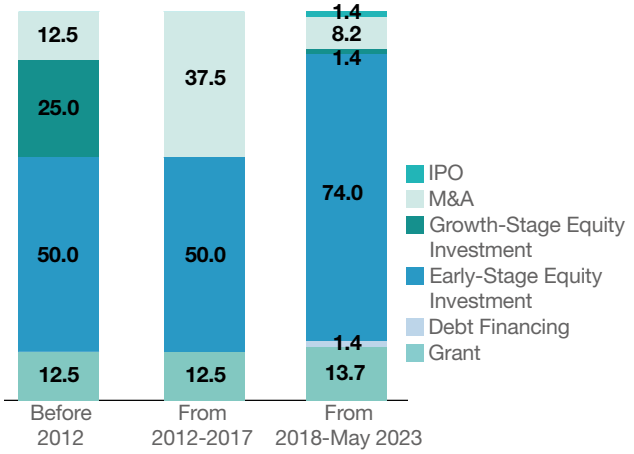
Figure 51. Cumulative disclosed Investments in the EU in million €



Source: CB Insights. PwC analysis

The figure below shows the share of the total number of deals per investment category. Similarly, to coastal and maritime tourism, deals are mostly concentrated in the latest period, and thus it is more meaningful to analyse this period only.

Figure 52. Share of deals per investment category in %



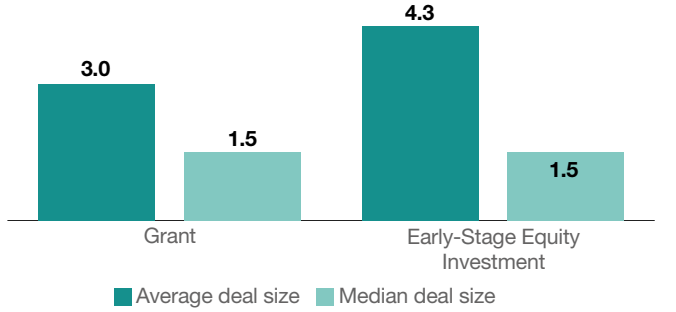
Source: CB Insights. PwC analysis

The limited share of secondary capital inflows (M&A) illustrates the overall lack of maturity of the sector and the relative absence of commercial pressures that might drive companies to undertake more extensive M&A activity in order to consolidate their competitive positions in this sector. Since 2018, **M&A represent about 8.2% of the number of deals,** well below the average for the other sectors (about 38%).

Moreover, **early-stage investments make up the vast majority of the deals, representing three quarters of the number of deals since 2018, and grants represent another 13.7%, both shares being significantly higher than in the other sectors of the Blue Economy.** It is worth noting that grants represent a higher share of deals in this sector compared to coastal and maritime tourism, which is similarly low level of deal activity. The importance of grants here is likely to reflect the fact that innovations in this sector require relatively more public support in the context of their public-good nature and therefore limited incentives for private investments. In other words, the landscape of companies still remains dominated by start-ups in early stages of development. **This is typical of a sector which has strong potential for science-based innovation but has yet to become a truly substantial commercial force. This is further illustrated by the very limited share of growth equity investments which represent only a 1.4% of the total number of deals since 2018.** Finally, debt financing is very rarely used: it represents about 1.4% of the number of deals, while in all sectors of the Blue Economy the average share is closer to 5%. The importance on addressing climate change and protecting the environment in Europe means that this sector is on a path towards a more mainstream commercial position in the coming years, and we would expect to see a correspondingly strong upswing in investment. This is likely to include additional investment into larger, more stable companies that have gained a strong foothold in their markets via growth equity stage and also via debt over the coming years.

Regarding the average deal size in this sector, it amounts to €4 million, which is far below the average for all sectors combined (€24 million). This is explained by the lack of major transactions in terms of volume and the concentration of deals in typically smaller early-stage equity investments. In terms of median, the results are similar: the median deal size in this sector amounts to €0.9 million compared to €1.9 million for the whole Blue Economy, showing that investors are not currently willing to invest large amounts and may need more examples of successful companies and evidence of successful exit strategies before committing to larger investments. Given that we have relatively more information on early stage (35 disclosed deals) and grants (8 disclosed deals), we provide the average and median deal size for these stages only. **Median and average deal size are quite similar in size, reflecting the concentration of the deals around the median.** Average grant size amounts to €3 million, compared to €4.8 million for the rest of the Blue Economy, and could reflect lower level of funding needs for early-stage companies in this sector because of the relative prevalence of grants. The average early-stage equity investments stand at €4.3 million, which is quite in line with the rest of the sectors.

Figure 53. Average and median deal size for some investment types, in million €

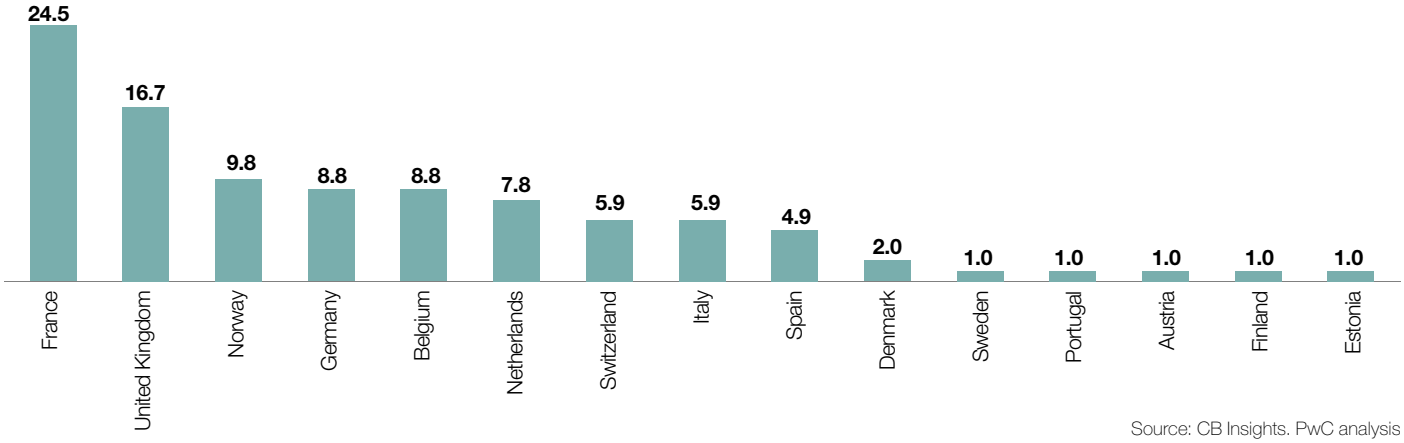


Source: CB Insights. PwC analysis

2.8.3. Investor demographics

EU and European non-EU investors represent 67% of investors. It is noticeable that whereas most European companies are based in an EU country, investors from non-European countries have an unusually strong presence. Furthermore, investors from other continents come mostly from the United States, and the remaining come from Asia and Australia. Within Europe, the majority of investment originates from investors based in France. The next most significant investor group comes from Germany, Belgium (likely EU institutions) and the Netherlands, which together form 25.4% of the EU investor base. UK and Norwegian investors contribute another 26.5% of the European investor base. The share of investors from these two countries is also bigger than in the rest of the Blue Economy. We find a relatively smaller number of countries from which the investors originate, which may also indicate a lower level of investment opportunities awareness around this sector.

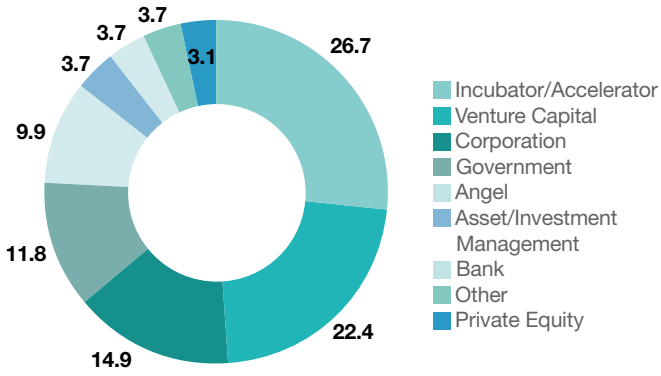
Figure 54. Distribution of European Investors (% total number of investors)



Source: CB Insights. PwC analysis

Incubator/Accelerators and Venture Capital represent more than 40% of investors, followed by corporations and government. This reflects the fact that this is not an established sector but that some attractive opportunities are still present at the smaller-scale, highly innovative end of the market. It can be noted that incubators/accelerators come from a variety of countries. In the EU, there is a concentration of these investors in France, Germany, Italy, Spain amongst others, but they also come from the UK and the US, showing that international capital also supports the development of this sector at early stages in the EU.

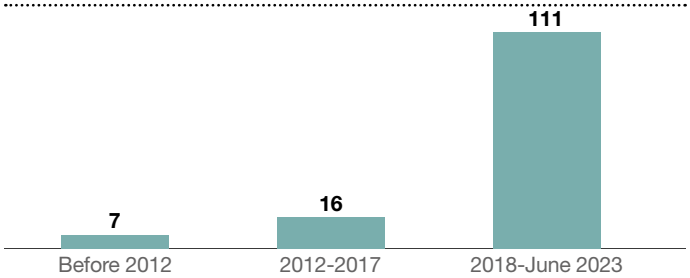
Figure 55. Type of Investors (in % total number of investors)



Source: CB Insights. PwC analysis

Finally, **the number of investors has been growing over time,** even though if we consider the period 2018-2023, the number of investors is one of the lowest across all sectors. While this club of investors was very limited in size with only 16 investors being active between 2012 and 2017, an increased interest for the sector is indicated by a surge in the number of active investors that reaches 111 in the period after 2018. Even if the total amount invested is not increasing significantly, this steep rise in the number of active investors is likely to be a sign of the growth to come. Also, compared to the other sectors, **there are fewer investors who have repeatedly invested in several deals, showing the importance of additional growth, and scaling over time** to retain and interest new types of investors, including growth capital investors. In the most recent period (2021-2023), investors have provided about €55 million, mostly through early-stage equity investments in small amounts (the majority of deals are inferior to €1 million) and requiring on average two investors per deal.

Figure 56. Number of active investors over time



Source: CB Insights. PwC analysis

2.9. Deal trends in shipbuilding & refit

Shipbuilding and refit involve the production of vessels and the delivery of products and services for their construction, maintenance, repair, and refitting. The industry operates in shipyards with dry docks and manufacturing equipment, and it is typically categorized based on vessel type, size, or end-user type.

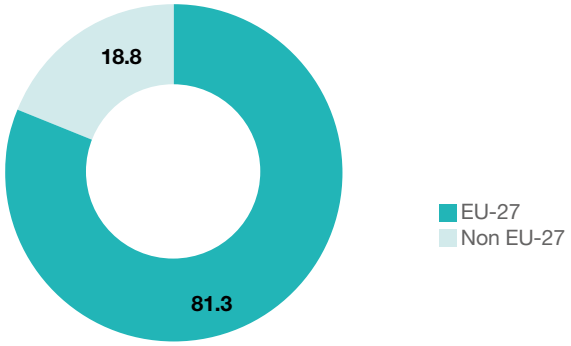
The green transition in shipbuilding and refit focuses on concepts like "green ship" design, which minimizes environmental damage through reduced material and energy consumption, recycling, and reusing materials. "Green shipyard" practices aim to use resources efficiently and reduce emissions during construction. Technological advancements enable the use of propulsion systems and e-fuels to decrease emissions and improve energy efficiency in vessels.

2.9.1. Geographical overview

Given that there are relatively more deals with undisclosed terms (74% of them), and a limited number of large deals related to big corporations active in the sector and undergoing a green transition, it is more informative to focus mostly on the number of deals for this sector.

Over the past 20 years, this sector accumulated 160 deals, which is rather low compared to 251 on average all sectors combined, and since 2018, the sector closed an average of 12 deals/year compared to 26 deals/year for the whole Blue Economy, which may indicate a relative lack of dynamism in this sector. In terms of disclosed investments, the sector accumulated about €1.6 billion investments which represents 7% of the capital deployed in the Blue Economy. We also observe large disparities depending on the source of financing: the number of debt financing deals was quite limited (9 in total) but large (over €1 billion in total) whereas other financial flows amounted to about €300 million in total, with an average of €3 million per transaction. This is also a sector where Italy and Denmark are relatively more present than in other sectors.

Figure 57. Share of deals in Europe (% total number of deals)



Source: CB Insights. PwC analysis

For the shipbuilding & refit sector, a total of 160 deals were analysed for this period. The shipbuilding & refit sector is the 7th sector in terms of total number of deals, but almost half of them occurred in the last five years.

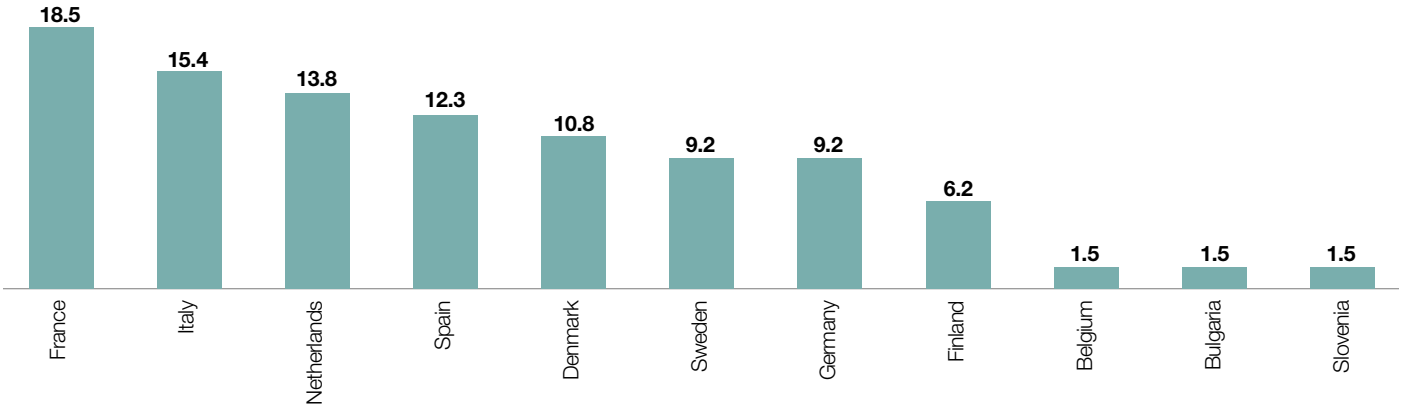
More than 80% of the deals in the shipbuilding & refit sector occurred within the European Union while about 18.8% of the deals were made in the rest of Europe, with most of the latter occurring in the UK. The share of the EU is bigger than in the Blue Economy in general, for which on average 72% of deals are sourced within the EU, showing the relative strength of the EU vs non-EU European countries in this sector.

Within the EU-27 in the past 20 years, France, Denmark, the Netherlands, and Germany represented more than 50% of the deals. The largest share of deals occurred in France, reflecting its reputation for its well-developed maritime industry and the presence of international players likely to provide a favourable investment environment for the shipbuilding and refit industry. Next, the Netherlands that gathers about 15% of the total number of deals is also known to be strong in the shipbuilding field, and Germany is another traditional strong player gathering 10% of the total number of deals Finally, an increasing number of deals occurred in Italy and Spain: since 2018, the two countries gather 27% of the total number of deals compared to 11% in 2012-2017.

Among the non-EU countries, a large share of the investee companies was based in the United Kingdom, however when we look at only the last five years, the number of deals has declined significantly in the United Kingdom and Norway. This trend could be linked to the European Green Deal and related policies, aiming amongst other things to provide incentives for the sustainable development of the EU shipbuilding & refit technology sector.[71]

71. USWE (2020), Forecasting trend & challenges for a shipbuilding workforce in Europe

Figure 58. Distribution of deals (% total number of deals) within the EU-27 as from 2018 (Shipbuilding & refit)

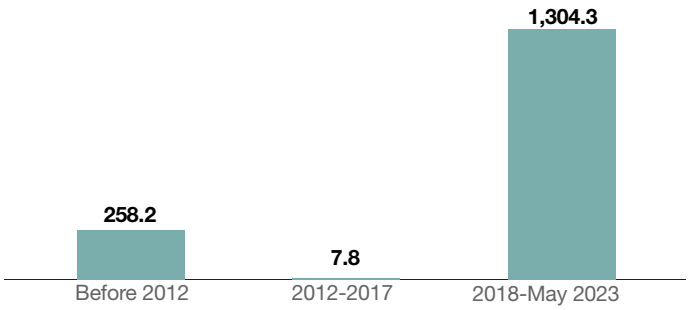


Source: CB Insights. PwC analysis

2.9.2. Deals and investment dynamics

The investments in the sector present some important disparities. Before 2012, the volume of disclosed investments stood at about €260 million, which represented about 25% of the capital deployed in the Blue Economy. The very few deals with disclosed amounts between 2012 and 2017 explain why the volume of investments is reported to be extremely low for this period.

Figure 59. Cumulative disclosed Investments in the EU in million €



Source: CB Insights. PwC analysis

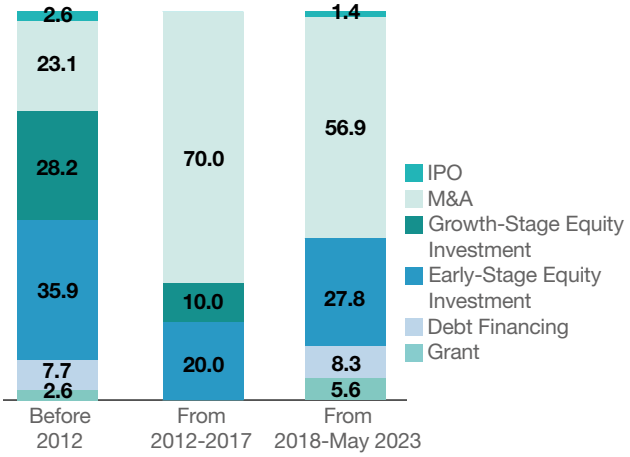
Since 2018, the sector has gathered €1.3 billion of investments but most of the disclosed volume is due to a limited number of loans provided to an international player active in its green transition. Apart from this type of financing, the volume of disclosed investments is particularly low, at about €200 million since 2018, and as from 2021, the sector gathered only €30 million annually.

The challenging circumstances related to the disruption of shipping from 2020 onwards[72] due to COVID-19 and a slowdown in global trade may be one source of explanation for the lower level of deal activity in the sector. In a forward-looking perspective, the sector's growth and future potential should not be underestimated, especially since the introduction of the European Green Deal in 2019, aiming to support the ongoing efforts to build innovative and climate-neutral ships and sustainable solutions for the shipbuilding and refit sector.[73]

The next figure indicates the share of each type of investment in the total number of deals for the three periods. Overall, the high share of M&A deals reflects the maturity of the sector with the presence of large and established firms able to make strategic investments. This is also a sector where **debt is a significant option due to the scale and maturity of many of the operators: debt financing represents about 8.3% of the total number of deals** since 2018 compared to 4.6% all sectors combined. By contrast, early-stage and growth-stage equity investments appear to lose track progressively in favour of debt and grants. Actually, since 2018 no deals were identified for growth-stage equity, and early-stage investments make about 28% of the deals. **The shipbuilding and refit industries are generally not a sector of interest for early and growth-stage equity investors because of their scale and maturity. The risk / return profile of most investments is more suited to larger scale corporate investments or debt.** These investors are typically looking for more dynamic investment opportunities, which do exist to some extent in this sector but with a lower investment volume. M&A does remain a significant force in this sector – despite its maturity there are a good number of opportunities for M&A deals to occur. The decline in growth-stage equity investment can be linked to the significant capital investments required for infrastructure development combined with in an uncertain context of global trade that may deter investors' appetite. Finally, grants represent a low share of transactions but are picking up to represent 5.6% of the deals, still below the average for all sectors combined (7.3%).

72. UNCTAD (2022): Covid-19 and Maritime Transport
73. USWE (2020): Forecasting trends & challenges for a 4.0 Shipbuilding Workforce in Europe

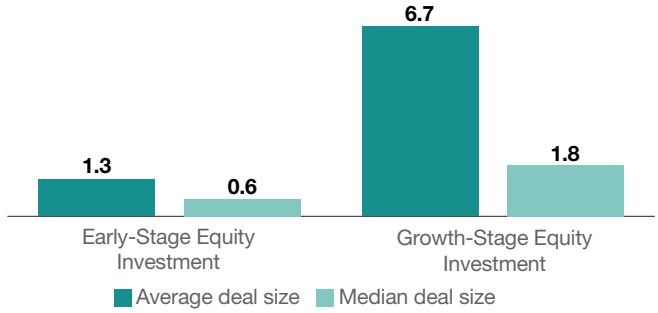
Figure 60. Deals per investment category (% total number of deals)



Source: CB Insights. PwC analysis

Regarding the average deal size in this sector, these numbers must be taken with caution and are more illustrative than representative of the whole sample because only 41 deals have disclosed information on the deal size. **All deals included, the average deal size amounts to €37 million** compared to €24 million for all sectors combined. As explained earlier, a relatively small number of debt deals make up the majority of the deals and drive up the average. In this context, the median deal size offers an interesting additional perspective: it stands at €0.9 million compared to €1.9 million all sectors combined.

Figure 61. Average and median deal size for some investment types, in million €



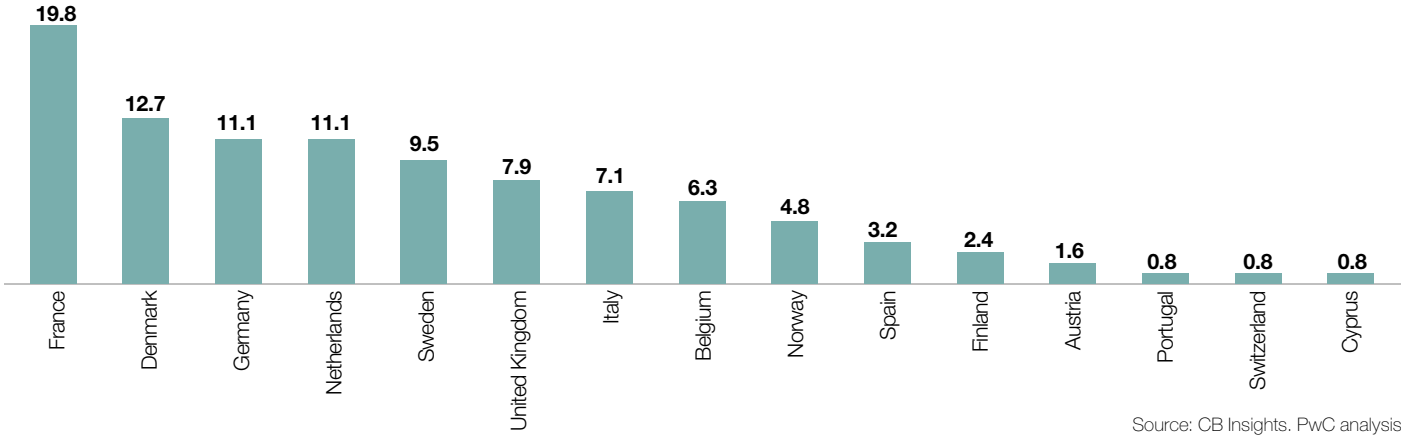
Source: CB Insights. PwC analysis

Hence, in addition to the large debt deals, the sector also includes some innovative technology companies that are of interest to investors offering mostly smaller investment amounts. Furthermore, early-stage and growth-stage equity investments provide limited amounts of capital to the sector, with average deal sizes in the sector for both early stage and growth-stage equity investments being lower than for other sectors. Overall, this tends to show a dual dynamic in this sector, with smaller early-stage equity investments representing investments in emerging technologies often still in the early stages of development co-existing with larger deals that involve international companies using mostly debt financing.

2.9.3. Investor demographics

When looking at the investors' profiles, we note that 65.2% of investors are from the EU, with a strong presence of France, Denmark, Germany, and the Netherlands. **Because shipbuilding is an activity that is located by default in very specific geographic locations, it is natural that it attracts a majority of investors from the host country.** Some of the earlier stage companies in this sector may still fall into the category that appeals to international investors who know the industry well. It is also important to note that 10% of investors are US-based, which is line with the share of US investors seen in the other sectors of the Blue Economy. The number of US investors is ahead of the UK which represents about 7% of the investors' population. US investors are composed of VC, PE, and corporations exclusively for this sector.

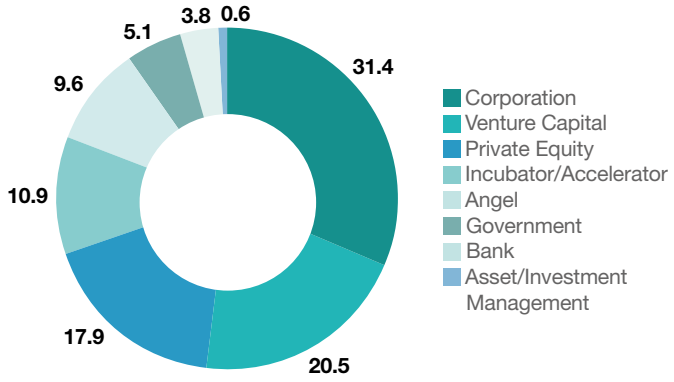
Figure 62. Distribution of European Investors (% total number of investors)



Source: CB Insights. PwC analysis

Figure 63 shows the different types of investors involved in the sector. Venture Capital, Corporations and Private Equity represent more than half of the investor base. The shipbuilding and refit sector requires substantial financial resources due its capital-intensive nature, explaining the large presence of corporations that have the capacity to undertake significant M&A transactions and larger amounts of capital expenditures. Asset/investment managers are relatively less present in this sector: all sectors combined, these investors represent 5% of the investors' population but only 0.6% for shipbuilding and refit. The same is true for government which represents 5% of investors compared to 9% all sectors combined, which is linked to the low share of grants in the total number of deals. Furthermore, while debt financing represents about 8% of deals, banks represent about 4% of the investor base indicating that other actors such as private equity funds may also be a relevant source of debt. Finally, business angels and accelerators/incubators represent about 20.5% of the investor population and are the ones investing in small tickets at early stage, suggesting that innovation in this sector remains alive and well.

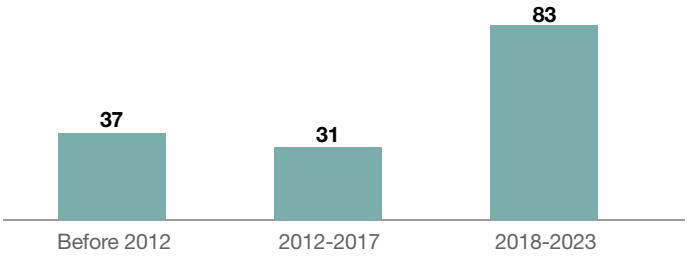
Figure 63. Type of investors (in % total number of investors)



Source: CB Insights. PwC analysis

Finally, the number of investors reflects the modest dynamics of the deals. Before 2012, 37 investors participated in deals, then participation declined in line with the limited number of transactions. Since 2018, activity has picked up again to reach 83 investors. The highest investor base growth is observed in France, the Netherlands, Germany, and Italy, followed by the United States, Belgium, and Sweden. However, when compared to other sectors, we observe that **relatively fewer investors are active in this industry, which would be in line with its characteristics as a mature, established industry with known and repeated sources of finance.**

Figure 64. Number of active investors over time



Source: CB Insights. PwC analysis

2.10. Deal trends in shipping & ports

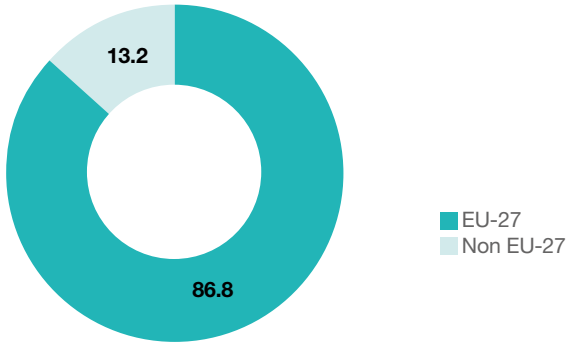
The shipping and ports sector involves the transportation of freight and passengers by water, as well as the infrastructure and activities that support it. Shipping includes passenger transport, freight transport, and other related services, while ports are crucial infrastructure that handle cargo and passengers. **Sustainable shipping and ports focus on "green shipping" strategies to make ship operations more sustainable, such as using cleaner fuels and optimising routes, and "green ports" initiatives that transform port processes, structures, and policies to reduce environmental and climate impact,** including infrastructure adaptation, digitisation, transparency in sustainability reporting, and use of renewable energy sources.

The activity in sustainable shipping and ports has been moderate over the full period based on the number of deals (189 deals compared to an average of 251 across sectors). Unlike some other Blue Economy sectors, **since 2018 the activity has not strongly picked up, with an average of 18 deals/year compared to 26 all sectors combined.** Along with shipbuilding & refit, this sector has a very low level of investments with disclosed details (only 18% of deals have disclosed amounts compared to 36% for the whole Blue Economy). Hence, we may underestimate to a significant extent the total volume of investments in this sector and the analysis focuses mainly on the number of deals (rather than the volume) and their characteristics. In terms of types of investments, early-stage and growth-stage equity are rare compared to M&A, which is consistent with the fact that this sector is quite mature, and investors see limited opportunities for ready-to-market innovations. Finally, countries such as the Netherlands and Belgium have relatively high degrees of investment activity due to the presence of international ports in these countries.

2.10.1. Geographical overview

For the Shipping & Ports sector, a total of 189 deals in the last 20 years were analysed. This makes it the sixth sector in terms of the total number of deals compared to the other Blue Economy sectors, which have an average of 251 total deals. As with shipbuilding and refit, this sector lags behind the major sectors of the Blue Economy in terms of deal numbers, and this remains true for the latest period with an average of 18 deals/year compared to 26 deals/year for the whole Blue Economy.

Figure 65. Share of deals in Europe (% total number of deals)



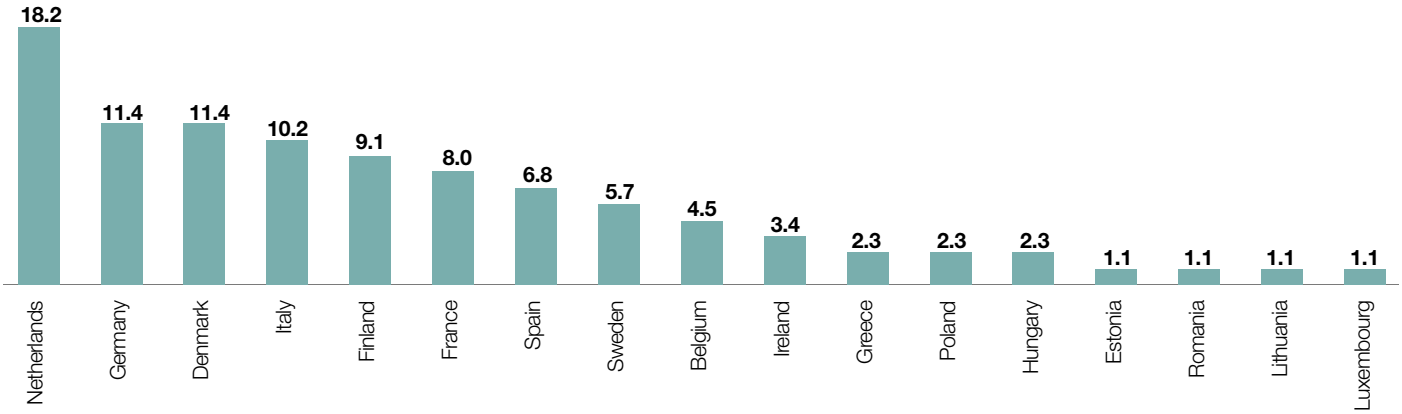
Source: CB Insights. PwC analysis

In Europe, the majority of deals in the Shipping & Ports sector occurred within the European Union while about 13.2% of the deals were made in the rest of Europe, mostly the UK with companies developing devices or IT solutions for ports. **The share of EU companies is higher than in the rest of the Blue Economy due to the economic activity of the EU ports in Europe.**

Within the EU-27, deals are concentrated around four countries. The Netherlands, Germany, Denmark, and Italy gather around 50% of the deals since 2018. This trend can be explained by several factors: first, these countries are known for their well-developed port infrastructure, making them some of the most advanced ports in Europe.[74] Furthermore, their ports are well connected to the rest of Europe, and the shipping and ports sector is a vital part of their economies, resulting in a reputation of expertise in maritime logistics, port management and shipping operations. Some ports in these countries have done a particularly good job of creating supportive environments that foster the development of young companies within the ports or their immediate surroundings through initiatives such as PortXL in the Netherlands.

74. European Parliament (2015): Modal Share of Freight Transport to and from EU Ports

Figure 66. Distribution of deals (% total number of deals) within the EU 27 as from 2018 (Shipping & ports)

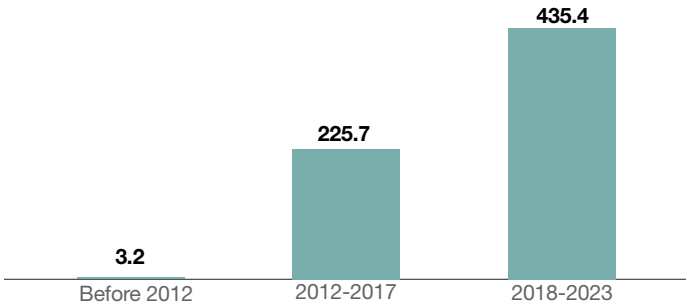


Source: CB Insights. PwC analysis

2.10.2. Deals and investment dynamics

The total cumulative investments over the past 20 years account for €664.3 million, for a total of only 33 deals with disclosed information on deal size. Given the low number of deals with disclosure of details, these numbers need to be put into perspective. Indeed, all Blue Economy sectors combined have an average of 90 deals with disclosed information compared to only 33 for this sector.

Figure 67. Cumulative disclosed Investments in the EU in million €



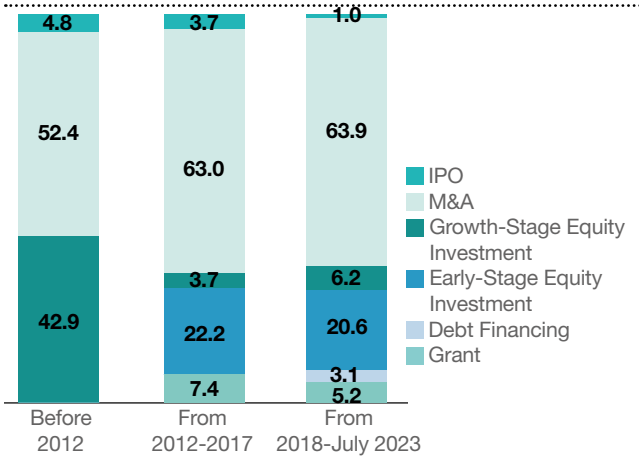
Source: CB Insights. PwC analysis

Cumulative disclosed investments in the sector have approximately doubled from 2012 – 2017 to 2018 – May 2023. Compared to the other sectors, this increase is still moderate. In terms of the total amount invested, between 2012 and 2017 this sector gathered about 5% of the total capital deployed in the Blue Economy, and between 2018 and 2023 it represents about 3% of the total capital deployed. **Also, whereas deal activity (number of deals) tripled on average between 2012-2017 and the latest period in all sectors combined, the activity only doubled in this sector.** The relatively lower growth could be attributed to the challenging circumstances and volatility in the shipping and port sector as a result of the 2020 pandemic causing disruptions and supply chain breakages, with negative consequences on the sector.[75]

In fact, since 2021, when looking at the number of deals, the activity in this sector is relatively limited, with 62 deals in total, only ahead of 3 sectors (coastal & maritime tourism, environmental protection & regeneration, and shipbuilding & refit). Looking forward, the increasing recognition of the need for additional investment to improve efficiencies and traceability of goods, and to decarbonise shipping and ports[76] may boost investors' appetite in this sector.

The figure below indicates the share of the number of deals per type of investment. Over the years, the largest share of deals is in the M&A category which has a greater number of deals than all primary capital transactions combined. This can be explained by the maturity of a sector which provides an opportunity to companies to grow through secondary capital and in which larger companies are seeking to consolidate their positions through acquisition of smaller but strategically important players.

Figure 68. Deals per investment category (% total number of deals)



Source: CB Insights. PwC analysis

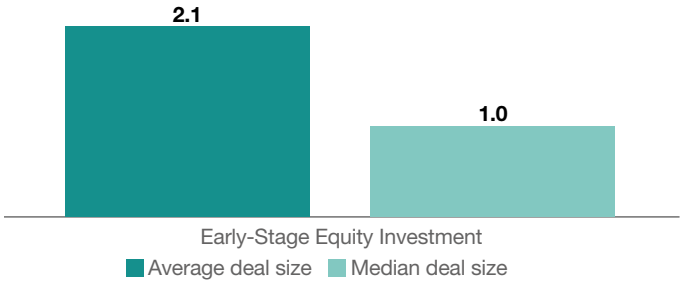
75. UNCTAD (2022): Covid-19 and Maritime Transport

76. Reuters (September 2023), Shipping industry has no easy path towards decarbonisation, UN agency says.

Regarding growth capital, whereas a large proportion of deals occurred through growth-stage equity investments, this share has declined over time. **Since 2012, and in the latest period as well, a smaller proportion of deals is devoted to early-stage or growth-stage equity investments. The decline in growth-stage equity investment could be linked to the fact that these sectors are not considered mainstream investment targets for professional investors.** In certain sub-sectors it is also true that significant capital investments are required compared to the relatively modest average ticket size of investors for this type of investment. The absence of substantial amounts of growth capital inflow explains the predominantly small size of M&A deals, where young companies have to rely on M&A in order to achieve some liquidity or access to capital rather than on capital inflows from growth-oriented investors.

Due to the large proportion of undisclosed deal amounts, the following numbers are more illustrative than representative. First, the average deal size in the sector stands at €20.5 million due to the influence on the analysis of some large IPOs, whereas the median deal size stands at €2 million which is in line with the median deal size all sectors combined (€1.9 million). In addition, early-stage equity investments have an average and median deal size around €1- €2 million, indicating that deals at this stage of investment are of rather similar size, and below the ones observed in other sectors (the average deal size for early-stage investments being at almost €4 million).

Figure 69. Deal size for some investment category, in million €

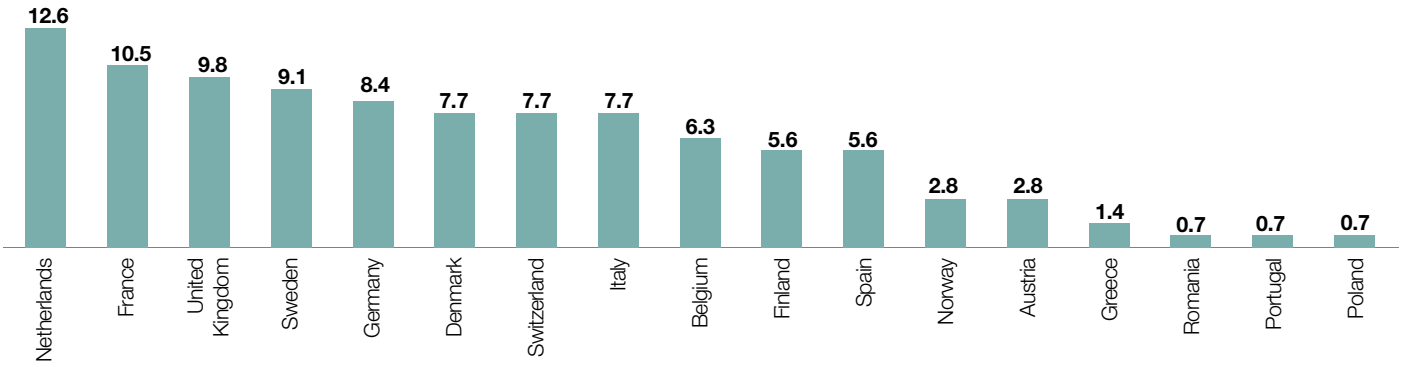


Source: CB Insights. PwC analysis

2.10.3. Investor demographics

When looking at investors' profiles, we note that 64.7% of investors are from Europe (see below for the split per country, with those coming from other continents contributing 31.8%, mostly coming from the US. The small number of investors from other continents came mostly from North America, followed by Asia. Within the EU, the distribution of countries is more even than in the rest of the sectors, showing that investors from many countries see opportunities in this industry. Whereas the shipping industry is by its nature a global industry that will attract global capital flows, ports are more likely to attract investment from local players looking to invest in their domestic infrastructure.

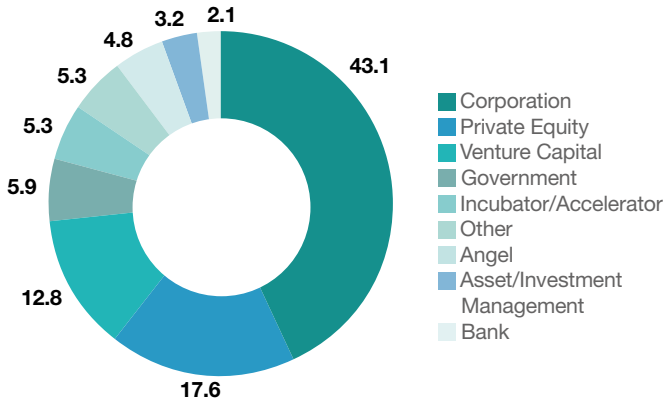
Figure 70. Distribution of European investors (% total number of investors)



Source: CB Insights. PwC analysis

Corporations represent a large share of the investor base with 43.1% of deals, which is directly linked to the number of M&A deals in the sector. In fact, this is the sector with the highest share of corporations as investors. Compared to the other sectors, the share of venture capitalists appears lower, standing at 12.7% compared to an average of more than 20% in the other sectors of the Blue Economy, which indicates a smaller share of early and growth-stage capital targeting this sector. The share of accelerators/incubators is also relatively smaller with 5.3% of the investor base compared to about 12% for the whole Blue Economy. Finally, active investors do not often make multiple investments in this sector. This would seem to show that investor community is still lacking around this sector and that investors are treating it in a more opportunistic way rather than as a core component of their investment strategy.

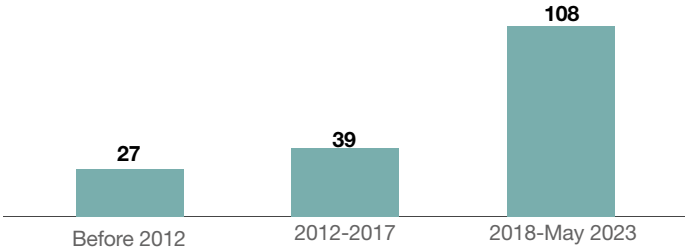
Figure 71. Type of investors (in % total number of investors)



Source: CB Insights. PwC analysis

Finally, the number of investors has increased since 2017 but the total number of investors remains low. Between 2012 and 2017, it slowly increased to 39 investors and reached 108 investors over the latest period. Still, when compared to other sectors, the number of investors remains quite low, a fact which could correlate with the high prominence of M&A deals and reflect the difficulty of companies in raising funds from multiple investors. The heavy infrastructural aspects of ports and shipping requires stable large-scale finance, and this may mask the potential for smaller innovative companies to play a meaningful role in this sector. **Continuing to develop innovation hubs around ports will be an important means of countering this phenomenon. Creating a stronger ecosystem of young companies and connecting them to opportunities in this sector will in turn help attract greater investment from angel and early-stage investors.**

Figure 72. Number of active investors over time



Source: CB Insights. PwC analysis

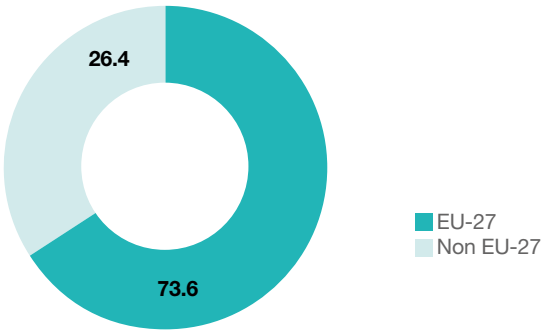
2.11. Deal trends in water management

Water management involves services and infrastructure related to the water usage cycle, including water supply, sewage operation, waste treatment, and water decontamination. Green water management focuses on preventing and repairing damage caused by pollution or contamination through stricter control measures, pollution reduction at the source, improved wastewater treatment, and carbon neutrality efforts. Moreover, sustainable water management includes desalination to supplement freshwater supply, promoting responsible water use, and fostering circularity by recovering valuable resources from waste products like salt and sewage sludge.

2.11.1. Geographical overview

This sector shows a relatively high number of deals over the full period studied: 284 deals were analysed compared to an average of 251 across all sectors combined, making it the 4th sector in terms of the total number of deals. Moreover, the number of deals has tripled between 2012-2017 and 2018-2023, in line with the whole Blue Economy. **In terms of volume, about €2.7 billion of capital was deployed, which makes it the 2nd largest sector in terms of the total capital deployed in the Blue Economy.** Among these investments, we observe that early-stage and growth-stage capital make almost 50% of the number of deals, which may indicate strong innovation possibilities. It is also a sector where the average deal size (€31 million) is higher than the average deal size across all the sectors (€24 million) which may be due to higher cost of deploying large scale infrastructure-based solutions in this sector.

Figure 73. Share of deals in Europe (% total number of deals)



Source: CB Insights. PwC analysis

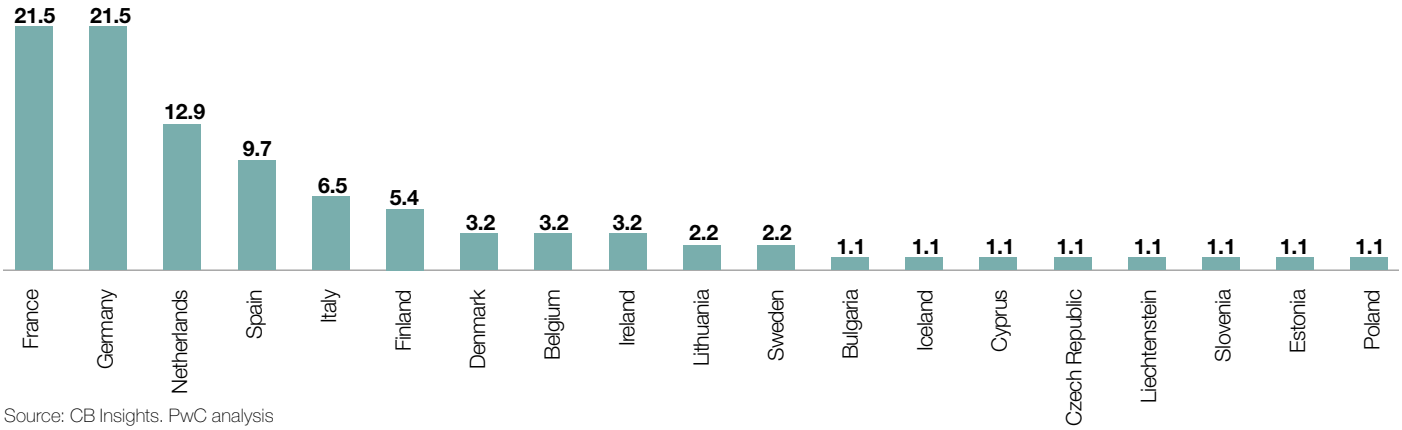
Within the sector, 284 deals were included in the dataset[77] compared to an average of 251 deals for all Blue Economy sectors, which reflects the overall investment opportunities that exist for this sector over the whole period studied. Moreover, **the rate of investment in the sector continues to accelerate, with the number of deals that tripled from 55 deals in 2012-2017 to 134 deals in 2018-2023. This growth is similar to the other sectors of the Blue Economy and indicates steady growth.**

Over the past 20 years in Europe, about three quarters of the deals in the water management sector occurred within the European Union while about 26.4% of the deals were made in the rest of Europe, either the UK, Norway, or Switzerland. This is in line with the other sectors within the Blue Economy.

Within the EU-27, deals are concentrated in three countries: France, Germany, and the Netherlands gather more than 55% of the deals. This could be linked to their history of dealing with water-related challenges, the already existing strong water management infrastructure in these countries, the regulatory framework and policies that promote sustainable water management, and their reputation for technological innovation and expertise in related industries.[78] The importance of water management for these countries is underlined by the new national plans that Germany and France published in 2023 to tackle water scarcity, with an increasing need to boost the water management sector.[79] Likewise, for the Netherlands water is a national security issue, contributing to its adoption of successive national plans and a strong focus on water management.[80] Out of the non-EU countries, the United Kingdom is the country with the highest number of deals, especially in the recent years. Its island status and lengthy coastline, as well as a well-established tradition of private sector management of water companies, contribute to this standing.

77. The full methodology is available in Annex
78. Global Water Intel (2023); OECD (2014)
79. Global Water Intel (2023)
80. OECD (2014)

Figure 74. Distribution of deals (% total number of deals) within the EU-27 as from 2018 (Water Management)

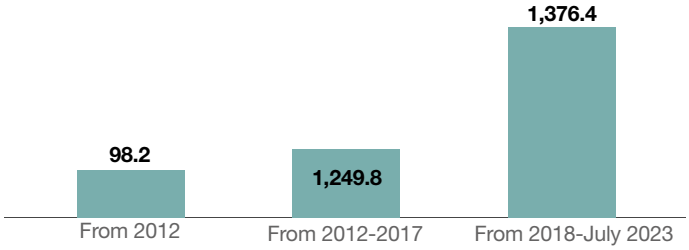


Source: CB Insights. PwC analysis

2.11.2. Deals and investment dynamics

The cumulative disclosed investments in the water management sector in Europe have reached more than €2.7 billion in the last 20 years, which represents about 15% of the investment made in the EU Blue Economy. This makes it the second largest sector in terms of the investment amount. To be noted, this sector has a relatively better data coverage in terms of the disclosed amounts, with 57% of undisclosed deals compared to 64% all sectors combined.

Figure 75. Cumulative disclosed investments in the EU, in million €



Source: CB Insights. PwC analysis

Moreover, it is notable that in the last five years investments were close to €1.4 billion. The growth is observed after 2012, however, compared to 2012-2017, the total disclosed volume over the most recent period has been high but largely static. This contrasts most other Blue Economy sectors where disclosed investments have been concentrated over the recent period.

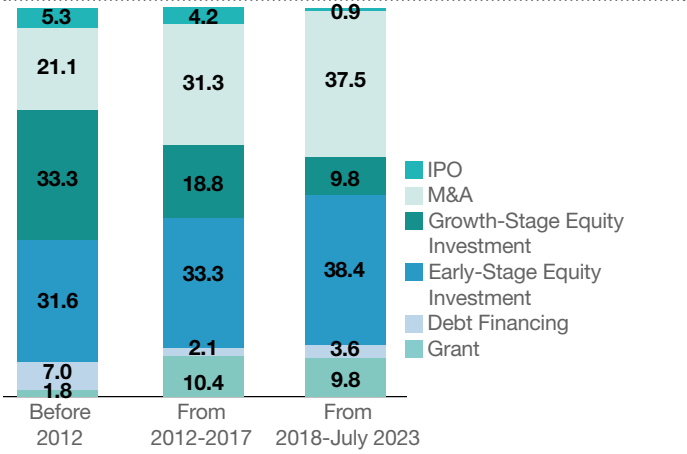
To be noted, a few very large investments made over the last 10 years have driven these amounts up, and correspond to either large loans, growth-stage equity investments or IPOs. Still, **with already more than 50 deals only for the period 2022-2023, this sector appears to continue to attract investor interest.**

An important determinant for the high level of investments in the sector is climate change and its effects on domestic and industrial water, driving the need to address water pollution, protection of human health and efficient recycling of resources. There is also a growing need for investments in wastewater collection and treatment, flood protection, modernising irrigation infrastructure and improving water efficiency to enhance agricultural productivity.[81] Similarly, an increased demand for desalination plants in water-stressed countries can be linked to climate change, with the global desalination market expected to increase with an annual growth rate of close to 9% between 2012 and 2030.[82]

As regards the different types of investment, the figure below shows the share of deals by investment category. On the one hand, **the share of M&A has been increasing over time, in line with the other sectors of the Blue Economy.** If the sustainability dimension of the sector is more recent, water management is in general a mature sector with a large share of well-established companies which can also help to explain the stable share of the total deal activity for M&A, which stands at about a third of all deals for this sector.

81. EIB (2023): Water Sector Orientation
82. EIB (2023): Water Sector Orientation

Figure 76. Deals per investment category (% total number of deals)

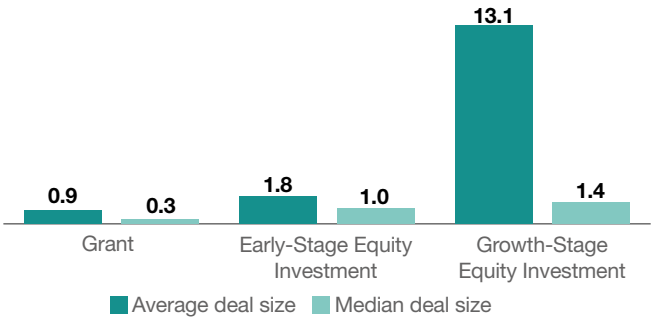


Source: CB Insights. PwC analysis

The share of deals made in early-stage equity investment has grown to reach about 37.5% of the number of deals in 2018-2023. Although the amount invested has risen, the relative number of deals in growth stages has been declining from about 33% before 2012 to about 10% as from 2018. This is in line with the other sectors of the Blue Economy where early-stage equity investments are more numerous than the typically larger growth-stage equity investments.This trend may reflect a combination of promising early-stage companies requiring capital and a smaller number of companies that go on to achieve commercial and attract later stage equity investments. **The water sector has also traditionally suffered from a paucity of business s that are considered investable by private sector investors, which may also be reflected in the lower number of growth equity investments.** Pressure on global water resources and the need to improve environmental aspects of water management mean that water is set to be an investment theme of growing importance over the coming years. Proving new business models in this sector and demonstrating success through case studies will help to maintain investor interest in the sector.

For the water management sector, the data covered 122 deals with disclosed information on deal size compared to 90 deals on average across the 10 sectors which help provide more information on the deal sizes for different categories of investments. The average deal size for the whole sample is about €30 million (compared to €24 million) due to a few major deals, as explained above. In terms of median, it stands at €1.1 million compared to €1.9 million for the whole Blue Economy, which reflects the relative high share of small deals that are at the early stages. There is clearly a diversity of deal-types in this sector ranging from the very large investments made into water companies down to the much smaller investments made into innovative technology companies that are seeking to address the sector.

Figure 77. Average deal size for some investment stages, in million €



Source: CB Insights. PwC analysis

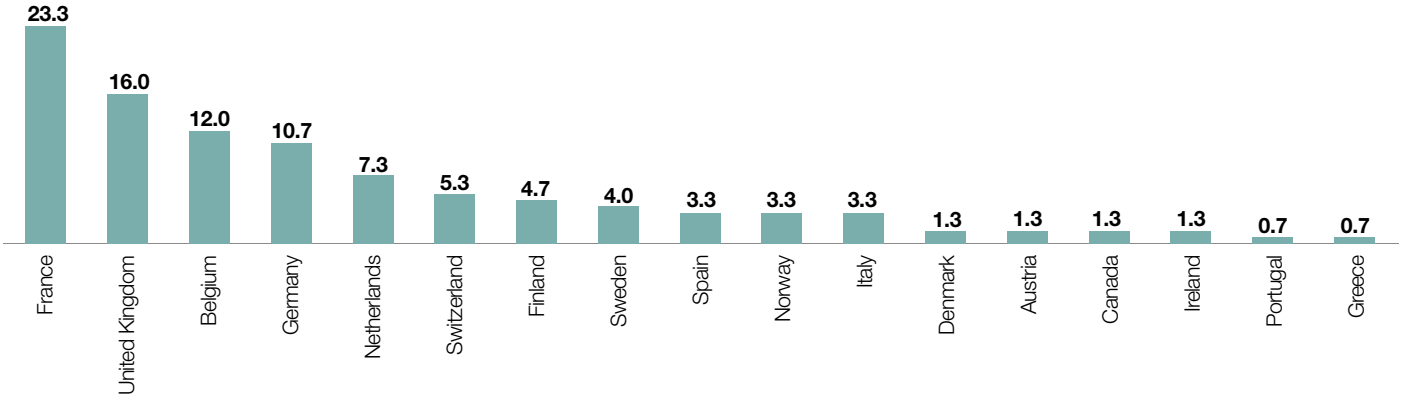
The average deal size for both grants and early-stage investments are below €2 million, showing that most of the deals in this sector are still low compared to other sectors. For instance, regarding grants, even though they represent about 8% of the total number of deals, the size of grants remains small: whereas the overall average size for grants all sectors combined stands at about (€4 million), the average in water management is lower than €1 million. These small investments would be consistent with small tickets often invested into promising young technology companies rather than larger more established operators. Larger average deal sizes are observed for growth-stage investments, but this remains below the average for equivalent stages across all sectors combined (€22 million).[83]

2.11.3. Investor demographics

When looking at the investors' profiles, we note that 65.2% of investors are from the EU, mostly from France, Belgium, Germany, and the Netherlands. Investors from the UK are also well represented, accounting for about 16% of the total number of investors. These countries have relatively open markets and a conducive context for private sector investment in the water management sector. Outside Europe, investors came mostly from the US and invest in many different countries within Europe (from Finland to Germany, Cyprus and Italy), whereas investors from Asia mostly focused their investments in Northern Europe (Netherlands and Norway).

83. We excluded here 2 major deals made at growth-stage that would drive-up the average to excessive levels, but they are kept in the overall analysis as they are fully relevant as water management deals.

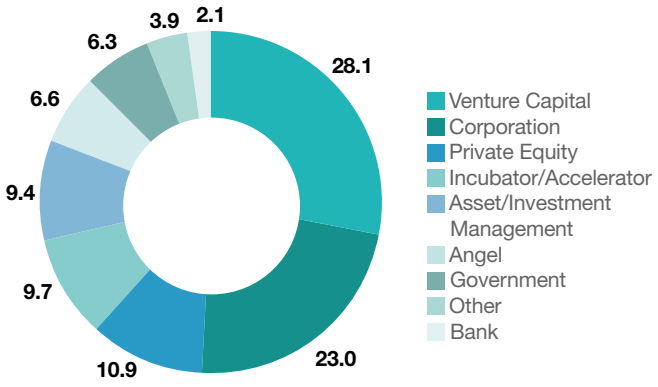
Figure 78. Geographical distribution of European investors (% total number of investors)



Source: CB Insights. PwC analysis

Venture Capitalists and Corporations represent the largest part of the investor base. This is in line with the mentioned predominance of early-stage and M&A investments. The share of the other types of investors represents between 5 and 10% of the investor base, which is quite similar to the other sectors of the Blue Economy. However, we observe that **about 9% of investors are asset/investment managers while the share is closer to 5% for all sectors combined.** This may be due to the presence of large companies in this sector that are a good natural match for the investment **capacity** of these investors. On the other end, business angels represent about 6.6% of the investors, while the share is 3.3% for all sectors combined. The latter will be mainly focused on investments in the smaller technology-oriented companies whereas asset managers will naturally tend to favour the larger infrastructure-heavy deals. **In total, this sector appears to be characterized by two prominent segments: more mature companies subject to M&A that interest large corporations and other investors with large ticket sizes, and on the other hand, innovative small businesses that attract a significant number of smaller tickets from a variety of actors.**

Figure 79. Type of investors (in % total number of investors)



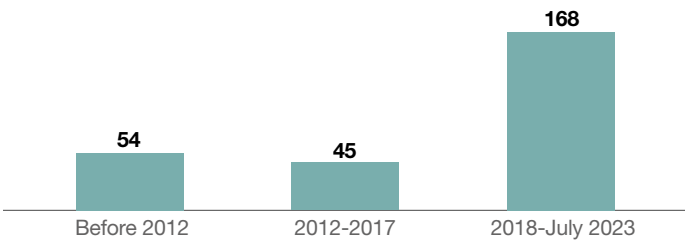
Source: CB Insights. PwC analysis

Finally, the number of investors has increased since 2017 as shown by the figure below. Before 2012, a total of 54 investors participated in water management deals, whereas between 2012 and 2017, this number decreased to 45. **The last period shows a substantial expansion to 168 active investors.** The highest growth of the investor base has taken place in the Netherlands, France, Germany, Belgium, followed by the United Kingdom and the United States.

The growing interest of investors in water management shows the increasing importance of the sector and the expanding business prospects. Besides investors recognising the need for innovative solutions and investments in the water sector to address climate challenges, policies and regulations implemented by European governments aim to create a more favourable investment climate for water-related investments.[84]

However, compared to other sectors, water management is not yet attracting the highest numbers of investors. For instance, compared to Blue biotechnology that seems a less mature sector and attracted 275 different investors as from 2018, water management counts less investors (168). This may indicate a lack of visibility for the innovations and their business potential, in spite of the key role of the sector in countering and adapting to climate change, improving access to water resources, water treatment capacity and wastewater management.

Figure 80. Number of active investors over time



Source: CB Insights. PwC analysis

84. European Commission (2023): Laws and Actions, Water scarcity and droughts

3.

Key technologies shaping the Blue Economy

This chapter **focuses on technologies that have taken centre stage over the past months and have a relatively higher degree of maturity.**

The analysis **centres around blue renewable energy, aquaculture and water management, and ocean observation**, due to their critical relevance in addressing pressing environmental and economic challenges in coastal regions. Furthermore, acknowledging recent innovations in other sectors underscores the interconnected nature of advancements and the potential for cross-cutting solutions in marine sustainability. The chapter ends with an illustration of success stories of companies that manage to grow through sustainable innovations in each of these sectors.

This chapter complements the first edition, which provided an outline of key technological innovations for each of the 10 BlueInvest sectors. Most of these remain valid.

3.1. Blue renewable energy

Blue renewable energies include several technologies exploiting natural and renewable resources abundantly available at water-based locations (inshore, coastline, nearshore and offshore). The table below lists these from the most commercially available technology to the one that is least mature:[85]

Table 4. Major technologies for Blue Renewable energy

Technology	Acronym	Development status
Fixed offshore wind	OW	Approx. 20 GW of commercial capacity has been installed to date.
Floating offshore wind	FOW	Several pilot pre-commercial farms are under construction or already operating.
Floating solar PV	FPV	Several pilot pre-commercial farms are under construction or already operating (mostly inshore for the moment, e.g. lakes).
Tidal energy converters	TEC	Several full-scale demonstrator units have been deployed. The first pre-commercial farms are expected to be commissioned within 2-3 years.
Wave energy converters	WEC	Several full-scale demonstrator units have been deployed. The first pre-commercial farms are expected to be commissioned within the next 3-5 years. Some off-grid applications are nevertheless already commercially available.
Ocean thermal energy conversion	OTEC	Several full-scale demonstrators have been deployed.
Salinity gradient conversion	SAL	A few pilot plants.

From a geographical perspective, European countries have been clearly pioneering the development of most of those Blue renewable energy technologies. **While there remains an EU leadership on R&D capabilities, the competition from both North America and Eastern Asia is intensifying**. Looking forward and in all regions, the growth of the Blue renewable energy sector will primarily depend on two drivers:

1. **A positive acceptability of deploying industrial units of renewable energy at coastal, nearshore, and offshore locations.**
2. **A competitive cost of energy over the lifecycle of the production plant.**

85. We exclude traditional hydraulic power systems using tidal barrage/dams from the scope since this is a fully mature technology with minor perspectives recognising that most suitable deployment sites have already been exploited in Europe.

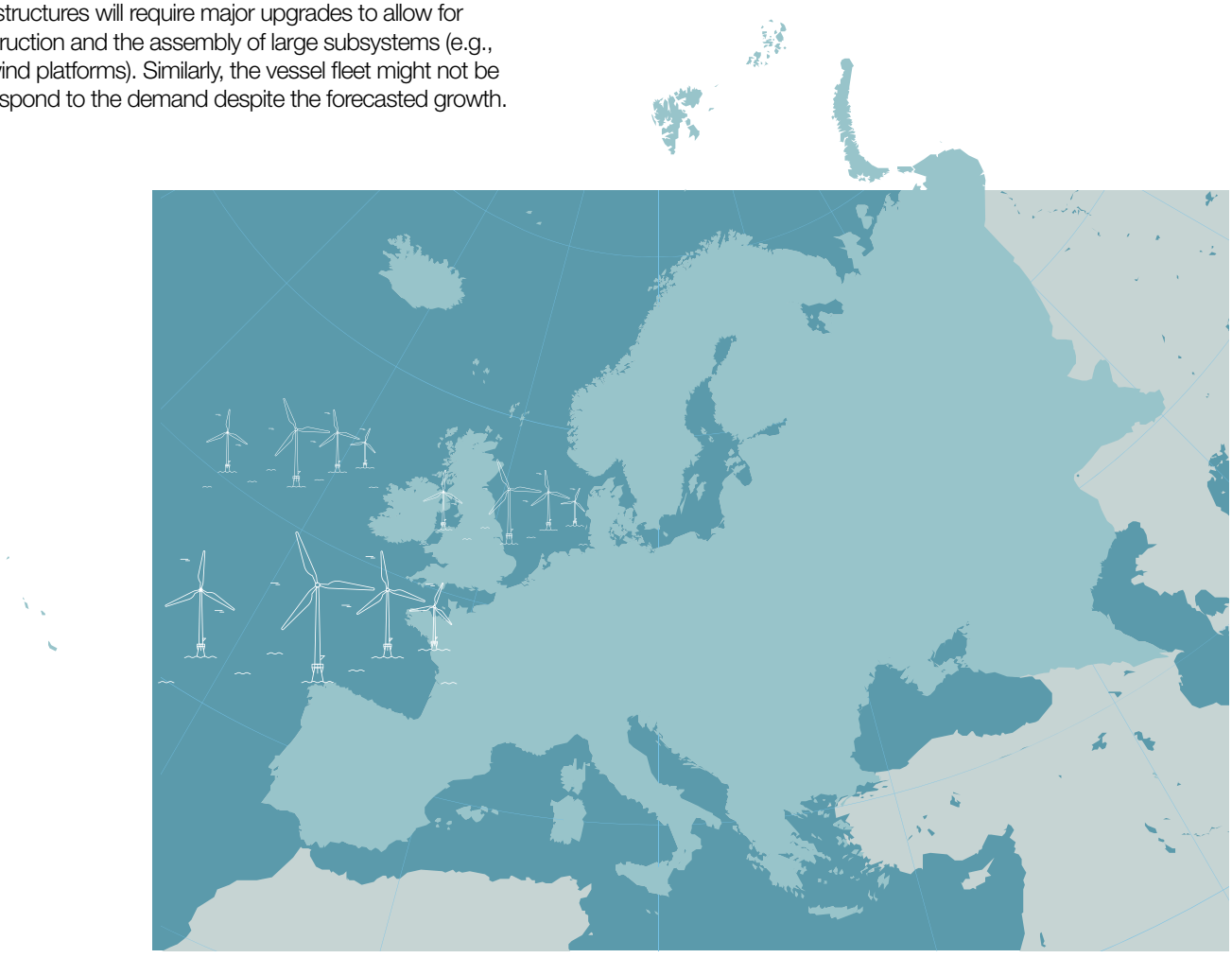
Having said this, the energy demand is expected to grow in the future while energy security remains a critical element for geopolitical stability leading to the overall ambitious renewable energy targets adopted by the majority of EU countries.

All EU countries having access to a significant amount of sea areas are considering Blue renewable energy in their future energy mix. Many of those Blue EU countries have voted installed capacity targets for offshore wind on a horizon ranging from 2030 until 2050. Moreover, concerning offshore wind, which is the most mature one, the European Network of Transmission System Operators for Electricity (ENTSO-E)[86] stated that a €400 billion investment in offshore wind grids is required to meet European plans, corresponding to around 25.5 GW installation annually in the entire area. To efficiently do that, ENTSO-E stated that future grid connections should be designed at the sea basin level around the North Sea, the Baltic, the Atlantic Basin, the West Mediterranean, the East Mediterranean, and the Black Sea. As a result of these ambitious targets, the deployment of Blue renewable energy is expected to grow fast.

However, there might be some socio-economic and technological obstacles that could hinder this development. For instance, port infrastructures will require major upgrades to allow for the construction and the assembly of large subsystems (e.g., floating wind platforms). Similarly, the vessel fleet might not be able to respond to the demand despite the forecasted growth.

Human resources can also become a bottleneck in a context of difficulties to recruit in several alike industrial sectors. Finally, social acceptability issues leading to long permitting procedure is a concern. Indeed, conflicts of usage and other legal actions may jeopardize the realisation of a project – sometimes by delaying the launching of the construction by several months/years. These barriers represent a risk for investors and project developers that must be anticipated. Geopolitical instability, energy insecurity (depletion of fossil fuels reserves) and environmental issues (pollutions, climate change and biodiversity loss) define an unknown future in which it is difficult to foresee how the future energy mix will look like. Although Blue renewable energy will have to face these challenges, the overall market growth perspectives remain very attractive.

Finally, the table below depicts the main innovative topics accelerating the overall deployment of Blue renewable energy. There are many EU startups, SMEs and corporates developing new products and services in each type of innovation. Some examples are provided that are by no means exhaustive.



86. Offshore Network Development Plans: European Offshore Network Transmission Infrastructure Needs

Table 5. Main innovative topics accelerating the overall deployment of Blue renewable energy*

Innovation Trends *Associated challenges*	**Technologies mainly concerned**	**Lifecycle stages affected**	**References**
Increase unit power rating *Mechanical fatigue, blade production capabilities, novel designs & concept, etc.*	ALL – mostly OW and FOW	ALL	Upwind X1Wind Eolink
Going further offshore & deeper *Floating electrical substation, HVDC network, mooring line materials, electrical dynamic cable reliability, methods for marine operations, etc.*	OW, FOW, FPV	ALL	DNV INNOSEA PLOCAN
Off-grid & microgrid applications *Autonomous environmental monitoring, docking/charging station, water desalination, remote/island grid connection, etc.*	WEC, TEC, FPV	ALL	GEPS Techno Greenpipe WEFE Nexus
Improved manufacturing process *Modularity & scalability, serial production, material choice, assembly strategy, etc.*	ALL	DDE, CIC	BW Ideol DNV
Novel monitoring and environmental protection systems *Noise mitigation system, asset surveillance, continuos environnemental monitoring, etc.*	ALL *Synergies with the Blue observation sector*	O&M	GREENOV-ITES ELWAVE WESE
Enhanced marine operations *Heavy lift operations, unmanned offshore inspections, tow to port strategy, etc.*	ALL	CIC, O&M	Van Oord XOCEAN RAMBOLL
Multipurpose floating platforms *Combined or co-located wind & wave energy plant, maintainability, combined aquaculture with floating wind, energy islands, etc.*	FOW, WEC, (OW) *Synergies with many other Blue Economy sectors especially aquaculture*	ALL	Floating Power Plant IHCantabria PLOCAN Waterborne
Power-to-X or Blue fuel *Marine worthiness of electrolysers, brine waste management, transport & storage of H2 and derivatives, etc.*	OW, FOW, WEC *Synergies with shipping & ports*	ALL	Lhyfe FARWIND Siemens Energy DEA

* Lifecycle stages acronyms: design, development & engineering = DDE; construction, installation & commissioning = CIC; operation & maintenance = O&M; end of life = EOL

Source: PwC analysis

3.2. Aquaculture

3.2.1. Top aquaculture categories

It is usual to bring together under the name of aquaculture the various forms of intensive rearing of species of fish, crustaceans, and molluscs in fresh, brackish, and salt water. There exist an extraordinarily long history of mankind exploiting natural biological resources near the coastline for human nutrition. For centuries, shellfishes were harvested at the intertidal zone. In East Asia, oyster culture dates to before the Christian era. Palaeologists have unveiled signs of complex freshwater fish-farming in which several species of fish were combined over a thousand years ago. According to the FAO,[87] the top 10 aquaculture species consumed in 2019 can be classified as follows:

Ranking	Species	Aquaculture category
#1	Carps, barbels and other cyprinids	Freshwater fishes (FF)
#2	Red seaweeds	Aquatic plants (AP)
#3	Brown seaweed	AP
#4	Marine shrimps and prawns	Crustaceans (CR)
#5	Catfishes	FF
#6	Tilapias and other cichlids	FF
#7	Oysters	Molluscs (MO)
#8	Clams, cockles, ark shells	MO
#9	Salmons, trouts, smelts	Diadromous fishes (DF)
#10	Freshwater fishes neo	FF

For the remaining of this document, the scope will focus on the aquaculture categories listed in the above table. It should be noted that transformation of added-value products making use of extracts from aquaculture is not covered by this section since we consider that such initiatives fall within the Blue biotechnology sector which is also briefly examined on the last part of the chapter.

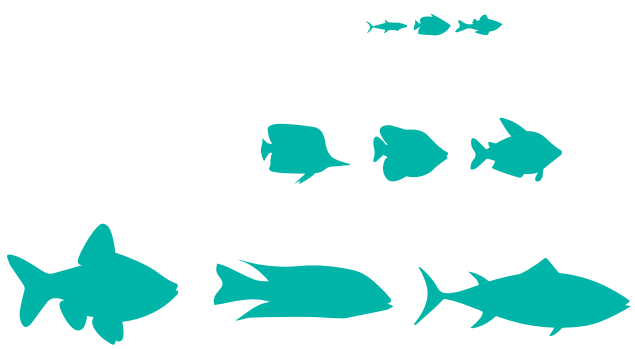
Water quality is a critical issue for aquaculture. In fact, the ability to produce food in line with the human nutrition standards primarily depends on the quality of water in which the species are growing. For example, high concentrations of norovirus in freshwaters flowing down into shellfish farming locations at the coastline may prevent the producer from being allowed to commercialise its products for safety reasons. As a results, aquaculture activities have been closely intertwined with water quality issues. For this reason, this section will also address issues related to water management.

3.2.2. A growth driven by global demographic pressure

As the worldwide population grows, the demand for aquaculture is expected to also increase. Also, since there is an increasing number of people living near the coastline, **the consumption of seafood and aquatic-based proteins is likely to be encouraged by policy-makers- especially considering the overall good food efficiency ratio of such aqua-based nutrition.**

As more and more aquaculture schemes employ technology-driven systems, several challenges remain. Among those challenges, one can cite genetics, new husbandry technologies, and innovations in aquafeed as three key enablers for growth in the market. While traditional aquaculture in natural freshwater or coastal areas have limited growth prospects due to the little availability of suitable site for aquafarming, one should not neglect the relative importance of such traditional aquacultures (e.g., carps, tilapia, oysters, trouts, and mussels) in the overall sector. Nevertheless, many new aquaculture sites consider land-based or offshore locations.

Access to safe water is the most basic human need for health and well-being. Demand for water is rising owing to rapid population growth, urbanisation and increasing water needs from agriculture, industry, and energy sectors. According to the United Nations, the demand for water has outpaced population growth, and half the world's population is already experiencing severe water scarcity at least one month a year. From a Blue Economy perspective, water represents the natural element indispensable for the economic activity to thrive. Hence, it is of utmost importance to preserve this resource so that all users can benefit from it in a safe and sustainable way. **Any technology able to support the management (e.g., monitoring, cleaning, preserving) of the water resources is therefore receiving strong interest from the Blue Economy community.**



87. Top 10 species groups in global aquaculture 2020 by FAO Fisheries and Aquaculture Division https://www.fao.org/documents/card/en/c/cc0723en

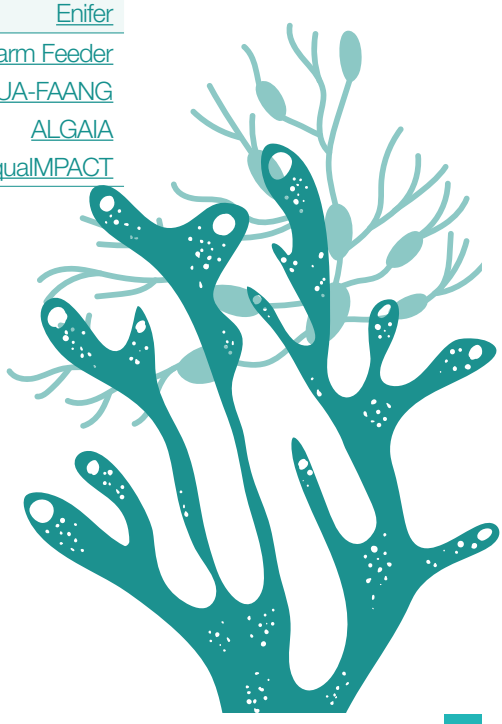
3.2.3. Key innovation trends

Finally, the table below depicts the main innovative topics accelerating the transformation of the aquaculture sector. Similar to Blue renewable energy, there are many EU startups and SMEs developing new products and services in each type of innovation. Some examples are provided that are by no means exhaustive.

Table 6. Key innovation trends within aquaculture

Innovation Trends *Associated challenges*	**Lifecycle stages affected**	**References**
Inland sustainable aquaculture *Permitting and social acceptability, recirculated system, aquaponic/hydroponic systems, LCA reduction, waste & discharge management, coupling with other onshore industrial effluent, etc.*	ALL	LISAQUA HighComp SEAentia BioMar
Offshore sustainable aquaculture *Permitting and social acceptability, biobased gears, O&M issues, harvesting techniques, growth & predation control systems, coupling with offshore renewables, etc.*	ALL except FFF	AlgaeDemo P2M Algolesko AKVA Group
Multi-trophic aquaculture & diversification *Bioremediation efficiency, extraction processing, algae cultivation, long-term stability, adaptation to climate change, encourage quality certification (e.g. organic food), etc.*	ALL	CTAQUA NewTechAqua BiOceanOr Agriloops
Novel aquafeeds *Feed conversion efficiency, encapsulation, insect-based proteins, ingredient processing and waste reduction, etc.*	Mostly FF, DF & CR	HuddleCorp Ynsect Tilamur Enifer
Genetics, breeding and hatcheries *Enhanced screening techniques, selective breeding, genomics, food safety, juveniles' resilience, etc.*	ALL	Fish Farm Feeder AQUA-FAANG ALGAIA AqualMPACT

Source: PwC analysis



3.3. Water management

Access to safe water is the most basic human need for health and well-being. Demand for water is rising owing to rapid population growth, urbanisation and increasing water needs from agriculture, industry and energy sectors. According to the United Nations, demand for water has outpaced population growth, and half the world's population is already experiencing severe water scarcity at least one month a year.

From a Blue Economy perspective, water represents the natural element that is indispensable for economic activity to thrive. It is therefore of utmost importance to preserve this resource so that all users can benefit from it in a safe and sustainable way. Any technology able to support the management (e.g. monitoring, cleaning, preservation) of water resources is therefore receiving strong interest from the Blue Economy investor's community.

It should also be emphasised here that the EU Mission 'Restore Ocean and Waters' specifically addresses the issue of water management by already funding a number of state-the-art innovative projects.[88]

The table below provides an update on the latest innovations that apply to water management.

Table 7. Key innovations for water management

Innovation Trends *Associated challenges*	**Examples**
Water quality monitoring *Biosensors, eDNA techniques, multi & hyper-spectral analysis, etc.*	BlOceanOr JPI Oceans
Water purification system *Ultrafiltration, micro/nano-fluid, nature-based solutions, prevention of contaminations, etc.*	EdenTech Retein KLAR2O Sundew Rietland nextGen
Water pollution management	Pollustock The OceanCleanup PUROCEANS Cedre
Desalination *Energy efficiency of desalination, renewable-based desalination plants, brine management, etc.*	Aqualia Sealeau Zero Brine

88. Some example of projects can be found here: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/restore-our-ocean-and-waters_en

3.4. Ocean observation

There is a well-known saying that claims that we know more about the surface of the Moon and about Mars than we do about the deep sea floor. This reflects how unexplored the blue part of planet Earth remains. And yet, observations and measurements have been made in salt and fresh waters for centuries. The scope of blue tech & ocean observation can be divided into different perspectives:

Looking from above to the surface and atmospheric layers

Looking down below across the surface and the water column

Globally through set of data covering a large geographical area

Locally at a precise spatial coordinate

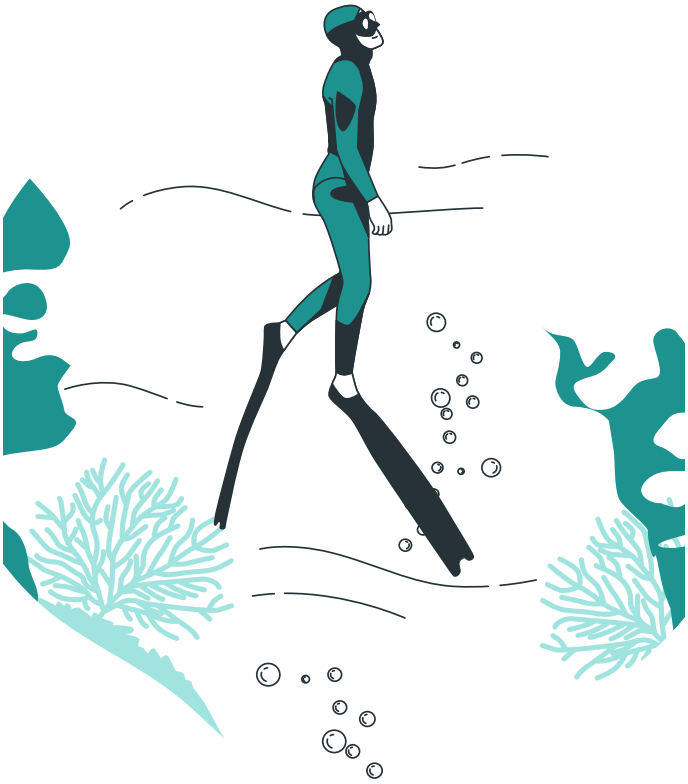
Blue measurements can also originate from a wide variety of media ranging from satellites to fixed-surface buoys through underwater vehicles. Such media serve as a carrier hosting one or several sensors allowing the collection of relevant data. Depending on the applications, the data collected can be used for a very large number of purposes across any Blue Economy activity and beyond. Furthermore, blue tech & ocean observations is capturing technical, environmental and social information. Typical blue parameters of interest include:

Category of parameters		**Examples**
Oceanographic	Biochemical	CO_2, O_2, salinity, pH, turbidity, levels of nutrients/ pollutants, *etc.*
	Physical	Temperature, wave height, wave period, current speed, magnetic levels, gravity weight, roughness, *etc.*
	Geological	Include the study of bathymetry (water depth) and sedimentology (soil resistance)
Direct human activities		Vessel tracking, human/ UFO detection, fish-school detection, illegal-discharge detection, noise propagation, surface-runoff analysis, *etc.*

3.4.1. Growth drivers & main challenges

Digitalisation has a transformative impact on this sector and with the rise of artificial intelligence, ocean observation technologies have benefited from a lot of improvements from sensors to climate analysis, whereas new data usage has generated demand from various industries.

Fishers can benefit from better sensors to catch fish with better precision and minimise their impact on the environment. Researchers can also better understand the dynamics of our ocean, an area that has been neglected for decades. Overall, these technologies can bring concrete solutions to foster compliance with environmental regulations. However, there is perhaps one growth driver that may have the biggest positive impact on this sector: defence and surveillance. Given the current geopolitical uncertainty and rivalry, the security of infrastructure is key, which is why major public organisations have had an increased interest in blue ocean technologies as a means to strengthen their strategic activities underwater and protect their critical infrastructure.



3.4.2. Key innovation trends

Innovations in ocean observation can be illustrated through the two required stages, namely the data collection & transmission followed by the post-processing and analysis. The table below identifies the main trends in relation to enhancing both stages while providing some insight into the new way of exploiting the data.

Table 8. Key innovations in ocean observations

Innovation Trends *Associated challenges*	**Examples**
Data collection & transmission *Novel sensors (e.g. biosensors, quantum sensors), high resolution imagery (inc. underwater), high accuracy radar systems, satellite constellations, offshore IoT, open and participative science-based approaches, etc.*	ELWAVE Wedge XOCEAN eOdyn
Data processing & analysis *Reanalysis, data fusion, artificial intelligence, eDNA analysis, multi-disciplinary analysis, etc.*	Natural Power Space4Water ProBaNNt
New data usage *MSP surveillance, carbon credit certification, deep-sea exploration, fight against illegal fishing, enhanced pollution tracking, human-rescue operations, etc.*	WSENSE Unseenlabs SINAY Reef Pulse Sea Detect

Source: PwC analysis

3.5. Other Blue Economy innovations and case studies

Finally, the table below provides a list of the main other innovations that are contributing to the dynamism of the Blue Economy, with specific examples of projects, start-ups, SMEs, and corporates that have taken significant steps in these innovations. These examples have been meticulously curated based on thorough research and comprehensive market analysis conducted specifically for this report. Each example represents a carefully selected case study that highlights the diverse range of advancements shaping the Blue Economy landscape, reflecting the analysis to provide actionable insights for stakeholders.

Table 9. Other Key Innovations

Blue Economy sector	Innovation Trends *Associated challenges*	Examples
Shipbuilding & Refit	**Greenship** *Ecodesign, wind-assisted propulsion, hybrid electro-thermal engine, e-fuels, biofuels, speed reduction, routing, logistical optimisation*	Bound4Blue Astander Waterborne
	Smartship *Digital twin, next generations of AUVs and ROVs*	eyeGauge Bluepulse D-ICE Engineering
Ports infrastructure	**Greenport** *Quayside electrification, air and water quality monitoring, eco-management of port flow*	Magpie Seafar NV Green Inland Ports
	Smartyard & smartport *Robotics, digital twin yard, smart logistics*	H2Ports SmartPort Inrotech HEXAGON
Blue Biotechnologies Strong synergies with aquaculture and fisheries	**Blue bio by-products** *Materials from shells, extraction of collagen and other molecules of interest from fish waste…*	F4F Hemarina PhosphoTech Alegina
	Algae *Bioraffinery, novel food applications, added-value molecules for human health and wellbeing applications…*	Algama SAS A4F Necton MICROPHYT
Fisheries	*Enhanced resource evaluation tools, improved traceability, increased circular management of the resource, fishing fleet decarbonation (synergies with green ships), more selective fishing techniques, safety devices for fishermen, illegal fishing combat (synergies with blue observation), by-product valorisation (synergies with blue biotechnologies), ghost-fishing avoidance system, promoting local and diversified fish consumption, facilitate co-activities with other users of the sea, shared processing tools, novel digital services for fishermen, animal well-being considerations…*	Marine South East SINTEF FISH INTEL Ifremer MINOUW
Coastal management	*Sea-level management, advanced protection against extreme coastal events (e.g. coastal flooding), nature-based regeneration techniques for coastal areas, sustainable coastal tourism…*	Egis Group GREENOV-ITES Epc S.r.l. PROTECT SUBMON

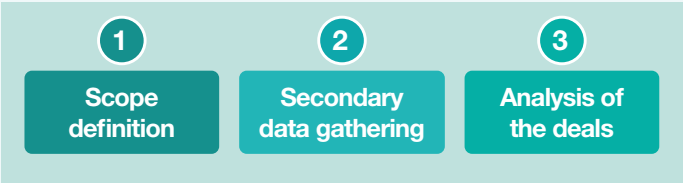
Source: PwC analysis

Annex

Methodological note

This Annex explains the methodology we have employed to source and analyze the data that were used in Chapter 2: in-depth analysis of the deals' landscape.

Figure 81. Methodology for the deal analysis



Scope definition

The BlueInvest sectors were defined based on EU and international official classifications and technology types, ensuring consistency and comparability across 10 separate but interconnected sectors – bearing in mind that aquaculture and fisheries have been considered together in this analysis. A perspective on sustainability was provided in the green transition of each sector snapshot, and in considering its key innovations and sample technologies. The full list of sectors considered in this analysis is aligned with the 10 sectors already presented in the first Investor' Report and are the following:

List of sectors included in the analysis:
Aquaculture & Fisheries (combined for the purpose of the deals' analysis)
Blue biotechnology
Blue tech & ocean observation
Coastal and maritime tourism
Environmental protection and regeneration
Shipbuilding and refit
Blue renewable energy
Shipping and ports
Water management

For each sector, we have searched for companies whose description include of the specified keywords (these keywords were related to the description of each sector and extracted from the Chapter "Sector opportunities" in the first edition of the report). For instance, for blue renewable energy, we use this non-exhaustive list of keywords: floating tidal, floating offshore, tidal energy, blue renewable energy, wave energy, offshore wind, wind farms, blue energy, offshore photovoltaic, deep-sea energy, biomass offshore, sea floating platform, marine energy infrastructure, etc. Once extracted, manual cleansing was performed to remove oils gas companies or unrelated companies.

Secondary data gathering

The analysis performed below relies on a database of financial deals involving European companies in the period of January 2000 to July 2023. Data was sourced from CB Insights, a commercial market intelligence database that is updated on a regular basis through "reliable machine learning to crawl, classify and extract millions of insights from unstructured documents from openly available market data, analyst intelligence and experts' input."

To be noted, we merged aquaculture and fisheries deals because many applications related to processing can apply both to aquaculture and fisheries, making it difficult to disentangle these sectors. It must be noted that within these merged sectors, purely fisheries-related deals with a sustainable dimension were relatively scarce which may reflect a weak innovation dynamic and lower investor interest compared to aquaculture. Aquaculture encompasses a wide range of innovations (planning systems, feeding improvements, management tools, etc.) while fisheries-related deals relate mostly to catch innovations.

In sourcing Blue Economy deals from the database, the following approach was taken:

- Initial assumption that the commercial database has been quality controlled and cleaned for duplicates.
- Definition of a set of 100+ keywords covering the 10 Blue Economy sectors in focus in this report based on the description of the sectors and the sustainable innovations related to them.
- Inclusion of enabling technologies relevant to Blue Economy value chains, as illustrated in the Chapter 4 on "sector opportunities" of the first **Investor Report.**[89]
- Exclusion of companies with a singular focus on oil & gas, with the exception of relevant solutions with multiple offshore applications that may also apply to oil & gas.
- Deals not covered by the abovementioned filters were not included.
- Deals from pre-seed to IPO stage across all company sizes were analysed whereas stock market transactions were not considered.
- In terms of geographical scope, companies were based in Europe (EU and European non-EU companies) while investors could be based anywhere in the world.
- The geographical attribution of companies and investors is based on their respective headquarters.

89. Investor Report: An ocean of Opportunities, EU Commission at: https://oceans-and-fisheries.ec.europa.eu/system/files/2023-03/Blueinvest-Investor-report-An-ocean-of-opportunities_0.pdf

In terms of limits, we are conscious that:

- The methodology and assumptions described accept a small margin of error and variation on the sectors mapped.
- The dataset may not be exhaustive, due to the limited scope of direct search for Blue Economy search function.
- Debt financing may be underrepresented because small loans from a bank to a company are not necessarily captured by CB Insights.
- Government funding may be under-represented since most public funding is not covered by CB Insights.
- All sectors combined, about 65% of deals have no data on deal size, hence the information of total, average and median deal size need to be taken with caution.

Analysis of the deals

Based on the data collected, we performed a manual data cleansing to avoid unrelated deals based on the company's description and website. In the end, we retrieved 2,513 related to the 10 Blue Economy sectors. The analysis mainly consisted of the following:

Geographical distribution of deals
The country of the deal corresponds to the location of the company headquarters.

Cumulative investments
We summed up the cumulative investments for each sector for three periods: Before 2012 (i.e. from January 2000 to 2012), 2012-2027, and from 2018 until July 2023 when we finalised the data collection. To be noted, a majority (65%) of deals have no disclosed information on deal size which causes an underestimation of the total amount of investments.

Deals per investment category
Most of the deals have information on the investment stage at which deals were done with a high level of disaggregation. We have therefore grouped some investment stages into simplified category.

The Debt category encompasses loans, debt, and convertible notes.

Early-stage equity investments include Seed, Series A, B, C and incubator/accelerator as well as Angel.

Growth-stage equity investments include series C, D, private equity and growth equity.

M&A include acquisition, corporate majority/minority and merger and leveraged buyout.

Geographical distribution of investors
The country of the investor corresponds to the location of the investor headquarters. Note that while deals were constrained to bepon the european territory, investors could be based worldwide.

Number of investors
We counted the number of investors for different time periods. Note that we may have a greater number of investors than deals given which means that different investors can participate in one deal.