European Commission

The Next Wave of Blue Growth

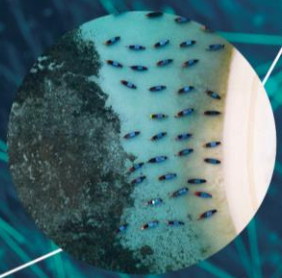
Investor Report 2026












BLUE INVEST

EUROPEAN COMMISSION

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The Next Wave of Blue Growth

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Introduction

If the ocean economy were a country, it would rank among the world's five largest economies[1], with long-term growth potential projected to outpace global GDP.

Yet, scientific assessments of planetary boundaries show that ocean-related thresholds, such as warming, acidification, biodiversity loss and nutrient pollution, are under severe pressure, threatening both ecological resilience and economic value creation. This is why fostering sustainable ocean innovations cannot be considered a philanthropic activity, but a way to safeguard our own ability to generate economic value in the long term.

The ocean is a dynamic hub for innovation, where the "blue economy" encompasses a wide spectrum of cutting-edge technologies that deliver sustainable solutions to ocean-related challenges. For asset managers, the blue economy represents a multitude of strategic and investable opportunities aligned with the priorities of the European Union. Sustainable aquaculture is driving the creation of new enterprises focused on strengthening European food security and ensuring robust traceability. Blue biotechnology is transforming product development across sectors such as pharmaceuticals, sustainable packaging and advanced biofuels. Marine renewable energy is set to play a pivotal role in reinforcing the EU's sovereign energy security. Innovative ocean technologies safeguard vital underwater infrastructure and support the growth of dual-use applications. Coastal and marine environmental protection is fostering climate resilience through solutions that preserve biodiversity and support long-term economic resilience of coastal cities, while sustainable shipping and port-related start-ups are shaping the future of global maritime transport.

These diverse segments of the blue economy offer asset managers a compelling opportunity to invest in the next generation of sustainable growth and technological leadership in Europe. But while the strategic importance of the blue economy increases, the global community continues to underinvest in the ocean. SDG 14 remains the most underfinanced of all Sustainable Development Goals, revealing a persistent contradiction: a sector with strong fundamentals, growing demand for sustainable solutions, and clear climate relevance still struggles to attract sufficient private capital. This gap is not due to a lack of innovation. Europe hosts world-class capabilities in aquaculture, blue biotechnology, ocean observation, marine renewable energy and sustainable maritime transport, and the continent is a recognised leader in maritime research capabilities.

The challenge for Europe appears to lie in market uptake. Many solutions remain early-stage, demand signals are still emerging and while regulatory incentives are improving, these are not yet strong enough to fully close cost gaps or create

[1] OECD's Ocean Economy to 2050

predictable revenue streams. Many financiers do not yet perceive the breadth of opportunities simply because these have not reached the scale or visibility of more mature green sectors.

BlueInvest, the initiative behind this report, seeks not to persuade but to demonstrate. BlueInvest brings evidence, visibility and community support to a sector whose potential to combine financial performance with measurable impact is increasingly clear. Since 2019, BlueInvest's mission has been to address market failures, raise awareness, and support innovators so that private capital can flow where it is most needed. Today, we are no longer observing a niche movement, we are witnessing the early formation of a wave of investment that can help shape Europe's sustainable future.

In this report, **Chapter 1** shows that a growing number of investment funds are already positioning themselves in the blue economy. From Venture Capital (VC) to Private Equity (PE) and Corporate Venture Capital (CVCs), the interest towards the sector has increased and likely to generate a strategic shift. **Chapter 2** presents the results of our latest investor survey: blue economy asset managers are optimistic, increasingly active and ready to scale, but they need stronger demand side incentives, clearer market signals and targeted support to unlock their full potential. This sector does not fear innovation, it embraces it. What it needs right now is the right enabling environment to translate innovation into bankable projects. For readers less familiar with the sector, **Chapter 3** provides a concise overview of key blue economy segments and emerging trends. Our experts also highlight a selection of promising European startups that illustrate the diversity and dynamism of the ecosystem.

Looking forward, Europe benefits from a stable regulatory environment, a strong innovation ecosystem and a strategic commitment to technological sovereignty. But to fully realise the potential of the blue economy, **more private capital must join the effort**. The opportunities are real, the innovation pipeline is strong, and the need – for climate resilience, food security, biodiversity protection, new materials, EU-based energy sources, nature-based solutions, economic competitiveness and sovereignty – is undeniable. It is no longer a question of *why* we should invest in the ocean economy, but *how quickly* we can scale the solutions that will define the next generation of sustainable growth.

This edition of the Investor Report builds on the previous reports released in 2023 and 2024. The inaugural BlueInvest Investor Report: An Ocean of Opportunities (2023), provided a thorough overview of the EU blue economy investment landscape, identifying key stakeholders, sharing investor insights, and highlighting opportunities and innovations across ten distinct sectors. The following BlueInvest Investor Report: Unlocking the Potential of the Blue Economy (2024), took this further by delivering a more in-depth analysis of the financial environment. The report examined deal activity by sector, tracking evolving investor trends and highlighting specific technological advancements.

Table 1. The BlueInvest Investor Reports

	**2023 (First Edition):** Presented a comprehensive mapping of the EU blue economy investment ecosystem, focusing on investor perspectives, sector opportunities, and the emergence of dedicated blue funds. This edition included a broad range of funds to capture mainstream asset manager interest.
	**2024 (Second Edition):** Provided a deeper analysis of blue economy investments, using a larger dataset and more granular deal statistics. This edition differentiated funds with a full focus on the European blue economy and those with partial or thematic exposure. It highlighted the growing number of dedicated blue funds while acknowledging the limitations of comparability across editions due to evolving definitions and data sources.
	**2026 (Third Edition):** Provides an updated and refined mapping of blue funds, analysing past deals. This edition offers a critical reflection on the evolution of the blue economy investment landscape. While there is limited comparability to previous reports due to the differences in sample composition, new insights have emerged from this research.

Chapter 1. Private capital mapping: sources of private capital for blue economy innovators

This chapter analyses the principal sources of equity funding available to blue economy enterprises. It aims to provide actionable insights into the investment landscape, enabling readers to better understand the types of private funding that is available to blue economy ventures, and how this has evolved.

While the awareness of the blue economy has increased among private investors, particularly in the last three years, it is not yet recognised as an asset class. Hence, the entities that have been mapped for this chapter include those with funds that are fully dedicated[2] to, or those which partially involve blue economy technologies[3]. The selection has been based on the priority sectors defined for the BlueInvest platform.

The investor sample included in this chapter distinguishes between funds exclusively focused on the blue economy and those with a partial or emergent interest. Emphasis is given to venture capital, corporate venture capital and private equity funds given their vital role in sectoral growth and innovation.

This report focuses on the European[4] investment landscape. Due to growing interest from non-European investors in European startups and scale-ups, we have included some North American and Asia-based funds[5] in our broader mapping of private funds investing in the blue economy. This provides a perspective on their emerging role in European innovation for the blue economy. Their impact on the decision-making of European businesses, particularly as they identify potential co-investment partners and exit opportunities beyond Europe, reflects the reality of cross-border investment flows. Given limitations on the availability and comprehensiveness of public data, we cannot guarantee an exhaustive mapping for North American and Asia-based funds which invest in European blue start-ups.

This mapping identifies active and significant players and seeks to support the benchmarking of strategies that will point to co-investment and/or exit opportunities. Startups and scale-ups can use it to better understand the investor landscape and tailor their outreach activities to their solutions, streamlining their fundraising efforts and accelerating their path to market. European stakeholders, such as accelerators, regional clusters, research centres and regulatory bodies whose roles are pivotal in advancing sustainable ocean-

[2] Fully dedicated blue funds are funds that invest exclusively into blue economy, either in one sustainable blue economy sector or in various blue economy sectors (aquaculture vs aquaculture and blue biotechnology, or shipping vs ocean tech and shipping).
[3] This corresponds to funds that focus on wider investment topics (e.g. deep tech, decarbonisation, transport, energy transition) and include blue technologies into their portfolio.
[4] The term “European” is used when including private funds coming from the EU as well as the UK, Norway, Switzerland and other European non-EU countries.
[5] Funds from other parts of the world (Middle East, Africa, Oceania) are not included in this edition, as their involvement in EU blue economy deals remains limited and data availability is currently insufficient.

related solutions and strengthening the resilience of the blue economy, may use it gain data-driven insights that inform support programmes and guide policy development.

By translating these insights into practical actions, this chapter seeks to drive more effective fundraising, deepen investor engagement and accelerate the growth of innovative technologies. It hopes to contribute to the global positioning of the European blue economy by fostering innovation, attracting strategic investments, and reinforcing Europe's leadership in sustainable ocean solutions.

Box 1. Investor mapping

The mapping focuses on venture capital funds, private equity funds and corporate venture capital, given their prominent role in providing private capital to fuel the growth of the blue economy start-ups and scale-ups.

- **Venture capital (VC)** refers to funds that provide *early-stage, high-growth risk equity*.
- **Private equity (PE)** refers to buy-outs and later-stage investments in established companies.
- **Corporate Venture Capital (CVC)** are **venture capital-like investors operated by corporates.**

We excluded angel investors given their very limited ticket size. Debt and grant providers (banks, non-governmental organisations, development finance institutions, etc.) were also excluded since BlueInvest has traditionally focused on sources of equity investment. We looked mainly at players in Europe, but as explained above, some non-European players were included given their clear interest in European blue economy.

We primarily identified more than 600 VC/PE funds and CVCs. Each fund was evaluated based on its investment thesis, portfolio composition and publicly disclosed blue economy deals to end up with a final sample of 159 sources of private capital.

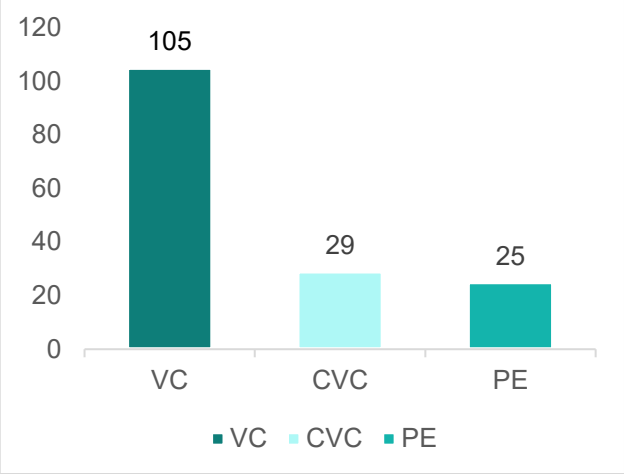
This mapping might not capture the entirety of relevant funds due to limitations such as incomplete public disclosures, varying definitions of blue economy activities, and differences in reporting standards. Figures such as fund size and typical investment amounts are intended to provide general guidance, however, they may not always be entirely precise given fluctuations in assets under management, undisclosed investments, or inconsistent reporting across funds.

1.1. General insights

1. Venture Capital funds remain the largest provider of equity funding for European blue economy companies, in terms of numbers

Among the 159 CVCs, PEs and VCs with clear interest in European blue economy, **the Venture Capital ecosystem is the largest group, with 105 VC funds.**

Figure 1. Type of equity providers for blue economy companies



Source: PwC analysis

This is to be expected given the sector's innovative and high-growth profile. Not all VC funds were fully dedicated to the blue economy. Some had invested in sustainable solutions or deep tech, but demonstrated a clear appetite for ocean and water solutions. **The number of VC funds with a clear interest in blue is a very positive signal for early blue ventures who can tap into a wide range of potential investors.**

The relatively lower number of Private Equity funds with a clear interest in blue economy opportunities may reflect the fact that PE funds have traditionally been investing in broader sectors (tech, healthcare, energy, industrials). Ocean and water may appear too niche and are underinvested. Most of the blue PE funds that have been mapped were linked to infrastructure-related investments in traditional sectors such as shipping and energy. Consequently, **European blue scale-ups may face difficulties in accessing later-stage capital needed for their growth**.

The mapping identified 29 CVCs with a clear interest in the blue economy. These CVCs were linked to large maritime corporations and corporates that seek solutions for decarbonisation within ocean related innovations.

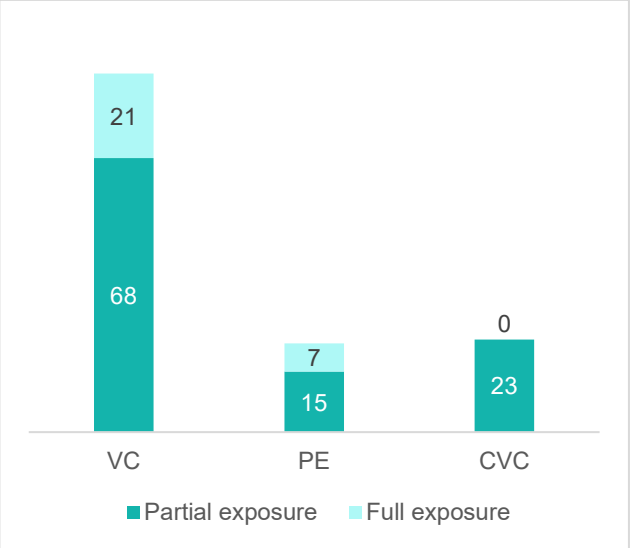
2. Europe is a hub for early-stage blue economy investment

Figure 2 shows the composition of European-based players that are active in the European blue economy and their relative exposure to the sector.

Europe leads the way in terms of early-stage investments. **Europe hosts 89 Venture Capital funds with a clear interest in the blue economy, out of which 21 VC funds are fully dedicated to the blue economy and 68 partially exposed to the sector.**

This shows that blue economy ventures can tap into a large pool of risk capital providers to finance their growth. It also signifies that blue economy is a theme covered by many VC funds who can play a key role as potential co-investors alongside blue economy dedicated funds. Chapter 2 of this report shows that the exposure of these partial funds is quite substantial (upwards of 50% for the majority of them).

Figure 2. Exposure to the blue economy per type of private investors (Europe only)



Source: PwC analysis

Corporate venture capital forms the second largest group, with 23 European CVCs identified in the mapping. All CVCs, including the ones backed by large marine corporations, had only partial exposure to the blue economy. This is because CVCs typically invest in ventures that are relevant to different stages of their parent company's value chain, which are not limited to core ocean and marine technologies. A portfolio review of these marine-based CVCs reflected investments in startups working on logistics, digitalisation, energy efficiency and materials innovation, as well as areas that support or enhance various aspects of their business operations, from supply and production to distribution and sustainability.

Notably, several CVCs that did not have their core business in the ocean or water sector demonstrated interest[6] in sustainable technologies by blue economy ventures, particularly those that would support their decarbonisation objectives. CVCs invest at different stages, offer acceleration services and are highly strategic partners for start-ups and scale-ups.

European Private Equity funds were identified as the third largest source of private capital in the mapping, with 22 demonstrating exposure to the blue economy. Of these, only seven had full exposure to the sector, suggesting that the pipeline of more mature businesses in the European blue economy is still insufficient European PE funds generally have a broader focus (such as health, technology, etc.). The blue economy may appear too niche for most asset managers within the PE sector.

All mapped European PE funds had a clear sustainability focus, being Article 9 funds under SFDR[7] for the EU-based funds. **Raising awareness about the market opportunities within the blue economy sector among these impact investors could be pivotal**, as it would enable European blue economy ventures to access growth capital locally and reduce reliance on international investors for late-stage funding.

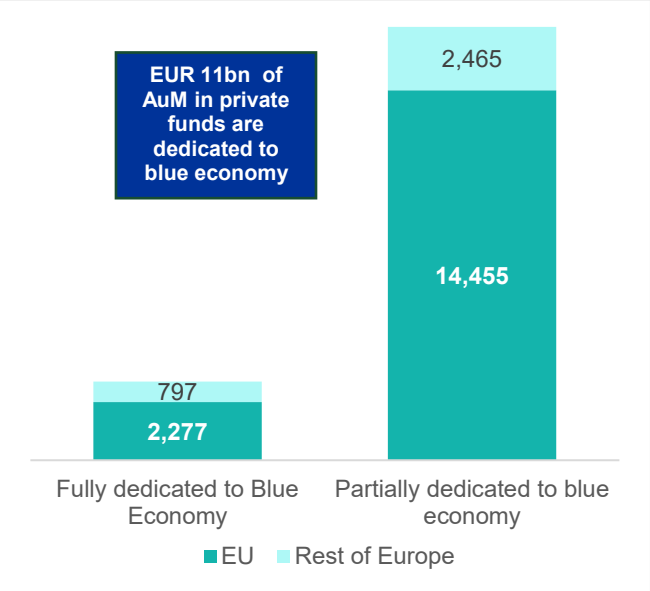
The rising number of VC, PE, and CVC funds investing in the blue economy highlights its growing appeal as an asset class. Nearly two-thirds of these funds

[6] This was measured through their past investment into blue start-ups.
[7] An Article 9 fund under the EU's Sustainable Finance Disclosure Regulation (SFDR) is a financial product with a primary objective of making sustainable investments. Often referred to as "dark green" funds, these funds are subject to the most stringent disclosure requirements within the SFDR framework.

are VCs, indicating that most deal flow is still at an early stage. As portfolios develop, greater capital and more PE participation will be needed to support the sector's growth.

3. Approximately EUR 11 billion in assets under management is currently dedicated to blue economy

Figure 3. Asset under management of fully/partially blue funds based in Europe (in EUR million)



Source: PwC analysis

Considering that venture capital and private equity funds fully dedicated to the blue economy manage EUR 3 billion in assets, and assuming that half of the assets of partially dedicated funds are allocated to blue economy companies[8], we estimate that **EUR 11 billion in private funds are directed towards the blue economy**.

Assets under management by non-European based equity investors were excluded from the analysis, given that the share of their investments in Europe is not available.

Figure 3 provides an estimate of the capital available for investment in blue economy activities, both from European funds whose primary focus is in the sector and from those with broader investment mandates.

Dedicated funds

Assets under management (AuM) of European VC and PE funds fully dedicated to blue economy ventures are estimated at upwards of EUR 3 billion. The figure below reflects the capacity of funds whose primary investment focus is the blue economy and whose entities are based on Europe[9]. To illustrate these sources of capital, below is a list of fully dedicated blue funds:

[8] We assume that 50% of their AuM is allocated to blue economy deals since the survey results in Chapter 2 show that a majority of the blue funds allocate more than 50% of their AuM to the blue economy.
[9] It was calculated using fund size information, which was available for approximately 77% of the mapped database. Aso, CVC funds were excluded from this estimate due to their typically partial exposure to the sector.

Table 2. Non-exhaustive list of fully dedicated blue funds

	Fund manager	Blue economy fund	Headquarters	Fund size (target in EUR million)
	Aqua-Spark	Aqua-Spark	The Netherlands	400
	Atlante Gestion	Atlante Marine I	France	200
	Bluefront Equity	Bluefront Capital I	Norway	50
		Bluefront Capital II		100
	Eurazeo	Sustainable Maritime Infrastructure Fund	France	175
	Future Planet Capital	Future Planet Blue Ocean Limited	United Kingdom	27
	GO Capital	Impact Ocean Capital	France	60
		Mer Invest		15
		Sud Mer Invest		7,5
	Growth Capital Partners	Growth Blue	Portugal	50
	Hatch Blue	Hatch Fund I, II, Blue Revolution Fund	Ireland	75
	Indico Capital	Indico Blue Fund	Portugal	50
	Katapult Ocean	Katapult Ocean	Norway	75

	Fund manager	Blue economy fund	Headquarters	Fund size (target in EUR million)
M|A|M MONACO ASSET MANAGEMENT	Monaco Asset Management	ReOcean Fund	Monaco	100
OCEAN14 CAPITAL	Ocean 14 Capital	Ocean 14 Capital Fund	United Kingdom	200
OUTRIGGER IMPACT	Outrigger Impact	Outrigger Impact Fund	Luxembourg	100
Planet Ocean Fund	Planet Ocean	Planet Ocean Fund	Luxembourg	n.a.
Seventure	Seventure Partners	Blue Forward Fund	France	130
SWEN CAPITAL PARTNERS	SWEN Capital Partners	SWEN Blue Ocean	France	170

Source: PwC analysis

The spectrum of European fully blue funds is large: from VC funds like **Aqua-Spark**, specialised in aquaculture and with large assets under management (EUR 400M) to **Indico Capital** that is focused on blue deep tech and of smaller scale (EUR 50M), to PE funds with a broad blue economy focus like **Growth Capital Partners,** and specialised funds like **Ocean 14 Capital,** that focus on food security and marine ecosystems.

Unlocking the broader equity pool

The assets under management of European equity providers with partial exposure to the blue economy - including VC, PE and CVC[10] funds – amount to EUR 17 billion.

While these funds focus on a wider range of sectors and activities (agriculture, industrial energy transition, deep tech, circular economy, etc), not always related to the blue economy, these private investors represent an additional source of capital for blue businesses as long as they align with the verticals of these funds.

[10] The investments made by CVCs may include other forms of financing than equity. The amounts considered for CVCs are their total investments and may include some form of debt or other technical support for start-ups.

This expands the potentially available capital beyond the EUR 3 billion attributed to funds with a full blue economy focus to the total of up to EUR 20 billion. To illustrate these sources of capital, below is a list of partially dedicated blue funds:

Table 3. Non-exhaustive list of partially exposed blue funds

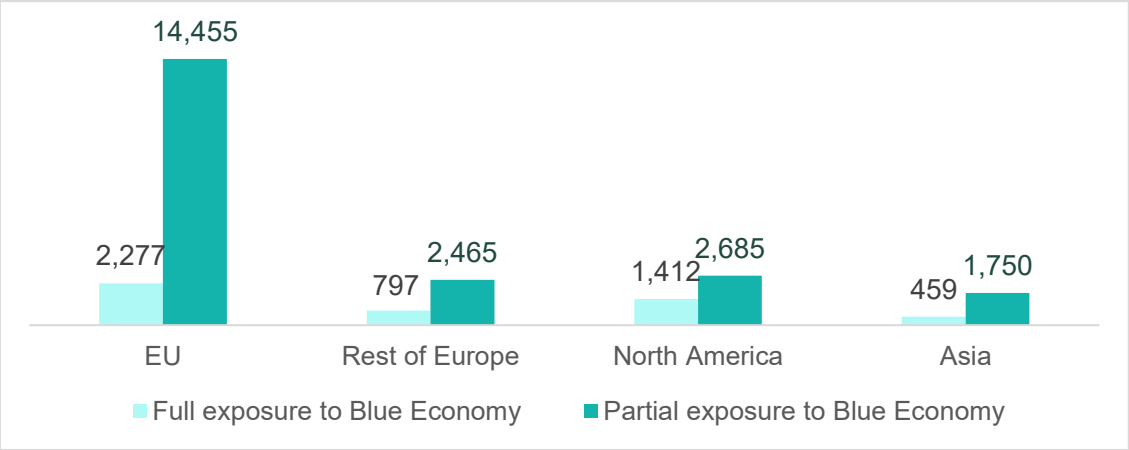
	Fund manager	Partially dedicated fund	Headquarters	Fund size (EUR million)
alter equity	Alter Equity	Alter Equity I, II, III	France	236,5+
ASTANOR VENTURES	Astanor Ventures	Astanor Ventures Fund II	Luxembourg	350
CHALMERS VENTURES	Chalmers Ventures	Chalmers Innovation Fund	Sweden	50
CIRCULARITY CAPITAL	Circularity Capital	Circularity European Growth Fund I, II	United Kingdom	215
CONVEN CAPITAL	Convent Capital	Agri Food Growth Fund	The Netherlands	100
ECBF	European Circular Bioeconomy Fund	European Circular Bioeconomy Fund	Germany	300
faber	Faber	Faber Tech III	Portugal	60
Future Positive Capital	Future Positive Capital	Future Positive Fund I	France	n.a.
ICOS CAPITAL	Icos Capital	CleanTech Fund I, II, III, IV	The Netherlands	100
INFINITY RECYCLING	Infinity Recycling	Circular Plastics Fund	The Netherlands	150
METAVALLON	Metavallon VC	Metavallon VC	Greece	n.a.
momentum	Momentum Partners	Momentum III AS	Norway	50

	Fund manager	Partially dedicated fund	Headquarters	Fund size (EUR million)
Regeneration.VC	Regeneration VC	Sub-ocean Fund	United Kingdom	n.a.
RIVE PRIVATE INVESTMENT	Rive Private Investment	n.a.	France	n.a.
SARSIA	Sarsia	Sarsia Climate & Environment Fund	Norway	45
SINTEF	SINTEF	n.a	Norway	100
UNA TERRA	Una Terra	Una Terra – Blue Economy EIS Fund	Switzerland	150
Vala	Vala Capital	Sustainable Growth EIS Fund	United Kingdom	20
yotta L'EMPREINTE DU PROGRÈS	Yotta Capital Partners	Yotta Growth Industry (Article 9 fund)	France	200
		Yotta Sustainable Industries 2 (Article 9 fund)		200
WIND	Wind Capital	Wind Capital II	France	90

Source: PwC analysis

North American and Asian players can bring additional sources of funding for blue economy ventures. Figure 4. below provides a breakdown of the equity investment per region, illustrating the relative contributions of each fund type to the total pool. Note: the assets under management of non-European based investors mapped were not fully allocated to European companies.

Figure 4. AuM of VC, PE and CVC dedicated to blue economy per region (EUR million)



Source: PwC analysis

From the investor standpoint, unlocking capital largely hinges on increasing sector-specific knowledge. Through our various investor capacity building sessions, we observed that many funds were unfamiliar with the blue economy's unique dynamics, which include a limited understanding of all the verticals related to the blue economy, technical understanding of technologies, available pool of talent and necessary competencies. This has limited their willingness to engage.

Additional funding sources with partial exposure to the blue economy have the potential to act as co-investors alongside dedicated blue economy funds. Their involvement can significantly amplify the growth prospects and international scaling of blue economy enterprises by providing both capital and strategic expertise. This collaborative approach offers several advantages:

- **Enhanced deal flow**: co-investment broadens the pipeline of viable ventures by pooling networks and sourcing capabilities.
- **Diversified investment risk**: shared exposure across multiple investors reduces concentration risk and improves portfolio resilience.
- **Accelerated innovation**: Strategic partnerships foster cross-sectoral learning and enable ventures to scale more rapidly across geographies and markets.

While these benefits are promising, it is important to note that the positioning of these funds as co-investors will depend on sector familiarity, risk appetite, and alignment with blue economy objectives.

The potential of co-investment must also be weighed against persistent structural funding gaps. **Many dedicated blue economy funds manage modest assets, often below EUR 50 million, which restricts their capacity for follow-on investments and scaling support.** These limitations risk slowing innovation and reducing the effectiveness of co-investment strategies. **A parallel priority is the growth of the investment ecosystem itself.** This includes policy alignment across borders, the formation of public-private partnerships, and capacity building

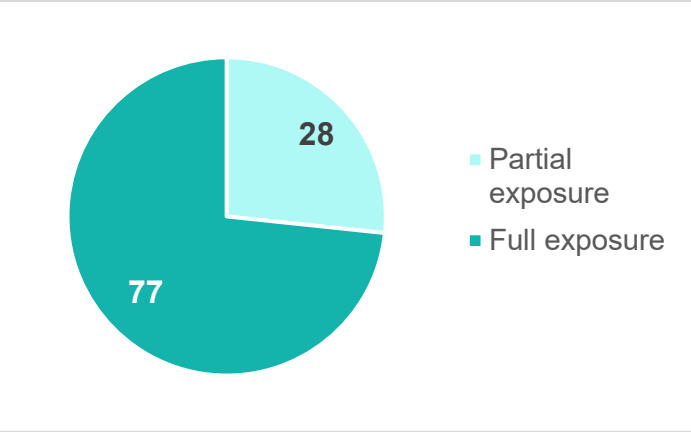
for emerging entrepreneurs. These elements are not causally linked to capital flows but are essential to sustaining long-term sectoral development.

Looking ahead, strengthening the interconnectedness between dedicated blue economy funds, broader impact funds, and public institutions is essential. By fostering strategic partnerships, providing targeted incentives, Europe can solidify its leadership role and set the stage for a new era of sustainable blue economy growth - driven by both financial innovation and a shared vision for a low-carbon, resilient future.

1.2. Spotlight on Venture Capital Funds

Our mapping revealed **105 venture capital funds with partial or full exposure to the blue economy**.

Figure 5. Number of VC funds with exposure to the blue economy

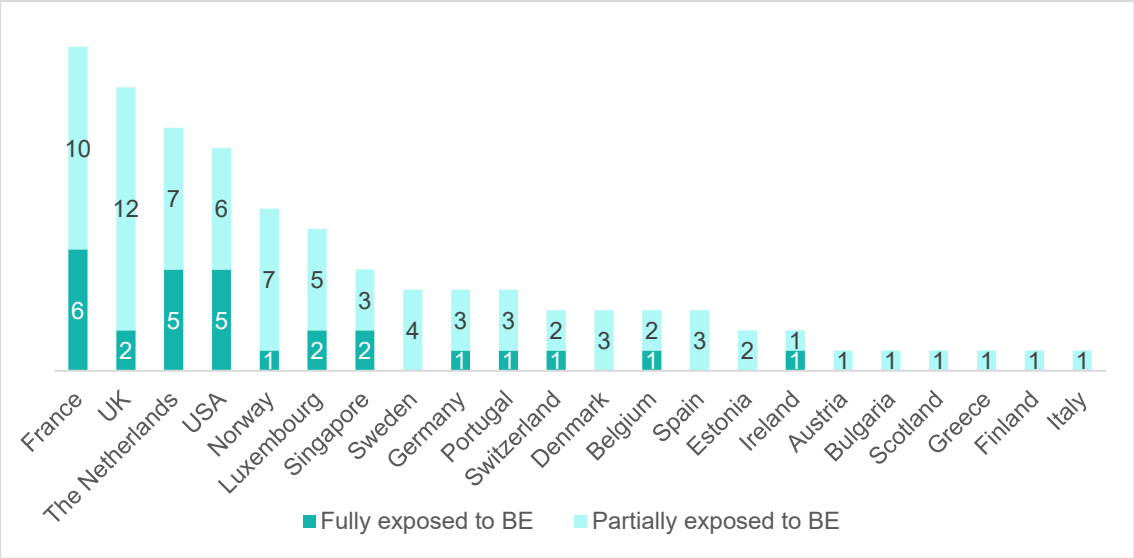


Source: PwC analysis

This finding reflects both an enhanced mapping methodology and rising investor interest in ventures that contribute to the decarbonisation of our economies. Many of these funds were identified through analyses of deal activity, revealing repeated investments in blue economy-related sectors.

Among the 105 VC blue funds, 65 were based in the EU, with an additional 24 in the rest of Europe. **Across Europe, France, the UK, and the Netherlands emerge as the three principal hubs**. These countries benefit from strong blue economy ecosystems, advanced research clusters and dynamic start-up scenes.

Figure 6. VC funds per entity's headquarters



Source: PwC analysis

Looking into why these countries are leading the way, two key enablers have been pivotal for the development of the VC ecosystem: the presence of public LPs and a clear structure of collaboration between innovation makers and innovation financing.

In **France**, BPI France has played an enabling role in providing funding and support for innovative projects in the blue economy, particularly in sustainable maritime activities and marine renewable energy. France also hosts various clusters and research centres, such as the Pôle Mer Bretagne Atlantique and Ifremer, which fosters collaboration among businesses, researchers, and public authorities.

France's investment landscape stands out with several notable examples such as **Go Capital**, which manages four distinct blue economy funds supported by public entities; **SWEN Capital**, backed by BPI France; and **Seventure Partners,** which benefits from Banque Populaire's involvement. These funds illustrate the strong role of public support at national and EU level in mobilising private capital for blue ventures.

In the **Netherlands**, Invest-NL, Invest International and Oost NL showed a clear track record in sustainable economic growth, investing in innovative companies within the blue economy, particularly in water management and marine technology. These investments have gone directly into blue start-ups and/or as LPs into funds. The Dutch government has actively promoted initiatives through its Netherlands Enterprise Agency (RVO), which supports startups and businesses in sustainable practices.

The Netherlands' key players include **Aqua-Spark**, which specialises in aquaculture ventures, **Rotterdamse Havendraken** and **Pure Terra Ventures**,

both of which aim to drive sustainable transformation in ports and water innovation, respectively. Pure Terra Ventures is supported by the InvestEU programme as well a Circular Plastics fund and Convent Capital Agrifood.

These countries also host well-established financial sectors capable of mobilising significant investment. The interplay between public and private capital is particularly notable: **VC funds often enjoy substantial support from government bodies, regional authorities, and national development banks**. Public banks, like the French Development Agency, offer specific financing windows for blue economy projects.

Norway, Luxembourg, Sweden and Germany host a notable concentration of blue economy VC funds. In some cases, this reflects fund registration rather than the location of investment activity. Luxembourg's reputation as a major financial centre helps attract international asset managers, while Norway and Sweden's deep ties to the maritime and aquatic sectors favour the development of specialised blue funds. Germany's scale and diversified economy also contribute to its appeal for impact investment managers. Overall, nearly all blue economy VC funds operating in Europe exhibit a strong regional or pan-European approach rather than being limited to their domestic markets.

Notable examples in these 5 countries include: Aqua-Spark, Astanor Ventures, Bluefront Equity, BluKap Ocean Ventures, Chalmers Ventures, Future Planet Capital, Go Capital, Good Only Ventures, HatchBlue, Haltra, Indico Capital, Icos capital, Infinity Recycling, Katapult VC, Ninepointfive Tidal, Outrigger Impact Fund, Planet Ocean Fund, Propeller VC, Pure Terra Ventures, Rotterdam Port Fund, SWEN Capital (Blue Ocean Fund) and Yotta Capital, among others.

The role of public capital in VC blue economy investment in Europe

Public support plays a significant role in shaping the blue economy venture capital landscape, although such involvement is not always fully visible. A considerable number of funds have raised capital from public limited partners (LPs), including national promotional banks and public financial institutions. **This public backing is often instrumental, helping to de-risk early-stage investments, attract private co-investors, and align investment flows with broader policy goals** such as climate resilience, biodiversity, and maritime innovation.

Countries with established investment ecosystems, such as **Norway, the Netherlands, the UK, and France, frequently provide consistent public support**. In these countries, public institutions often act as anchor investors or co-investors, enabling the launch and scaling of blue-focused VC funds. **This support is not limited to capital: it includes technical assistance, regulatory guidance, and access to strategic networks**, which are especially valuable for first-time fund managers or those targeting emerging blue economy segments. Where public backing is significant, funds tend to focus relatively more on national

ecosystems, whereas others adopt a broader European or even global investment outlook.

Other countries, such as **Portugal, Greece and Spain** support blue economy funds through national development banks or regional public entities, although these are more limited in number and scale compared to Northern Europe.

Public support offers clear benefits, de-risking early-stage investments, attracting private co-investors, and signalling policy alignment. However, the landscape remains uneven across the EU. **A handful of member states offer consistent public financial support**, contributing to an unbalanced ecosystem where startups in some regions have greater access to capital and networks than others. This disparity underscores the need for stronger policy coordination at both national and EU levels, and greater support for cross-border collaboration to ensure that innovative blue economy projects can scale and compete globally, regardless of their geographic base.

Insights from BlueInvest panels and workshops over the years reinforce this message. **Stakeholders have repeatedly highlighted the importance of public capital not only as a financial lever but also as a strategic enabler**. Public investors help shape market expectations, pilot new investment approaches, and create visibility for emerging sectors. Their involvement can also inform policy developments by surfacing gaps and demonstrating scalable models.

Among the VC funds, 27% are fully dedicated to the blue economy and 73% have partial exposure to the sector

Fully dedicated funds often **adopt a cross-sectoral investment strategy,** targeting multiple segments of the blue economy such as ocean health, sustainable marine technologies, and maritime logistics. Their diversified approach allows them to spread risk across different verticals while maintaining thematic coherence around ocean-related innovation and sustainability.

Fewer than half of the funds have a sectoral focus. Among those that do, **aquaculture, shipping & ports, and water management dominate as sectors that have clearer paths to market and lower perceived risk.**

Currently, there are **no funds exclusively focused on blue biotechnology, ocean tech or environmental protection, likely due to limited deal flow and perceived investment readiness**. A handful target emerging markets only, such as **Outrigger Impact Fund**, which invests in small island developing states.

Funds with partial exposure often include blue economy within broader themes **like climate tech, biodiversity, circular economy** and agri-food. Many focus on gigatonne-scale decarbonisation, seeking technologies with measurable CO_2 reduction potential.

Notable examples of funds with a partial connection to the blue economy are: Astanor Ventures, World Fund Management, Brace4Impact, AiiM, Circularity Capital, Emerald (Water Innovation Impact Fund), ETF Partners (ETF Partners Fund IV), Faber, Future Positive Capital, ICOS Capital, Metavallon VC, Sarsia, Starquest, Vala Capital, Wind (Wind Capital II), Regeneration VC and Navus Ventures, among others.

The size of the VC funds with exposure to blue economy remains of moderate scale

Fund sizes dedicated exclusively to the blue economy tend to be modest, which can limit the scale of support available for start-ups aiming for major growth. The average size of these fully blue funds is around EUR 92.8 million, with a median of EUR 80 million, indicating a relatively balanced distribution in terms of size. **Over a third of these funds manage less than EUR 50 million, which restricts their capacity to make larger investments and follow-on commitments as portfolio companies mature.**

Table 4. Fund size of VC funds exposed to the blue economy

Exposure	Average fund size (EUR million)	Median fund size (EUR million)
Full exposure	**92.8**	**80**
Partial Exposure	**130.7**	**100**

Source: PwC analysis

In contrast, funds with only partial exposure are slightly larger, with an average fund size of EUR 130 million, and a median size of EUR 100 million. This dynamic suggests that while dedicated blue funds provide valuable expertise and focus, their limited scale means that **start-ups often need to engage more broadly with generalist VCs willing to support blue economy ventures as part of a diversified portfolio**.

Engaging with impact funds to amplify ocean growth

For blue economy investors, impact funds can serve as valuable co-investment partners. While they may not typically act as lead investors in blue ventures, they can contribute complementary capital and broaden the investor base.

More importantly, by increasing awareness and understanding of the blue economy among impact fund managers, these funds could play a catalytic role in shaping the market. They often help signal emerging trends, pilot new investment approaches, and surface weak signals that indicate future growth areas.

Their involvement can also create visibility for public sector stakeholders, helping to clarify where support mechanisms are most needed. In some cases, funds may even influence regulatory developments by demonstrating scalable models and highlighting policy gaps through their portfolio activities.

For blue economy start-ups, these funds represent additional sources of capital, beyond specialised blue funds. When approaching these impact funds, start-ups need to keep in mind adapting their story telling to match these investors' investment focus.

For policy makers, the presence of impact funds with interest in the blue economy indicates that – **from a private sector perspective – ocean, biodiversity, life sciences, etc. are often considered under the same sustainability umbrella: meeting the decarbonisation and innovation challenge.**

Box 2. Recommendations for startups approaching VCs

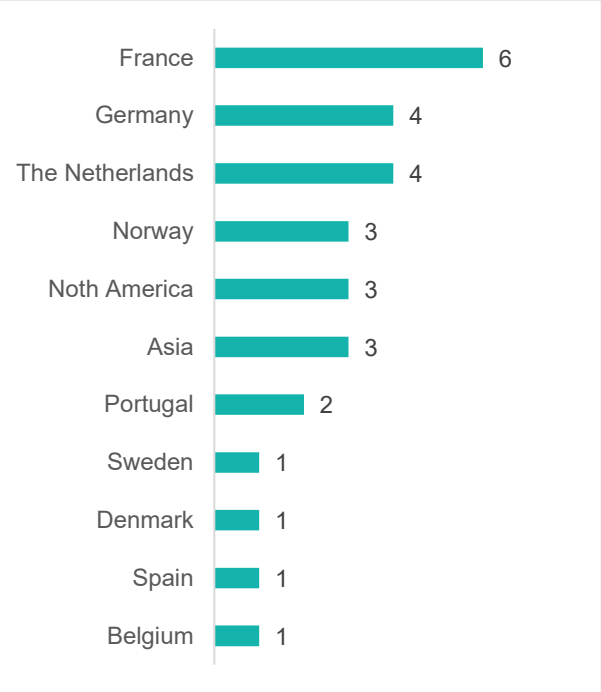
- **Geographic focus:** It is essential for start-ups to assess the geographical exposure of target funds to avoid misdirected outreach and maximise their chances of success.
- **Sector relevance:** It is more important for start-ups to identify investors whose sectoral specialisation aligns with their business, rather than focusing solely on nationality. A fund's expertise in the blue economy or related fields can be a decisive factor in both funding and strategic support.
- **Leverage public support:** Start-ups should consider how public funding initiatives can indirectly benefit their fundraising efforts, either by securing investment from publicly backed funds or by engaging with ecosystems fostered by government support. Participating as portfolio companies in such funds can enhance credibility, attract follow-on investors, and provide access to strategic networks.
- **Networking and collaboration:** The interconnected nature of the European blue economy VC ecosystem means that building relationships across borders, through accelerators, industry events, and research collaborations, can significantly enhance visibility and investor interest.
- **Cross-border opportunities:** While investors may have deeper knowledge of their home markets, most European funds are open, if not eager, to co-invest in promising foreign ventures. This openness helps fuel cross-border innovation and knowledge exchange.

Looking forward, increased collaborations between public and private investors and broader education on the opportunities within the blue economy for generalist VCs could help address the lack of awareness on the growth opportunities generated by ocean ventures. **One way to achieve this is to promote further successful exits and share success stories to attract larger fund commitments**. In parallel, ongoing dialogue between investors, policymakers, and entrepreneurs have been often essential to ensure that public support evolves in step with market failures, enabling the blue economy to scale and compete globally.

1.3. Spotlight on Corporate Venture Capital

The aggregate capital committed by Corporate Venture Capital investors to activities relevant to the blue economy is considerable, although transparency regarding individual fund size remains limited.

Figure 7. CVCs with exposure to the blue economy per headquarter



Source: PwC analysis

The 29 active CVCs identified[11] represent a combined investment pool of approximately EUR 5.5 billion.

While only a portion of these resources is explicitly earmarked for blue economy ventures, this figure underscores the substantial financial firepower that CVCs can direct toward innovation in the sector should the right opportunities and impact align. Fund sizes are often undisclosed, but available data suggests that CVCs typically manage portfolios ranging from EUR 50 million to several hundred million, depending on the parent company's scale and strategic priorities.

CVC act as strategic partner, with potential complications

While some CVCs align with corporate sustainability goals, others are primarily driven by financial returns or open innovation strategies. Corporates create CVCs for diverse reasons, including:

- **Strategic transformation**: Supporting long-term shifts in business models, such as digitalisation or sustainability.
- **Access to emerging technologies**: Gaining early insight into disruptive innovations that complement internal R&D.
- **Market expansion**: Exploring adjacent markets or geographies to diversify revenue streams.
- **Disruption mitigation**: partnering with startups that could challenge or enhance the corporate's core business.

CVCs provide more than capital. Their strategic involvement often includes:

[11] Data was available for 15 CVCs

- **Acceleration programmes:** Providing structured support to help startups refine their business models, scale operations, and access networks.
- **Pilot opportunities:** Facilitating real-world testing of technologies or services within corporate environments, which can validate solutions and accelerate market entry.
- **Commercialisation pathways:** Offering direct routes to market through corporate channels, supply chains, or customer bases.
- **Exit potential:** Their readiness to acquire or partner with startups created valuable exit opportunities and enables rapid scaling – particularly important for ventures aiming to deliver major environmental impact.
- **Sector specific knowledge:** CVC involvement often brings sector-specific knowledge, access to established distribution channels, and credibility that can encourage follow-on investment from other sources.
- **Regulatory guidance**: CVCs may also facilitate regulatory navigation and provide guidance on product-market fit through deep industry connections.

CVCs also invest at different stages, some at seed, others from Series A, so their criteria must be reviewed before outreach.

Start-ups should carefully assess alignment with corporate objectives and consider potential implications regarding independence or pivoting strategies. CVCs might also seek acquisition, which can affect valuation and independence. Negotiations with CVCs often differ from those with traditional VCs, requiring a clear understanding of corporate strategy and long-term alignment.

CVCs seek strategic innovation linked to their decarbonisation challenges

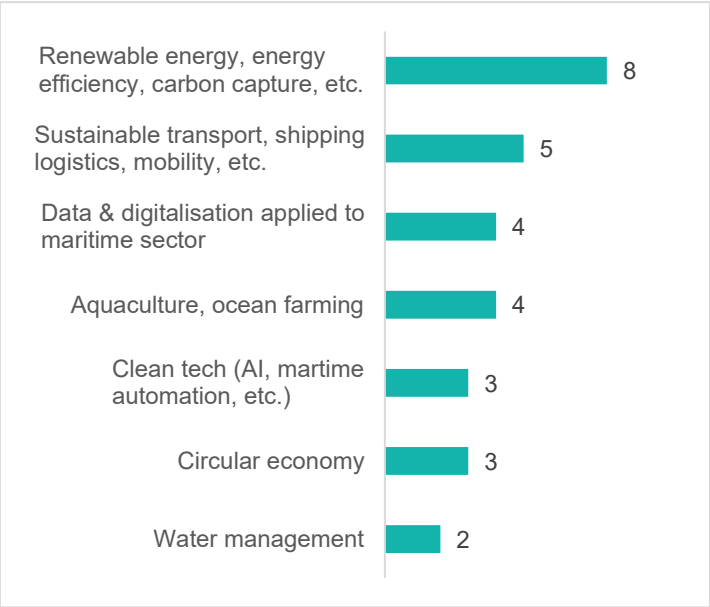
Europe hosts 23 CVCs with an interest into the blue economy. However, this interest is neither exclusive to Europe nor uniform across sectors.

Most CVCs do not explicitly state "blue economy" in their mandates, even those backed by large marine corporations. This is because CVCs invest across their entire value chains, and not necessarily in core ocean or marine technologies. Instead, they reference broader themes such as decarbonisation or sustainable innovation.

Many CVCs outside the ocean or water sectors are interested in sustainable technologies provided by blue economy ventures to meet their decarbonisation objectives. There is less distinction between EU and non-EU CVCs in terms of investment approach, as most operate globally and seek innovations wherever they align with corporate strategy.

Typical sectors of interest include marine technology, water treatment, sustainable logistics, alternative materials, and biotechnology. Figure 8 below provides a clearer view of on the topics of interest to CVCs.

Figure 8. Key topics of CVCs with interest into the blue economy



Source: PwC analysis

This creates a strategic alignment gap for blue economy start-ups, which must learn to position their solutions in terms that resonate with corporate priorities.

For instance, a maritime logistics giant like Maersk may invest in IT and software with only partial relevance to the blue economy. Companies such as INGKA (IKEA's CVC arm) have sought out ocean-based innovations, like Notpla's seaweed-derived alternatives to plastic, to advance their decarbonisation strategy. These examples highlight a broader knowledge gap: **many CVCs remain unaware of the strategic and impact potential of blue economy ventures.**

At the same time, the broad scope of CVC mandates can make it difficult for start-ups and mission-driven investors to identify the best-fit partners. Most CVCs are technology-driven, casting a wide net across sectors and geographies. Most pursue a global strategy, seeking innovations worldwide to address their unique business needs, which creates further opportunities but also competition **While this means blue economy ventures must compete with a wide array of innovations for attention, it also reflects a growing appetite for scalable, tech-enabled solutions that align with sustainability and innovation goals.**

Notable examples of CVCs with a direct connection to the blue economy are: BASF Venture Capital, Engie New Ventures, Maersk Growth, GTT Strategic Ventures, Olaisen, Repsol, Schulte Group, Statkraft, Veolia, Zebox Ventures, SEB Greentech, EDP Ventures, Damen Maritime Ventures, Eneco Ventures, Equinor Ventures, Saipem, Wärtsilä, etc.

CVCs – towards flexible investment models

Relevant for impact and blue investors, **many CVCs invest in and hold shares of tech, green, and blue funds, making them potential LPs** and enhancing fund success and start-up business opportunities. Their dual role as direct investors and LPs in thematic funds allows them to shape market trends and support ecosystem growth. They are naturally also a privileged partner for exits,

especially the ones investing at later stage or looking for acquisitions only. This makes them particularly attractive for startups and VCs as long as interests from CVCs, VCs and start-ups can align.

As markets evolve, some CVCs are adopting more flexible investment models and fostering open innovation ecosystems to stay competitive. These trends are likely to further shape the strategic role of CVCs in driving sustainable growth and impact. Startups should monitor these shifts closely and adapt their engagement strategies accordingly – especially as CVCs increasingly collaborate with VCs, accelerators, and public platforms to source and scale innovation.

Box 3. Recommendations for startups approaching CVCs

- Understand the CVC's strategic motivation: Is it decarbonisation, open innovation, financial return or acquisition?
- Position your solution in terms that resonate with the corporate's priorities.
- Be prepared for strategic discussions, not just financial ones.
- Consider the implications of potential acquisition early in the relationship.
- Use CVCs as validation partners and leverage their networks for market entry.
- Expect longer decision cycles: CVCs often require internal alignment across multiple departments before committing to investment.
- Tailor your pitch to the corporate's business model: Highlight how your solution fits into their operations, customer base, or sustainability goals

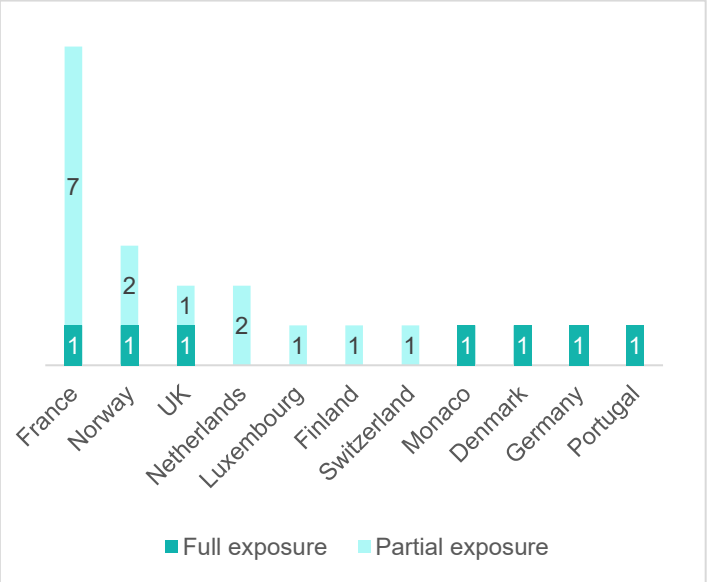
Building trust and alignment early can lead to deeper partnerships, pilot opportunities, and faster market entry. The sector would benefit from more transparent communication and knowledge-sharing between corporates and innovators.

1.4. Spotlight on Private Equity Funds

This mapping identifies seven European based private equity funds fully dedicated to the blue economy and an additional 15 European funds with partial exposure to the sector.

The relatively modest number of European PE funds correlates with a limited volume of late-stage growth deals, as highlighted in the 2024 Investor Report.

Figure 9. Number of European PE funds per country



Source: PwC analysis

Nonetheless, these figures represent a **significant increase compared to prior years, indicating a growing investor appetite** and sectoral maturation.

PE funds with blue economy exposure are predominantly concentrated in France, Norway, the Netherlands and the UK.

Northern Europe hosts most of these funds, reflecting a strategic clustering of blue finance expertise. France in particular stands out as a leader in the sector. This leadership is underpinned by robust financial infrastructure, extensive marine territory, and a strong tradition of maritime innovation. France's prominence in the sector is highlighted by its hosting of marquee events like the Blue Economy Finance Forum in Nice and Monaco in 2025

Norway and the UK's pivotal roles leverage on their extensive maritime industries and established networks of institutional investors. These countries have not only channelled significant capital into blue economy ventures but have also fostered ecosystems that support technology transfer, public-private collaboration, and cross-border investment.

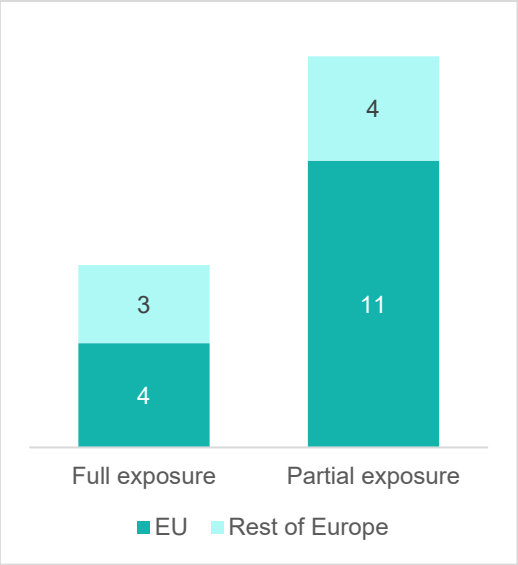
It is important to note the international scope of these PE funds. While headquartered in Europe, many operate with mandates that span multiple regions, including the EU, global markets, and, in some cases, emerging blue economy hubs in Asia-Pacific and Latin America. **This global orientation means that promising blue economy scale-ups are not limited by geographic boundaries when seeking investment.** Instead, they can tap into a global investor network, provided they meet the increasingly sophisticated criteria around sustainability, impact measurement, and scalability and returns.

Comparative capital deployment: Partial vs full exposure to the blue economy

The European mapping identified only 7 fully blue-focused PE funds, most of which emphasised maritime decarbonisation and operated on a smaller scale (EUR 1.2 billion in total).

This raises both opportunity and challenge for EU investors: **while their sectoral interests may be diverse, the available capital for large-scale blue economy initiatives is comparatively limited.**

Figure 10. Number of European PE funds per level of exposure to the blue



Source: PwC analysis

The picture shifts markedly when factoring in PE funds with partial blue economy exposure. Europe is home to a considerably higher number of such funds (15), signalling a latent potential for scaling up blue economy ventures through increased growth-stage investment. In total, **the EU hosts a total of EUR 9.1 billion in Assets under Management by PE funds with a partial exposure to blue economy.**

Fully blue-focused PE funds remain modest in scale, **averaging EUR 297 million** while partially exposed funds average **EUR 742 million**. This disparity is even more pronounced in PE than in VC, likely due to:

- The nascent pipeline of investable ventures at the scale required by traditional PE,
- The illiquidity and longer time horizons of ocean-related investments,
- The absence of established exit markets for many blue economy sectors.

Indeed, PE funds with partial exposure to blue economy sectors benefit from portfolio diversification - they can deploy capital across a spectrum of sustainable infrastructure or growth opportunities, only a subset of which are marine or water-related. This flexibility not only supports larger fund sizes but allows managers to balance risk more effectively.

Table 5. Fund size of European PE funds exposed to the blue economy

	Average fund size (EUR million)	Median fund size (EUR million)
Full exposure	**186**	**150**
Partial Exposure	**718**	**450**

Source: PwC analysis

The fully blue-focused funds tend to be sector-specific, targeting established industries such as water management, shipping, and seafood. The capital intensity that is characteristic of PE vehicles often directs investment towards infrastructure projects (e.g., shipping ports, energy), the decarbonisation of maritime assets and large-scale water systems.

A select group of funds, such as **Growth Partners Capital (Growth Blue Fund – backed by InvestEU), Monaco Asset Management (ReOcean Fund), and Ocean 14 Capital (Ocean 14 Capital Fund I – backed by EFSI)** distinguish themselves by adopting a cross-sectoral approach. These funds exemplify best practices in identifying and scaling late-stage growth companies that span the entire blue economy spectrum.

Many of the partially blue-focused PE funds, much like their CVC counterparts, are firmly oriented toward sustainability. A significant number are **classified as Article 9 funds under the Sustainable Finance Disclosure Regulation (SFDR).** These funds typically carve out niches within the broader blue economy, tailoring their strategies to sectors with high impact potential:

- **Rive Private Investment (France)** focuses on the energy transition of transportation assets, including electric ferries and offshore wind.
- **Navigare Capital (Denmark)** focuses on maritime assets and marine infrastructure.
- **Umoe (Norway)** invests in clean tech, bioenergy, and maritime services, with operational businesses too.
- **Yotta Growth Industry and Yotta Sustainable Industries 2 (France)** targets Industry 4.0 SMEs and projects advancing industrial decarbonisation and energy efficiency.

The evolution of these partially exposed blue funds is contributing to a more dynamic and resilient investment landscape, where capital is increasingly channelled toward innovations capable of driving both financial returns and lasting environmental impact.

In summary, while fully blue-focused PE funds remain comparatively small today, the sector's potential is substantial. As capital market infrastructure continues to develop, and as the scale and quality of blue economy projects grow, we can expect new waves of investment and increasingly sophisticated financial structures to support ocean innovation at scale.

Fostering a vibrant innovation finance ecosystem in the EU will depend on bridging the gap between its strong and numerous VC funds and the comparatively limited pool of dedicated PE capital. Continued investor education and cross-border collaboration will be essential to bridge the gap between available capital and the needs of late-stage ventures, ensuring that the blue economy can attract and deploy larger pools of growth capital in the years ahead.

Box 4. Recommendations for scale-ups approaching PEs

Private Equity funds seek scalable and profitable companies. You will need to demonstrate scalability and risk-adjusted returns.

- PEs favour companies that are at post-technology risk: show a clear path to positive EBITDA.
- Showcase the positive environmental impact of your solution, but make sure you include how this clearly translates into positive outcomes (revenue premium, risk reduction, etc.)
- PEs require a credible exit strategy: help them map strategic buyers and multiple exit options.

To effectively access these larger funds, scale-ups should actively participate in international blue economy forums, engage with cross-border investors and align their business models with globally recognised ESG and impact standards. Building visibility through strategic partnerships and showcasing scalable, data-driven solutions will be key to attracting international capital.

As a reminder, the Annex contains an overview of some key differences between VC and PE funds.

1.5. Conclusion and key takeaways

The blue economy investment landscape is evolving, with an increasing number of private funds expressing interest in the sector. This is in line with the expanded deal landscape in the previous investor report. Recent developments, such as the broader visibility of the blue economy and clearer emphasis on the political level, e.g. through the European Ocean Pact, as well as events like the EU's BlueInvest Days and the Monaco Blue Economy Finance Forum 2025, signal a shift in momentum.

Nonetheless, **the pool of venture capital and private equity funds solely dedicated to blue economy investments currently remains limited at only around 40 such funds, globally and 28 based in Europe. When including funds with partial blue economy exposure, this number rises to approximately 110, driven by a growing field of impact funds** seeking, among others, profitable and sustainable ventures in ocean and maritime industries.

Corporate Venture Capital is emerging as an underutilised but potentially transformative force in the blue economy. CVCs can play multiple roles: not only as LPs in funds, but also by providing acceleration services, pilot opportunities, and market access for innovative start-ups. While engagement with CVCs can be challenging, their involvement is highly valuable and can drive both funding and commercialisation.

The path to scaling the blue economy lies in aligning it more closely with the broader decarbonisation agenda and fostering high-value innovation to attract a larger pool of investors. **Disparities remain across Europe, where countries like France, the UK, Norway and the Netherlands are leading**,

largely due to strong public sector involvement and support. **At EU level, institutions such as the European Investment Bank Group, including the European Investment Fund (EIF), play a central role** in catalysing growth and their impact should be further enhanced.

Looking ahead, **unlocking the sector's full potential will require stronger collaboration between public and private investors, and a shared commitment to innovation**. Stakeholders should prioritise building **strategic partnerships and supporting capacity-building** for entrepreneurs. **Broader education on the opportunities** within the blue economy, especially for generalist investors, will help bridge the gap between dedicated and partially exposed funds, and enhance cross-border investment frameworks.

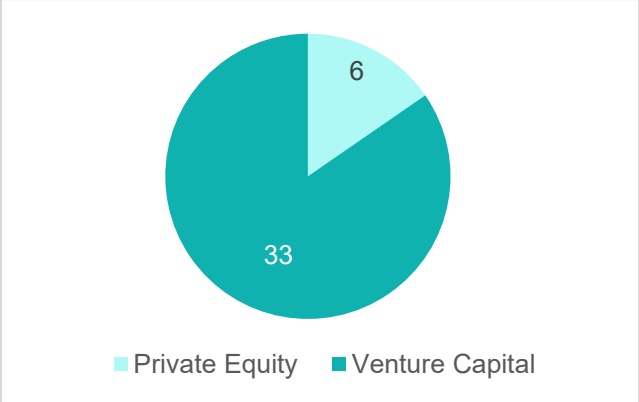
As the market matures, regulatory harmonisation improves, ocean innovation accelerates, and investor awareness on the economic benefit of ocean health increases, larger and more sophisticated financial structures are likely to emerge. This will help narrow the current gap in fund scale and support the emergence of the blue economy as a mainstream sustainable investment theme.

Mapping equity sources, especially those supporting start-ups and scale-ups, will be essential to track this evolution and increase awareness about a sector that is at the nexus of deep tech, cleantech and sustainability.

Chapter 2. Investor perspectives on blue growth: Insights from Venture Capital and Private Equity asset managers

From July to September 2025, we conducted a comprehensive survey targeting investors in the Blue Economy, emphasising private equity and venture capital funds that focus on EU-based start-ups and scale-ups. The respondent sample reflects the balance between VC and PE funds outlined in Chapter 1, including 6 PE funds and 33 VC funds – both of which are key players in the blue economy.

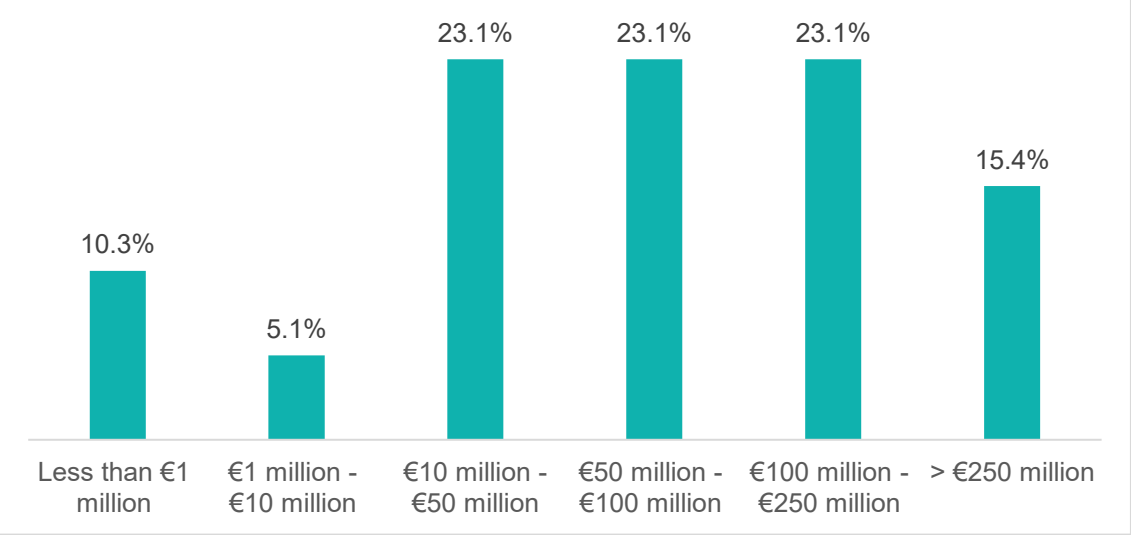
Figure 11. Type of respondents



Source: PwC analysis

1. Most blue funds are below EUR 50

Figure 12. Assets Under Management of survey respondents

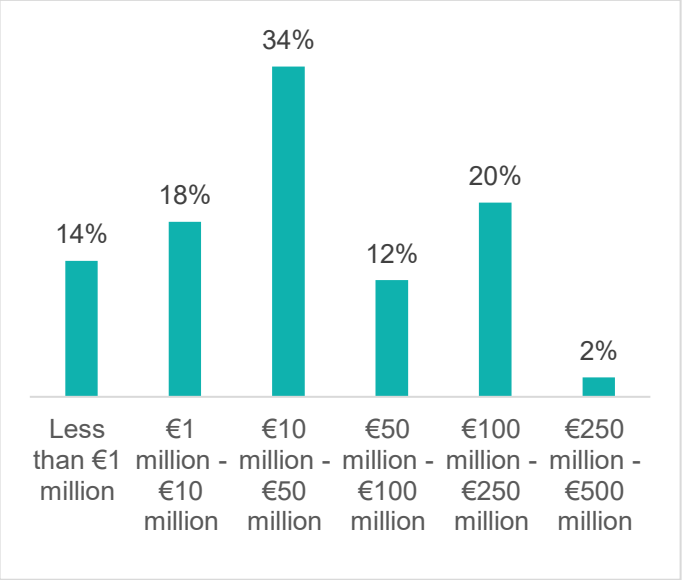


Source: PwC analysis

The respondents are asset managers of varying sizes: 40% manage under EUR 50 million, while 15% handle more than EUR 250 million, **indicating interest in the Blue Economy from both small and large financial players**. The sample

also reflects typical VC firm sizes; according to the EIF VC survey in 2024[12], 60% of VC firms have AuM between EUR 50 and EUR 500 million.

Figure 13. Size of the blue funds



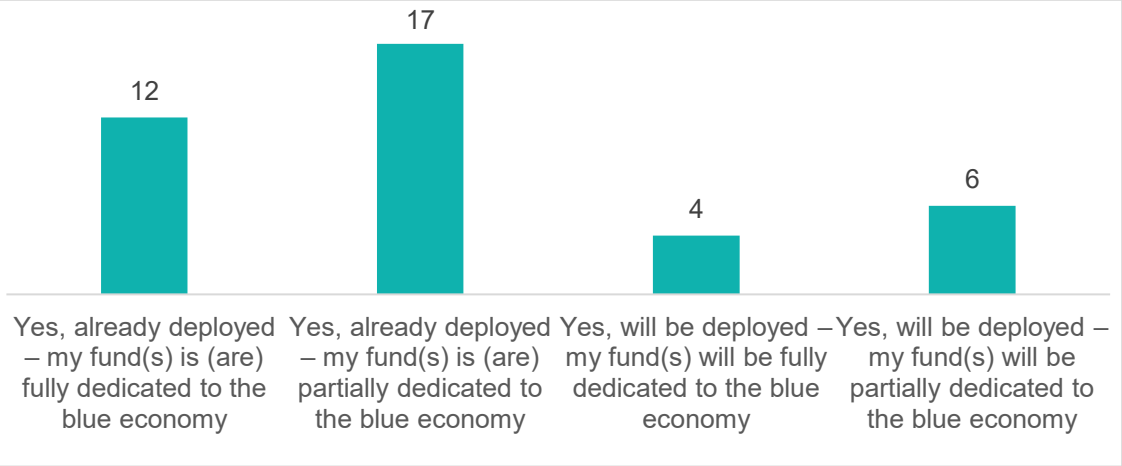
Source: PwC analysis

At fund level, blue funds - whether fully dedicated or with partial exposure to the sector - tend to be relatively small, the majority gathering less than EUR 50 million. This limited scale constrains their ability to deploy significant capital and makes it challenging to provide follow-on funding to portfolio companies. The issue of small fund sizes is not unique to the blue economy; it reflects a broader challenge facing venture capital in Europe[13].

1. The asset class is on the rise

The level of exposure to the Blue Economy among our survey respondents closely reflects the mapping presented in Chapter 1. More funds have partial exposure to the Blue Economy than full exposure.

Figure 14. Respondents' exposure to the blue economy



[12] EIF VC Survey 2024: Market sentiment, available at: https://www.investeurope.eu/media/adrjsqvh/eif-vc-survey-2024_online.pdf

[13] These include policy measures to attract more limited partners - especially pension funds and insurance companies - into VC funds, as well as initiatives to further integrate European capital markets. Strengthening cross-border investments, improving resource allocation, and creating a more robust exit environment are all essential steps. Several of these recommendations have been highlighted by the IMF in its report "Stepping up Venture Capital to Finance Innovation in Europe," and they are equally relevant to advancing the blue economy sector.

A promising development is that **10 asset managers intend to launch blue funds in the coming months.** This surge in interest is echoed by findings from an EIF survey[14], which revealed that, among more than 390 VC fund respondents, **11% currently include the blue economy in their portfolios, while 22% plan to focus on the sector in the future.** In addition, as highlighted during the BlueInvest Investor Capacity Building session on "Unlocking Public Capital and Measuring Impact,"[15] the EIF currently supports 10 funds under InvestEU Blue Economy, including **5 specialist funds**, and **expects 3 to 4 additional signatures within the next 12 months.**

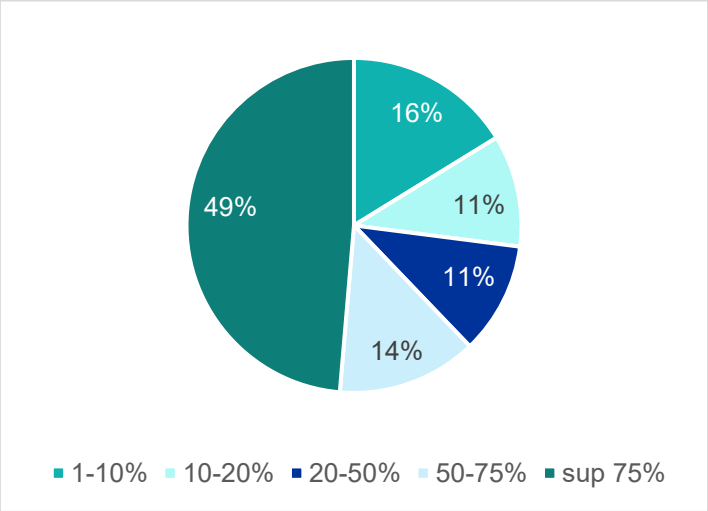
Although the blue economy is often regarded as an emerging asset class, **recent regulatory advances may help explain the growing appetite for this sector**. As is often the case, regulation acts as a major catalyst. Rikkert Beerekamp, Chief Investment Officer at impact investment advisor Phenix Capital, noted that "A big barrier to attract institutional capital is that only 1% of the oceans are regulated. The new UN treaty will bring a legal framework, which is, for a lot of institutional investors, a prerequisite for financing[16]." Currently, Phenix Capital reports that, out of 3,000 impact funds, only 186 devote a certain portion of their investments into SDG 14[17].

The blue economy may benefit from the fact that a growing list of countries have signed the UN High Seas Treaty, the first legally binding agreement focused on protecting marine biodiversity. Another initiative is the Kunming-Montreal Agreement, adopted at COP 15 in 2022, which sets two key ocean-related targets: restoring at least 30% of degraded marine and coastal areas by 2030, and protecting at least 30% of these areas. With over 190 states endorsing the framework, it provides a significant reference point for impact investors to focus on global marine ecosystem preservation goals.

Looking ahead, the implementation of the European Ocean Pact is expected to enhance the competitiveness of the blue economy. The Pact emphasises the need for investment in innovation and research to boost the EU's standing, encouraging the growth of sustainable and cutting-edge industries while helping to close the technology gap with international rivals. By advancing new ocean technologies such as underwater robotics, sustainable aquaculture, the blue bioeconomy, AI-driven marine monitoring and environmentally friendly shipping, the EU seeks to establish itself as a world leader in a sustainable blue economy that promotes both economic prosperity and environmental responsibility. **With the Ocean Pact, the EU aims to offer a clear framework for investors that helps attract private capital for the blue economy**.

[14] EIF VC Survey 2024: Market sentiment, available at: https://www.investeurope.eu/media/adrjsqvh/eif-vc-survey-2024_online.pdf
[15] BlueInvest Investor Capacity Building Session VII, 30th October 2025, recordings are available on the BlueInvest Community at: https://blueinvest-community.converve.io/investor_capacity_building.html
[16] CFA Institute, What the blue economy means to the investment industry, available at: https://www.cfainstitute.org/insights/articles/blue-economy-opportunity-investment-industry
[17] Phenix Capital Blue Economy Impact Report

Figure 15. Share of blue economy in total fund size

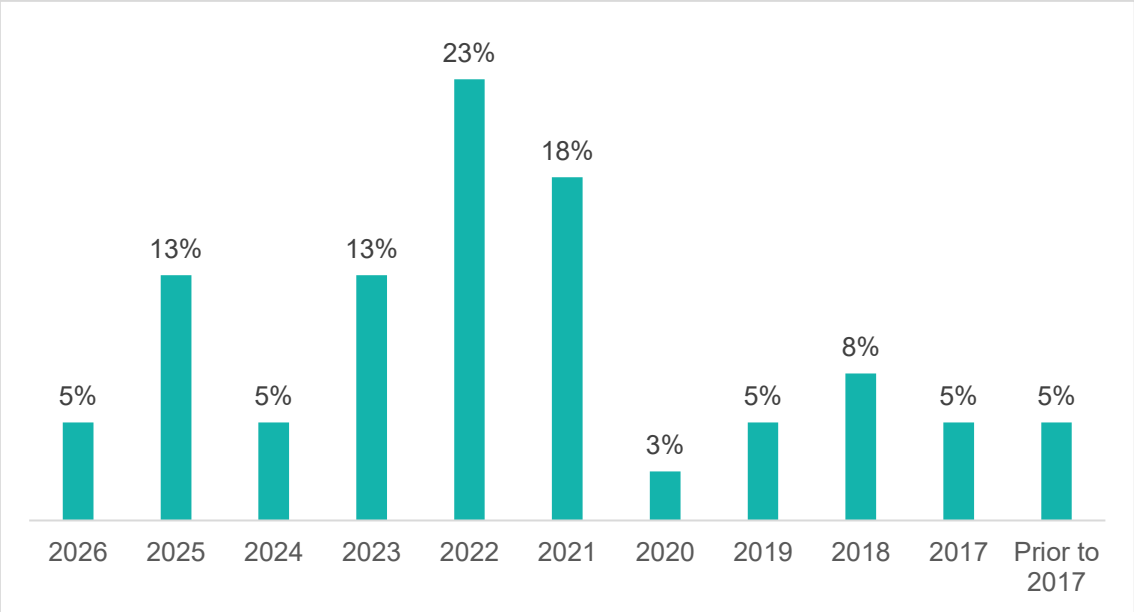


Source: PwC analysis

Another positive signal on blue economy relates to the level of exposure of blue funds: for most respondents, **this exposure is not marginal. A significant 63% of asset managers stated that the Blue Economy comprises more than 50% of their portfolio.** 16% indicated that the Blue Economy represents less than 10% of their portfolio, while 22% reported it accounts for between 10% and 50%. By targeting different verticals (shipping, aquaculture, blue renewable energy, blue biotechnology, etc.), the blue economy offers diversification that enables fund managers to combine a focused investment thesis with diversification potential.

2. Blue funds target high returns but are still too young to demonstrate performance

Figure 16. Vintage year of the fund

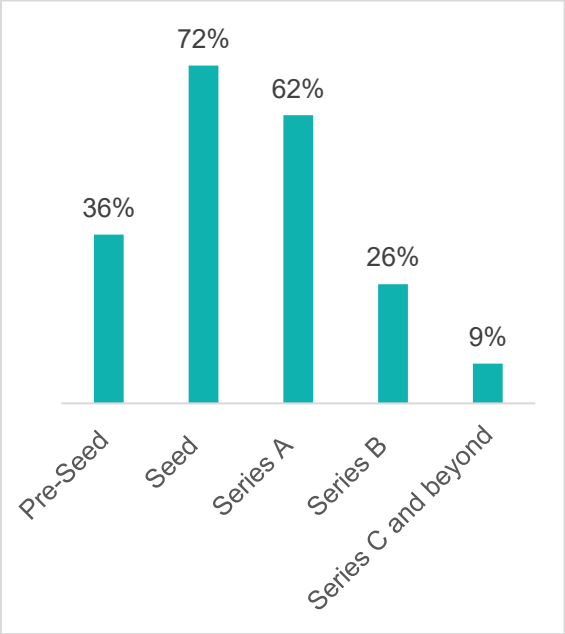


Source: PwC analysis

The majority of blue funds have been launched after 2021 (77%), reflecting the sector's recent momentum. Funds established before 2017 typically had only partial exposure to the blue economy, often as part of broader climate tech strategies. This recent wave of fund launches means that the sector is still in its

formative years, with few exits reported to date. Given the standard 10-year lifecycle of these funds, the first significant wave of exits is not expected before 2028.

Figure 17. Typical funding rounds



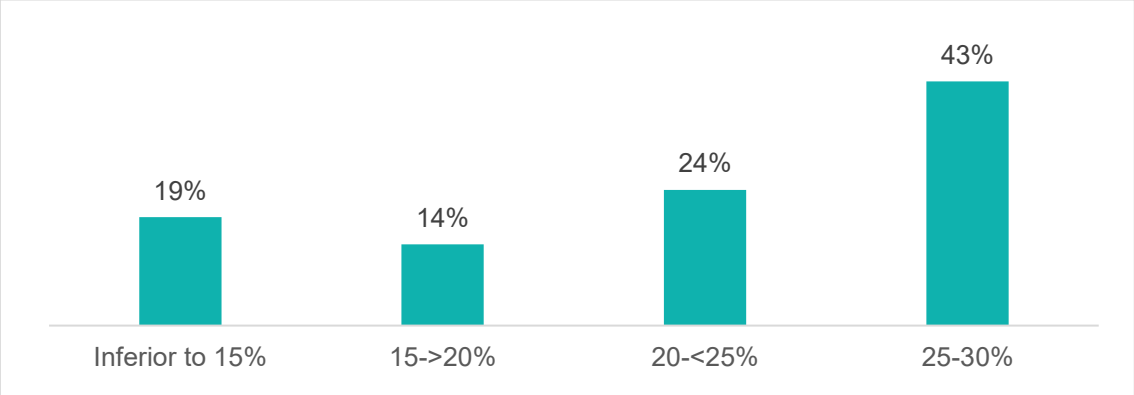
Source: PwC analysis

Surveyed funds predominantly invest at the Seed (72%), Series A (62%) and Pre-Seed (36%), indicating a preference for early-stage, high-potential ventures, as most VC funds do. Series C and beyond are naturally reported by the PE funds included in the survey. This investment profile also aligns with the profile of companies in the blue economy sector[18].

This resonates with the observations made in the EIB report "European Blue Champions: Chartering the course of Innovation Finance" that shows that while European scale-ups have high growth ambitions, they have many hurdles stacking their growth.

Given the early-stage focus and associated risk profile, blue funds report high return expectations. Notably, 67% of funds expect a net IRR above 20%, which is in line with European VC in general. Indeed, a report by Invest Europe shows that **European VCs delivered 23% net annual returns over the last 10 years[19].**

Figure 18. Expected IRR of blue funds



Source: PwC analysis

As noted by the EIF, the first half of 2025 has been marked by high market uncertainty and record low IPOs. At the same time, positive deal flow

[18] The BlueInvest Investor Report 2024 showed that most of the blue economy deals were done at early-stage (up to Series A) in most of the blue economy sectors.
[19] Venture Capital: Fuelling European Innovation 2024, Invest Europe

expectations and valuations are on the rise in Europe, as from Q3 2025 according to the same EIF report.[20]

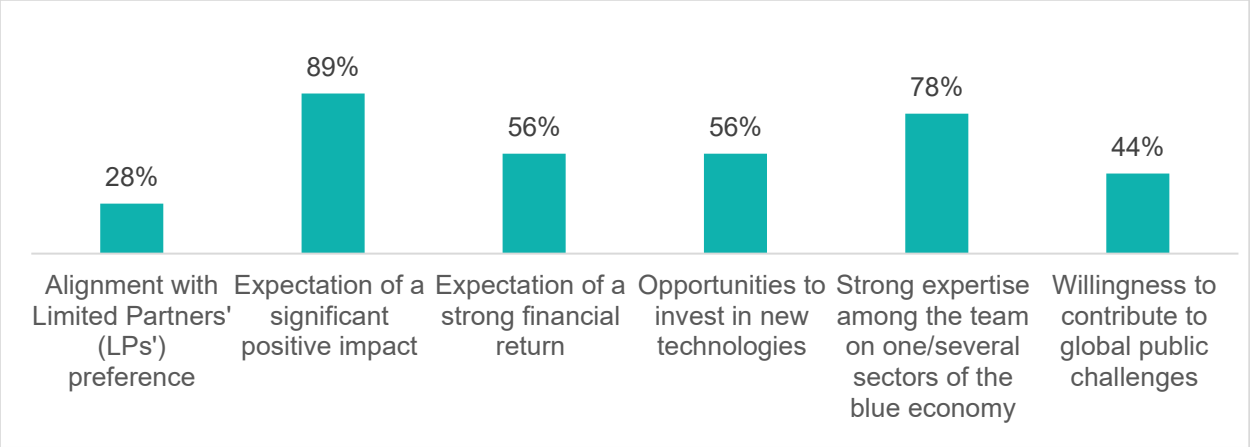
For blue funds, the months to come will be key to materialise such performance and offer ways for asset managers to return the capital back to their limited partners. While **the currently expected IRR for blue funds reflects the perceived growth potential of the blue economy, the limited availability of actual IRR data - due to the sector's nascence - does not allow yet for strong evidence of such performance.**

The number of responses received in the current survey regarding exits was insufficient to provide meaningful insights. Looking ahead, collecting comprehensive data on fund exits will be crucial for the continued development of these funds, and BlueInvest is committed to building and sharing such data to further support the growth of the ecosystem.

3. Impact and team expertise are the main drivers for launching blue funds

Among asset managers who set up fully blue funds, the most frequently cited determinant is the "expectation of a significant positive impact" (89%), which relates directly to their engagement toward sustainability. This is confirmed by the mapping performed in Chapter 1. **The "presence of a strong team with expertise in one or several blue economy sectors" (78%) comes as the second most cited reason.**

Figure 19. Why did you set-up a fully blue fund?



Source: PwC analysis

Team structure is a key success factor for GPs at fundraising stage. In various meetings organised under BlueInvest with the EIF, the strength and quality of the fund team was highlighted as a key element in the due diligence process when

[20] EIF Equity Survey 2025, available at: https://www.eif.org/files/publications/eif-equity-survey-2025.pdf

funds are fundraising. **Developing the blue economy investment ecosystem will require nurturing talents that combine industry and financial expertise.**

As the blue economy becomes an investment space on its own, the human capital dimension will need to be considered. Supporting the transition of industry experts into the financial arena is key because these experienced professionals will be the best placed to spot out promising technologies. It also means **facilitating the collaboration between technical experts (companies, research centres) and financial experts (funds, asset owners)**. Such networks support knowledge exchange with positive effects on the whole investment ecosystem. The table below emphasises the value of blue networks for these four categories of actors.

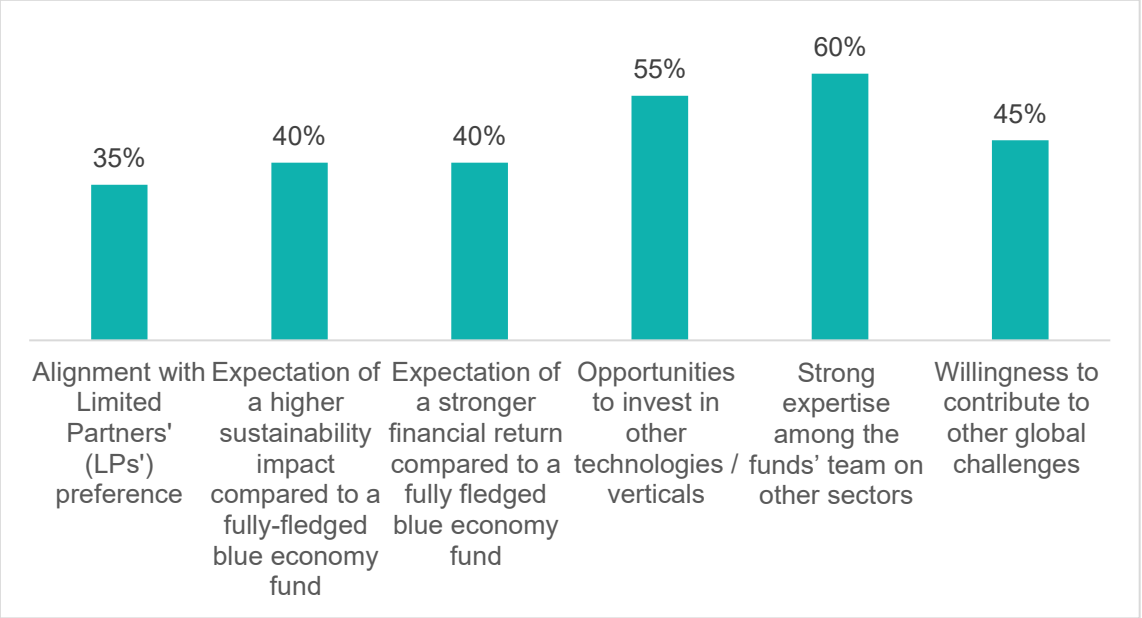
Table 6. Expected benefits of blue knowledge networks (exchange between financial and technical experts) per category of actor

Technical experts		Financial experts	
Companies	***Research centres***	***Fund managers***	***Asset owners***
Enhancing financial literacy	Generating spin-off opportunities	Insights on emerging technologies	Access to use cases
Understanding the fundraising process (timing, volume, sources, etc.)	Matching research to market needs	Access to wider deal flow	Increased awareness on equity investment opportunities
Insights on competition	Access to private funding	Access to talent	Identification of challenges to be solved (theory of change)
Integrating "impact" considerations	Alternative career pathways for young researchers	Ocean literacy	Aligning impact frameworks with ocean specific data

Source: PwC analysis

The expertise of the team is also a key decisive factor in the setting up of **partially blue funds** (60%). The graph below reinforces the need to foster pathways between technical and financial expertise. Another 55% of the funds set up partial blue funds to be able to invest in other verticals, suggesting that **partial exposure is less about outperforming fully blue funds and more about diversification and leveraging existing strengths.**

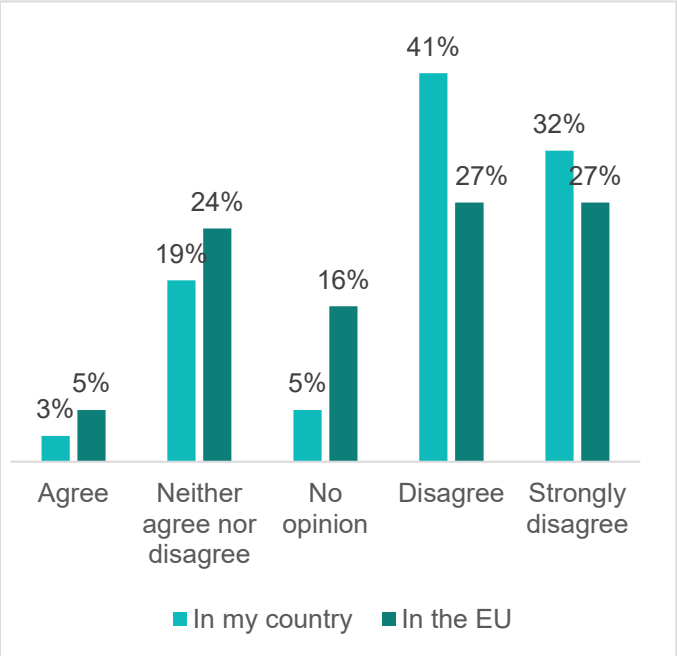
Figure 20. Reasons to set up a partial blue fund



Source: PwC analysis

4. Securing Limited Partners for blue funds remains a major challenge

Figure 21. Opinion on the ease of finding LPs for investment into funds



Source: PwC analysis

Finding Limited Partners for blue funds remains a significant hurdle. Only 3% of respondents agree it is easy to secure LPs in their country, and just 5% in the EU (mainly respondents from Ireland and the UK). By contrast, a majority of EU-based funds, as well as those in Switzerland and the US, report difficulty attracting LPs for Blue Economy strategies.

Even though blue economy triggers the appetite of fund managers[21], **in the last months fundraising for blue VC and PE funds has proven to be particularly challenging**.

[21] 11% of asset managers currently include the blue economy in their portfolios, while 22% plan to focus on the sector in the future according to the EIF survey: EIF VC Survey 2024: Market sentiment, available at: https://www.investeurope.eu/media/adrjsqvh/eif-vc-survey-2024_online.pdf

Fund managers report increased difficulty in closing fundraising rounds, largely due to the heightened sense of uncertainty in the market[22]. In previous years, the low-interest rate environment encouraged institutional investors to increase their exposure to private markets, including venture capital and private equity funds. However, the current environment, marked by volatility and rising interest rates, has prompted a strategic re-shift. Many institutional investors are re-prioritising less risky investments, primarily favouring debt instruments such as bonds and private debt, which offer a more predictable stream of income that aligns with their investment constraints. As highlighted in the broader context[23], this is not unique to the blue economy but is a trend observed across the European VC landscape, particularly during periods of economic uncertainty.

Overcoming these hurdles will require building a robust track record through successful fund performance and demonstrating credible exit opportunities are essential to instilling confidence in prospective investors. Fostering co-investment structures can help de-risk investments, making them more attractive to cautious institutional capital. Crafting compelling narratives that demystify the blue economy asset class and highlighting its impact potential and diversification benefits, also plays a pivotal role in attracting private capital.

While the current fundraising environment is challenging, a multifaceted approach that combines regulatory support, demonstrable success stories, innovative co-investment mechanisms and effective communication, is key to unlocking greater private investment in blue funds and advancing the development of the blue economy.

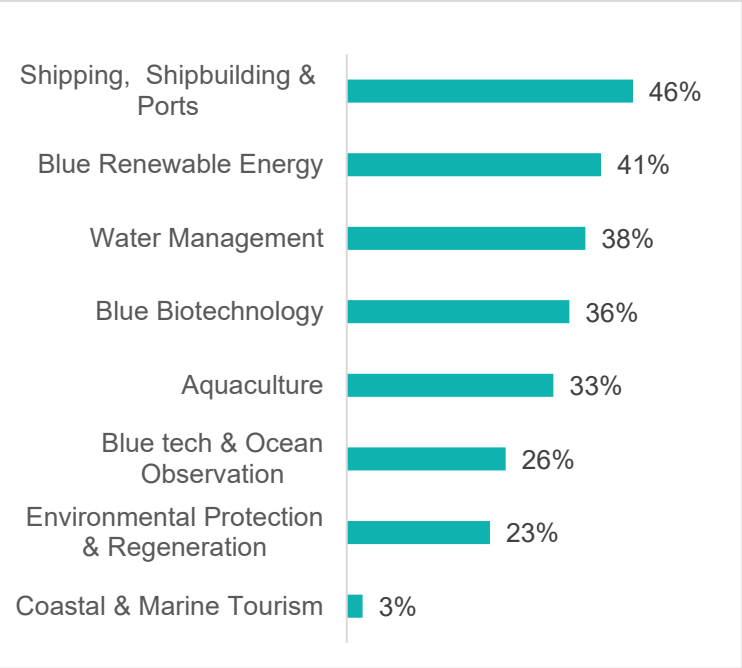
5. Investor Hotspots: Shipping, Renewable Energy, and Water Management

When asked about the most attractive blue economy sectors from a financial perspective, the top three most attractive sectors for investors were ‘Shipping, shipbuilding, and ports’ (46%), ‘Blue renewable energy’ (41%) and ‘Water management’ (39%). Compared to the 2023 investor report, the main shift has been the rise of the shipping sector, which moved from 4th place to becoming the most attractive sector for the investors surveyed.

Although the polled VC and PE funds targeted quite early-stage companies, there appeared to be links to the surge in infrastructure-related investments over the past years. In private markets, infrastructure equity is outpacing other asset classes in terms of growth[24], driven by the need for decarbonisation and the

[22] Insights from the BlueInvest Investor Capacity Building Session VII, 30th October 2025, recordings are available on the BlueInvest Community: https://blueinvest-community.converve.io/investor_capacity_building.html
[23] EIF Equity Survey 2025, available at: https://www.eif.org/files/publications/eif-equity-survey-2025.pdf
[24] IFNM Private Markets 700 report, 2024

Figure 22. Most attractive sectors from a financial perspective



Source: PwC analysis

digitalisation of assets. In this context, the start-ups and SMEs providing solutions in this sector may have higher chances of finding market traction and potentially exits.

In shipping and ports, the path towards decarbonisation remains challenging, but the International Maritime Organisation has set ambitious targets for the shipping industry to achieve net zero greenhouse gas emissions by 2050. Also, as from 2024 the EU ETS includes maritime transport, bringing ships over 5,000 gross tonnage calling at EU ports into the carbon pricing system. **With the introduction of stricter regulations, the case for energy-saving devices becomes stronger, which may incentivise investors to seek out innovative companies supporting the shipping and ports sector.**

The strong appeal of blue renewable energy is unsurprising, as investment analysis[25] in the blue economy already revealed a boom in this sector, which is expected to continue attracting investors[26].

Regarding water management, BlueInvest thematic workshop in Vatten earlier this year provided an opportunity to share insights into this sector. On one hand, ageing infrastructure creates opportunities to introduce new technologies, even though the focus on safety makes it difficult for start-ups to convince large companies to adopt technological innovations (such as AI, IoT and smart meters). On the other hand, population growth and climate change are putting pressure on water as a strategic asset and will require technologies to enhance water efficiency. This may explain investor appetite for this vertical.

Blue biotechnology and Aquaculture continue to attract significant investor interest, each cited by around 30% of respondents. **Blue biotechnology** is rapidly emerging as a high-growth area within health tech, offering applications in marine-derived pharmaceuticals, biomaterials, and nutraceuticals. As

[25] BlueInvest 2024 Investor Report: https://blueinvest-community.converve.io/upload/fck/file/Report_Blue_Invest_FINAL_7march-compressed.pdf
[26] See BlueInvest deals analysis 2024 presented during the Investor Capacity Building session

highlighted in the EU Blue Economy Report 2025, the sector is *"evolving beyond resource exploitation to deliver high-value products,"* generating **€942 million in turnover in 2022, an 18% year-on-year increase**[27]. **Aquaculture** is becoming a strategic investment sector as it tackles food security and reduces pressure on wild fisheries. According to the World Bank, it already supplies nearly **60% of global seafood** and could represent a **$1.5 trillion market opportunity by 2050**[28]. This growth is reinforced by regulatory momentum: the OECD notes that *"overfishing risks are driving regulatory reforms, making sustainable aquaculture a priority for governments and investors"*[29].

Finally, coastal and marine tourism ranks lowest of the sectors included in the survey, with only 3% of respondents considering it an attractive investment opportunity. This sector's lower technology component likely explains its limited appeal. Tourism ventures often lack scalability and innovation compared to infrastructure-heavy or tech-driven segments, making them less aligned with investor expectations for high returns. Additionally, according to the European Commission's Blue Economy Report this sector suffers from structural weaknesses such as seasonality, environmental dependency, and climate vulnerability, limiting scalability and innovation compared to infrastructure-heavy or tech-driven segments. The Commission's strategy for Growth in Coastal and Maritime Tourism[30] further highlights its exposure to geopolitical and climate risks, reinforcing investor concerns about resilience and long-term returns.

It is noteworthy that **blue tech and ocean observation** currently attract relatively low investor interest, with **only 26%** of respondents considering this segment. This category encompasses **ocean technologies** that support observation and monitoring, **which can have dual-use applications**. Given the increasing focus on defence and strategic autonomy as reflected in the European Ocean Pact and its Ocean Observation Initiative, this asset class is likely to gain greater prominence in the future. However, a plausible explanation for its current position is the uncertainty surrounding long-term opportunities at the time of the survey.

6. Concentrated investor appeal: France and the Netherlands at the top

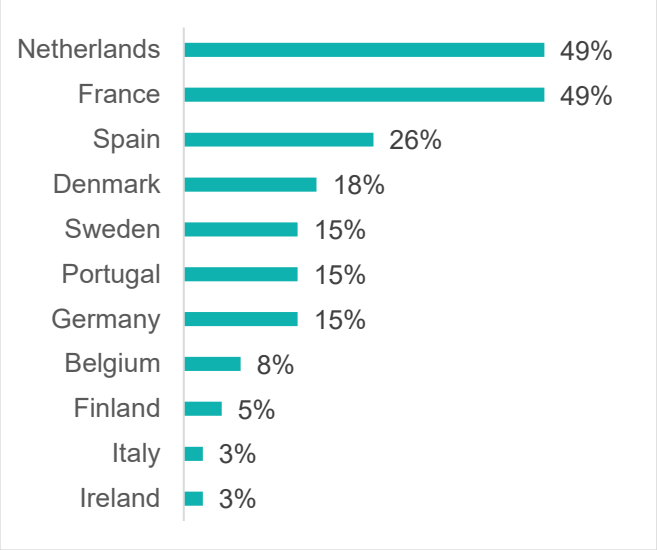
Geographically, investor sentiment as to the most attractive countries to invest into the blue economy is highly polarised. France and the Netherlands dominate the ranking, each cited by nearly half of respondents (49%). Spain (26%),

27 European Commission, EU Blue economy report, available at: https://op.europa.eu/webpub/mare/eu-blue-economy-report-2025/blue-economic-sectors/blue-biotechnology.html
28 World Bank, Harnessing the Waters: Sustainable Aquaculture, available at: https://www.worldbank.org/en/topic/environment/publication/harnessing-the-waters-sustainable-aquaculture
29 Global Seafood Alliance, Report ties government subsidies to overfishing, urges stronger fisheries management, available at: https://www.globalseafood.org/advocate/report-ties-government-subsidies-to-overfishing-urges-stronger-fisheries-management/
30 European Commission's communication on the European Strategy for more Growth and Jobs in Coastal and Maritime Tourism available at: https://transition-pathways.europa.eu/tourism/policy/european-commissions-communication-european-strategy-more-growth-and-jobs-coastal-0

Denmark (18%), Sweden, Portugal, and Germany (15% each) form a second tier, while Italy and Ireland register only 3% each.

There is no correlation between the headquarters of the asset manager and the selection of the country for this question, suggesting that the Netherlands and France are perceived within the VC blue community as hubs to source blue economy start-ups. The fact that the Netherlands and France are recognised for their advanced innovation ecosystem may also help explain such results. That said, this reveals an investor sentiment that does not correlate with the size of the blue economy of these countries: France and Netherlands rank 5th and 7th respectively in terms of share of blue economy in total employment[31].

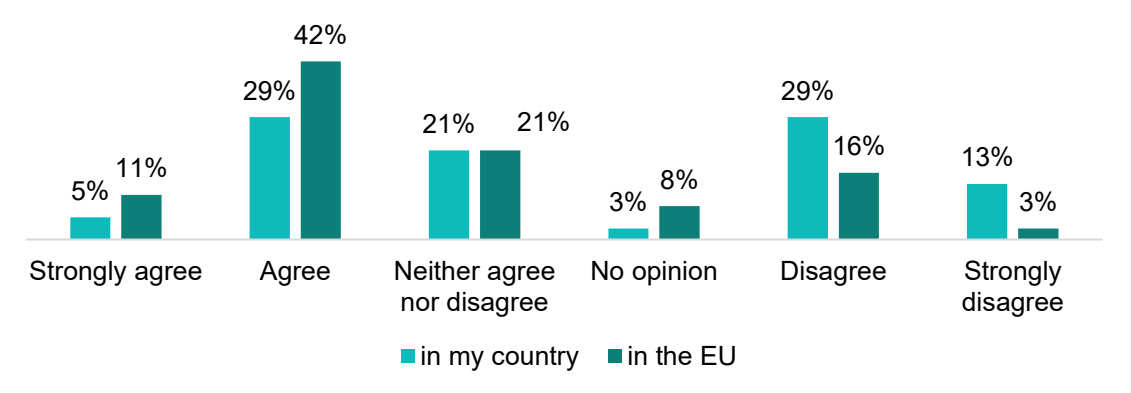
Figure 23. Attractiveness of countries for the blue economy investment



Source: PwC analysis

7. Sourcing Blue Economy companies is easier at the EU level than nationally

Figure 24. Opinion on ease of finding companies in the blue economy sectors



Source: PwC analysis

Blue funds find suitable investment opportunities in the blue sectors at EU level. Indeed, a clear majority (53%) agree or strongly agree that it is easy to find

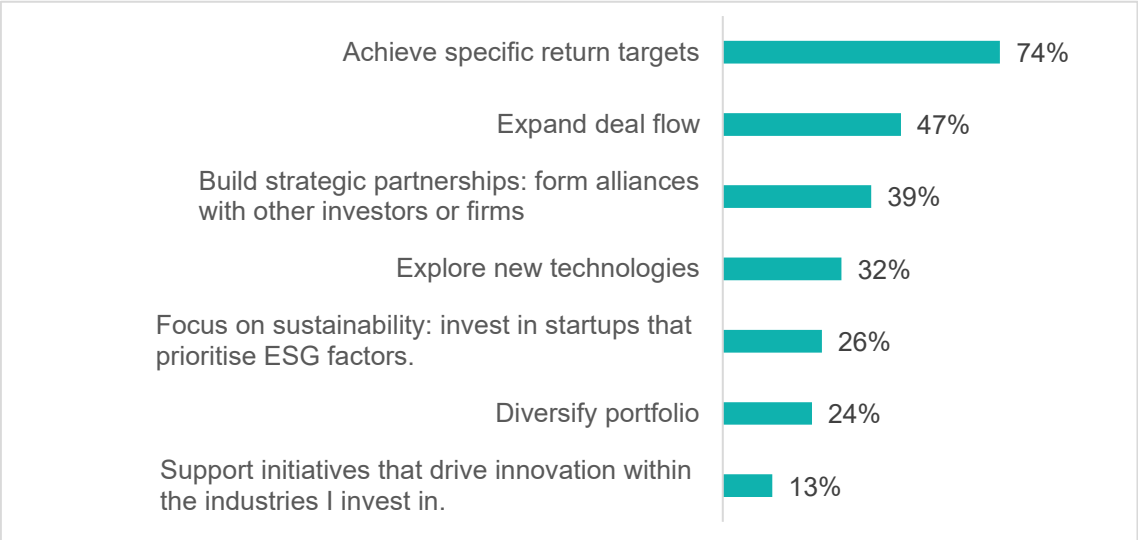
[31] Blue Economy Observatory, latest data available as of 2022, available at: https://blue-economy-observatory.ec.europa.eu/depth-analytical-tool_en

companies at the EU level, while only 19% disagree. Regarding the national level, views are more divided: 34% agree while 42% disagree. This suggests that the EU market offers a broader pool of investable companies, while local ecosystems may still be fragmented or underdeveloped. This is also signalling that blue economy funds may be tapping into a pool of cross-border investment opportunities.

8. Investors are driven by return targets but face structural challenges: strategies to mitigate risk will be essential

Looking to the future, investors in the Blue Economy are prioritising strong financial returns. 74% identified this as their foremost objective over the next five years. Asset managers must demonstrate strong financial track records to their LPs to return capital and successfully raise new capital for subsequent funds. This is particularly relevant for blue asset managers because most of them currently oversee just one blue fund. Hence, they must deliver robust performance to their LPs for their first blue fund in order to secure support for establishing additional funds in this sector.

Figure 25. Priorities for the next 5 years



Source: PwC analysis

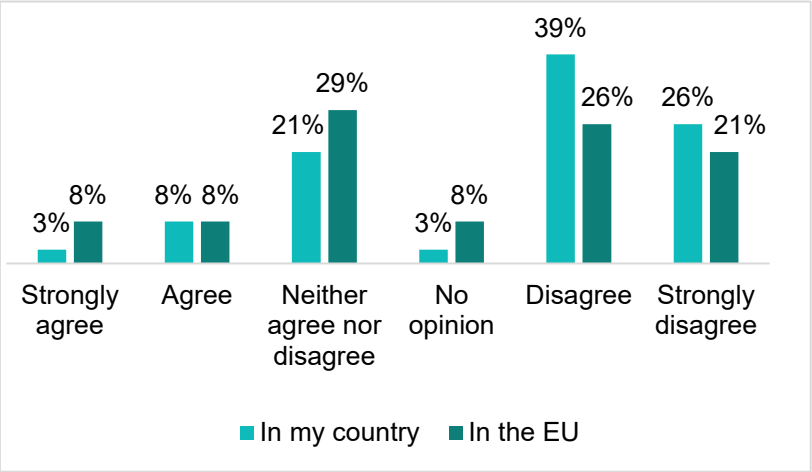
Expanding deal flow (47%) and cultivating strategic partnerships (40%) are significant priorities for asset managers, closely tied to the current life cycle of blue economy funds and the search for return. As many of these funds are still actively seeking new investment opportunities, this trend presents an encouraging landscape for start-ups looking for investors.

The emphasis on developing strategic partnerships is linked to the search for deals and return. Notably, asset managers operating in the blue economy demonstrate a markedly collaborative mindset, frequently engaging in co-investment arrangements. This collaborative approach not only broadens the

range of investment possibilities but also enhances the sharing of knowledge across the sector. Where achieving commercial traction is often a decisive factor for the success of blue economy ventures, asset managers actively facilitate connections between their start-ups and established corporates, opening doors to contracts and helping to validate market fit. This proactive engagement assists in identifying high-potential deals and supports start-ups in overcoming common barriers to entry.

9. Exit opportunities remain limited

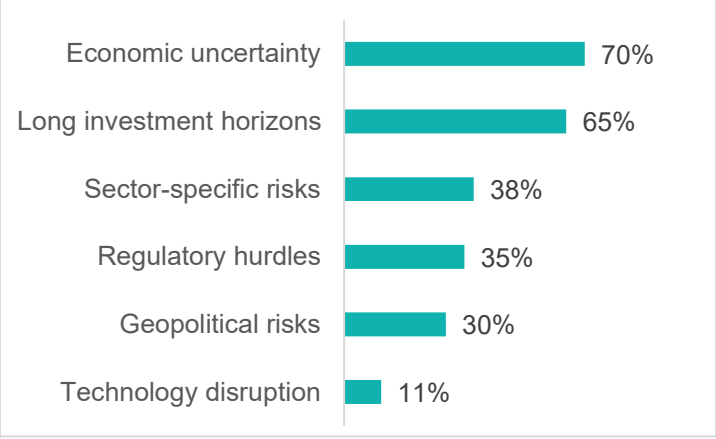
Figure 26. Opinion on the ease of finding exits



Source: PwC analysis

Finding exits is widely seen as difficult at both the national and EU levels. At the national level, 65% of respondents disagree or strongly disagree that it is easy to find exits, compared to 47% at the EU level, reflecting uncertainty and limited confidence in exit opportunities for blue investments. The difference stems from asset managers based in France, Belgium, and the Netherlands, who tend to achieve exits more easily at the EU level than at the national level. This data point aligns with the EIF findings[32] on the overall VC market, showcasing that exit challenges are a broader constraint faced not only by blue economy funds.

Figure 27. Main challenges for investors



Source: PwC analysis

When it comes to challenges, economic uncertainty understandably stands out as the most significant concern, with 70% of respondents identifying it as their primary issue. Closely following is the lengthy time horizon associated with early-stage investments, cited by 65%, which underscores the

[32] EIF Equity Survey 2025, available at: https://www.eif.org/files/publications/eif-equity-survey-2025.pdf

patience required before returns can be realised.

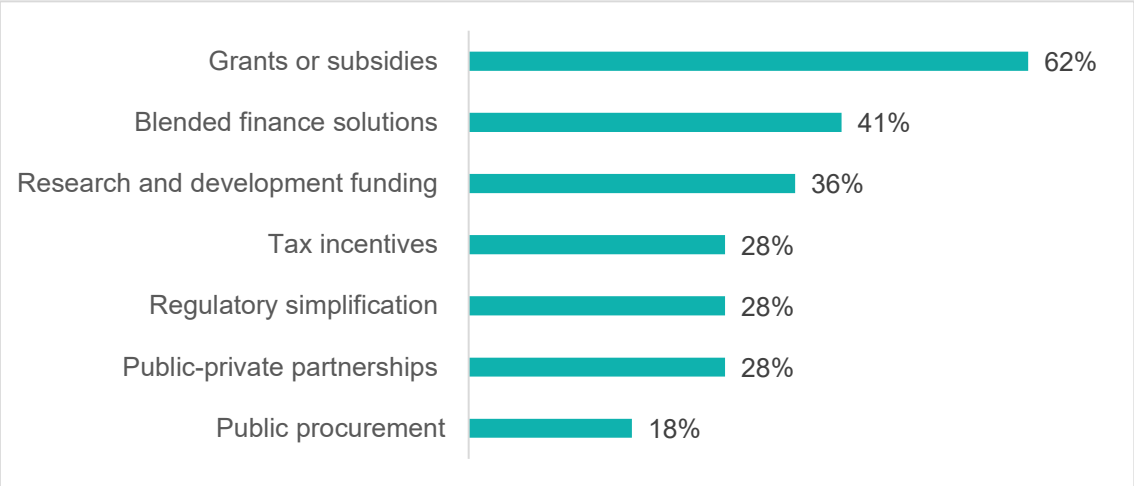
These factors are directly tied to **investors' prioritisation of financial returns and mirror broader venture capital market sentiment, where exit environments remain severely restricted and current macroeconomic conditions are volatile**. The unpredictability of global economic factors, such as inflation, interest rate shifts and geopolitical tensions, compounds these challenges, making it harder to forecast returns and plan successful exits.

Sector specific risks and regulatory hurdles were each cited by roughly a third of respondents. That two thirds that did not name these as concerns suggests that investors may not see the blue economy as markedly riskier than other asset classes, nor do they see regulation as a main barrier. Note: The limited sample size and lack of disaggregation prevent an analysis by subsector or investor type, which could reveal meaningful differences.

Technology disruption was highlighted by just 11% of respondents - the lowest among the concerns - implying that investors are generally confident in their ability to manage rapid technological changes.

10. De-risking incentives for accelerating investment in the Blue Economy

Figure 28. Incentives needed to de-risk investments in the blue economy



Source: PwC analysis

When considering the types of support most needed by blue economy fund managers, **the two most cited were public funding mechanisms.**

Asset managers are strongly advocating for the expansion of grants and subsidies. There are several reasons for this:

- **Market Validation through third-party vetting**: Grants and subsidies typically require a rigorous assessment by the awarding public body or partner. This external validation not only bolsters the credibility of the supported projects but also acts as a signal to the broader market about the commercial and societal potential of these innovations.
- **De-risking deep tech innovation**: Innovations within the blue economy, such as blue renewable energy, marine digital infrastructure, and autonomous sub-marine vehicles, often involve complex water-related systems and inherently higher technological risk. Grants and subsidies play a critical role in offsetting these risks, thus making it more feasible for venture capital to participate in these early-stage, high-potential opportunities.
- **Redirecting financial support towards sustainability:** Historically, grants and subsidies have been used to underwrite activities with adverse environmental impacts. While such financial support persists, there is a resounding call from blue economy funds for the creation of national schemes that are aligned with the EU's sustainability objectives. Updating tax and grant frameworks to favour green alternatives and discourage harmful legacy industries is essential for fostering genuine progress towards environmental goals.

Box 5. The need for "blue" public incentives through the lens of 3 sectors

- **Water management**

In many countries, contracts with water supply companies fail to encourage efficient water use. For example, municipalities often reimburse companies based on costs, offering no incentive to reduce water loss - which averages 20% at best. On the contrary, in regions where utilities are rewarded for reducing leakage and improving service quality (such as parts of the United Kingdom) water loss rates have declined more rapidly. These contracts typically include measurable targets, financial incentives for achieving reductions, and penalties for underperformance, thereby aligning the interests of both public authorities and private operators.

Additionally, emerging digital technologies such as smart metering, real-time leak detection, and advanced data analytics are revolutionising water management. Countries that have invested in these innovations have reported substantial reductions in response times to leaks, and enhanced consumer engagement. Public support for enhancing a more efficient use of water would benefit both local public finance and access to this strategic asset.

In this context, targeted public incentives are an effective mechanism to correct incentive misalignment and enabling upfront investment in efficiency-enhancing technologies that reduce long-term public costs and protect access to a strategic resource.

- **Shipping**

Despite the International Maritime Organization's net-zero ambition for shipping by 2050, the sector's transition remains slow because conventional marine fuels retain a price advantage

in many jurisdictions through excise exemptions or lower tax treatment, creating a persistent cost gap for alternatives such as green ammonia, methanol and bio-LNG.

The EU's decision to include maritime transport in the Emissions Trading System in 2024 introduced a carbon cost for ship operators, but current carbon prices (around €80/t) and phased surrender requirements are not yet sufficient to make low carbon fuels commercially competitive without complementary support.

Multiple expert analyses and NGO reports show that direct financial support - such as targeted grants, production and blending subsidies, fuel purchase rebates, and demand-side quotas - is essential to bridge upfront capital and operating cost gaps that carbon pricing alone does not yet address.

Pilot schemes in Northern Europe testing differentiated port fees, tax rebates and direct grants for zero emission vessels have shown early promise in lowering transition costs and stimulating demand, indicating that a package of grants plus regulatory demand signals will be more effective than taxation alone.

- **Blue renewable energy**

Despite clean energy's critical role in decarbonising the economy and supporting EU climate targets, existing fiscal policies often maintain subsidies or tax breaks for legacy energy industries, which can undermine the business case for renewables. This imbalance has been noted by the International Energy Agency (IEA) highlighting that fossil fuel subsidies in the EU remain substantial, while support for renewables, though growing, is still not on a level playing field.

To accelerate the transition to sustainable energy, targeted grants and subsidies are essential. Offshore wind is now the fastest-growing renewable power source in Europe, but high upfront capital costs and longer development timelines mean that financial incentives are still necessary to make projects viable and attract private investment. According to WindEurope, funding support remains crucial, especially as projects move into deeper waters and more challenging environments. Regarding tidal energy, it is even earlier in its commercialisation journey, hence requiring grants and subsidies to enable pilot projects, supporting research and development, and ultimately driving down costs through economies of scale and technological learning.

The second most required incentive are **blended finance solutions** (cited by 41% of participants), highlighting the need for mechanisms that combine public and private capital to reduce risk.

Blended finance refers to investment structures where different types of investors contribute capital, allowing for varied risk and return profiles. Typically, some investors accept lower or subordinated returns to attract others who may be more risk averse. In the blue economy, blended finance is seen as a crucial tool to address commercial investors' concerns, mitigating risks and enhancing potential returns. Blended finance can be developed at company level, project level, fund

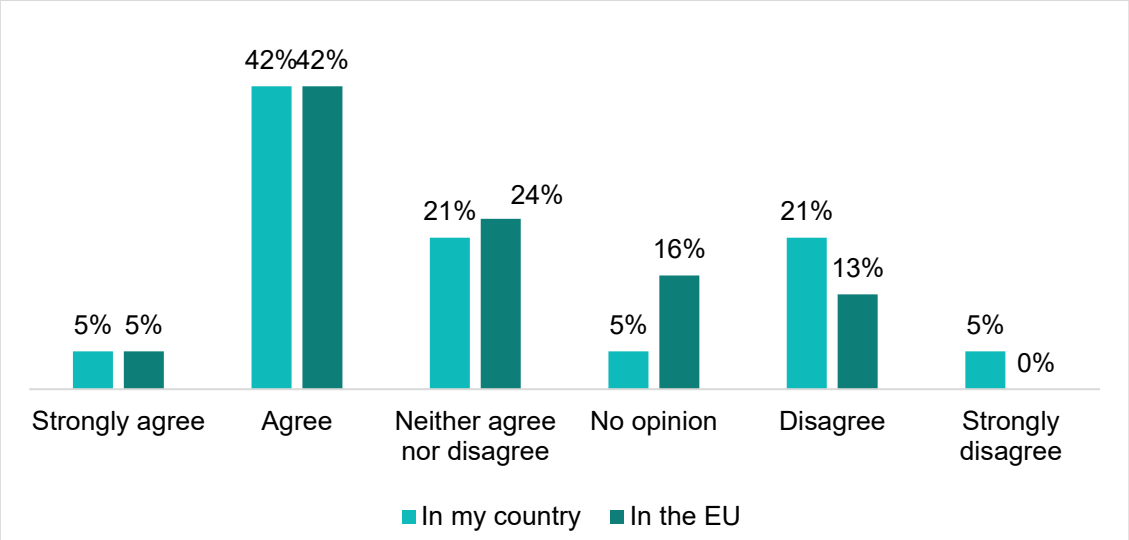
level or through outcome-based finance[33]. Blended finance structures bring key advantages in:

- **Risk mitigation**: Blended finance allows public or philanthropic investors to take on more risk (e.g., through subordinated debt or guarantees), making the sector more attractive to commercial investors.
- **Mobilising private capital**: Blended finance structures are designed to crowd in private investment that might otherwise be deterred by risk or low returns, thereby scaling up capital flows to blue projects. With public structures (such as EIB Group) providing subordinated loans or guarantees, or philanthropic foundations providing first loss protection, private investors are more likely to back up risky projects.

11. Innovation ecosystems are generally perceived as well developed for Blue Economy start-ups

Innovation ecosystems are a "combination of all the stakeholders that make choices influencing innovation-related-related outcomes and, consequently, the direction of innovation (…) it includes businesses, intermediaries, research institutes, finance, government and IP offices".[34]

Figure 29. Option on whether the innovation ecosystem is supportive for blue economy start-ups



Source: PwC analysis

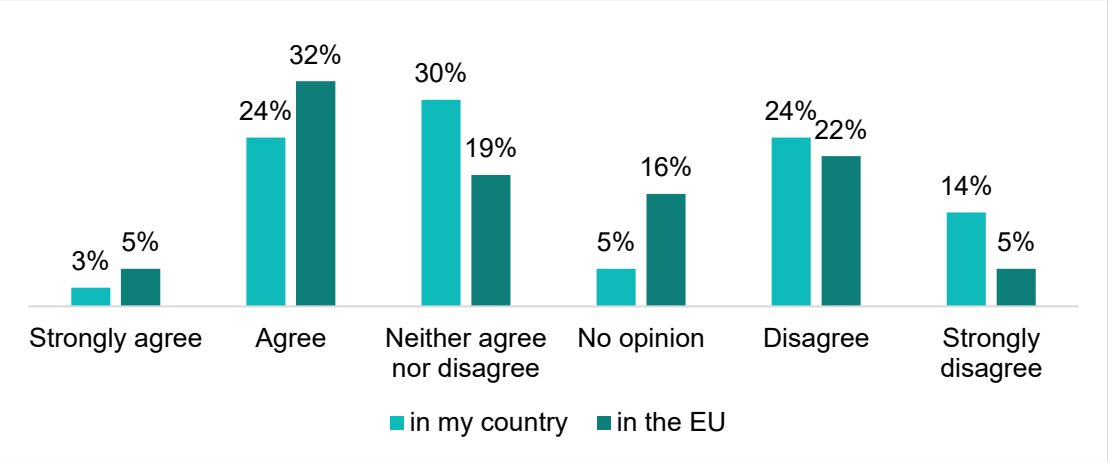
While these ecosystems clearly foster innovation, they are especially well regarded for supporting blue economy companies. In both national and EU contexts, 47% of respondents agree that conditions favour blue economy startups, while disagreement is relatively low (26% nationally; 13% at EU level).

[33] More information on blended finance structure over these 4 levels is provided by UN Compact can be found here: https://www.cfocoalition.org/blueprints/p3-3-3-mapping-examples-of-corporate-blended-finance
[34] WIPO, IP in the Innovation Ecosystem, available at: https://www.wipo.int/en/web/innovation-ecosystems

Taken together, these results indicate that - although not flawless - the ecosystem is broadly perceived as enabling innovation and conducive to the growth of blue ventures.

12. The EU regulatory environment is seen as rather supportive for blue economy start-ups.

Figure 30. Opinion on whether the regulatory environment offers a conducive environment for blue economy start-ups

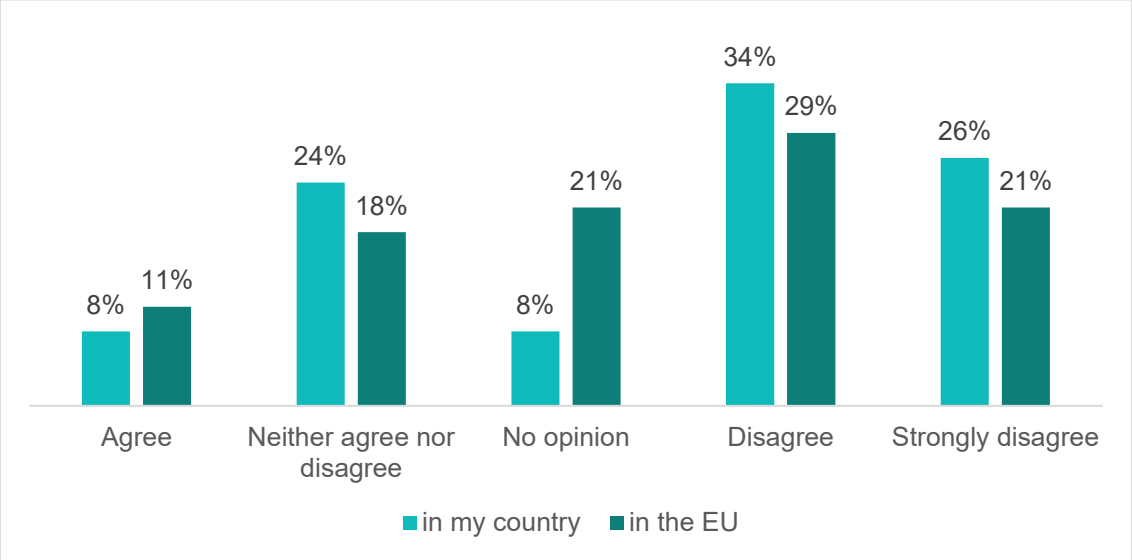


Source: PwC analysis

The EU is perceived as offering a rather conducive regulatory environment for Blue Economy start-ups. At the EU level, 37% agree or strongly agree, compared to 27% who disagree or strongly disagree, creating a positive gap of 10 points. This echoes the general perception that regulation is a trigger for investments.

13. Traditional finance remains a weak link for blue funds

Figure 31. Perception that the traditional financial ecosystem (banks) is supportive of the blue economy



Source: PwC analysis

The traditional financial ecosystem is widely perceived as unsupportive of Blue Economy funds. Around 60% of respondents either disagreed or strongly disagreed that banks and traditional funds provided adequate support in their country, and 50% in the EU. Only a small minority believe the financial ecosystem is supportive (8% nationally and 11% in the EU), highlighting a significant gap in traditional financing for blue ventures.

This gap likely stems from the limited exposure of conventional players, such as banks, to the blue economy sector. EU banks in particular, tend to be risk-averse, often focusing on companies with steady revenue streams that can guarantee loan repayments.

Access to debt remains a vital, complementary funding source for blue economy start-ups and funds. Unlike equity, debt financing is non-dilutive, allowing entrepreneurs to retain ownership and control of their ventures. This is especially important for early-stage companies that wish to preserve their stake while securing the necessary capital to fuel growth. Debt is also particularly well-suited to meeting working capital requirements or trade finance needs, supporting day-to-day operations and enabling participation in larger, more complex projects.

However, the current lack of tailored debt products for the blue economy sector limits start-ups' ability to scale and innovate. Many promising ventures struggle to access affordable loans due to the perceived risks and unfamiliarity among traditional lenders. Blended finance solutions, guarantees, and technical assistance can play a pivotal role in de-risking investments, thereby unlocking greater flows of debt capital into the blue economy.

14. Conclusion and key takeaways

The survey sets a clear trajectory for the next phase of growth in the blue economy while highlighting important gaps that require attention.

On a positive note, **asset managers have significantly increased their deployment of funds in the sector**, with ten surveyed managers planning to launch new investment vehicles. This demonstrates a robust appetite for engagement and signals to asset owners that the blue economy presents a timely and attractive investment opportunity. The momentum established in recent years is expected to persist, further underlining the sector's dynamism.

Return expectations for blue economy investments are aligned with the broader industry, dispelling the misconception that this is a niche market with limited prospects. While asset managers share industry-wide concerns about the exit environment and ongoing economic uncertainty, **they remain undeterred by the pace of technological change, recognising the sector's innovation-driven nature as a catalyst for enhancing EU competitiveness**. The European Union's supportive innovation ecosystem and regulatory framework are viewed favourably, and fund managers are increasingly comfortable with technological disruption, as their portfolios are concentrated in highly innovative companies.

When benchmarked against the wider venture capital landscape, **the perceived risk associated with blue economy assets is on par with other VC verticals**. This convergence suggests **a maturing market** where blue investments are no longer viewed as inherently riskier than their peers.

However, challenges remain. There is **a pronounced need for talent that blends financial acumen with technical expertise**, which is essential for the continued establishment and success of blue funds. **Attracting limited partners is an ongoing concern**; as funds mature, achieve exits, and demonstrate financial performance, it is expected that LPs will take greater interest in the sector.

Asset managers are also calling for **increased support in the form of grants, subsidies, and blended finance instruments to help de-risk investments**, particularly in areas where taxation and regulation have yet to fully encourage the adoption of sustainable solutions. While environmental challenges are well recognised, it is vital that **each sector translates these into viable business cases**. Asset managers are clear: **the involvement of traditional finance is crucial, as is access to debt financing to support company growth**.

The survey also highlights **sectoral and national disparities in attractiveness**, likely reflecting differences in national support structures, the strength of local innovation ecosystems, and the market readiness of blue start-ups.

Looking ahead, the blue economy stands on the cusp of its next stage of development. Supporting this growth remains a core objective of BlueInvest. For

asset managers, this means **continued provision of market insights, stakeholder engagement, and raising awareness among the broader financial community**. For companies, the focus remains on **supporting the most promising blue innovations, as a strong pipeline of projects is fundamental to sustained progress**.

While the blue economy is entering a period of significant opportunity, success will hinge on closing the funding gap, nurturing talent, and ensuring supportive policy and financial frameworks across Europe.

The boxes below summarise what BlueInvest does for asset managers, how BlueInvest support blue start-ups and showcases our pipeline and success stories.

Box 6. Investor Capacity Building on Blue Economy

Overall objective:

- Market insights
- Deals' trends on blue economy sectors
- Regulatory updates
- Impact frameworks and impact reporting
- Fundraising challenges and opportunities
- Collaboration opportunities with the EIF and the EIB
- New financial instruments: blue bonds, blended finance in blue economy, etc.
- Networking

Audience:

- VC funds
- PE funds
- Funds of Funds
- Business Angels
- Banks
- Institutional investors
- Foundations

Past Records:

- 80+ participants for each session
- Satisfaction rate: 98% on average

Frequency: Twice a year, one webinar, one physical event

Format:

- Keynote speech
- Subject matter experts
- Case studies
- Panel discussions
- Round tables

More information on the programme: https://blueinvest-community.converve.io/investor_capacity_building.html

Box 7. Our Technical and Financial Assistance

Overall objective:

BlueInvest provides **Investment Readiness Assistance** to help early-stage businesses and SMEs in the EU blue economy strengthen their investment readiness and accelerate their access to finance. The programme focuses on improving business strategy, visibility, and investor engagement through hands-on coaching and advisory support.

It is separated in two distinct programmes:

1. **Readiness Assistance (RA)**:

Selected companies receive **10 days of personalised, one-to-one coaching over a three-month period**, tailored to their investment-readiness level and strategic objectives. The programme is impact-driven, focusing on helping companies refine their strategy, strengthen commercial and operational foundations, and prepare for successful fundraising.

Available assistance packages:

1. Pre-assistance discovery workshop
2. Pitch doctor
3. Internal and sustainability reporting
4. Operational excellence
5. Market readiness, product & innovation
6. Marketing & growth strategy
7. Improving investment readiness and reaching bankability
8. Access to finance
9. Corporate strategy

2. **Fundraising Assistance (FA)**:

Beneficiaries may receive **up to 20 days of 1:1 advisory**, delivered by investors and investment-readiness specialists with extensive experience in seed, Series A and Series B financing. This support focuses on preparing founders for negotiations, refining financial strategy and documentation, and strengthening the company's investment proposition.

Additional features:

- Increased market visibility, investor matchmaking and sector intelligence
- Close collaboration with EIF/InvestEU to mobilise public and private capital into blue innovation
- Access to experienced coaches, expert networks, and the wider BlueInvest community

Audience:

High-potential startups and SMEs with innovative, sustainable products for the blue economy

Past records:

- 430 technical and financial assistance beneficiaries
- 92 companies with investments secured
- 200+ certified coaches
- 96% satisfaction rating among participants

Frequency: The Investment Readiness Assistance programme runs in edition-based cycles, with more foreseen cycles for 2026-28.

More information on the programme: https://blueinvest-community.converve.io/readiness_assistance.html

Box 8. Our pipeline of blue projects

The BlueInvest Project Pipeline is a qualified database of highly investable and innovative business ventures across all 10 key sectors of the blue economy. It brings together companies developing high-potential solutions and provides a structured view of the most promising innovations emerging across Europe.

The Pipeline ensures that investors benefit from a high-quality, investment-ready stream of European blue ventures, which feeds directly into BlueInvest's matchmaking activities.

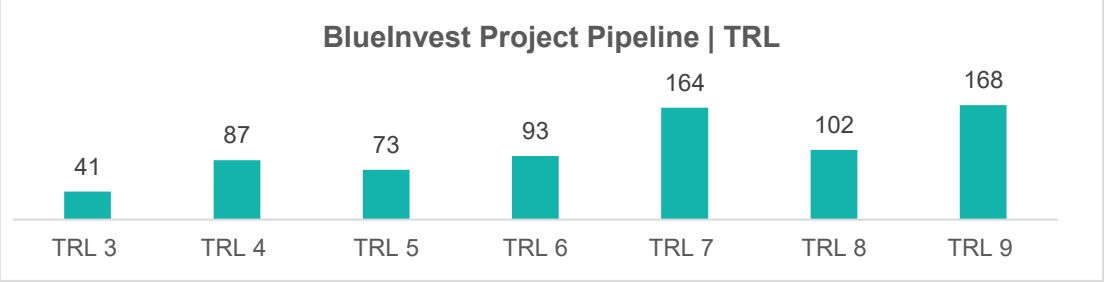
Companies featured in the Pipeline benefit from increased visibility and can be easily identified by investors who can request meetings through the platform. Likewise, stakeholders, start-ups and SMEs can search and explore companies featured in the database. The Pipeline includes filtering functions, such as TRL, sector, investment-readiness beneficiary status, and country, allowing users to rapidly identify relevant opportunities.

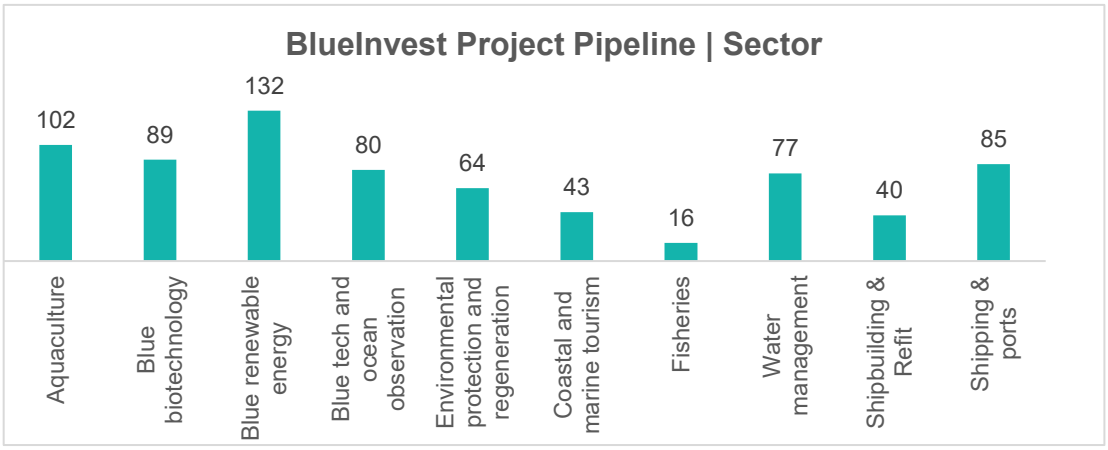
Beyond visibility, the Pipeline helps broaden knowledge of emerging sectors, keeps the community updated on new technologies and cutting-edge innovations, and supports anticipation of market trends across the blue economy.

The Pipeline showcases + 720 innovative projects and entrepreneurs who are shaping the future of the Blue Economy.

Impact:

- 720 projects featured
- +650 introductions between investors and projects
- 36 countries represented



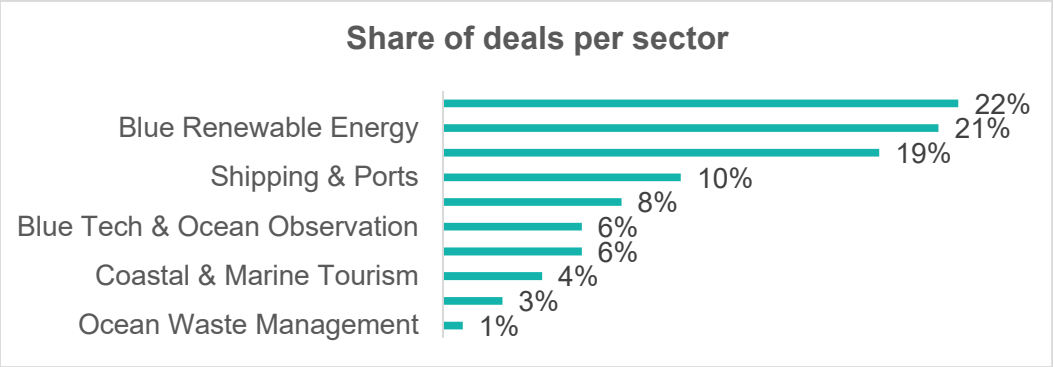


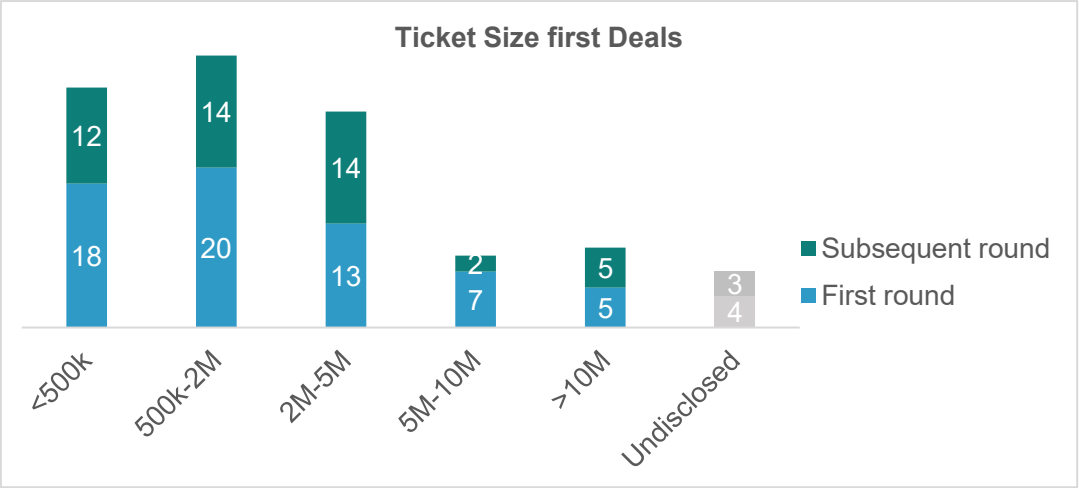
Box 9. Our success stories

BlueInvest translates its actions into measurable outcomes for companies and for the wider blue economy investment ecosystem-economy investment ecosystem.

Impact:

- EUR 532,100,363 total amount raised (disclosed)
- 92 Success stories companies
- 117 Total deals secured
- 19 Total companies that secured multiple rounds





Chapter 3. Blue economy market momentum: Key sector developments and emerging opportunities

This chapter provides an in-depth overview of the key sectors currently attracting strong investor attention, as highlighted in the 2024 BlueInvest Investor Report[35].

Our focus lies on aquaculture and fisheries, blue biotechnologies, blue renewable energy, blue tech and ocean observation, shipping and ports as well as water management, given that these sectors have attracted in the past 5 years the majority of equity investments in the sustainable blue economy. These blue economy sectors have also demonstrated significant potential for sustainable growth and innovation, increasing capital inflows, and critical role in advancing environmental objectives.

In the following pages, we examine the main growth drivers and challenges that both investors and start-ups should consider when entering these markets. We also explore emerging technologies that are reshaping industry practices, with real-world examples from, among other, the BlueInvest community that are delivering impactful and sustainable solutions within each sector. This approach aims to inform stakeholders and foster a deeper understanding of the dynamic opportunities present in the blue economy.

3.1. Aquaculture and Fisheries

The world's fisheries and aquaculture production reached a record of 223.2 million tons in 2022 (last recorded official data with an estimated EUR 403 billion first-sale value).

Aquaculture represented 130.9 million tons (valued at EUR 270 billion) and comprising 94.4 million tons of aquatic animals and 36.5 million tons of algae, while fisheries production was 91.0 million tons for aquatic animals + 1.3 million tons for algae harvested, with a total value of EUR 136,4 billion[36].

For 2025, the Food and Agriculture Organization of the United Nations (FAO) and industry experts estimate a ~5% increase in global aquatic-animal tonnage, which suggests a possible increase in "first-sale value" to EUR 430 billion, under stable price and species-mix assumptions[37]. Specifically for the EU, aquaculture has been growing in a slow pace during the last years.

Both aquaculture and fisheries have recently entered a new technological era. They are undergoing continuous transformation through Aquaculture

[35] BlueInvest, Investor Report: unlocking the potential of the blue economy, available at: https://blueinvest-community.converve.io/upload/fck/file/Report_Blue_Invest_FINAL_7march-compressed.pdf
[36] FAO, Global Fisheries and Aquaculture production 2022 official data, available at: https://www.fao.org/newsroom/detail/fao-report-global-fisheries-and-aquaculture-production-reaches-a-new-record-high/en
[37] WeAreAquaculture: according to the FAO, global fish output will reach 197m tonnes in 2025, available at: https://weareaquaculture.com/news/research/fao-says-global-fish-output-will-reach-197m-tonnes-in-2025-as-aquaculture-drives-growth

4.0 and Fisheries 4.0, which refer to the application of Fourth Industrial Revolution (Industry 4.0) Technologies to the aquatic food sectors, creating smart and data-driven systems aimed at improving efficiency, sustainability, and transparency. The core distinction lies in their respective focus areas:

- **Aquaculture 4.0** applies these technologies to controlled farming environments (ponds, tanks, marine cages). The focus is on precision and automation (precision feeding, sensors, RAS, automation and AI) within the farm, where there is control over the environment and the life cycle of the aquatic organisms. Such Technologies directly improve productivity by reducing feed conversion ratios, increasing survival, enabling higher stocking densities and shortening production cycles. These effects translate into higher biomass output per unit of feed, water and time.[38]

- **Fisheries 4.0** extends the concept to the management and operation of wild-capture fisheries, focusing on strategies for data collection, exchange, and real-time processing to support sustainable fishing practices and fight illegal fishing in natural marine ecosystems.
  By automating data collection, monitoring and enforcement, Fisheries 4.0 increases productivity by enabling more efficient, data-driven management and compliance with fewer personnel, thereby reducing labour needs in monitoring and control while improving the effectiveness and sustainability of fishing operations[39].

In today's aquatic food sector, digital tools and automation increasingly complement and sometimes replace traditional fishing nets and manual methods. Mass production is shifting toward **smart, data-driven production, harvesting, processing and commercialisation[40]**.

Through technologies such as IoT, sensors, satellite imagery, robotics and drones (both above as under water) to collect data/info, combined with newly developed, application-specific software and fast, accurate data analysis and reporting, aquaculture and fisheries professionals now have far more tools at their disposal than experience alone. These innovations support better-informed decisions and more efficient operations.

In **aquaculture**, the adoption of **Recirculating Aquaculture Systems (RAS)** allows for continuous water treatment and reuse, enabling more sustainable production and even making it possible to grow "fish in the city" or in industrial areas/abandoned barns[41] - high-quality aquatic food produced close and delivered fresh to the consumers, with a reduced environmental footprint[42].

[38] Aquaculture 4.0, available at: https://iaeme.com/Home/article_id/IJFAQ_03_01_001
[39] Fisheries 4.0, available at: https://www.fisheries.noaa.gov/national/fisheries-observers/electronic-technologies
[40] Smart Farming, available at: https://www.iso.org/smart-farming/smart-farming-data-driven#:~:text=Smart%20farming%20refers%20to%20using,%2C%20weather%20patterns%2C%20and%20more.
[41] European Commission, Access to Space and Water for Freshwater and Land-based Aquaculture, available at: https://aquaculture.ec.europa.eu/key-documents/access-space-and-water-freshwater-and-land-based-aquaculture
[42] Recirculating Aquaculture Systems are considered a sustainable production method due to their low freshwater use, reduced transport distances, and controlled land-based environment, which limits escapees, disease transmission and the need for antibiotics. They could therefore contribute to the EU Farm to Fork target of reducing antimicrobial use in aquaculture by 50% by 2030. However, RAS are energy-intensive, making energy efficiency and the integration of renewable sources essential. Ensuring fish welfare is also critical, as RAS can involve high stocking densities, require strict water-quality control, and may not always provide the environmental stimuli

However, the recirculation technology consumes vast amounts of energy. It is therefore **essential that energy efficiency and the use of renewable energy sources is ensured** in RASs. Another essential aspect is **that fish welfare is ensured**. Animal welfare is a priority in the EU Strategic guidelines for EU aquaculture.

In **fisheries**, new technologies help identify the right fish populations to harvest, ensure the use of appropriate and selective fishing tools, support quota compliance, reduce waste, contribute to climate-change mitigation efforts, and uphold aquatic food safety standards.

Key growth drivers

Aquaculture

There is a **rising global aquatic food consumption** due to population growth, higher protein demand and a shift toward healthier food. This rising demand faces several developments and trends.

While high prices and limited consumer awareness can constrain demand for certain premium aquaculture products, aquaculture overall remains a key demand-driven growth sector because it supplies affordable mass-market species, substitutes declining wild catch, and increasingly responds to consumer concerns through cost reductions, certification, and improved transparency.[43]

Decline & limits of fisheries

35% of marine stocks are overfished (FAO) and therefore aquaculture is needed to meet aquatic food demand sustainably.

Consumer preference for traceable, sustainable food

Eco-labels (ASC, BAP, MSC) are gaining traction and retailers are pushing for certified, low impact aquatic food.

Premiumisation of aquatic food markets

Global buyers show a growing willingness to pay for high-value species like salmon, shrimp, and seriola, prioritising quality, consistency, and brandable sustainability attributes.

Ongoing urbanisation and growing middle class

needed for certain species. Under the European Maritime, Fisheries and Aquaculture Fund, Member States may support RAS projects that meet these sustainability, energy and welfare criteria.

[43] EUMOFA/DG MARE, EU Fish Market Report 2025, available at: https://oceans-and-fisheries.ec.europa.eu/news/eu-fish-market-report-2025-reflects-challenging-market-conditions-2025-12-01_en

This development is illustrated by an increased per capita consumption and higher demand for ready-to-cook aquatic food and convenience products.

Fisheries

- There is a **high global demand for aquatic food**, which a stagnating fisheries industry can't meet given the natural limits that have been reached, but a smart-transforming fisheries industry could selectively do, if it focuses on sustainable practices and value-added products.
- **A shift toward sustainability-certified wild fish**, with an increasing demand for MSC and similar eco-labels.
- **Growth of value-added aquatic food**, like ready-to-eat, processed fillets, frozen meals, and an expanding demand for premium species (tuna, cod, black tiger shrimp).
- **Demand for traceability and transparency**, due to concerns around IUU fishing (illegal, unreported, unregulated), as well as buyers demanding records of origin.

While certification and traceability may appear as constraints, in practice they function as demand-side growth drivers by unlocking market access, enabling value-added products, supporting price premiums and increasing buyer confidence.

Market trends and highlights

Aquaculture

Empirical evidence from RAS, IoT and AI systems shows that aquaculture technology adoption is already driving higher volumes and greater efficiency — with reported gains such as up to ~35% higher productivity per m³, reductions in mortality and feed costs, and rapid scaling of technology-enabled farms.

Advances in precision aquaculture technologies

IoT feeders, underwater sensors, computer vision and AI now enable real-time health and biomass monitoring, automated feeding, and predictive farm management. Combined with RAS, these innovations allow land-based aquaculture close to consumers, reducing environmental footprint and logistics costs.

Breakthroughs in feed efficiency and circular nutrition

New feed technologies, such as algae oil, insect protein and single-cell proteins, combined with automated feeding systems, are improving feed conversion ratios

and lowering emissions. These advances reduce production costs while supporting sustainability goals across the aquatic food value chain[44].

Evolution in genetics and breeding

Conventional selective breeding programs, based on multi-generation performance selection rather than genetic modification, deliver faster growth rates, improved disease resistance and lower production costs. These advances in traditional breeding and genetic selection are becoming a cornerstone for scaling aquaculture sustainably and improving resilience to environmental stressors.

Improvement in diseases control and management

Underwater monitoring cameras and integrated “health platforms” (e.g. Zoetis/Pharmaq Analytic/i Wise) also enhance the profitability potential of the sector.

Investment and financing momentum

Specialised aquaculture funds (e.g., Aqua-Spark, Hatch Blue) and rising corporate investment in sustainable aquafeed and RAS facilities are accelerating sector growth.

Fisheries

- **Digital monitoring & enforcement technologies:** satellite analytics (Global Fishing Watch, OceanMind), AIS/VMS tracking, electronic monitoring onboard vessels, enable more controlled, legal and sustainable fisheries.
- **Improved fishing gear efficiency**, with smart nets, bycatch reduction technologies and more selective gear improving species management.
- **Better fisheries management frameworks**, with quota systems, marine protected areas and science-based stock assessments.
- **Growth of block-chain and logistics capacity**, with new infrastructure in developing countries and better transport (i.e., reduced spoilage).
- **Advances in processing and value recovery**, like in automation and robotics, improved filleting yields & side-stream valorisation (production: fish oils, collagen, proteins).
- **Data-driven decision making**, thanks to Ecosystem models, Real-time stock indicators and Digital logbooks and catch reporting.

[44] Business Wire, Global Fish Farming Industry Report 2023-2024 & 2029, available at: https://www.businesswire.com/news/home/20240530879070/en/Global-Fish-Farming-Industry-Report-2023-2024-2029-RAS-IoT-Devices-and-Sensors-Plant-based-Feed-Biofloc-Technology-Emerge-as-Key-Trends---ResearchAndMarkets.com
[11] Aquaculture Technology drivers: Water Quality Management, available at: https://www.mdpi.com/2673-9496/5/3 & A review on the latest developments in Aquaculture Nutrition Research, available at: https://aquaculturemag.com/2025/10/27/a-review-of-the-latest-advances-in-aquaculture-nutrition-research/

Main challenges to sustainable solutions

Although sustainable solutions are essential to address the growth drivers, we have identified a set of primary challenges that limit their scalability, indicating key opportunities for start-ups.

Environmental and biological

Feed dependence and wild-fish pressure

Feed cost in aquaculture is a significant part of the total production cost (except for non-fed species like molluscs and seaweed); for some cultured species it is superior to 50%[45]. Many farmed species still rely on feed including raw materials like fishmeal (FM) and fish oil (FO), which are derived from wild fishing stocks; scaling aquaculture without better feed ingredients alternatives risks shifting pressure back to the ocean. Feed markets are heavily commodity-driven, and price volatility for conventional ingredients discourages early adoption of sustainable alternatives. Investors highlight that regulatory incentives or market mechanisms may be needed to make low-impact feeds competitive and accelerate their scale-up.

Impact: Prioritise species-specific nutritional research so FM/FO replacement doesn't reduce fish growth or feed conversion and investment required in new feed formulation programs.

Diseases, biosecurity and escapes

In order to reach the needed production growth, the output of the intensive culture systems may increase to a scale that can amplify pathogens (e.g. shrimp culture) and escapes (e.g., farmed salmon)[46]. Limitations in veterinary services, diagnostic capacity, and farm-level biosecurity support are repeatedly cited as major operational barriers. Investors emphasise that weak veterinary ecosystems delay the adoption of modern, sustainable practices and increase risk exposure for early-stage ventures.

Impact: Invest in breeding and genetics, for disease resistant and stronger offspring, vaccination programs and communicate their importance, and "closed systems" where appropriate (e.g., RAS) to reduce medication use and escapes.

[45] Aquaculture feed cost can easily be >50 or even 70% of total production cost, available at: https://blog.manolinaqua.com/en/record-high-fish-feed-prices#:~:text=Fish%20feed%20has%20always%20been,of%20a%20few%20different%20factors.

[46] Salmon escapees, National Institute of Health, available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC12647055/#:~:text=Each%20year%2C%20approximately%20200%20000,degradation%20%5B1%2C%2011%5D.

Habitat impacts and pollution

The nutrient loads, benthic impacts from cages, and land-use change remain real concerns for many aquaculture models[47] which need to be addressed, to be able to expand without negative environmental impact.

Impact: Invest in well balanced poly-culture systems and closed (recirculated) systems or IMTA (Integrated Multi Trophic Aquaculture) development to reduce habitat impacts and support ecosystem resilience. IMTA and well-managed RAS have been shown to deliver real economic benefits in practice, including significantly higher production and net income compared with traditional systems, positive cash flows and competitive return on investment. IMTA outperforms conventional polyculture with respect to environmental remediation, productivity and economic return in brackish water ponds.[13]

Climate change and ocean change

Global warming, acidification, altered currents and extreme events affect both aquaculture viability (temperature-sensitive species) and wild stock distributions. One of the most worrying points is that temperature increase reduces oxygen levels in seawater, which brings high fish mortalities in intensified farming systems (and wild fish populations)[48].

Impact: Invest in “synergetic consortiums” from various industries (including Aquaculture and Fisheries) e.g. alternative energy windmill parks (e.g. Win@sea (DEN) & OLAMUR (Den), where Oxygen-generation will be efficiently done and water-oxygenation should be cost-effectively feasible at site. Invest in R&D of new Oxygenation technologies, to be able to increase Oxygen levels in farming waters in an efficient way.

Technical and economic

Feed innovation through alternative ingredients

Alternatives exist (plant and marine proteins, insect, single-cell oils, fermentation products, upscaling of agricultural by-products, fisheries and aquaculture side streams) but scale, cost, and nutritional profiles aren’t fully solved for all species. This truly slows sustainable upscaling[49].

Impact: Investment in circular feed-ingredients production, to substitute raw materials coming from nature or having a negative environmental impact, by upgrading agricultural by-products and fisheries and aquaculture side streams through new technologies for alternative raw materials and additives production (e.g. insect proteins and fats, microbial oils, alternative marine proteins and fats, and responsibly sourced plant proteins.

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[47] FAO, The state of World Fisheries and Aquaculture, available at: https://www.fao.org/publications/fao-flagship-publications/the-state-of-world-fisheries-and-aquaculture/en

[13] IMTA outperforms conventional polyculture systems, available at: https://www.sciencedirect.com/science/article/abs/pii/S0044848619325414

[48] European Environmental Agency, How climate change impacts marine life, https://www.eea.europa.eu/en/analysis/publications/how-climate-change-impacts-marine-life#:~:text=Warmer%20water%20alters%20organisms'%20metabolisms,ventilation%20(IPCC%2C%202019).

[49] FEFAC, circular feed optimised nutrient recovery through animal nutrition, available at: file:///C:/Users/sleon/OneDrive/Desktop/Press%20&%20Articles%20&%20Reports/FEFAC-Circular-Feed-Publication-13-June-2022.pdf

Capital intensity and cost volatility

New tech (e.g. RAS, offshore cages) requires heavy CAPEX; small producers can be excluded, and margins are exposed to feed and energy price swings. High capital intensity is consistently flagged as a barrier to start-ups. Investors note that new financial instruments that reduce equity burden, including guarantees and concessional debt, are needed to make aquaculture innovation competitive with other sectors. CAPEX-heavy models remain unattractive without risk-sharing mechanisms.

Impact: Opportunity in setting-up cooperatives and consortiums in the aquatic food chain, engaging the various players of the chain; pair with tailored risk mitigation and blended finance solutions to reduce equity intensity and improve bankability.

Governance, traceability and social

IUU fishing, poor enforcement and weak management

Illegal, unreported and unregulated fishing undermines sustainability, depresses prices for compliant fishers, and obscures stock status. Capture fisheries need better monitoring and enforcement.
Impact: Vessel monitoring systems (VMS) and electronic catch documentation should help prove compliance with regulation.

Traceability and supply-chain transparency gaps

Lack of reliable traceability allows illegal or unsustainable product to reach markets; investors and retailers are pushing traceability, but implementation is patchy[50].
Impact: Gaps in traceability and supply-chain transparency restrict market access, reduce pricing power, increase reputational and regulatory risk, and limit investor confidence, whereas implementing robust traceability enables premium market access, operational efficiency, and stronger growth prospects.

Social and labour issues

Small-scale fishers and aquaculture producers' livelihoods, labour standards on fishing vessels and farms (especially in Southern Europe), and equitable benefit sharing are often under-addressed in rapid expansion or growth plans.
Impact: Opportunities lie in investing in local communities' involvement in the aquatic food chain growth pillars through finance, co-management, and access to markets and training, so that sustainability gains don't exclude vulnerable communities.

[50] FAIRR, Tracing Risk and Opportunity: The Critical Need for Traceability in Today's Seafood Supply Chains, available at: https://www.worldwildlife.org/documents/535/755o7ir5wm_FAIRR_Seafood_Traceability_Engagement_Phase1_Progress_Report_2024.pdf

Innovation and entrepreneurial ecosystem gaps

Entrepreneurial quality

The sector needs to attract stronger founders into aquaculture. Investors note that a limited pipeline of experienced entrepreneurs slows the conversion of science and operational know-how into investable, scalable business models, particularly in areas that require execution in complex biological and regulatory environments.
Impact: Strengthen efforts to attract founders into the sector by building dedicated outreach, incentives, and targeted support structures that make aquaculture a more compelling field for entrepreneurial talent.

Link between research institutions and industry

A persistent disconnect between research institutions and industry slows the adoption of modern, science-based solutions. Promising innovations often stall in the transition to commercial deployment due to gaps in applied validation, industry partnerships, and market-oriented development.

Impact: Targeted programmes to attract high-calibre founders, paired with mechanisms that tighten research–industry collaboration (e.g., translational pilots, joint development agreements, and embedded industry fellowships), can accelerate adoption of science-based solutions and improve the qualitative investment-readiness of new ventures.

Access to finance

Access to finance remains a structural challenge for early-stage and technology-intensive ventures. Risk mitigation instruments have a continued role to derisk early-stage ventures, especially where development cycles are long and CAPEX requirements are high. In regions such as South-East Europe and the Black Sea, access to finance has improved compared to a decade ago, but sustained support remains necessary for risk-heavy innovations.

Impact: Blended finance and dedicated guarantee or concessional debt facilities can reduce equity burden, crowd in private capital, and make investments competitive versus other sectors.

Technologies to watch

Aquaculture

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Fish welfare and handling systems	Handling systems improve fish welfare by reducing stress and mortality, increase flesh-quality by reducing stress during harvest and pre-rigor mortis time, and decrease carbon emissions, costs and risks of disease.	ACE Aquatec MMC First Process Sematec STIM Optimar
Disease detection and prevention	The sooner a possible disease can be detected, the better it can be tackled, with less cost and less losses (mortalities)	Pharmaq/Zoetis KYTOS Stingray Marine Solutions FIIZK WellFish Tech
Genetic improvement of species	The application of genetic techniques makes it possible to predict disease propensity, increase disease resistance and reduce the existence of infectious diseases within the aquaculture ecosystems.	ryoGenetics Eligo Bioscience Resistomap Xelect Ltd Benchmark Genetics
Recirculating aquaculture systems (RAS)	Better performing RAS significantly reduce water waste and deliver improved energy efficiency, better adaptability to saltwater use, improved water filtering and better output rendering.	BIG AKWA Farm in a Box SAGA AQUA Atlantic Sapphire Salmon Evolution Kingfish Zeeland Landing Aquaculture PaRas Aqua Cresponix Aquinuga Living Seas Norse Innovation SeaEntia Next Tuna Gmbh
Crustacean production in RAS	RAS systems facilitate sustainable crustacean production that emits less contamination and pollution, better manages with the large and steady flow of waste generated by crustaceans during the rearing process and is able to adapt to specific water conditions, such as salt levels.	AquaPurna OceanLoop Local Ocean AquaQLT CreveTec Hava AB Lucky Shrimp Pure Shrimp
Aquaculture digitalisation, data capturing, IoT platforms and Satellite monitoring	These devices measure and regulate environment conditions such as water temperature and Oxygen levels, the amount of water required and the amount of feed needed, thereby increasing predictability, cost efficiency and speed of production.	BEIA Mathclick Agritrack SA AquaGrid Analytics ExypnoTech Engineering Vision3F / V-tag

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Remotely operated vehicles (ROVs) for aquaculture	ROVs can perform tasks that demand a skilled workforce and expensive protective underwater gear. With the help of ROVs, farmers can inspect nets quickly and without leaving their desks.	Probotic / ScaleAQ REMORA Robotics Aqua Robotics
Automation and standardisation	Labour intensive operations in hatcheries and farms are replaced by automation devices, mostly constructed by aquaculture technical experts. As such, much equipment has been developed, that work on operational efficiency, environmental sustainability, fish health and welfare, product quality and safety, economic performance, workforce safety and labour optimisation.	Excess Engineering AS Fish Automation Aquatrade srl Maral Technologies
Water quality monitoring	Companies dealing in monitoring water quality either, through nanobubble water treatment, or water purification technology, or by developing and deploying an innovative Submersible Ocean Data Buoy, a reliable and scalable monitoring system that provides continuous, in-depth environmental data and enhancing water quality monitoring, reporting and management decision making.	BiOceanOr Chucao Tech APRIA Systems S.L Ocean Access Stockholm Water Technology Waboost d.o.o. DABCE AB HydroNeo
Alternative feed sources and ingredients	Fish meal and fish oil alternatives present an opportunity to sustainably scale aquaculture production by reducing dependency on fish meal and fish oil coming from the wild, and eventually also reducing the price of the process.	Aquanzo ltd Mealfood Europe InnovaFeed Protix FERMENTALG NASEKOMO MicroHarvest MacroCarbon EniferBio b.fab. Gmbh, KIDEMIS BioFeyn Kinsect Maral Technologies Marine Feed Sweden Mealfood Europe Ocean Twist Biotechnology Seagure labs

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Offshore production	Offshore aquaculture lately involves new technologies, like full submergible and self-feeding/controlling cages, big (>3 KMT capacity) semi-closed cages, fully enclosed units with impermeable walls (e.g. FishGlobe, Ovum and Bluegreen) or even ship-based fish farms (e.g. Guoxin from China) with capacity of >100 KMT, or Fish-cage-solutions for challenging environments.	IMPACT-9 ScaleAQ AKVA Group Badinotti group
Multifunctional and Integrated multi-trophic aquaculture (IMTA)	IMTA enables a circular-economy approach to aquaculture production, decreases the environmental impact of production, optimises the use of space and reduces waste. It can also have a positive impact on the growth rates of certain species, such as sea urchins.	KERTEMINDE SEAFARM Agriloops

Fisheries

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Bycatch reduction devices	These technologies substantially lower the amount of bycatch, improving fishing revenues, saving more fish, supporting fisherfolk and protecting an essential food source.	SafetyNet Technologies Smartfish H2020
Anti-waste fishing gear	The use of anti-waste fishing gear decreases the costs associated with replacing lost gear and mitigates the impact of ghost gear on biodiversity.	Resqunit Sealive
Electronic monitoring systems	The implementation of these systems makes it easier to meet fishing quotas and enables higher selectivity in fishing methods via fast monitoring, control and identification of bycatch. Bycatch can be returned to the sea faster, increasing its chances of survival.	Remote Electronic Monitoring Pelagic Systems ScanMar
Fish tracing apps and platforms for consumers	These apps and platforms enable consumers to make better decisions about what they are consuming and help them opt for more sustainably caught products from outfits that respect animal welfare and provide reasonable work environments throughout the supply chain.	Seafood Tomorrow Provenance S-Group
Maritime surveillance technologies to prevent IUU fisheries	These technologies can provide maritime guards with a real-time live feed of the oceans and store data in the cloud, thereby reducing the effort and resources required from coastal and sea guards.	TopView SRL Ocean Mind Satlink Maritime Robotics

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Fish tracing apps and platforms for market players	These apps and platforms give fisherfolk more control over their activities, allow them to make higher profits and ensure their rights are protected and fair treatment is secured	Sinay Seafood App
Fish health control	Controlling fish health reduces the risk of putting poor quality fish into the market, contaminating healthy catches or releasing larvae and parasites into the areas where fishing fleets operate.	Marexi Nofima

3.2. Blue Biotechnology

Blue biotechnology is the application of science and technology to aquatic organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services[51]. Blue biotechnology is therefore a cross-cutting approach spanning multiple industries and applications, and its market growth has been exponential forecasted to reach approximately USD 13.59 billion by 2034, with a predicted CAGR of 7.2% up to 2034[52].

Blue biotechnology is expanding rapidly as marine-derived ingredients gain traction across pharmaceuticals, nutraceuticals (supplements), cosmetics and agriculture. At the same time, advances in fisheries, aquaculture and biomass cultivation are enabling new applications in food, biomaterials, health, bioremediation and climate-relevant-relevant solutions[53]. Value creation in blue biotechnology typically follows a two-stage process: biomass or organism production (through cultivation, fermentation or controlled harvesting) and downstream processing and transformation (including extraction, purification, formulation and functionalisation). While advances in cultivation systems — such as aquaculture, microalgae photobioreactors and seaweed farming — are essential to secure reliable and scalable biomass supply, the highest value-added and differentiation usually occurs downstream, where biological materials are converted into high-purity ingredients, specialised compounds or functional

[51] From a technical perspective, blue biotechnology is commonly understood as a subset of modern biotechnology that exploits the genetic, biochemical and physiological properties of aquatic organisms — including marine, brackish and freshwater species — for the development of products, processes and services across industrial, environmental, food, health and energy applications. It encompasses the discovery, characterisation and modification of marine microorganisms, algae, invertebrates and fish, as well as the use of marine-derived enzymes, bioactive compounds, biomaterials and genetic resources, using tools such as genomics, metabolomics, synthetic biology, bioprocess engineering and systems biology. Unlike traditional marine bio-resource use, blue biotechnology is knowledge- and technology-intensive, relies on controlled cultivation or biosynthetic production rather than wild extraction, and is increasingly integrated into circular bioeconomy and sustainability frameworks. Varela, João, and Sara Raposo. "Marine biotechnology: a challenging path to sustainable food, feed, energy and improved human and animal health." 2018. CIMA - Centro de Investigação Marinha e Ambiental, DOI: http://hdl.handle.net/10400.1/13921

[52] OECD, 2017 - Marine biotechnology: Definitions, infrastructures and directions for innovation, OECD Science, Technology and Industry Policy Papers, No. 43, OECD Publishing, Paris

[53] Allied Market Research. (2024). Global Marine Biotechnology Market Forecast 2024–2035, Precedence Research (2025). Marine Biotechnology Market Trends Forecast 2024-2034

products[54]. As a result, the sector now spans multiple, parallel value chains, each with its own technological requirements and distinct risk return-return profiles[55].

Key growth drivers

Three main connected trends drive investor interest in blue biotech:

Market pull for sustainable, traceable inputs: Consumer and regulatory pressure to decarbonise supply chains is accelerating adoption of marine-based alternatives. Microalgae-derived omega-3 oils are replacing fish oil in aquafeeds, reducing reliance on wild fisheries. Seaweed and algae proteins, pigments, and hydrocolloids are entering food and cosmetics markets, offering lower land and water footprints than terrestrial crops. In packaging, algae-based polymers are emerging as substitutes for petrochemical plastics, supported by single-use plastic ban and circular economy mandates.

Technological readiness and convergence: Advances in cultivation systems - such as closed photobioreactors and offshore mechanised farms - combined with omics-driven bioprospecting, AI-assisted discovery, and metabolic engineering have reduced operational risk and accelerated product development. These innovations improve yield predictability, cost visibility, and regulatory compliance, shortening the path from lab to market.

Policy and blended-finance tailwinds: EU bioeconomy and circular economy strategies, coupled with funding instruments like Horizon Europe, InvestEU and EMFAF, create a supportive environment for early-stage ventures. Growing interest in carbon removal further strengthens the case for marine-based pathways, where biomass cultivation can integrate with carbon accounting and climate mitigation objectives.

From a market application perspective, drivers are clustered in:

Food and feed

Food and feed remain the most commercially mature segment of blue biotechnology, underpinned by robust regulatory frameworks, established safety standards, and consistent demand for sustainable, traceable ingredients[56]. Microalgae-derived proteins, lipids, and specialty ingredients are increasingly incorporated into aquafeeds and functional food products, driven by pressure to

[54] Varela, João, and Sara Raposo. "Marine biotechnology: a challenging path to sustainable food, feed, energy and improved human and animal health." 2018. CIMA - Centro de Investigação Marinha e Ambiental, DOI: http://hdl.handle.net/10400.1/13921

[55] In blue biotechnology, upstream activities focus on biomass generation through aquaculture, microbial fermentation or controlled cultivation of algae and marine organisms, where innovation primarily improves yields, reliability and environmental performance. Downstream activities — including extraction, biorefining, enzymatic conversion and formulation — typically account for a larger share of economic value, as they determine product functionality, regulatory classification, market access and pricing. Studies of marine bio-based value chains consistently show that downstream processing and formulation stages capture the highest margins, particularly for food ingredients, bioactives, biomaterials and health-related applications. Albay, M., Ozbayram, E. & Botana, L.M. Advancing Aquatic Biotechnology in the Circular Bioeconomy Era: Innovations, Challenges, and Opportunities. Environmental Management 75, 2366–2370 (2025). https://doi.org/10.1007/s00267-025-02205-2

[56] FAO, 2024

diversify away from overexploited marine fisheries and reduce reliance on resource-intensive terrestrial crops. Companies such as Algama and Sophie's Bionutrients demonstrate how regulatory readiness, defined by early compliance with EU food and feed legislation, can significantly accelerate market entry. In practice, this includes proactive engagement with the EU Novel Food authorisation process, adherence to feed safety regulations, full traceability of raw materials and production processes, and the implementation of certified quality and food-safety management systems (e.g. Hazard Analysis and Critical Control Point (HACCP) or ISO standards[57]). These firms combine controlled fermentation systems with rigorous quality management, enabling stable production of high-purity proteins, omega-3 lipids, natural pigments and clean-label ingredients suited to plant-based foods, aquatic food alternatives, sports nutrition and nutraceutical applications. As supply chains seek low-carbon, high-functionality inputs with verifiable provenance, food and feed applications continue to set the pace for scalability across the broader blue bioeconomy.

Biochemicals and enzymes

Marine-derived enzymes and bioactives constitute a fast-growing, high-margin segment thanks to their unique performance under extreme temperature, pressure, and salinity conditions. Most marine-derived enzymes come from marine microbial communities, including bacteria, fungi and, in some cases, what were initially isolated as being enzymes derived from marine sponge or cnidaria enzymes were later discovered to be from their microbial symbionts[58]. These properties translate into energy-efficient industrial bioprocesses, improved catalytic performance, and competitive advantages in cosmetics, nutraceuticals and specialty chemicals. European innovators - such as Microphyt, Abyss Ingredients and Sophie's Bionutrients - are already generating early revenues through premium ingredient sales, leveraging marine antioxidants, peptides and functional compounds with strong IP defensibility. The segment benefits from lower regulatory barriers compared to pharmaceuticals and requires only modest production volumes to achieve commercial viability. For investors, biochemicals and enzymes represent an attractive "bridge category," capable of producing near-term cash flow while building technical platforms adaptable to higher-value verticals, including industrial catalysis and advanced biomaterial manufacturing.

Materials and packaging

Materials and packaging constitute a strategic growth area, catalysed by extensive EU single-use plastic reduction targets and bans, extended producer-responsibility rules, and corporate decarbonisation commitments. Seaweed-derived polymers - including alginate, agar, and carrageenan - and algae-based bioplastics offer compostability, reduced carbon footprint, and

[57] ISO standards are used to demonstrate that a company operates consistent, traceable and well-controlled production systems. Commonly referenced standards include ISO 22000 – Food Safety Management Systems; ISO 9001 – Quality Management Systems; ISO 14001 – Environmental Management Systems.

[58] Carroll, A. R., Copp, B. R., Grkovic, T., Keyzers, R. A., & Prinsep, M. R. (2025). Marine natural products. Natural Product Reports, 42(2), 257-297. https://doi.org/10.1039/D4NP00067F

non-toxic degradation pathways. Although cost differentials persist (≈EUR 3–6/kg vs. EUR 0.7–2/kg for petro-plastics), techno-economic trajectories are improving as production capacity scales and downstream processing becomes more efficient. Despite accounting for <1% of global plastics, bioplastics are forecast to expand significantly[59]. European ventures such as PlantSea are piloting flexible seaweed-based films that meet dry-goods packaging needs while reducing dependence on fossil-based polymers. As regulatory tailwinds intensify, algae-derived biomaterials are positioned to capture growing market share, particularly in packaging, coatings, and biodegradable composite applications.

Health and pharmaceuticals

Marine ecosystems continue to yield a rich pipeline of structurally unique bioactive molecules, with >1,220 new marine compounds identified in 2024[60]. These discoveries underpin long-term pharmaceutical innovation, although clinical development timelines remain substantial (10–15+ years) and costs typically exceed USD 900 million. Challenges include low natural abundance of target compounds, difficulties in cultivation, and complexity in scaling extraction or biosynthetic routes. As a result, pharmaceutical candidates require sustained capital and specialised expertise. In contrast, marine-derived nutraceuticals, functional actives, and cosmeceuticals have a clearer, shorter path to market and can generate early revenue. Companies like Microphyt leverage proprietary cultivation technologies to produce high-value microalgal actives for cognitive health, metabolic support, and anti-inflammatory applications. This dual-track model — near-term nutraceutical income alongside longer-horizon therapeutic discovery — continues to define the health segment's commercial logic.

Blue carbon and CCU/CDR

Blue carbon and marine-based carbon capture, utilisation and removal (CCU/CDR) represent an emerging but strategically significant domain. Seaweed farms, microalgal and other microbial systems (microbial carbon pumps) exhibit high carbon-fixation rates, although the commercial viability of carbon removal hinges on permanence, baseline accuracy, and robust MRV (monitoring, reporting, verification) frameworks. Scientific advances are gradually improving measurement confidence, but validation methodologies remain complex and region-specific. Demonstration projects — such as Ocean Gardens (regenerative seaweed farming), SeaMark (ecosystem service monetisation), and North Sea Farm 1— illustrate potential dual-revenue models where biomass monetisation (food, feed, materials, bioactives) is complemented by future MRV-verified carbon services. Early participation in voluntary carbon markets (now >USD 2bn/year) suggests rising corporate appetite for high-integrity marine CDR pathways. However, until certification standards stabilise, investors should prioritise ventures that integrate carbon value as an additive upside to strong

[59] European Bioplastics Association; Bioplastics Market Update 2025, available at: https://www.european-bioplastics.org/market/
[60] Carroll, A. R., Copp, B. R., Grkovic, T., Keyzers, R. A., & Prinsep, M. R. (2025). Marine natural products. Natural Product Reports, 42(2), 257-297. https://doi.org/10.1039/D4NP00067F

underlying product markets, rather than relying exclusively on carbon credit revenue.

Market trends and highlights

Precision cultivation and strain engineering

Controlled systems and advanced strain optimisation enable consistent, traceable production of high-value ingredients such as omega-3 oils, pigments, and specialty proteins. These platforms reduce biological variability and contamination risks, supporting scalability and regulatory approval. In aquafeed, microalgae-derived EPA/DHA produced in closed photobioreactors and fermentation systems is already displacing fish oil; Corbion and Veramaris operate at industrial scale to secure quality and traceability for EU buyers. Process intensification and strain engineering (including CRISPR edits and adaptive laboratory evolution) are cutting unit costs while improving yields, with these data-rich, highly controlled systems also easing EU novel-food/ingredient compliance. On the food ingredient side, Algama and Sophie's Bionutrients use precision cultivation and fermentation to supply proteins and pigments to regulated markets, illustrating how platform control translates directly into market access and scale-readiness.

Cascade biorefineries for seaweed and algae

Sequential extraction of multiple product streams from algae or seaweed biomass improves economics and circularity. By valorising proteins, hydrocolloids, bioactives, and residues for energy or fertilisers, these models reduce waste and diversify revenue streams, aligning with EU circular bioeconomy goals.
Companies demonstrate this in practice: Sea6 Energy integrates offshore cultivation with bioplastic precursors, biofertilisers and bioenergy; in Europe, Algoliner and PlantSea are developing fractionation[61] trains that capture several revenue lines per tonne of wet biomass. With global bioplastics capacity projected around 2.4–2.6 million tonnes by the mid-2020s, algal polymer fractions have a growing offtake landscape, while residues routed to energy or soil amendments improve overall project margins and reduce disposal emissions.

Marine enzymes, industrial bioactives and advanced biomaterials

Enzymes from extremophiles (organisms, mostly microorganisms that thrive under environmental conditions that are lethal to most other known forms of life) offer stability and efficiency for industrial processes, while marine peptides and antioxidants serve nutraceutical and cosmetic markets. These products generate early revenues and support longer-term R&D into pharmaceuticals. The marine enzymes market is estimated at USD ~518 million in 2025 and projected to

[61] Fractionation refers to the stepwise separation of a complex biomass into distinct product streams (fractions), such as lipids, proteins, carbohydrates, pigments, minerals, and other secondary metabolites of interest.

approach USD ~1.0 billion by 2035 (~6.8% CAGR), reflecting adoption in food processing, detergents, cosmetics and life-science workflows.
EU companies such as Microphyt and Abyss Ingredients monetise bioactives in cosmetics and nutraceuticals, while Marine BioSolutions and Inclita Seaweed Solutions illustrate peptide and functional-ingredient routes that build IP and cash flow ahead of therapeutic programs—thereby financing discovery while staying within lighter regulatory pathways than pharmaceuticals.

Marine-derived pharmaceuticals and nutraceuticals

Marine ecosystems remain exceptionally rich in novel chemistry: the MarinLit database records 43,991 marine bioactives, including 1,220 new compounds in the last reported year. While marine-derived pharmaceuticals offer outsized value, they face 10–15+ year timelines and USD >900 million total development costs from discovery to approval, compounded by low natural abundance and challenging scale-up from extreme-environment organisms. Approvals such as trabectedin (Yondelis®) demonstrate the path but also the patience required. In contrast, nutraceuticals and functional ingredients—omega-3s, polysaccharides, peptides—move faster under lighter regulatory categories, providing revenue bridges while therapeutic pipelines mature. European players such as Microphyt and Sophie's Bionutrients exemplify dual-track models, where earlier cash flows from cosmetics or supplementation support long-cycle therapeutic discovery enabled by synthetic biology and controlled production that decouples supply from wild harvesting.

Blue carbon pathways and MRV technologies

Kelp and other seaweed as well as microalgae and other microbial-based systems exhibit high photosynthetic rates and can contribute to CDR when coupled to durable carbon storage (e.g., biochar, long-lived composites, verified sediment deposition). The unlock is MRV: bankable projects need transparent monitoring, reporting and verification of uptake, permanence and leakage using remote sensing, in-situ sensors, isotopic analysis and digital traceability. Early voluntary market price indications for high-integrity removals cluster around USD 50–150/tCO_2e, which is steering developers toward dual-revenue models blending product sales (ingredients, materials, bioactives) with carbon services. European initiatives—Ocean Gardens (EMFAF), SeaMark (Horizon Europe) and North Sea Farm 1—are building biomass-to-sink baselines and testing MRV toolchains that could inform certification schemes as methodologies mature. For now, the most credible approaches lock carbon in durable products or verified storage rather than relying solely on in-water sequestration claims.

AI, digital twins and synthetic biology (synbio)[62] now compress R&D cycles, improve reproducibility and reduce cost variability across blue biotech. Cradle Bio applies generative AI to design proteins and bioactives, raising hit rates; New

[62] Synthetic biology is an interdisciplinary field that: designs and builds new biological systems, or redesigns existing organisms to perform specific, useful functions.

Wave Biotech deploys machine learning and digital twins to forecast fermentation performance and resource intensity; BiOceanOr combines sensors and AI to optimise water quality and farm productivity in real time. On the production side, AmphiStar engineers biosurfactants via microbial platforms, illustrating how synbio-enabled molecules can reach market at scale with EU and venture support. Together, these tools underpin regulatory-grade datasets, scalable IP and process predictability, reinforcing the viability of multi-application platforms that span ingredients, materials and health—and dovetail with MRV data needs in emerging carbon-linked business models.

Main challenges to sustainable solutions

Despite strong scientific capacity and policy interest, a key challenge for blue biotechnology in the EU remains regulatory complexity and fragmentation, which continues to slow the transition from R&D to marketable products. Emerging technologies, such as gene editing in marine organisms, new microalgae bioproducts, and biorefineries that valorise biomass side streams, often face lengthy permitting, unclear classification, and overlapping regulatory requirements across food, feed, chemicals and environmental legislation at both EU and Member State levels, increasing compliance costs and operational risk for innovators. This complexity is compounded by sector-specific EU regulatory gaps, particularly in areas such as the recognition of sustainable marine feedstocks, the status of circular inputs derived from waste and by-products of fisheries and aquaculture[63], and harmonised sustainability criteria for bio-based marine products. As a result, companies frequently encounter divergent national interpretations and permitting practices, which undermine legal certainty, increase compliance costs and effectively prevent blue biotechnology innovations from scaling seamlessly across borders. This fragmentation limits the effective functioning of the EU Single Market, discouraging investment in capital-intensive projects and delaying the deployment of circular bioeconomy models that rely on cross-border value chains and consistent regulatory treatment.

Access to finance and investment scale-up constitutes another structural limitation. Many blue biotech ventures require long development timelines, high capital expenditure, and specialised infrastructure (e.g., offshore cultivation systems, bioprocess facilities; pre-commercial infrastructures and equipment). Conventional EU financial frameworks, which emphasise loan-based instruments, and often fragmented across national markets, are less aligned with the high-risk, high-potential investment profiles of biotech startups and scale-ups. Limited availability of large pan-European venture funds and difficulties in mobilising sustained private capital hinder the capacity of innovative SMEs to

[63] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Building the future with nature: Boosting Biotechnology and Biomanufacturing in the EU, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52024DC0137

reach industrial scale and compete globally, despite targeted EU support programmes intended to catalyse innovation across the sector.

A third, interlinked challenge lies in technical and operational constraints, particularly around sustainable marine biomass supply and production scalability. EU production of high-value marine feedstocks (e.g., specific microalgae species) remains marginal relative to global leaders (e.g Asia), in part due to high production costs and regulatory barriers, technological hurdles to large-scale cultivation, and limited shared infrastructure for downstream processing and bioprocess integration. Complex marine ecosystems and biological variability further elevate R&D and optimisation costs for novel biomolecules and bio-based materials. These technical hurdles are accentuated by skills shortages in advanced bioprocess, market deployment of marine derived products and digital technologies (such as process automation, data analytics, digital monitoring systems, and tools for traceability, quality control and optimisation across cultivation and processing stages)[64].

Technologies to watch

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Photobioreactors (PBRs)/Precision cultivation	Higher biomass productivity and product purity compared to open ponds; reduced contamination risk; suitable for food- and pharma-grade products and more precise carbon-accounting.	*Al*gae Capital Algamol Algoliner BlueCare Ebbing-Tides PowerAlgae Ufraction8
Marine biorefinery/ Cascade processing	Maximises value per tonne of wet biomass; mitigates risk; increases project economics and circularity while reducing waste.	Agaia Algavo Kidemis Oceanium Olmix Origin by Ocean Nutramara Vetik
Marine enzyme applications	Enzymes often lower energy consumption vs chemical catalysts, enable novel green chemistries and provide stable performance in harsh industrial conditions.	*Abyss* ArticZymes TailorZyme

[64] Hub Azul Portugal, 2025 (PT only) – What is promoting innovation in Blue Biotech? By Vitor Vasconcelos, CIIMAR R&D Unit Director and coordinator of Hub Azul Leixões 1

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Microalgae-based nutrients and supplements	High protein and omega-3 yields with limited land use; traceable, scalable alternatives to fish oil and terrestrial proteins.	5ESSENTIA Algaeforfood Algaria Algoliner Algaenergy Allmicroalgae Beta Alg Biotechnology Bromalgae Buggy Power FUL Foods Numar Veramis
Fertilisers and biostimulants from marine biomass	Improves soil health and crop resilience; reduces reliance on synthetic fertilisers and offers circular use of coastal biomass/waste.	Aurelius Aps Ficosterra Kyanos Biotechnologies South Agro SRL
Bioplastics and biomaterials produced from or with marine resources	Renewable alternatives to petroplastics; improved biodegradability and alignment with single-use-plastic regulation and corporate sustainability objectives.	AlgaeScope Algopack Avl Bio Waste Composite B'ZEOS ERANOVA Flexsea Kelpi Notpla OCEAN RECHERCHE Ponda RELICTA
Pharmaceuticals: Cancer drugs, antibiotics and other marine therapeutics	Unique chemistries with strong IP potential; high margins for successful assets; significant medical-need impact. Lon-term developments, high capex but also high ROI.	CyanoCare CCMAR Sea4us
Health-Tech: Marine-sourced vaccines and adjuvants	Strong opportunity in aquaculture health and potential human vaccine adjuvant innovation with immune-boosting properties.	Exogenus
Marine-based cosmetics and personal care	Large consumer market with high willingness-to-pay for sustainable and traceable ingredients; relatively low regulatory barrier vs pharma.	AETHIC Algaia Algaktiv Algamol Algotherm BELLEJO Beta Alg Biotechnology Blue Skincare CyanoCare Inclita Seaweed Solutions Kybele's garden MicroPhyt SurfAct

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Blue carbon / Seaweed CDR and carbon storage	Potential to create carbon-removal credits while producing commoditised co-products; dual-revenue models (product sales + verified carbon). Durable carbon storage combined with agronomic benefits; closes a product loop from ocean farming to terrestrial carbon mitigation/improvement.	Algaria Algaesys FICOSTERRA Kelp Blue NARA Neocarbon NewConcepts Open Climate Solutions Sea2Carbon SeaForester The Seaweed Company
MRV technologies for blue carbon	MRV is necessary for credible carbon credits and investor confidence; it underpins market pricing of blue carbon services.	Kongsberg Discovery
AI / digital twins and decision-support platforms	Increases yield, reduces risk, shortens scale-up time and improves MRV / reporting accuracy.	BiOceanor Microphyt ResistoMao
Synthetic biology and metabolic engineering platforms	Potential step-change in productivity and reproducibility; enables high-value molecule production without harvesting wild biomass.	AmphiStar Deep Blue Biotech Microphyt Nostrum Biodiscovery Sea Dyes

3.3. 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 most commercially available technology to the least mature one is presented as follows[65]:

Technology	Acronym	Development status
Fixed offshore wind	OW	Approx. 86GW of commercial capacity installed to-date worldwide including 25% in the EU
Floating offshore wind	FOW	First pre-commercial farms are under construction or already operating
Floating solar PV	FPV	Pre-commercial farms are under construction or already operating (mostly inshore for the moment, e.g lakes)

[65] 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.

Technology	Acronym	Development status
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 deployed
Salinity gradient conversion	SAL	A few pilot plants

European countries remain at the forefront of R&D and early deployment, but competition from North America and East Asia is intensifying. The sector spans multiple lifecycle stages from **design and engineering (DDE) to construction and assembly (C&A), transportation and installation (T&I), commissioning, operation and maintenance (O&M), and end-of-life (EOL)**.

Key growth drivers

Oceans, seas, rivers and wetlands offer vast areas energy resource potential that is largely underexploited to-date. According to the International Energy Agency (IEA), there is enough offshore wind resource globally to meet the world's entire electricity demand today[66]. Using current technology, the World Bank[67] estimates around **71,000 GW** of fixed and floating offshore wind technical potential worldwide. In addition, the **European industry estimates that ocean energy could supply up to 10% of Europe's current electricity demand by 2050** representing approximately 100GW of wave and tidal energy[68].

Furthermore, land scarcity and environmental competition onshore make water-based renewables more attractive today -especially for densely populated or coastal countries. In some EU countries, suitable land availability for renewable energy deployment is insufficient[69]. Combining onshore and offshore renewable energy can help both spatial planning and social acceptance.

Blue renewables often deliver power under conditions when onshore renewables are weak or when demand is high. This seasonal pattern helps smooth the management of the electricity mix, representing another key asset for blue renewable systems. Offshore winds have higher speed and consistency compared to onshore winds which helps grid stability[70]. Furthermore, waves are

[66] https://www.gwec.net/policy/offshorewind
[67] https://drawdown.org/explorer/deploy-offshore-wind-turbines
[68] https://research-and-innovation.ec.europa.eu/research-area/energy/ocean-energy_en
[69] European Environmental Bureau https://eeb.org/wp-content/uploads/2024/07/Land_for_RES_Report.pdf
[70] National grid https://www.nationalgrid.com/stories/energy-explained/onshore-vs-offshore-wind-energy

stronger during winter, and tides are 100% predictable which are also benefitting characteristics for grid integration[71].

The growth of the blue renewable energy sector is primarily driven by three factors:

- **Policy support to deploy favourable energy planning framework**
- **A positive acceptability of deploying industrial units of renewable energy at coastal, nearshore, and offshore locations.**
- **A competitive cost of energy over the lifecycle of the production plant**

At a global scale, energy demand, particularly electricity[72], is expected to grow 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[73].

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 set installed capacity targets for offshore wind on a horizon ranging from 2030 until 2050. The combined figures result in an overall ambition of installing approximately 88 GW of offshore renewable generation capacity by the end of this decade, rising to around 360 GW by 2050[74].

Over the past decade, a growing maturity of technologies, and transition from demonstration through early commercial scale to serial production (for fixed offshore wind), have contributed to significantly reducing the cost of electricity making the most mature blue renewable technologies competitive with conventional power generation.

Given the current geopolitical instability, EU nations are particularly motivated by energy security concerns, seeking to reduce dependence on fossil fuel imports through domestic resources. Coastal countries are therefore considering offshore wind and other blue renewables to contribute to this goal.

Market trends and highlights

The Global Offshore Wind Report 2025[75] shows that the offshore wind industry added another 8GW of capacity in 2024, making it the fourth highest year ever. This brings total installed offshore wind capacity globally to 83 GW – enough to power 73 million households.

[71] Ocean Energy Europe https://www.oceanenergy-europe.eu/industry-news/european-commission-names-ocean-energy-as-key-technology-for-reaching-eu-targets/
[72] IEA Global trends: https://www.iea.org/reports/global-energy-review-2025/global-trends
[73] McKinsey https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/electricity-demand-in-europe-growing-or-going
[74] European Commission https://energy.ec.europa.eu/news/member-states-agree-new-ambition-expanding-offshore-renewable-energy-2024-12-18_en
[75] https://tethys.pnnl.gov/publications/global-offshore-wind-report-2025

The global offshore wind market grew by an average of 10% annually over the past decade with forecasts on annual offshore wind capacity installations to grow from 8GW in 2024 to 34GW in 2030. China leads the market, accounting for half of global capacity, followed by the UK, Germany, the Netherlands, and Taiwan.

The market size was valued at approximately $40 billion in 2024 and is projected to grow at a CAGR of 8.9% through 2030, reaching $65 billion by 2030[76]. Some forecasts are even more optimistic, predicting a CAGR of 12.9% and a market size of $192 billion by 2037[77].

Europe however faces a slowdown, with forecasts for 2030 cut by 21% due to stalled auctions, delayed investments, and policy uncertainties. However, signs of recovery are emerging for 2026[78]

By 2030, about 4.1 GW of floating offshore wind capacity is expected to be installed or underway globally, with operational capacity reaching approximately 0.7 GW. This is forecasted to rise dramatically to 56.2 GW by 2040 as standardisation reduces costs[79]

The UK, France, and South Korea are currently the most attractive markets for floating wind, with ambitious targets and supportive policies. For example, the UK aims for 1 GW of floating wind by 2030, and the broader European market is expected to see significant growth despite recent slowdowns

In Europe, 11 tidal stream projects totalling 152 MW are in the pipeline, with 50 MW backed by European grants. Notable projects include CorPower Ocean's commercial-scale wave energy converter in Portugal and Wavepiston's full-scale testing in Spain[80]

Main challenges to sustainable solutions

Despite the positive momentum experienced by blue renewables and the above-mentioned ambitious targets, there are some socio-economic and technological obstacles that may hinder this development, namely:

- **High capital and operational costs — especially for emerging unproven technologies with significant reliability issues**

Installing tidal, wave converters, or floating foundations for wind, involves complex engineering, specialised supply chain such as vessels, mooring, subsea cabling - more expensive than many onshore renewables[81]. In the latest report from IRENA, it is highlighted that between 2010 and 2024, the global

[76] https://www.grandviewresearch.com/industry-analysis/offshore-wind-market-report
[77] https://www.researchnester.com/reports/offshore-wind-energy-market/7216
[78] https://www.tgs.com/press-releases/offshore-wind-forecast-slashed-but-signs-of-recovery-emerge-for-2026
[79] https://www.energy-pedia.com/news/general/offshore-wind-forecast-slashed--but-signs-of-recovery-emerge-for-2026-202373
[80] https://www.ren21.net/gsr-2025/technologies/ocean-power/
[81] European Commission https://energy.ec.europa.eu/news/member-states-agree-new-ambition-expanding-offshore-renewable-energy-2024-12-18_en

weighted average LCOE of offshore wind declined by 62%, from USD 0.208/kWh to USD 0.079/kWh[82]

Port infrastructures also require major upgrades to allow for the construction and the assembly of large subsystems (e.g floating wind platforms)[83]. Similarly, the vessel fleet might not be able to respond to the demand despite the forecasted growth[84]. Human resources can also become a bottleneck in the context of recruiting difficulties in several alike industrial sectors[85]. Marine environment challenges complicate operations significantly. Harsh ocean conditions—including extreme waves, corrosive saltwater, biofouling, and powerful currents—demand robust engineering and drive-up maintenance costs. However, the offshore industry has a long history providing specialised personnel and an existing supply chain relevant for blue renewables.

- **Grid connection and transmission challenges**

Offshore projects require long and costly cabling systems to connect to the onshore grid. Injecting massive amount of renewable electricity in areas where the onshore grid systems remain poorly equipped also represents another challenge. Today, grid connection constraints for offshore renewables are recognised as a bottleneck in the EU, and major investment programmes and regulatory changes are underway—especially in the North Sea, Baltic Sea and Atlantic basins. Social acceptability issues leading to long permitting procedure is also a major concern.

Indeed, conflicts of usage and other legal actions may jeopardise the realisation of a project – sometimes by delaying the launching of the construction by several months or years. These barriers represent a risk for investors and project developers that must be anticipated.

- **Geopolitical instability hinders the development of blue renewables**

Over recent years, many EU member states have experienced significant shifts in their energy policy framework[86]. Such changes can slow the launch of tenders for new offshore wind sites or other blue renewable projects. Since the industry is still developing, this unpredictability can particularly affect SMEs across the value chain, which often have limited financial buffers.

Energy insecurity linked to declining fossil fuel reserves, together with growing environmental pressures such as pollution, climate change and biodiversity loss, contributes to an uncertain global energy outlook. Although blue renewable energy will have to face these challenges, the overall market growth perspectives remain attractive. Despite recent revisions, the EU Green Deal strategy proposes ambitious offshore renewable energy targets.

[82] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Jul/IRENA_TEC_RPGC_in_2024_2025.pdf.
[83] Wind Europe https://windeurope.org/policy/topics/offshore-wind-ports/
[84] WindEurope https://windeurope.org/data/products/offshore-wind-vessels-availability-until-2030/
[85] DecodeHR https://www.decodehr.com/news-and-insights/navigating-hr-challenges-in-the-offshore-wind-industry
[86] The revision of the EU green deal is explained here: https://www.polytechnique-insights.com/en/columns/economy/omnibus-directive-a-setback-for-the-european-green-pact/

Technologies to watch

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Demonstrating the performance of ocean energy technologies at sea	Wave, tidal, OTEC and osmotic power conversion systems remain unproven for full-scale commercial deployment. Most mature companies are ready to demonstrate their capabilities at TRL9 The limited number of tidal energy sites in EU and the survivability of wave energy technologies under extreme weather conditions represent two key challenges.	Nova Innovation Orbital Marine Power Hydroquest Corpower Minesto Sweetch Energy SolarDuck SeaTurns Deltadriven24
Delivering serial production of floating wind turbines	Following the commissioning of first pre-commercial floating wind farms, this technology needs to find the right recipe for industrial rollout aligning port requirements, lean manufacturing, T&I and O&M strategies leading to a proven competitiveness.	Principle Power Oceargies BW Ideol
Going further offshore and deeper with optimised power footprint	As many favourable nearshore sites for wind energy have already been considered in EU, the industry must look at location further offshore often with deeper water conditions. In the meantime, space constraints encourage the use of technologies maximising the power output per surface area occupied. This led to novel components for substations, moorings and cables.	X1Wind Eolinck 3ST SeaTwirl
Environmental protection system	Environmental impact assessment is a mandatory component of any blue renewable energy project. Having a thorough and rigorous environmental plan is an increasingly important factor in the success of winning bid competing in offshore wind tender. This results in innovation in several aspects such as noise mitigation system, eDNA sampling, megafauna interactions characterisation, eco-design, long term effects from climate change on design, Biohut habitats etc.	Greenov ECOncrete SeaMe Project RWE
Digital twins and in-service monitoring	Reducing the risks and costs associated with O&M interventions at sea remain a critical objective. Digital solutions allowing better understanding of overall system behaviour, ageing of materials, rheology, stress corrosion, impact of biofouling and seaworthiness can all play a stronger role in the future of blue renewables.	AquaGrid DTWO project by Fraunhofer

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Enhanced marine operations	Heavy lift operations, unmanned offshore inspections, tow to port strategy are expected to unlock the development of blue renewable energy projects especially those located in more challenging offshore conditions	ESTEYCO
Multipurpose floating platforms and combined activities	Combined or co-located wind and wave energy plant, combining aquaculture with floating energy plants and solutions to facilitate the coexistence between blue renewables and fishing activities during exploitation can have a significant added-value in de-risking a project or facilitating its social acceptance.	Floating Power Plant OffWoff
Off-grid and microgrid applications	In addition to the main grid-connected market, alternative off-grid and microgrid markets represent a unique opportunity for ocean energy technologies. These niche markets usually require lower amount of energy and are typically destined for autonomous environmental monitoring, docking/charging station, water desalination or even remote/island grid connection.	AKROCEAN Ocean Oasis Oneka Wavetech
Storage, power-to-X or blue fuel	Integrate a large share of renewable electricity into the current grid infrastructure is a challenge that can be more easily overcome by the integration of storage and conversion techniques such as batteries, compressed air storage, marine worthiness of electrolysers, brine waste management, transport & storage of H2 and derivatives etc.	Lhyfe CRUSE Offshore StillStrom

3.4. Blue Tech and Ocean Observation

Blue Tech refers to the technologies and digital systems that enable sustainable use, monitoring, and management of the ocean—ranging from autonomous robotics and advanced sensors to AI-driven analytics, digital twins, and low-carbon maritime solutions. Ocean Observation, a core component of Blue Tech, encompasses the systematic collection and interpretation of physical, chemical, biological, and ecological data from the ocean through in situ platforms, satellite earth observation, and digital modelling. Together, these capabilities form the technological backbone of the modern blue economy.

The Blue Tech and Ocean Observation sector is undergoing accelerated transformation, driven by technological advances and a strategic policy push from the European Union: Ocean data is recognised as essential for climate resilience, economic competitiveness, maritime security, ocean forecasting and many other areas. This transformation is driven by two developments: the expansion of

autonomous sensing systems—such as gliders, robotic platforms, and subsea communication networks—and the steady improvement of digital technologies that turn raw ocean data into usable information through AI, data fusion, digital twins, and high-performance computing.

In parallel, the EU[87,88] is placing growing emphasis on dual-use technologies, maritime domain awareness, and the protection of underwater infrastructure. New policy initiatives highlight the strategic importance of secure ocean observation networks, trusted data pipelines and resilient subsea assets. This is reshaping market demand across civilian, industrial, and security-relevant domains. Consolidation is accelerating in subsea robotics, sensing hardware, and cable monitoring systems, while software-centric companies—particularly those offering AI analytics, digital twins, and integrated satellite–ocean platforms—are emerging as the next high-value layer.

Taken together, these perspectives provide a coherent view of where the sector is heading. Growth is fuelled by rising demand for high quality ocean data, while success increasingly depends on regulatory readiness, secure data handling, and the ability to integrate technologies across platforms and jurisdictions. Companies that combine technical innovation with compliance, interoperability and trusted dual-use capabilities are best positioned to lead the next phase of the bluetech economy.

Key growth drivers

Demand for advanced ocean observation technologies is rising sharply as governments, industry, researchers and financial actors depend on high quality, real-time ocean data to manage climate risks, maritime operations and underwater infrastructure. Several structural forces are pushing these innovations into the centre of strategic and commercial attention. Overall, the sector is shifting from hardware-heavy, survey-based operations to autonomous, digital, and data-centric business models.

The shift toward data-driven ocean management

Climate change, extreme events, biodiversity loss and coastal risks require more frequent, higher resolution and reliable ocean data. Public agencies and private operators—from offshore wind developers to insurers and shipping companies—need continuous, decision-grade information. This accelerates the move from occasional surveys to persistent, autonomous monitoring networks.
Startup opportunity: modular, scalable, lower-cost at equal data quality sensing and analytics outperform traditional ship-based survey methods.

[87] EU Maritime Security Strategy (EUMSS) and its 2023 Action Plan https://www.maritime-cybersecurity.com/European_Maritime_Security_Strategy_(EUMSS).html
[88] The European Ocean Pact https://oceans-and-fisheries.ec.europa.eu/european-ocean-pact_en

Expansion of offshore and underwater infrastructure

The rapid build-out of offshore wind, subsea cables, aquaculture, and marine energy systems increases the need for continuous monitoring, predictive maintenance, and environmental compliance. Operators require autonomous platforms, dense sensor grids, and integrated digital twins.
Startup opportunity: new infrastructure creates new "data gaps" and operational pain points, creating offerings for targeted monitoring and analytics tools that address unmet operational needs.

The rise of data-as-a-service and platformisation

EU-funded operational services that provide structured standardised, and quality-controlled marine data (EMODnet, CMEMS) lower barriers to accessing baseline ocean data. Free EU data services reduce entry barriers, but industry demand is shifting toward paid, value-added analytics that turn raw data into operational decisions. Those are value-added services—forecasts, risk scores, emissions intelligence—rather than owning hardware, that go far beyond what raw datasets offer integrating multiple data sources.
Startup opportunity: asset-light, software-centric business models with high scalability.

Advances in AI, modelling, and digital twins

AI and high-performance computing enable real-time predictions, anomaly detection and scenario modelling. These capabilities are becoming essential for maritime safety, offshore operations, pollution tracking and climate risk management.
Startup opportunity: proprietary algorithms, data fusion pipelines, and domain-specific digital twins.

Dual-use demand and maritime security priorities

The EU's[89,90] focus on maritime domain awareness, underwater infrastructure protection, and dual-use technologies is creating strong demand for secure, resilient and trusted ocean observation systems.

Startup opportunity: secure-by-design systems, encrypted telemetry and autonomous surveillance.

Regulatory and policy momentum

[89] EU Maritime Security Strategy (EUMSS) and its 2023 Action Plan https://www.maritime-cybersecurity.com/European_Maritime_Security_Strategy_(EUMSS).html
[90] The European Ocean Pact https://oceans-and-fisheries.ec.europa.eu/european-ocean-pact_en

EU regulations (NIS2[91], EU Data Act[92], EU AI Act[93], and EU Dual-Use Regulation[94]) and funding instruments (InvestEU[95], Horizon Europe[96]) push the sector toward cybersecurity and responsible data governance and reinforce interoperability by requiring open standards, FAIR data principles, and integration with EU data services in funded projects.
Startup opportunity: "born-compliant" solutions become market differentiators.

Market trends and highlights

Across the blue-tech and ocean-observation landscape, several clear market trends are reshaping how data is collected, processed and used. These trends reflect both technological progress and the growing demand for secure, high-quality ocean intelligence across civilian, industrial and dual-use domains.

Autonomous sensing and robotics becoming core infrastructure

The market is shifting from occasional, vessel-based surveys to persistent, autonomous monitoring. AUVs, USVs, ASVs, and robotic docking stations are now central to offshore wind, aquaculture, subsea inspection and environmental monitoring. We observe the consolidation around established robotics manufacturers such as Sea-Kit, Kystdesign, and Probotic, alongside strong demand for modular payloads and multi-mission platforms. Additionally, there is increased interest from defence and maritime-security actors.

AI-enabled ocean intelligence moving from pilots to operations

AI, machine learning, and digital twins are now essential for forecasting, anomaly detection, emissions optimisation, and biodiversity insights. We are seeing startups such as Hefring, SeaCras, SINAY, and MESPAC gain traction through scalable, software-centric models, while investors increasingly favour asset-light analytics platforms with cross-sector applicability. At the same time, regulatory drivers like the AI Act and Data Act are pushing demand for transparent, auditable AI systems.

Next-generation sensors expanding the data frontier

New sensing modalities—hyperspectral imaging, biomimetic sensors, electric-field sensing, advanced acoustic networks—are enabling higher-resolution, multi-physics observation. Hardware is consolidating, but defensibility is increasingly shifting toward data quality, analytics, and integration.

[91] Network and Information Systems 2 directive (NIS2) https://digital-strategy.ec.europa.eu/en/policies/nis2-directive
[92] EU Data Act (Regulation (EU) 2023/2854) https://digital-strategy.ec.europa.eu/en/policies/data-act
[93] EU Artificial Intelligence Act (AI Act) https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence
[94] EU Dual-Use Regulation (Regulation (EU) 2021/821) https://policy.trade.ec.europa.eu/help-exporters-and-importers/exporting-dual-use-items_en
[95] InvestEU: EU investment programme supporting sustainability, innovation, and strategic technologies https://investeu.europa.eu/index_en
[96] Horizon Europe (2021–2027) research and innovation programme https://research-and-innovation.ec.europa.eu/funding/funding-opportunities_en

There is also strong demand driven by biodiversity MRV, pollution detection, and offshore-energy monitoring.

Space–ocean integration becoming a "system-of-systems" layer

Combining satellite Earth Observation (EO) with in situ sensors and AI is essential for metocean forecasting, pollution tracking, and ESG reporting. Companies like MESPAC, Fregata, SeaCras, and Telespazio are building integrated platforms, while corporate interest is rising as insurers, energy companies, and regulators require multi-source data fusion. This trend aligns with the development of the European Digital Twin Ocean (EU DTO)[97], which integrates satellite EO, in situ observations, modelling, and AI into a unified 'system-of-systems' architecture.

Biodiversity, MRV and nature-positive solutions remain on the agenda

CSRD and voluntary frameworks such as TNFD and SBTN continue to shape expectations for biodiversity and blue-carbon reporting, particularly among larger companies and financial institutions. The segment is still early-stage, with start-ups like Diatom Blue, Moshun, PlanBlue, and Stream Ocean developing specialised monitoring and analytics tools. Alignment with EU sustainability and reporting frameworks persists, even as parts of the legislative landscape[98] are being adjusted.

Maritime security and dual-use architectures accelerating

The EU's focus on underwater-infrastructure protection, maritime domain awareness and dual-use technologies is reshaping demand. This shift creates a need for secure data-sharing architectures, encrypted telemetry and resilient autonomous systems, while public-private partnerships are emerging around surveillance, anomaly detection and subsea-asset protection.

Main challenges for sustainable solutions

Rapid growth brings structural challenges that shape how quickly new solutions can scale. For startups, these challenges influence market entry, investment readiness, and long-term viability. Yet many constraints - especially new EU regulations - are also catalysts for innovation.

- **Regulatory complexity and the pace of change**

Network and Information Security Directive 2 (NIS2), the Data Act, the AI Act, and the EU Dual-Use Regulation introduce obligations that did not previously apply to early-stage companies. Startups must demonstrate secure architectures,

[97] European Digital Twin Ocean 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/european-digital-twin-ocean-european-dto_en
[98] EU Omnibus Simplification Package https://finance.ec.europa.eu/news/omnibus-package-2025-04-01_en

transparent data governance, and export-control awareness earlier in their lifecycle.
Impact: higher compliance burden, steeper learning curve. Demand for “born-compliant” solutions.

- **Data governance, interoperability, and data integrity**

Ocean observation systems rely on combining data from public platforms, private sensors, autonomous vehicles, and satellite feeds. Ensuring interoperability and traceability is increasingly complex but necessary.
Impact: additional engineering effort. Startups that solve interoperability become essential infrastructure providers.

- **Cybersecurity and resilience**

Critical ocean observation networks are attractive targets for cyber threats. NIS2 raises expectations for secure-by-design architectures, supply chain security, and continuous monitoring.
Impact: higher scrutiny from investors and customers. Secure telemetry, encrypted data pipelines, and resilient autonomous systems.

- **Financing and risk management**

Investors expect clear evidence of data quality, governance, and compliance. Business models that avoid heavy upfront investment while still delivering trusted, traceable data are often preferred.
Impact: more due diligence and documentation. Competitive advantage for companies with strong governance.

- **Talent and ecosystem constraints**

Cross-disciplinary teams— including skills in AI/ML, oceanography, data management, robotics, cybersecurity — are in short supply.
Impact: slower scaling. New training and simulation solutions; partnerships with research institutes.

- **Regulation as catalyst but also a challenge**

EU regulation is reshaping the competitive environment. While it introduces new obligations, it also creates market pull for secure, interoperable, export-control-ready, and AI-governed solutions. Startups that embrace this shift can lead in a sector where trust and data integrity are as important as technical performance. Even though regulation creates new market opportunities, it is still a challenge for start-ups: compliance requirements arrive earlier than before in the business model, regulatory complexity demands skills many start-ups do not yet have, compliance affects product architecture and investors expect regulatory readiness.

Technologies to watch

Innovation	Added value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Next generation sensors and observation hardware	Higher resolution, multiphysics data; improved MRV; pollution detection; integration with digital twins.-resolution, multi-physics data; improved MRV; pollution detection; integration with digital twins.	Ocean Visuals PlanBlue ELWAVE SubCtech MAPPEM Geophysics Stream Ocean
Autonomous ocean robotics	Lower OPEX; safer operations; scalable autonomous data collection; dual-use surveillance, unmanned, remotely operated or autonomous vehicles. It includes drones.-use surveillance,	Notilo Plus (DELAIR) Sea-Kit Kystdesign (The Chouest Group) Probotic (SCALEAQ) SEAPROVEN Blue Armada uWare
Space–ocean integration	System of systems visibility; improved forecasting; ESGgrade data; scalable monitoring.-of-systems visibility; improved forecasting; ESG-grade data; scalable monitoring.	MESPAC Fregata Space Telespazio SeaCras
Pollution detection and clean-up	Environmental compliance; risk reduction; coastal resilience; regulatory alignment.	Natural Seabed RanMarine SciDrones AlgiOO Bluetweet
AI driven ocean intelligence and digital twins	Predictive maintenance; emissions optimisation; real-time insights; asset-light scalability.-time insights; asset-light scalability.	Hefring Marine SeaCras SINAY MESPAC
Biodiversity, MRV and nature positive solutions	Finance grade MRV; ESG compliance; automated biodiversity insights.-grade MRV; ESG compliance; automated biodiversity insights.	Diatom Blue Tech Moshun.earth PlanBlue Stream Ocean
Low carbon marine energy and infrastructure planning	Digital tools for wave/tidal energy, hybrid propulsion, offshore charging and carbon accounting support decarbonisation; reduction of emissions; enable electrified offshore operations.	SINN Power Jospa Ocean Batteries Weenav wSense
Immersive training and engagement	Workforce transition; safer training; scalable digital learning.	Delta Cygni Labs Envjoy Kanda, VirtualDive

3.5. Shipping and Ports

The shipping and ports sector covers the transportation of freight and passengers by water, and all the activities and infrastructure that enable it. Shipping is indissociable from ports and vice versa, as maritime transport must start and end at a port, and ports are designed to receive merchant vessels and handle their cargo and/or passengers.

Shipping encompasses the following subsectors: passenger transport (tourism or commuting services), freight transport (transport of any type of good), and other transport-related services (e.g. ship management). Both passenger and freight transport can be segmented according to the type of water environment (sea, coastal and inland).

Ports are crucial infrastructures of strategic importance that support significant flows of goods and people. They vary in size, scope, and ownership, from very large ports (hubs) down to small or regional ports owned and run by public authorities, private companies, or a mix, e.g. public port with private terminals and warehouses. Ports encompass the following subsectors: port development and construction (the erection of new ports and/or expansion of existing ones), cargo and warehousing/ terminal operations (the handling, warehousing and storage of cargo) and other port services (provision of port services like mooring, towage, shore side electricity (mandated in AFIR) also known as onshore power supply (OPS) to ships).[99]

Key growth drivers

Near-term investment opportunities in the European blue economy's shipping and ports sector, particularly for green solutions, are being reshaped by a combination of regulatory uncertainties, war and geopolitical competition, technological acceleration, and coalition-driven demand.

Regulatory drivers

Regulatory signals for the maritime sector are increasingly mixed. In the EU, climate and sustainability policy is becoming more ambitious, with Fit for 55 adding binding targets and extending carbon pricing to maritime emissions.[100] Currently, the extension of the EU Emissions Trading System (ETS) to maritime transport from 2024 and the entry into force of FuelEU Maritime from 2025 have led to a steadily tightening price on carbon and a declining GHG intensity limit for marine fuels. Together with the Alternative Fuels Infrastructure Regulation (AFIR), these instruments create a strong demand signal for:

[99] https://www.eea.europa.eu/en/analysis/publications/sustainability-of-europes-mobility-systems/energy-infrastructure
[100] https://www.consilium.europa.eu/en/policies/fit-for-55/

- Shore Side Electricity/ Onshore Power Supply (SSE/ OPS) and port electrification (in 2024, a report found that "some EU ports are well on their way to comply with the upcoming EU regulations for maritime onshore power supply. Other ports must make significant investments in shore power infrastructure for container, cruise, and passenger ships in the coming years to fulfil the requirements."[101]
- Alternative fuel production and bunkering for methanol, ammonia, hydrogen and advanced biofuels (examples include Mærsk's 18 methanol powered container vessels[102], ammonia bunkering in Port of Rotterdam[103], commercial hydrogen powered vessels on inland waterways (FLAGSHIP)[104] and a 42-meter-long waste collection tanker operating in Port of Klaipėda[105]. One white paper shows that out of 60 ports globally with biofuels bunkering, more than half are European.[106]
- Monitoring, reporting and verification (MRV) solutions and digital optimisation tools (examples include NAPA's integration of MRV reporting[107] and start-up Proseadure[108]).

On the one hand, industry is experiencing ambitious regulation to reduce GHG emissions, on the other hand, the EU is rolling back parts of the sustainability framework in the name of safeguarding competitiveness.[109] A similar pattern can be observed at the IMO. After adopting an ambitious GHG Strategy in 2023, and in April 2025 approving the Net Zero Framework's combination of a fuel standard and a price on emissions, only six months later support had weakened, and IMO Member States decided to postpone adoption by one year.[110] Together, these developments leave the sector facing a high degree of uncertainty. The key questions with no clear answers yet are: will global or regional regulation set the pace? How ambitious and demanding will either framework ultimately be? And will there be a robust and predictable price on emissions capable of steering the industry towards the agreed net-zero-by-2050 goal? If the IMO fails to adopt the Net Zero Framework at the resumed meeting scheduled for November 2026, national leadership already visible in for example Norway[111], China[112], and the EU could then translate into de facto standard-setting. It is also clear that green solutions are still very much on the table in Europe as GHG emissions regulation is already in place.

[101] https://www.transportenvironment.org/uploads/files/2025_06_27-TE-FINAL-EU-report_rev1.docx.pdf page 2.
[102] https://www.maersk.com/news/articles/2025/02/28/maersk-names-its-eleventh-dual-fuel-methanol-vessel-albert-maersk
[103] https://www.portofrotterdam.com/en/news-and-press-releases/port-rotterdam-takes-important-step-making-shipping-more-sustainable-pilot#:~:text=The%20port's%20goal%20is%20to%20enable%20the,the%20port's%20safety%20framework%20for%20ammonia%20bunkering.
[104] https://rd-magazine.com/2025/09/09/hydrogen-vessels-set-sail-across-europe/
[105] https://fuelcellsworks.com/2025/01/23/fuel-cells/lithuania-launches-first-hydrogen-powered-vessel-at-klaipeda-port
[106] DNV, 2025. Biofuels in shipping, Current market and guidance on use and reporting. https://www.dnv.com/expert-story/maritime-impact/maximizing-the-potential-of-biofuels-in-
[107] https://www.napa.fi/news/mrv-made-easy-by-new-functionality-in-napa-performance-monitoring-systems/
[108] https://proseadure.com/
[109] https://www.europarl.europa.eu/news/en/press-room/20251106IPR31296/sustainability-reporting-and-due-diligence-meps-back-simplification-changes
[110] https://www.shippingandoceans.com/post/post-mortem-on-imo-s-net-zero-framework-discussions-ucl-readout
[111] https://shippingwatch.com/regulation/article18238960.ece
[112] https://www.chinadaily.com.cn/a/202511/25/WS692508a3a310d6866eb2b370.html

Sustainability and climate action is today reframed under combined objectives of decarbonisation, safety, security, competitiveness, resilience, and the need to increase public and private investments is echoed in the EU Industrial Maritime Strategy[113] and the EU Ports Strategy[114]. They frame decarbonisation, digitalisation and new blue-economy markets as the core opportunity to rebuild and invest in the European waterborne industry. Ports are seen as multi-modal and multi-energy hubs whose modernisation is essential not only for trade, but also for energy security, resilience, and military mobility. These strategies will likely accelerate deployment of SSE/ OPS, prioritisation of e-fuel infrastructure (over LNG), and dedicated funding and state-aid frameworks for low-emission equipment, alternative fuel infrastructure and digitalisation.

Geopolitics and resilience

War on the European continent has redirected significant public and private funding towards defence and dual-use innovation[115], e.g. the EIB has tripled financing for banks to provide liquidity to SMEs in the supply chain of Europe's defence industry from 1 to 3 billion EUR.[116] History shows that defence-driven innovation often spills over into civilian industries, including advanced materials, digital systems and automation – all highly relevant for maritime decarbonisation and port efficiency.[117]

Europe's waterborne manufacturing base remains world-class[118], but global shipbuilding is still heavily concentrated in Eastern Asia with roughly 95%[119]. New national strategies and targets in China, Japan, the Republic of Korea, Singapore and India suggest that much of the next wave of green fuels, electrification, and maritime technology will be developed and scaled in those markets.[120] For investors, this geopolitical context cuts both ways. It intensifies competitive pressure on European yards, equipment suppliers and port technology firms, strengthening the case for targeted industrial policy and strategic capital to defend and extend Europe's position. At the same time, it creates opportunities for cross-regional partnerships around green corridors, co-investment in fuel hubs, and technology licensing between the EU and Asia.

While shipbuilding is dominated by Eastern Asia, Europe's competitive edge continues to lie in high-value capabilities in maritime equipment manufacturing and exports including services, design, systems integration, digitalisation, and

[113] The final strategy is not published at the time of writing – expected in February 2026. See also communication from the EU Commission https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=intcom:Ares%282025%295226239
[114] The final strategy is not published at the time of writing – expected in February 2026. See also communication from the EU Commission https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=pi_com%3AAres%282025%295226014
[115] https://www.iiss.org/online-analysis/military-balance/2025/02/global-defence-spending-soars-to-new-high/
[116] https://www.eib.org/en/press/all/2025-236-eib-triples-financing-available-to-defence-industry-suppliers-signs-first-deal-with-deutsche-bank-to-boost-european-security-investment
[117] Moretti, Enrico; Steinwender, Claudia; Van Reenen, John (2025) : The innovation dividend of defense R&D, EconPol Forum, ISSN 2752-1184, CESifo GmbH, Munich, Vol. 26, Iss. 3, pp. 46-51
[118] https://www.waterborne.eu/images/250303_Press_release_Clean_Industrial_Deal.pdf and Waterborne Technology Platform (2025), Strategic Research Agenda for the European Waterborne Sector: Towards A Resilient, Competitive and Sustainable Waterborne Sector. https://www.waterborne.eu/images/250708_Strategic_Research_Agenda_Final.pdf
[119] https://unctadstat.unctad.org/datacentre/dataviewer/US.ShipBuilding
[120] https://www.imo.org/en/ourwork/environment/pages/relevant-national-action-plans-and-strategies.aspx and https://www.scmp.com/news/china/diplomacy/article/3330802/china-eyes-rise-global-sea-power-while-countering-us-five-year-plan-shows

safety and security where European companies are world leaders.[20, 121] In addition, resilience is a new regulatory driver. Resilience has moved from a management buzzword to a defining concept of our time and, increasingly, a set of enforceable obligations. In many EU countries, legislation implementing the EU Directives on Network and Information Systems (NIS2) and Critical Entities Resilience (CER) is already converting "resilience" into concrete compliance requirements underpinning need for increased collaboration between sectors across supply chains and services where shipping and ports are often key.[122]

Technological acceleration

Within Europe, modularity and local scalability are emerging as defining trends in shipbuilding and in port and terminal planning. Examples include plug-and-play fuel modules from e.g. Zepp.solution, and Genevos, modular ship design and construction from e.g. NAVAIS123, modular and scalable micro-grids based on local renewable generation in e.g. Ports of Stockholm124 or solutions from Plexar Energy, and containerised battery storage from e.g. ABB or Wärtsilä. These developments could reduce capex and implementation risk, expand opportunities for European suppliers, and accelerate technology deployment through ports as multi-energy hubs.

Coalition-driven demand

Cargo owner alliances, green corridor initiatives, green shipping programmes and port-city coalitions are beginning to aggregate demand for low- and zero-emission services along specific routes and in key hubs.[125] By coordinating procurement, offtake commitments and infrastructure planning, these coalitions can de-risk first-mover projects, improve bankability and bring forward the commercialisation of new fuels, vessels and port solutions. For investors, such coalition-backed projects offer clearer revenue visibility and a more robust foundation for scaling capital-intensive assets[126].

Market trends and highlights

Across shipping and ports, market momentum is characterised by near-term efficiency and electrification scaling faster than uptake of alternative fuels. The market favours immediate, measurable abatement through voyage and vessel performance. Operators are rolling out route and speed optimisation, just-in-time arrival, weather routing, hull/propeller efficiency upgrades, digital performance

[121] https://one.oecd.org/document/C/WP6(2022)15/FINAL/en/pdf , https://www.seaeurope.eu/maritime/
[122] https://ec.europa.eu/newsroom/cipr/items/764849/en
[123] https://www.navais.eu/ and https://www.cambridge.org/core/services/aop-cambridge-core/content/view/958F199E91425CED7994164BE1F887DC/S2732527X23002912a.pdf/platform-approach-for-modularising-battery-electric-fast-ferries.pdf
[124] https://www.portsofstockholm.com/about-us/news/2024/innovation-with-sustainable-microgrid-technology-will-strengthen-ports-of-stockholm/
[125] https://initiatives.weforum.org/first-movers-coalition/home, https://www.shipzemba.org/, https://www.katalist.org/, https://globalmaritimeforum.org/report/annual-progress-report-on-green-shipping-corridors-2025/
[126] Some can be found here: https://www.hapag-lloyd.com/en/company/press/releases/2025/12/hapag-lloyd-wins-zemba-s-second-tender-for-pioneering-e-fuel-dep.html, https://www.katalist.org/

management, and wind-assist readiness as scalable levers that work across existing fleets. This trend is reinforced by compliance economics under EU ETS/FuelEU Maritime, where verified reductions and operational optimisation can be implemented faster and cheaper than new alternative fuel supply chains. With uncertainty around IMO regulation, fuel availability, price, and standards, owners increasingly favour dual-fuel configurations, fuel-ready designs, and modular retrofit packages that preserve flexibility (methanol/ammonia readiness, hybridisation, energy-saving devices, digital compliance tooling). The near-term result is a market that rewards solutions that are drop-in to existing operations, verifiable, and compatible with multiple future fuel pathways.

For Ports, OPS is moving from pilots to regulated roll-out becoming the first “at-scale” decarbonisation asset. OPS is emerging as the most bankable near-term port decarbonisation pathway because it cuts emissions at berth immediately. The market is now defined by execution capacity: grid connection timelines, standardised interfaces, commercial models for electricity provision, and port-wide deployment planning. Stakeholders are also pushing policy fixes (e.g., enabling third-party OPS providers, reducing early-phase tariff burdens, and recognising OPS in crediting frameworks) to accelerate utilisation. Port-wide electrification is forcing a “grid-and-energy-systems” upgrade cycle with microgrids, storage, and smart energy management as new core infrastructure. Ports are rapidly being reframed as energy system operators or even Energy Hubs, not only logistics nodes. Beyond OPS, the same grid constraints affect terminal equipment electrification, battery charging, and future e-fuel and hydrogen-derivative bunkering. As a result, investment is shifting toward grid reinforcement, microgrids, battery storage, and digital energy management, often requiring coordinated planning across port authorities, DSOs/TSOs, terminal operators, shipping lines, and other companies located in the port area.

Main challenges for sustainable solutions

Europe remains one of the few markets where maritime and port decarbonisation is still structurally supported by tightening GHG regulation and public funding, yet the investment context is increasingly shaped by energy security, dual-use requirements and infrastructure resilience. For investors targeting European blue economy start-ups and scale-ups, the main challenges mirror the main growth drivers, and they are linked to regulation, geopolitics, competitiveness and demand:

- **Regulatory uncertainty**

Globally, uneven standards and shifting timelines increase pathway risk for start-ups. Europe remains a comparatively investable market because decarbonisation is embedded in regulation and policy direction, but investors still need to price in execution risk from regulatory coordination issues and evolving implementation details as the shipping and ports sector is global by nature.

- **Geopolitics**

Shipping and ports assets are now treated as critical physical and digital infrastructure exposed to cyberattacks, organised crime, and geopolitical disruption adding diligence, compliance, and operational resilience costs that can be material for scale-ups, while also extending procurement cycles in ports and terminals.

- **Competitiveness**

Rapid innovation in fuels, propulsion, autonomy/digital, and port systems is raising the bar for product maturity and time-to-market. Europe's investors must underwrite not only technology risk but also industrialisation capacity and supply-chain competitiveness in a context of strong global competition and strategic dependencies in shipbuilding and maritime equipment.

- **Demand**

Many solutions become bankable only when demand is aggregated through offtake agreements, corridor-type coalitions, or public procurement that reduces the "chicken-and-egg" problem between ships, fuels, and port infrastructure. This creates a gap between the small scale of start-ups and large scale of coalition-driven demand and challenges of converting stakeholder alignment into contractable, long-duration revenues that investors can finance**.**

Targeted investments in sustainable solutions in the European blue economy can help overcome many of these challenges, particularly when technologies and infrastructures are designed as dual-use and resilience-enhancing – as well as when they service Europe. Shore power, micro-grids, alternative fuel hubs, digital situational awareness, and automation can simultaneously serve commercial, defence and civil protection needs thereby strengthening energy and supply-chain resilience while supporting climate goals. For investors, backing dual-use, standardised, and scalable solutions that enhance both competitiveness and security improves long-term asset value, broadens the customer base, and supports more robust risk-adjusted returns.

Technologies to watch

Innovation	Added Value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Smart port technologies	Smart technologies increase port throughput and reliability, reduce waiting times and emissions from ships at berth or at anchorage, and enable better coordination between terminal operators, shipping lines, energy users, and hinterland transport.	Awake.AI Teqplay BV GISGRO

Innovation	Added Value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Digital twin in the shipping and port ecosystem	Digital twins are used to optimise port call operations and allow all operations in a port complex and onboard seagoing vessels to be monitored without the need to install a hardware system.	ABIM Teqplay BV Esri R&D Center Stuttgart
Port robotics	Reduce costs and risks of hazardous or repetitive work allowing workers to avoid exposure to life-threatening conditions during maintenance and inspections.	DotOcean N.V. AquaHub Uavia
Ship electrification and sustainable propulsion systems	The use of these solutions has a positive impact on emissions, marine noise, and energy efficiency, recovery and storage without affecting vessel (and port) productivity.	Stillstrom VERVE Water Mobility CMB.TECH Azane Fuel
Green port ecosystems	Green port ecosystems are key for the renewable energy transition and can have a significant positive impact on the reduction of GHG emissions by accelerating decarbonisation of shipping and local industries, improving air quality for port cities, and position ports as strategic hubs in regional energy and fuel value chains.	Awake.AI Onshore power supply (OPS) Plexar Energy
Decarbonising industries active in and around ports	Decarbonisation drives emission reductions and energy efficiency in and around ports. Lowers the carbon footprint of energy-intensive industries co-located with ports, strengthen licence to operate in port cities and industrial regions, and enable new industrial symbioses around low-carbon inputs and by-products.	TechnoCarbon Titanium Technology INERGIO HOFOR
New infrastructures and products	Deliver higher efficiency and lower emissions per tonne-kilometre transported, reduce lifecycle costs for operators and asset owners, and open new market niches for specialised maritime products and services.-kilometre transported, reduce lifecycle costs for operators and asset owners, and open new market niches for specialised maritime products and services.	MONOTRICAT Titanium Sensefinity
Modernisation of inland waterways	Shift freight from road to cleaner waterways, reduce congestion and emissions in densely populated corridors, and extend the benefits of maritime decarbonisation into hinterland transport systems.	SpotVessels GmbH Odyboat Cstrider NepTech Zeam
Resilience technologies	Reduce downtime and disruption costs, support better preparedness for extreme weather and geopolitical shocks, and improve reliability of supply chains that depend on shipping and ports.	METIS Verizon Connect
Dual use integration	Expand addressable markets for innovators by serving naval, coast-guard and security clients alongside commercial operators, while leveraging common R&D and industrial capacities.	Alveus / as2con MONOTRICAT Manta Marine Technologies

Innovation	Added Value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Safety and security technologies and equipment	Protect people, assets and the environment, reduce accident and downtime risks, and build trust in the large-scale adoption of new fuels and digital systems in the maritime domain.	Marine Hound Actiontracker Exocare Sensefinity

3.6. Water Management

Evolution in the water management sector are primarily driven by mounting environmental pressures, rapid population growth, urbanisation, and the far-reaching effects of climate change. These factors have underscored the urgent need for efficient, resilient and sustainable water solutions. As a result, there has been a notable increase in the adoption and development of innovative technologies aimed at managing water resources more effectively.

Sustainable technology solutions in this sector now **span the entire value chain**[127]—from advanced monitoring and data analytics to smart infrastructure and resource-efficient treatment methods. Companies and organisations are increasingly leveraging digital tools such as IoT sensors, AI-powered analytics, and cloud-based platforms to optimise water usage and reduce waste. These technologies enable real-time monitoring of water quality, early detection of leaks, and predictive maintenance of distribution networks, all of which contribute to lowering operational costs and minimising environmental impact.

Despite these advances, most innovations within the past two years have **been incremental rather than disruptive**. The sector appears to be focused on refining and optimising existing systems, with a strong emphasis on cost-cutting and efficiency improvements rather than radical transformation. For instance, improvements in desalination processes, water recycling, and smart metering are helping to stretch available resources further, but do not fundamentally alter the way water is sourced or distributed.

Moreover, the integration of sustainable practices is increasingly visible in the form of green infrastructure, such as constructed wetlands and permeable pavements, which help manage stormwater and reduce urban runoff. The drive towards sustainability is also reflected in policy and investment trends, with greater emphasis on circular water systems and nature-based solutions that align with environmental sustainability goals.

[127] While water collection is an essential part of the overall water management value chain, it is less related to the ocean and maritime economy. Consequently, this report will focus on those elements of water management that are more directly linked to the blue economy.

Key growth drivers

On the basis of the aforementioned development, we can identify several key growth drivers that are shaping the water management sector. These drivers reflect the main forces influencing innovation and investment across the value chain, from collection and treatment to distribution and reuse.

Purification

Rising demand for potable water (drinking water quality)

The European Environment Agency projects that water demand could double by 2050, increasing pressure on both urban and rural supply systems. In parallel, the EU Drinking Water Directive (2020/2184) sets strict parametric values for contaminants (e.g., lead ≤ 5 µg/L by 2036, PFAS ≤ 0.5 µg/L total), mandating risk-based monitoring and harmonised standards for materials in contact with water, generating further purification solutions.

Health concerns over waterborne diseases

Flooding, rising temperatures, and infrastructure failures increase pathogen risks. WHO reports that 14 diarrheal deaths occur daily in Europe due to inadequate WASH (Water, Sanitation, Hygiene).

Advancements in filtration technologies

Europe is adopting nanofiltration (NF), the coming UV-LED technology and other advanced oxidation processes (AOP) for municipal and industrial water treatment. NF bridges the gap between Reverse Osmosis (RO) and ultrafiltration, removing heavy metals, viruses, and micropollutants efficiently.

Desalination

Desalination for sea and brackish water has been the solution for **freshwater shortages in coastal and island regions**. Now, the **technological Improvements** are focused on reducing Energy Consumption, Reverse Osmosis (RO) is the dominant desalination technology, but historically energy intensive. Innovations such as batch RO, energy recovery devices (ERDs), and hybrid systems now cut energy use by up to 50–80%, making desalination more sustainable.

Government investments in large-scale desalination plants

Southern European countries are investing heavily in seawater desalination to secure water supply for urban and agricultural needs. EU policies and funding programs support these projects under the Water Resilience Strategy. Spain

holds 60% of Europe's desalination capacity, with major plants near Barcelona and Canary Islands to combat chronic drought.

Industrial and agricultural demand for non-traditional water sources

Industries and agriculture increasingly adopt **water reuse** and **Zero Liquid Discharge (ZLD)** systems to reduce freshwater dependency and comply with EU sustainability goals. Regulation **EU 2020/741** mandates safe water reuse for irrigation.

Decontamination

Stricter environmental regulations on effluent discharge

The EU Urban Wastewater Treatment Directive (UWWTD) was revised in 2025 to mandate energy-neutral plants by 2045, stricter nutrient removal, and quaternary treatment for micropollutants under the polluter-pays principle. Industrial dischargers must adopt Best Available Techniques (BAT) and advanced monitoring systems.

Emerging contaminants (PFAS, microplastics, drug residues) requiring advanced treatment

Forever chemicals (PFAS) and microplastics are increasingly detected in European waters. 59% of river monitoring sites exceed PFAS limits[128], and microplastics are now regulated under the revised UWWTD. Advanced treatment technologies include adsorption, ion exchange, ozonation, and advanced oxidation processes (AOPs).

Public awareness and activism around clean water access

Citizen-led initiatives and NGOs are pushing for water as a human right, stricter pollution controls, and sustainable water governance. Campaigns like the European Citizens' Initiative for a Water-Smart Europe aim to embed water resilience in EU policy frameworks. Moreover, the European Citizens' Initiative mobilised over 1 million signatures demanding universal access to clean water and stronger EU water protection laws.

Distribution of water

Smart water grids and digital infrastructure

Smart water grids integrate IoT sensors, AI analytics, and digital twins to monitor water networks in real time, detect leaks, and optimise flow. These systems reduce non-revenue water losses, improve efficiency, and support predictive maintenance. As an example, Microsoft has partnered with Shayp (BE) in a 10-

[128] Recently, the EU has given member states the option to choose PFAS 21 with a limit value of 0.1 micrograms/liter or PFAS total, 0.5 micrograms/liter.

year initiative to reduce water waste across public buildings in Brussels and Paris, combining flow analytics, leak detection, and AI-powered monitoring. Despite this example, with the focus on safety, AI is adopted very slowly by company operators.

Urban infrastructure upgrades in aging cities

Many European cities have decades-old water infrastructure prone to leaks and contamination. Upgrades involve nature-based solutions (NBS), advanced treatment systems, and integrated planning to meet sustainability and climate adaptation goals. The financing institutions will probably along with the increased investments, require an implementation of “build better” philosophy.

Sewage and wastewater treatment

Circular economy initiatives promoting resource recovery

Circular economy principles transform wastewater plants into resource recovery hubs, reclaiming nutrients, energy, and water. EU projects under LIFE Programme and Horizon Europe promote nutrient recovery for fertilisers and industrial reuse.

Energy-efficient treatment technologies (Anaerobic Digestion, AD), converts organic waste into **biogas**, reducing energy consumption and greenhouse gas emissions. Advanced systems like anaerobic membrane bioreactors (AnMBRs) and staged digestion improve efficiency and enable energy-neutral WWTPs.

Government mandates for wastewater reuse and safe discharge

The EU Regulation 2020/741 sets minimum quality standards for reclaimed water used in agriculture, complementing the revised UWWTD. These mandates aim to alleviate water scarcity and promote circularity while ensuring health and environmental safety.

Water reuse

Water conservation policies and drought mitigation

Europe faces increasing droughts, especially in Mediterranean regions. The EU Water Reuse Regulation (EU 2020/741), effective since June 2023, sets harmonised standards for safe reuse of treated wastewater in agriculture, reducing pressure on freshwater resources and supporting climate resilience.

Technological advances in membrane bioreactors and advanced oxidation

Membrane Bioreactors (MBRs) combine biological treatment with membrane filtration, producing high-quality effluent suitable for reuse. Recent innovations include nanocomposite membranes, antifouling coatings, and hybrid systems

integrating advanced oxidation processes (AOPs) like ozonation and photocatalysis for removing micropollutants.

Agricultural reuse for irrigation in water-scarce regions.

Agriculture consumes 70% of global freshwater use, and in Europe, reclaimed water is vital for irrigation in drought-prone areas. The EU regulation sets minimum quality standards for safe agricultural reuse, promoting circular water practices.

Market trends and highlights

- **Emergency Water Solutions, providing aid in crisis and nature-based solutions in combination with digital solutions for water resilience**

Emergency water solutions are critical for providing clean water during disasters and crises. Innovative technologies can ensure reliable water supplies in emergency situations. The adoption by the European Commission of the Water Resilience Strategy for Europe, in June 2025 is a key milestone for the water community. It sets out an ambitious integrated agenda to secure and manage water in the context of the triple planetary crisis. The strategy prioritises water both within the EU and globally and has already created political momentum, for example, through its inclusion in the EU's 2024-2029 Political Guidelines.

Opportunity: Portable water purification devices can quickly and effectively remove contaminants from water, making it safe to drink. UV-LED technology and combinations of advanced oxidation processes (AOP) have made these devices more compact, efficient, and user-friendly, the same for solar-powered mobile units for off-grid disaster zones. Other connected opportunities relate to AI-driven predictive systems for early warning and optimised deployment.

- **Water Management executive and operational intelligence solutions, including cybersecurity and safety**

The increasing need of asset management based on digitalisation and big data opens a market for providers that can guide how to implement the systems in the organisation and how to operate and manage the digitalisation of assets and services, followed by new possibilities for niche- technology innovations to enter the market. Real-time sensor networks now monitor water quality across cities, farms, and coastlines creates accuracy and resilience, particularly in urban and industrial zones.

Opportunity: Machine learning detects contaminants before they become hazardous. Tools like triboelectric nano sensors and diamond-based electrochemical sensors enhance detection.

- **Changes and challenges in the financing environment and ecosystems for the societal water segment and aging infrastructure**

These changes require new innovative models for financing large structural projects. Service providers to take place in the development of cities to challenge old structures and models from both technical and economic point of view. The water management industry will face more diverse solutions and value chains, like decentralised systems and recovery of the value in water (energy, nutrients).

Opportunity: Easier access to finance for infrastructure projects. As an illustration, EIB and ACCIONA have signed a EUR 120 million loan to support infrastructure innovation, with a focus on digitalisation and sustainability. The EIB financing will enable ACCIONA to advance the development of innovative materials, processes and technologies in its areas of activity related to infrastructure, renewable energy and water treatment to promote greater sustainability and efficiency.

Main challenges for sustainable solutions

- **Economic and financial barriers**

Sustainable technologies (e.g., advanced treatment systems, smart sensors) often require substantial initial investment and can be hindered by high upfront costs. Many utilities and municipalities operate on tight budgets, making it hard to justify long-term ROI, there are today a limitation of funding models. In many regions the water is underpriced, which reduces incentives for investments, efficiency and innovation.

- **Regulatory and policy constraints**

Water governance often involves multiple agencies with overlapping or conflicting rules making it hard to decide on investments. Investors uncertainty on the future regulation, for example of micropollutants (PFAS, microplastics) which require advanced treatment, hinders the investment appetite for technologies and solutions. Regulations may not keep pace with emerging technologies like IoT-based monitoring or decentralised treatment could cause slow policy adaption. Lengthy approval processes for regulatory applications discourage innovations and innovators.

- **Technological challenges**

Many utilities rely on outdated infrastructure, making integration of new solutions complex. Data interoperability can be the cause when smart water systems generate massive data, but lack of standardisation hinders the effective use. In order to be effective, technologies must demonstrate reliability and the ability to scale, functioning consistently across a wide range of environments, including both urban and rural areas, and under various operating conditions.

- **Social and behavioural factors**

Many people are resistant to the adoption of recycled water or decentralised systems because they have concerns about safety. Also, consumers and

businesses often do not fully recognise the risks associated with water scarcity. Finally, it is difficult to change water-use habits unless there are strong incentives to encourage new behaviours.

- **Environmental and Climate Pressures**

Climate variability: Extreme weather events can significantly disrupt both water supply and demand patterns, which makes effective planning more difficult.

Resource constraints: The limited availability of clean water sources further increases the pressure on developing and implementing sustainable solutions.

- **Market and adoption issues**

Fragmented market: The market consists of numerous small players and is affected by significant regional differences, which makes it challenging to scale solutions effectively.

Unclear ROI: While the advantages of resilience and sustainability are realised over the long term, many customers are primarily interested in short-term gains. In some funded projects, the research component of technological development serves as a subsidy, but to obtain a realistic cost-benefit analysis, market conditions need to be closely aligned with those of larger-scale projects.

Technologies to watch

Innovation	Added Value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Advanced water treatment and reuse	Together with natural and self-cleaning filters, new advancements contribute to energy-saving and cost-effective water filtration. Ion exchange is low energy desalination applied for industrial waste water. UVC LED technology is challenging the traditional sleeves with no mercury contain and high energy efficiency.	Stockholm water technology Aquaporin Watersprint
Digital water management	Improves decision-making and efficiency in water utility companies by making it possible to monitor and identify toxicity levels and detect pollution episodes in the water, thereby enhancing safety and sustainability.	Sensemakers Gemit solutions EMS Pluvioflow
Novel desalination techniques,	Decreases energy costs associated with desalination (currently 25% of the world's water management energy use) and make desalination more accessible and easier to implement in different regions.	Ocean Oasis Flocean Salinnova

Innovation	Added Value	Examples of companies (highlighted companies are part of the BlueInvest pipeline)
Resources from wastewater byproducts	More economical and ecological ways to treat and dispose of sewage sludge while creating added value, thereby contributing to a circular economy. This wastewater could replace 25% of nitrogen and 15% of phosphorus used to fertilise agricultural land, as well as15% of the water used to irrigate the world's farmlands.	Ekobalans Easy-Mining Bio Azul
New wastewater treatment methods	These technologies require less space and less wastewater than traditional methods, produce less sludge, use the sludge that is produced for energy production, generate more biogas and/or pollute less.	Aqua-Green C-Green
Smart irrigation systems	Agriculture accounts for ~29% of freshwater abstraction in the EU. EU Green Deal promotes precision irrigation to combat droughts. New methods are designed to use water as efficiently as possible.	Spowdi Galcon Agrow Analytics

Annex 1. Glossary

Advanced oxidation processes (AOPs)
Chemical water treatment methods that use highly reactive oxidants to break down persistent organic pollutants.

AFIR (Alternative Fuels Infrastructure Regulation)
EU regulation setting requirements for the roll-out of alternative fuels infrastructure, including shore power in ports.

Agricultural water reuse
The use of treated wastewater for irrigating crops as an alternative to freshwater sources.

AIS (Automatic Identification System)
A vessel tracking system that broadcasts a ship's identity, position and course to improve safety and support fisheries monitoring and control.

AI (Artificial Intelligence)
Computer systems capable of performing tasks that normally require human intelligence, such as pattern recognition, prediction, and decision making.

Anaerobic digestion (AD)
A biological process in which microorganisms break down organic material without oxygen, producing biogas and nutrient-rich digestate-rich digestate.

Aquaculture 4.0
The application of Industry 4.0 tools (sensors, automation, AI and data analytics) to farmed aquatic production to improve precision, efficiency and transparency.

Aquafeed
Feed formulated for farmed aquatic species, typically combining proteins, lipids, carbohydrates, vitamins and minerals to meet species-specific needs.

Assets Under Management (AUM)
Current market value of all investments held on behalf of investors by a portfolio manager or investment company.

ASV / USV (Autonomous or Uncrewed Surface Vehicle)
Unmanned vessels that operate on the ocean surface for data collection, monitoring or supporting offshore activities.

AUV (Autonomous Underwater Vehicle)
A self-propelled underwater robot that operates without real-time human control for surveying, inspection and ocean monitoring.

Biomass cultivation
The production of marine or aquatic biological material through aquaculture, algae cultivation or controlled bioprocesses.

Bioreactor / Membrane bioreactor (MBR)
A wastewater treatment system combining biological treatment with membrane filtration to produce high-quality effluent suitable for reuse.

Bioprocessing
Operations transforming biomass into usable products through extraction, purification and formulation.

Blue bioeconomy
The sustainable use of aquatic biological resources to produce food, materials, chemicals and other bio-based products.

Blue biotechnology
The application of biotechnology to marine and aquatic organisms to develop knowledge, goods and services.

Blue Economy
Economic activities linked to oceans, seas and coasts aiming for sustainable growth while protecting marine ecosystems.

Blue Tech
Technologies enabling sustainable ocean observation, resource use and maritime operations, including robotics, sensors and digital platforms.

Brackish water
Water with a salinity level between freshwater and seawater.

Bunkering
Supplying a ship with fuel; for low and zero emission fuels this includes new safety, storage and handling procedures.

Bycatch
Non-target species or sizes caught during fishing operations and often released; reducing bycatch is a key sustainability objective.

C&A (Construction and Assembly)
Activities to build, integrate and prepare components of an offshore renewable project before installation at sea.

Carbon capture, utilisation and removal (CCU/CDR)
Processes capturing CO_2, using it in products or storing it for long-term removal from the atmosphere.-term removal from the atmosphere.

Cascade biorefinery
A processing approach extracting multiple valuable components from a single biomass source through sequential steps.

CMEMS (Copernicus Marine Environment Monitoring Service)
An EU service providing operational ocean data, forecasts and reanalyses.

Co-cultivation of complementary species
Farming multiple species (e.g. finfish, shellfish, seaweed) so outputs of one become inputs for another, reducing waste and impacts.

Co-investment
Multiple investors jointly investing in the same deal; frequent across VC/PE/CVC.

Corporate Venture Capital (CVC)
CVC refers to the investment of corporate funds directly in external startup companies.

Cosmeceutical bioactives
Biologically active ingredients used in cosmetic products that provide functional benefits without being classified as medicinal substances.

CSRD (Corporate Sustainability Reporting Directive)
EU legislation requiring large companies to report on environmental, social and governance impacts.

Daas (Data as a Service)
A business model in which users access processed, ready-to-use data rather than collecting or managing raw datasets.

Deal Flow
Deal flow is a term used by finance professionals such as venture capitalists, angel investors, private equity investors and investment bankers to refer to the rate at which they receive business proposals/investment offers. The term is also used not as a measure of rate, but simply to refer to the stream of offers or opportunities as a collective whole.

Decentralised water systems
Small-scale or localised water treatment systems situated close to the point of use.

Desalination
Processes removing salts and minerals from seawater or brackish water to produce potable water.

Digital Twin (of the Ocean / water systems)
A virtual, data driven model simulating real world conditions for planning, prediction and decision making.

Dual fuel vessel
A ship operating on two fuel types (e.g. conventional fuel and methanol) to increase flexibility during energy transition.

Dual use technologies
Technologies with both civilian and defence/security applications.

Eco labels (ASC, BAP, MSC)
Certification schemes verifying environmental and social practices in aquaculture and fisheries.

Effluent
Treated wastewater discharged into the environment or reused.

Electronic monitoring (EM)
Use of onboard cameras and sensors to document fishing activity and support quota compliance.

EMODnet (European Marine Observation and Data Network)
An EU initiative providing harmonised open-access marine data.

End of life (EOL)
Decommissioning, repowering or repurposing an offshore renewable asset at the end of its service life.

EO (Earth Observation)
Collection of environmental data via satellites, aerial platforms or in-situ sensors.

Energy recovery devices (ERDs)
Equipment recovering and reusing energy in desalination and other water treatment processes.

ESG (Environmental, Social and Governance)
A framework for assessing corporate sustainability risks and performance.

EU ETS (EU Emissions Trading System) for maritime
Extension of the EU carbon pricing system to maritime CO_2 emissions.

Exit
An exit is a deal for removing an ownership stake in an enterprise or temporary project. Types of exits include selling via an initial public offering or corporate acquisition, and writing off assets.

Extremophiles
Microorganisms thriving in extreme environmental conditions that may produce valuable biomolecules.

FAIR Data Principles
Standards ensuring data is Findable, Accessible, Interoperable and Reusable.

Feed conversion ratio (FCR)
A measure of feed efficiency: feed required to produce one unit of weight gain.

Filtration
Removal of suspended or dissolved materials by passing water through a filtering medium.

Fisheries 4.0
Digitalisation of fisheries to improve management, traceability and enforcement.

Floating offshore wind (FOW)
Wind turbines on floating platforms for deep-water deployment.

Floating solar PV (FPV)
Solar photovoltaic systems installed on floating structures.

Follow-on investment
Additional capital injections into existing portfolio companies.

Food and feed applications
Use of marine biomass in aquafeeds, functional foods and nutrition products.

Fractionation
Separating biomass into proteins, lipids, carbohydrates, etc.

FuelEU Maritime
EU regulation limiting GHG intensity of energy used onboard ships.

Fund Vintage Year
Year a fund was launched; relevant for assessing track record.

General Partners (GPs)
A General Partner (GP) in a venture capital fund is the managing entity or individual responsible for raising capital, making investment decisions, and overseeing portfolio company operations.

Glider
A buoyancy-driven autonomous underwater platform for long-duration monitoring.

Green infrastructure
Nature-based systems (wetlands, permeable surfaces) managing water naturally.

Green shipping corridor
Routes where stakeholders coordinate deployment of low and zero emission vessels and fuels.

Grid connection
Linking offshore assets to the onshore electrical grid.

HACCP (Hazard Analysis and Critical Control Points)
A preventive system for identifying and controlling food and feed safety hazards.

Horizon Europe
The EU research and innovation funding programme (2021–2027).

Illegal, Unreported and Unregulated (IUU) fishing
Fishing violating rules and undermining sustainability.

Internal Rate of Return (IRR)
The IRR is an indicator of the profitability, efficiency, quality, or yield of an investment. IRR is also used for VC and PE, from the limited partners'

perspective, as a measure of the general partner's performance as investment manager.

In situ observation
Environmental data collected directly in the water.

Interoperability
Ability of systems and data platforms to exchange and use information.

InvestEU
EU funding programme supporting sustainable infrastructure and innovation.

ISO standards
International standards supporting quality, safety and regulatory compliance.

Just in time (JIT) arrival
Adjusting a ship’s speed to arrive when a berth is available, reducing emissions.

Leak detection
Identifying and locating water losses in distribution systems.

LCOE (Levelised cost of energy)
Average lifetime cost per unit of electricity generated.

LiDAR (Light Detection and Ranging)
Remote sensing technology using laser pulses.

Limited Partners (LPs)
Limited partners (LPs) are investors in a partnership—commonly private equity or venture capital funds—whose liability is restricted to the amount of their capital contribution. They provide capital but generally do not participate in day-to-day management, leaving operations to the general partner (GP).

Marine bioactives
Active compounds from marine organisms used in food, cosmetics and health.

Marine enzymes
Enzymes from marine organisms valued for industrial applications.

Marine Protected Area (MPA)
Areas designated to conserve marine habitats and species.

Metocean forecasting
Combined meteorological and ocean forecasting for maritime operations.

Micropollutants
Trace contaminants difficult to remove through conventional treatment.

ML (Machine Learning)
Algorithms that learn patterns from data.

Monitoring, Reporting and Verification (MRV)
Procedures ensuring accuracy and traceability of environmental or operational data.

Nanofiltration
Membrane process removing very small contaminants.

NIS2 (Network and Information Security Directive 2)
EU cybersecurity requirements for essential and important entities.

Non revenue water
Water produced but not billed due to leaks, theft or metering errors.

Novel Food authorisation
EU regulatory procedure for foods not consumed significantly before 15 May 1997.

Nutraceutical bioactive
Bioactives providing health benefits beyond nutrition.

Ocean observation
Systematic collection and analysis of ocean data.

Ocean thermal energy conversion (OTEC)
Generating power from temperature differences between warm surface and cold deep water.

O&M (Operation and Maintenance)
Ensuring offshore assets remain safe, reliable and efficient.

Onshore Power Supply (OPS)
Electricity provided from shore to a ship at berth.

OPEX (Operational Expenditure)
Ongoing costs of operating equipment or facilities.

(Fixed) Offshore wind (OW)
Wind turbines on fixed foundations in shallow waters.

Permeable pavements
Surfaces allowing rainwater infiltration.

PFAS
Persistent chemicals contaminating water sources.

Pharmaceutical bioactive
Compounds providing therapeutic effects.

Photobioreactor (PBR)
Closed systems cultivating photosynthetic microorganisms.

Port call optimisation
Coordinated planning of a ship’s arrival and departure.

Potable water
Water safe for human consumption.

Power to X
Converting renewable electricity into other energy carriers or products.

Precision aquaculture
Data-driven management optimising farmed species-driven management optimising farmed species.

Precision fermentation
Microorganisms engineered to produce targeted high purity compounds.

Predictive maintenance
Predicting equipment failures using data and analytics.

Private Equity (PE)
A private equity fund (PE fund) is a collective investment scheme used for making investments in various equity (and to a lesser extent debt) securities according to one of the investment strategies associated with private equity.

Rainwater harvesting
Collecting and storing rainwater for non-potable uses.

RAS (Recirculating Aquaculture System)
Land-based systems that treat and reuse water in a loop.

Regulatory readiness
Alignment with regulatory requirements.

Reverse osmosis (RO)
Membrane filtration removing dissolved contaminants.

Robotic docking station
Stations enabling autonomous vehicles to recharge and transfer data.

SAL (Salinity gradient energy)
Energy from the chemical potential between freshwater and seawater.

SBTN (Science Based Targets for Nature)
Framework guiding biodiversity and nature related targets.

Selective fishing gear
Gear designed to reduce bycatch.

Side stream valorisation
Recovering value from processing residues.

Smart water grids
Digitally connected water networks improving efficiency.

Stock assessment
Scientific evaluation of fish populations.

Stormwater
Rainwater flowing across surfaces carrying pollutants.

Synthetic biology
Engineering biological systems for specific functions.

T&I (Transportation and Installation)
Marine operations to move and install offshore equipment.

Taskforce on Nature related Financial Disclosures (TNFD)
Global framework for assessing nature related risks.

Telemetry
Wireless transmission of data.

TEC (Tidal energy converter)
Devices capturing tidal current energy.

Technology Readiness Level (TRL)
Scale for assessing technology maturity.

Terminal electrification
Deployment of electric port equipment.

Ticket Size
Typical investment amount committed per deal.

Traceability
Ability to document origin and movement of products.

Tidal energy converter (TEC)
Device converting tidal currents to electricity.

UUV (Unmanned Underwater Vehicle)
Umbrella term for unmanned underwater systems.

UV treatment / UV LED treatment
Using ultraviolet light to disinfect water.

Value chain
Activities involved in producing and delivering a product.

Venture Capital (VC)
Venture capital (VC) is a form of private equity financing provided by firms or funds to startup, early-stage, and emerging companies. Venture capital firms or funds invest in these early-stage companies in exchange for equity, or an ownership stake.

Vessel Monitoring System (VMS)
Satellite-based tracking of fishing vessels.

Wastewater treatment plant (WWTP)
Facility treating used household, industrial and stormwater.

Water resilience
Ability of water systems to withstand shocks.

Water scarcity
Lack of sufficient freshwater.

Wave energy converter (WEC)
Device converting wave energy into electricity.

Wind assist technology
Devices harnessing wind to reduce ship fuel use.

Zero Liquid Discharge (ZLD)
Industrial process recovering and reusing all wastewater.

Annex 2. Methodology: Investor mapping

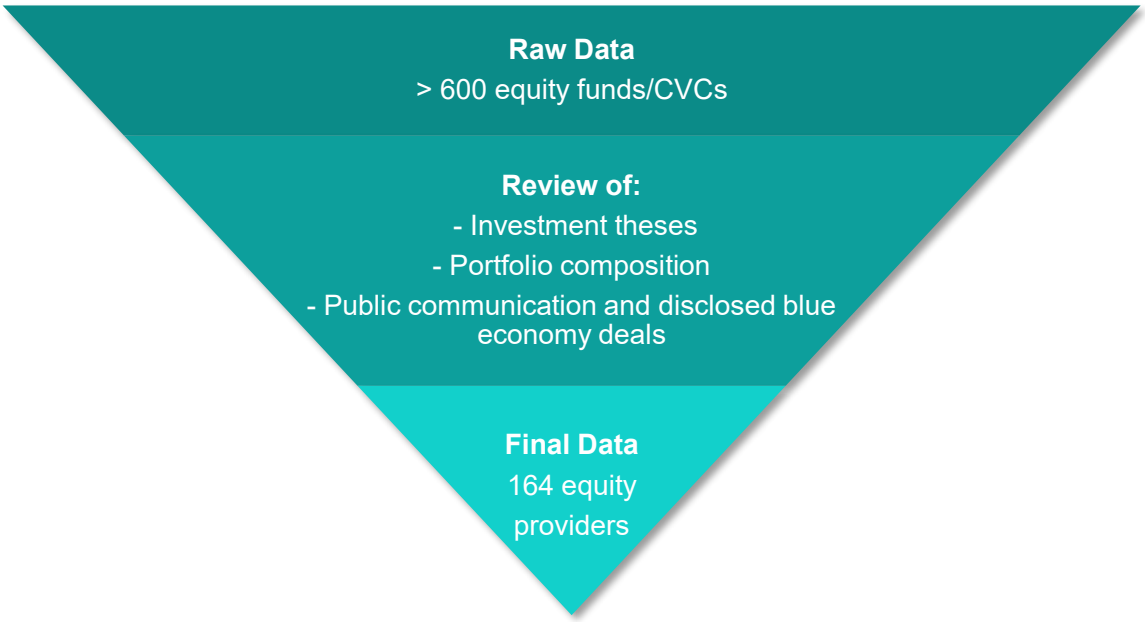
This edition uses the same core mapping principles and selection criteria as the previous two editions of the BlueInvest Investor Report to maintain comparability. Each edition builds on the same foundational data sources as presented in the table below. The scope has been refined to reflect the evolution of the market and the latest available data. Where there have been changes in fund inclusion or categorisation, these are mentioned throughout this chapter (for example, distinguishing between fully dedicated and partially exposed funds).

Table 7 Scope of Analysis and Data Sources

Data Sources	In Scope	Out of Scope
• BlueInvest investor database • CB Insights • Pitchbook • Desk research • Interviews with industry representatives and funds	• Venture Capital funds • Corporate Venture Capital funds • Private Equity funds • State-owned VCs, if operating independently and ROI-driven • Focus on Europe but including key players from North America	• Angel investors • Debt providers • Grant providers • Non-profit/public funds (e.g., banks, NGOs, DFIs, accelerators only) • Mutual funds

Data cleansing & selection criteria

Our data selection process identified more than 600 equity funds and CVCs that were potentially relevant to the blue economy. To determine relevance, each fund was evaluated based on its investment thesis, portfolio composition and publicly disclosed blue economy deals. Funds with a clear and substantive engagement with the blue economy sectors in scope were retained for further analysis. This screening resulted in a final dataset of 164 equity providers.



The overview below contains some key differences between VC and PE funds.

	VC	PE
Target SMEs	Early-stage companies, often startups focused on innovation in the blue economy	More established companies with positive EBIDTA, growth potential or in need of restructuring
Risk return focus	High-risk, high-reward; focuses on disruptive technologies and scalable solutions	Lower-risk; focuses on stable returns through operational improvements and strategic growth
Ease of access	Generally more accessible for innovative startups; often requires a compelling pitch and proof of concept	More stringent requirements; often involves extensive due diligence and established financial metrics
Focus	Primarily on technology and innovation (e.g., marine tech, sustainable fisheries)	Broader focus including operational efficiencies, market expansion, and financial restructuring
Links to ecosystem	Strong connections to incubators, accelerators, and research institutions; often involved in networking events	Ties with larger corporations, industry leaders, and financial institutions; may engage in strategic partnerships
Value-added support	Often provides mentorship and guidance, fostering growth through active involvement	Typically focuses on value creation through management support and strategic direction

Annex 3. Methodology: Investor questionnaire

The findings presented in Chapter 2 are based on a targeted online survey conducted among investors active in, or with an interest in the blue economy. The questionnaire was designed to capture insights on investor profiles, investment strategies and fund characteristics, geographic and sector preferences, perceptions of the blue economy ecosystem, key challenges and opportunities, and the financial performance of blue-focused funds.

The survey was distributed to members of the BlueInvest community and beyond, reaching a broad range of investor profiles, including venture capital and private equity funds, investment banks, funds of funds, corporate venture capital arms, family offices, incubators and accelerators, as well as other financial intermediaries.

Responses were collected over a defined period and analysed in aggregate to ensure confidentiality. While the sample is not statistically representative of the entire global investor landscape, it provides a robust snapshot of perspectives from actively engaged blue economy investors.

The complete set of survey questions used in this report is presented below to ensure full clarity on the data collection approach.

Section 1 - Demographics & Investor Profile

1. **What type of investor best describes your organisation?**
   VC; PE; Investment Bank; Fund of Funds; Corporate VC; Family Office; Incubator/Accelerator; Other.
2. **What is the approximate size of your total Assets Under Management?**

   Less than €1 million; €1 million – €10 million; €10 million – €50 million; €50 million – €100 million; €100 million – €250 million; €250 million – €500 million; Above €500 million; Other.
3. **Where is your entity headquartered?**

   Country dropdown list.
4. **Do you currently have, or are you planning to establish, a fund or funds dedicated (even partially) to the Blue Economy*?**
   *The Blue Economy encompasses all sustainable ocean and water related activities (aquaculture, ocean tech, blue biotech, fishing, coastal tourism, ports, shipping, etc.).

   Yes, already deployed – fully dedicated; Yes, already deployed – partially dedicated; Yes, will be deployed – fully dedicated; Yes, will be deployed – partially dedicated; Not yet; No; Other.

- **(If "No" or "Not yet") Why haven't you set up a Blue Economy fund?** *Select all that apply: Lack of investment opportunities; Lack of demand from LPs; Lack of internal knowledge / expertise; Sector already covered in existing mandate; Regulatory / structural barriers; Other.*
- **(If "Yes") In which sectors of the Blue Economy do you invest / plan to invest?**

  Select all that apply: Aquaculture; Blue Biotechnology; Blue Renewable energy; Blue Tech & Ocean Observation; Coastal & Marine Tourism; Environmental Protection & Regeneration; Fisheries; Shipping, Shipbuilding & Ports; Water Management; Other.
- **(If "Yes") Why did you decide / have you planned to set up a Blue Economy fund?**

  Select all that apply: Alignment with LPs' preference; Strong internal sector expertise; Expectation of strong financial return; Expectation of higher sustainability impact; Expectation of significant positive impact; Willingness to contribute to global public challenges; Opportunities to invest in new technologies; Opportunities to diversify across verticals; Other.

Section 2 - Ecosystem (Perceptions/Attitudes)

"Please indicate your level of agreement with the following statements."

Scale: *Strongly disagree; Disagree; Neither agree nor disagree; Agree; Strongly agree.*

- It is easy to raise funds from LPs for blue funds in **my country** (entity's headquarters).
- It is easy to raise funds from LPs for blue funds in the **European Union**.
- The **innovation ecosystem** (research centres, accelerators, incubators) is effective in supporting blue startups in **my country**.
- The innovation ecosystem is effective in supporting blue startups in the **EU**.
- The **traditional financial ecosystem** (banks) is effective in supporting blue startups in **my country**.
- The traditional financial ecosystem is effective in supporting blue startups in the **EU**.
- It is easy to **find suitable blue companies** to invest in **my country**.
- It is easy to find suitable blue companies to invest in the **EU**.

- The **regulatory environment** in **my country** offers a conducive environment for blue companies.
- The regulatory environment in the **EU** offers a conducive environment for blue companies.
- It is easy to **find exits** for my investments in **my country**.
- It is easy to find exits for my investments in the **EU**.
- **Please share any additional comments regarding your answers above** (Optional).

Policy/support needs

- **What government support measures would you find most beneficial for fostering investment in the Blue Economy?**

  Choose up to 3: Tax incentives, Grants/subsidies, Regulatory simplification, R&D funding, Public-private partnerships, Public procurement, Blended finance solutions, Other.
- **Could you explain why in a few words?** (open)

Sentiment

- **"Could you please provide us with your sentiment around the following topics (past year & next year)?"**

Fundraising environment; Exit environment; Access to external finance of portfolio companies; Valuations; Number of investment proposals; Number of new investments.

Scale: *Significantly better; Better; Same; Worse, Significantly worse; No opinion.*

Section 3 - Challenges & Opportunities

- **Which sectors in the Blue Economy do you see as more attractive from a financial perspective?** (select up to 3)

  Aquaculture; Blue Biotechnology; Blue Renewable Energy; Blue Tech & Ocean Observation; Coastal & Marine Tourism; Environmental Protection & Regeneration; Fisheries; Shipping, Shipbuilding & Ports; Water Management; Other.
- **Which countries do you see as more attractive when investing in the Blue Economy?** (select up to 3)

  Country dropdown list.
- **What are the main challenges you face as an investor?** (select up to 3)

Economic uncertainty; Regulatory hurdles; Geopolitical risks; Sector-specific risks; Long investment horizons; Technology disruption; Lack of investment opportunities; Limited follow-on funding/difficult exit environment, Other.

- **What are your primary objectives for the next 5 years?** (select up to 3)

  Achieve specific return targets; Expand deal flow; Diversify portfolio; Build partnerships; Focus on sustainability; Explore new technologies; Support innovation initiatives; Raise next fund; Other.

- **Could you explain why in a few words?** (open)

Section 4 - Fund level Profile & Performance

- **How many blue funds do you manage?** (number)

For each fund (looped for up to five funds):

- **What is / will be the share of the sustainable blue investments in the total size of this fund?** (%)
- **What is the vintage year of the fund?**
- **What is the total size of your blue fund?**
- **What is the country of domiciliation?**
- **What are your typical ticket sizes when investing into Blue Economy companies in this fund?**

  < €50k; €50k-€100k; €100k-€250k; €250k-€500k; €500k-€1m; €1m-€5m; €5m-€10m; >€10m.

- **Which funding rounds do you typically target for this fund?** (select all that apply)

  Pre-Seed; Seed; Series A; Series B; Series C and beyond.

- **What is the expected internal rate of return (IRR) for your fund?** (%)
- **How many investments have you made to date for this fund?** (Blue Economy companies only)
- **Total invested amount** (€)
- **How many exits have you made to date for this fund?** (Blue Economy companies only)

For each exit (repeated per exit):

- In which **sector** did the invested company operate?
- How much **capital was invested** at the entry stage? (€)

- What was the **returned capital** at the exit stage? (€)
- What was the **duration** of the investment period? (years)
- Was the **investment period:** *Shorter than expected / As expected / Longer than expected?*
- At which **stage** did you exit?
- Which **type of investors** were involved at the exit stage? *PE; IPO; Corporation; Hedge fund; Management buyout; VC; Other.*
- Where did the **investors at exit** stage come from? *EU; Rest of Europe; US Rest of America; China; Middle East; Asia; Other.*

Notes for readers

- Some questions include “Other: please specify” text fields.
- Several items use answer scales (agreement, sentiment rating) and **skip logic** (e.g., CVC paths; fund loops).

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