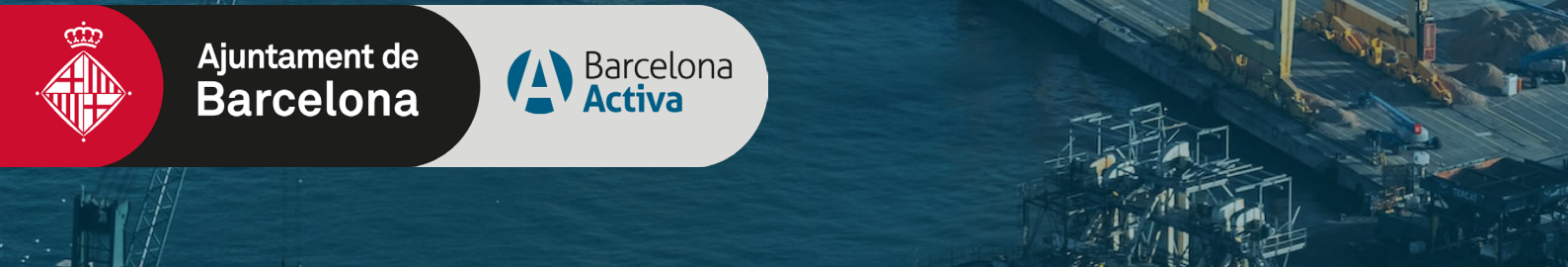


# Blue Economy

## Sector report

2023



Ajuntament de  
Barcelona

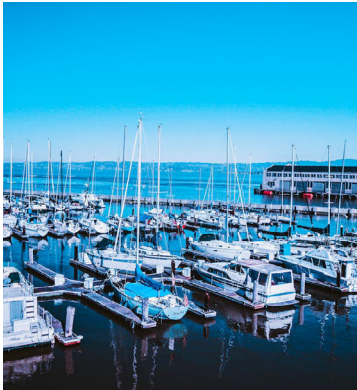


# Abstract

# Blue Economy

The concept of **Blue Economy** — understood as a sector of economic activity — has appeared recently but has been widely accepted. This sector is made up of companies and economic activities of very different kinds that share the fact that they are strongly linked to the seas and oceans. The shared view implied by the term Blue Economy derives from current **knowledge about the strategic importance of the oceans for the future of mankind**, from an environmental sustainability point of view. The direct or indirect use and consumption of resources extracted from the oceans is a key factor in the overall global and local economy. Traditionally, this sector used to refer to **maritime transport and fisheries** as traditional

economic activities, which are still maintained. In recent decades, however, we have become aware of the need to boost economic activities linked to the seas and oceans for the following reasons: their briskness, the possibility of generating new economic activities and labour markets, and also the global challenge of **preserving marine ecosystems** for the future of society. The Blue Economy sector includes a wide range of economic activities, technologies and professional profiles ranging from fishing to **recreational boating and tourism**, among many others. Recently, it is receiving special attention from the public authorities to ensure its economic vitality and the sustainability of the sector.





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Get to know

# the sector

## Introduction to the sector

The **Blue Economy** sector includes economic activities that are directly or indirectly related to the seas and oceans. Because of its briskness, the Blue Economy is the focus of private companies and public entities interested in taking advantage of the opportunities it generates as well as preserving its sustainability. From a broad perspective, this sector includes **economic activities that depend on the sea and also those that are clearly connected with it**. Thus, it includes more traditional or established subsectors — such as the capture and production of food resources — and also the more emerging or innovative ones, which provide new investment opportunities and have great potential for the **development of coastal cities and territories**. Yet the diversity of **economic activities** is enormous:

- **More traditional activities:** obtaining living marine resources for food (fishing, aquaculture) and mineral resources (salt, gas, oil); activities providing service to ships of all kinds, concentrated in ports; building and repairing vessels; maritime transport activities (cargo ships or ships on regular shipping lines); and tourist and recreation activities (cruises, recreational boating, leisure spaces).
- **More emerging or innovative activities:** obtaining renewable energies (e.g. tidal power, wave power, floating solar power installations, and the generation of hydrogen in the high seas); the blue bioeconomics and biotechnology (e.g. the production of algae for different purposes); research and exploitation of new minerals; desalination of water for human consumption; research and training; and the design and development of maritime infrastructure (e.g. submarine wiring, aquatic robots, etc.).





Thus, while the more traditional activities offer the most possibilities of **employing professional profiles** at all levels of qualification, the more emerging or innovative activities offer a significant potential for **economic growth**, for **transitioning to sustainability** and also for creating **new professional profiles**.

All these subsectors offer great job opportunities, but not everywhere. For example, the construction of large vessels is irrelevant in Europe, as it is concentrated in South East Asia.

**Ports** are the area where flows of marine traffic converge and the point of demand and delivery of services that ships — with their cargo and passage — require. In these areas, the principle governing activity is **efficiency**: ships arriving with goods want to unload as quickly as possible, to load as much as possible and to start a new journey as soon as possible. This also happens with yachts, tourist cruises and all sorts of vessels. This means that most professional profiles in the sea sector work under the pressure of **excellence in service quality** and **cost minimisation**, which defines highly demanding jobs that are often in an unforeseeable context, which puts even more pressure on professionals in the sector.

In the European context, in 2019, only the more traditional activities had a turnover of EUR 667,200 million, generating **added value of EUR 183,900 million** and **4.45 million jobs** with an average wage of EUR 24,739.

Despite its potential, the **Blue Economy** sector also has challenges ahead that it will have to face. **Climate change** will bring about changes in sea level and will have a major impact on coastal areas. The sector will also have to restructure in order to eliminate CO<sub>2</sub> emissions, a major challenge for maritime transport, as well as to ensure the biodiversity of the oceans.



## Barcelona and Blue Economy

Barcelona has always been a **port city, focused on trade**, and in recent decades it has been consolidated as a **major tourist destination**, also by sea. In Barcelona and Catalonia, however, the fishing and aquaculture maritime subsector does not generate a large number of job opportunities. Similarly, the construction and exploitation of marine platforms for energy generation is of little relevance. By contrast, freight transport, the nautical subsector and tourist cruises offer remarkable employment opportunities in the Port of Barcelona and in the rest of Catalonia.

In the year 2020, the Port of Barcelona concentrated 74% of Catalonia's maritime trade and **23% of Spanish maritime trade**, with a freight value of over EUR 120.686 billion and 71 million tonnes transported almost 40,000 people work in this sector, both directly and indirectly.

Similarly, the tendency to make the ports of the metropolitan areas an **environment of citizen leisure** is reinforced. This is the case of the Port Vell in the city of Barcelona, which is consolidated as a shopping centre. It is also worth mentioning the importance of placing itself internationally in the market for quality service provision for yachts and superyachts, as they have a huge impact on the local economy in terms of added value.

The city of Barcelona published in October 2021 the [Government Measure to promote the Blue Economy](#) with the aim of promoting the blue sectors as a new economic pole for the city, as well as defining the promotion strategy of the Blue Economy and setting out a roadmap for its implementation through projects and strategic measures.

In addition, the port of Barcelona is aiming to position itself internationally as a destination for luxury yachts by offering itself as a **shipyard for vessel repair, maintenance and refurbishment**, as well articulating customer care. Barcelona is a reference centre for sports and recreational boating and has a thousand companies dedicated to shipyards, charters, nautical services and equipment and water sports. It is home to [Barcelona's Nautical Cluster](#) and hosts the sector's reference show, the [Saló Nàutic](#).

# Fields of activity

Below is a description of the three subsectors of economic activity that make up the Blue Economy sector.

## Recreational boat navigation

It includes activities aimed at **learning and enjoying the activity of navigation**. There are many modes of navigation and ships and they need services, such as parking for non-navigation periods and mooring when they arrive in port, where basic services such as food, fuel and electricity supply are also needed in case they are en route. Within the subsector of Recreational Boat Navigation, economic activities are grouped into:

- **Marina.** Marinas host nautical clubs. In practice, **marinas** are understood as areas providing services of all kinds to ships, among which are maintenance and repair. Marinas are places of great employment opportunity. Particularly, ship **repair, maintenance and transformation activities** require many and diverse professional profiles. It must also be said that marinas have developed facilities related to activities such as hospitality, shopping centres, office rental and coworking, which can provide services to both marina users and the general public.
- **Recreational boat navigation repair and maintenance.** In this area, it is worth mentioning the importance of yachts, and especially of luxury yachts. The maintenance and repair of these vessels requires personnel with highly **skilled and highly qualified technical profiles**, which creates job opportunities that are often difficult to cover. Additionally, crews of these ships require a wide range of services during their stay, when their yachts are undergoing maintenance operations in the marina or because they make stopovers for tourism purposes.
- **Nautical activities support.** Nautical activity generates **sporting and tourist activities** aimed at the citizenship, which require qualified personnel. For these activities, the regulations require the professionalisation of the staff involved, who must be in possession of the pertinent permits and certificates in order to be able to develop their activities legally and safely.



## Fishing and aquaculture

This subsector has little specific weight in the city of Barcelona but maintains **significant importance along the Catalan coast**. It is a traditional activity that consists of obtaining marine resources for food. Fishing and Aquaculture amount to 2.48% of exports from the agri-food sector in Catalonia with EUR 368.90 million. This sector has about forty fishing ports and a fleet of more than 800 vessels. More than 27,000 tonnes of fish are marketed every year at fisheries, with an economic value of EUR 106 million. Statistics indicate that an average of 24 kilograms of fish per person are consumed each year in Catalonia. Within the subsector of Fishing and Aquaculture, economic activities are grouped into:



- **Aquaculture.** Despite being a traditional activity, a **great future projection** of aquaculture is expected because it ensures the supply of marine products (especially fish and shellfish) for food without the need to extract natural resources from seas or oceans. Aquaculture consists of facilities that operate as production centres located on the coast line, where marine species in captivity are bred, transformed and transported to consumer markets.
- **Fishing.** Fishing fleets have reduced significantly over the last few decades, affecting the countries of the European Union. This has happened both because of **ecological moratoria** aimed at preventing the over-exploitation of certain marine species and because of the **restructuring of the fleets** by quotas on catch volumes, which have gradually been reduced. Thus, fishing activity is residual in Barcelona, and at some points on the Catalan coast it is linked to the exploitation of certain species, as in the case of the Palamós prawn.

## Maritime transport

The economic activities linked to **sea transport** are included in this area of activity. Today, seas and oceans are the main freight route, and passengers also have a considerable weight. Thus, this subsector encompasses, broadly speaking, the services needed to transport goods and people, and its economic activity is structured in the following areas:

- **Passenger and freight transport.** Goods of all kinds travel by sea, from powdered food to liquefied gas and a wide range of products manufactured within containers. In addition to manufacture, freight traffic also includes bulk solids and liquids. It is also worth mentioning, especially in the case of the port of Barcelona, the import and export of vehicles, which is a type of manufacture. The **import and export of goods in containers** has seen strong global growth through the consolidation of containers, and is a good indicator of the briskness of the local business fabric and its degree of international projection. In relation to passenger transport, it includes both regular





passenger lines (on ships called ferries or short sea shipping) and cruise ship tourism. This activity generates a **direct and visible impact on the receiving city and the territory**, as well as an undeniable economic impact. In recent years, passengers who travel for tourist and leisure purposes has remarkably increased along the Catalan coast. Regarding **short sea shipping**, Barcelona is well positioned towards the Balearic Islands and North Africa.

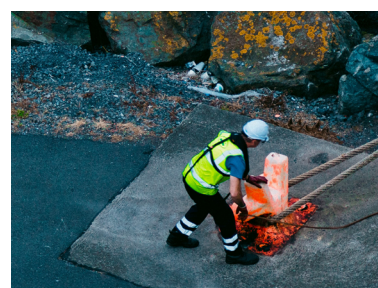
- **Container terminals for loading and unloading operations.**

They are located in the port areas where cargo loading and unloading operations are carried out. Freight travels on large vessels adapted to the type of cargo. When reaching their destination port, vessels must unload or load with the maximum speed and safety at the pertinent terminal, since the loading and unloading terminals are technically adapted to one type of goods or another. Loading and unloading operations are the essence of port activity. They are highly specialised operations, since facilities vary depending on whether the goods are cement, clinker (the main component of Portland cement or concrete), grain, flour, animal feed, soybeans for the food industry, or potassium.



- **Port services.** Maritime transport generates a more than remarkable demand for support services that takes places in ports. For example, in Catalonia there are a total of 26 port facilities (ports, fishing docks and piers) that depend on the Generalitat of Catalonia. Besides, the Ports of Barcelona and Tarragona depend on the Spanish Government. Ships carrying goods require the services

of **shipping companies and consignees**, which provide support in organisational, legal and administrative matters, as well as more technical or basic services such as facilitating a safe entry to the port or mooring. Also, port services include the port authorities personnel, who ensure the proper functioning of port services as well as the issues related to the safety of port facilities and the management of their environmental impact.



# Trends

The sector of is linked to the development of society (for example, fishing for food, maritime trade, transfer of people and armies). However, in recent decades, taking into account the challenges of transition to sustainability and the accelerated technological change, it is changing rapidly and there is a willingness among public administrations and private organisations to **boost as a vector for job creation, sustainability and intensive use of new technologies.**

## Established trends

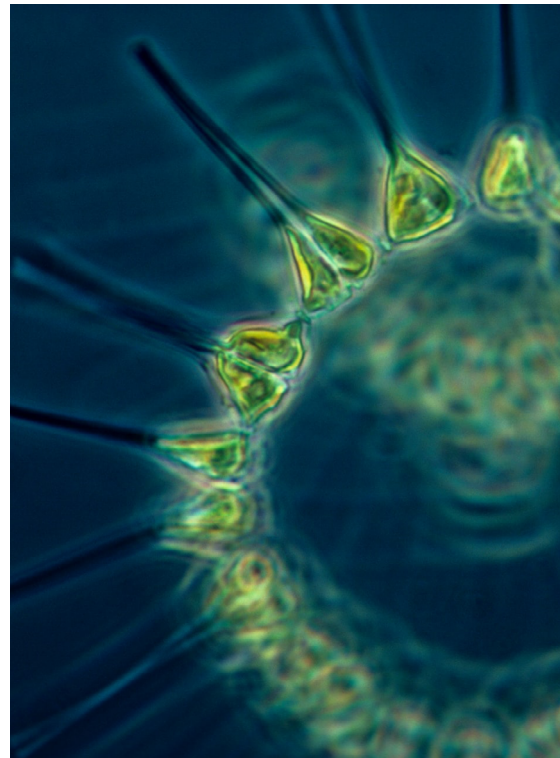
- The **container transport** method has been consolidated as **the most used system to send manufactured goods by sea**, especially from South-East Asia to the rest of the world (Barcelona and Rotterdam being two key points of entry of goods into Europe). Containers are stacked on huge transport vessels. They must be discharged in the port of arrival as efficiently as possible — in other words, in the shortest possible time and with maximum safety. And this is where container transport has led to a **technological leap** in its management at port. This task, which was traditionally associated with dockers, is now carried out with large mechanical cranes that do the work by digital remote control, loading or unloading the ships and distributing the containers to the logistical network beyond the destination port. Containers are, for now, the most competitive method of transport.
- The tourist side of the Blue Economy is represented by the **cruise industry**. A true mass phenomenon, cruise tourism has a remarkable impact and dragging capacity, from the construction of cruise ships to the economic impact on the backcountry of the ports where they climb (tourism and supplies, primarily). Cruise ships can also be assimilated into hotels, resorts, or real floating cities, which also has a significant impact on job generation by **“marinising” traditional occupations**, ranging from the hotel (room and kitchen staff) to entertainment through medical services, apart from the ship’s own technical and maintenance staff.



- At present, the **production of wind energy at sea** is a reality and in the coming years more projects are expected to be developed in the maritime field. Commercially, it allows for deployment that has not been experienced so far by other renewable energy sources of marine origin, such as tidal power. Europe is by far the world leader in offshore wind energy with **over 90% of the global installed capacity**. In the early 2000s, there were only a small number of demonstration plants in Europe. Now in the European Union there is a total installed wind capacity of 14.6 GW in 11 countries — in 2020 there were 2.4 GW of new capacity added to the network. The main producers of offshore wind power in the EU are Germany, the Netherlands, Belgium and Denmark, and projects are being planned for the Catalan coast.

## Emerging trends

- **Blue biotechnology is the application of science and technology to living aquatic organisms** for the production of knowledge, goods and services. This includes microorganisms (microalgae, bacteria and fungi), algae and invertebrates (e.g., sea stars, sea cucumbers, sea urchins, etc.). Blue Economy converts aquatic biomass into food, animal feed, nutraceuticals, pharmaceutical products, cosmetics, energy, packaging and clothing, among others. It is an economic activity still in the process of consolidation, but it is expected to make a significant contribution in terms of sustainable production. In particular, algae are a versatile material, with **potential new applications in various sectors of the economy**. They are used to develop new pharmaceutical products, bring healthy food to the market or replace fish oil in feed. Marine algae aquaculture, especially if combined with shellfish aquaculture, will provide healthy food and contribute to ecosystem services: carbon sequestration, elimination of nutrient and CO<sub>2</sub>, ecosystem support, restoration of the oceanic habitat, and coastal ecosystem resistance, among others. Algae can also be used in cosmetics, fertilisers, packaging manufacturing and biofuel.



- The great ports (the closest around us being Marseille, Barcelona, Tarragona, Valencia, Malaga and Algeciras) have traditionally been a source of CO<sub>2</sub> emissions into the atmosphere, energy consumption and other pollution vectors. Thus, the **trend towards sustainability** has also affected the Blue Economy and it is in ports that, in particular, the port authorities are making efforts to make progress on sustainability, both in systems of **reducing emissions, reducing energy consumption** or taking approaches to the **circular economy**. The Barcelona port has set itself the target of reducing greenhouse gases by 50% by 2030 and by almost 100% by 2050. It is also committed to energy transition with the implementation of an ambitious photovoltaic generation project, which should produce 120 GWh of clean energy annually. Some actions that stand out are the monitoring of water and sediment quality and the pilot tests of photovoltaic energy consumption communities to advance towards energy transition.
- There is a trend towards **integrating the port and the city**. In functional terms, ports are an industrial area that often acts as a barrier between the city and the sea. In addition, port areas often undergo constant changes in land use: growth and expansions, restructuring of areas of activity, changes in usage due to the introduction of new technologies, among others. In a way, a port is a city within another city serving a hinterland. Thus, the relationship between the port and the city becomes difficult, and it is a **matter of governance and dialogue** between these two realities. The relationship between the city and the port has become more complex by integrating the **environmental, social and economic dimensions** and it is not easy to plan for this interface. The management of this interface between the port and the city is a trend for the future that must resolve port integration into urban and territorial functioning, the development of public spaces or the need to respond to the citizens' aspirations associated with port areas. In the case of Barcelona, one can cite the opening of the Old Port as a citizen's leisure space and the debate on the rail infrastructures that should link the port to the Mediterranean Axis.

# Professional profiles

Blue Economy has an impact that is often not visible to the public. However, it is key to daily life and the normal functioning of the economy, as this sector generates and transports much of the food and energy we consume. The **range of professional profiles employed in this sector is very broad**, such as work at high sea in the transportation of people or goods, the port services of a city, cleaning the oceans of plastics, and designing the modification of a ship. Blue Economy has **great prospects** over the coming decades because of the **growth expectation of global trade** and because of the key role the sector must play in the **transition to sustainability**. At the same time, Blue Economy is an **accelerator of technological change and innovation** with clear links to the digitisation process. More specifically, some of the key professional profiles in the present and future configuration of the sector are:

## Marina service and maintenance technician

They look out for the **good state of conservation and functioning of marinas**. Their tasks include maintenance, ship mooring and assisting crews in docking maneuvers. They are also in charge of supplying fuel to marina customer vessels, as well as providing them with basic supplies (water and electricity). Among other functions, they also carry out rounds of inspection and control of the facilities, checking the correct mooring of the vessels and amending what they consider to be necessary; they plan and execute the facilities maintenance tasks; they ensure safety and compliance with the implementing rules and are also in charge of the monitoring and control of access for people.

## Nautical maintenance technician

This professional mainly works in companies that maintain, repair and reconvert ships and yachts. They manage and organise repair tasks, especially in deck elements, deck fitting, and the use of composite materials to perform repairs of recreational boats. **They master the tools, techniques and materials for the service and maintenance of recreational boats**. They are also responsible for keeping in good condition the hull, structures and elements and systems that make up recreational boats, as well as identifying and collaborating in the planning of tasks to be performed with the other specialist technicians. They assess the characteristics of the area to be intervened and then choose and manage materials, tools, products, and types of treatment to perform according to the technical specifications of repairs, sanitation operations and maintenance to perform.





## **Head of recreational boat navigation**

They assume the **responsibility of the ship, crew and passengers**, dealing with **navigation, safety and compliance with the applicable regulations**. The size of the recreational vessel determines the required qualifications of the person responsible for navigation and the type of navigation that can be performed, so that the professional must always be in possession of the corresponding certification. Recreational boats are usually small in size and cannot sail far away from the coastline, and are therefore mainly for tourist or recreational purposes. The person responsible for navigation deals with the established route, the state and the maintenance of the boat and the safety of the passage.

## **Responsible for aquaculture operations**

They are responsible for **tasks relating to the proper development of animal and plant crops** (fish, molluscs and/or crustaceans, algal species) and manage their planning, production, collection and marketing. To this end, they also plan, organise and supervise facilities, machinery, finance, and manage staff. In short, they are the professionals coordinating all the resources of the exploitation in order to achieve the required quality of the product and to comply with the applicable environmental and risk prevention regulations. **Aquaculture facilities** can be located in saltwater or fresh water and both in open and closed spaces. These facilities can integrate the entire production cycle — reproduction, the control of juveniles, fattening and finishing — or they can be specialised in a part of the cycle.

## **Marine scientist / technologist**

They study the processes that occur in both the ocean and aquatic environments on the coast, with the aim of establishing strategies and actions that promote the **conservation and sustainable use of natural aquatic resources**, and also providing scientifically based responses to the problems posed by the exploitation and use of oceanic resources. They carry out **research and consultancy** work as they generates knowledge that must then be applied by public administrations and private companies working on the seaboard. The range of issues they can address is quite broad, especially within the field of environmental management: water quality and pollution, management of invasive species, emission of gases and pollution



by hydrocarbons and heavy metals in port areas, management of the sediment supply dynamics in coastal and beach areas, and impact of construction of port infrastructure, among others. A marine scientist / technologist may be joined by **several professionals with diverse training** who work together in an interdisciplinary way to create new knowledge that will impact on the promotion of new regulations and practices in port infrastructure management.

### **Operations and Port Services Engineer**

They work in the port providing port services and authoring and controlling **operations directed at both freight and passenger ships**. They are responsible for stowage and unstowage operations — stacking cargo on board or emptying the ship — as well as loading and unloading operations. They also assist in the coordination of these activities in relation to operations. At the same time, they assume the **tasks of inspection and control of the maintenance** of facilities providing services to ships. They also manage commercial traffic following established programming and collaborate in organising crane services, area use, water supply, electricity, etc. making sure everything works properly.

### **Cruise travel agent**

Also called Ground Operations Manager or Tour Agent, they are the professional who **negotiates, plans, organises and coordinates all tourist and leisure activities** for a cruise company in all destinations the cruise visits. Upon the arrival of a cruise to a port, passengers already have booked the tourist services they will enjoy during their stay (concerts, day trips, cultural visits, highlights tours), and this offer has been organised and managed by the cruise travel agent. They work in contact with cruise companies and providers of tourist services that the passage may require on the ground, connecting supply and demand. Their work requires a great capacity for negotiation and response, as they must plan services and activities up to a year in advance, but they will not be confirmed until the day they are carried out. Every year they annually with the tourist cruise companies the number and type of activities to be carried out during the next tourist season. They define the needs to be met together with the client company. They specify the ports where cruise ships will stop, the cities and towns to visit, the type of passage and other specific requirements.



## **Radio officer**

They ensure **the operation and maintenance of electrical equipment** on the ship. As in most jobs at sea, and as an officer who manage electronics on a ship, they are likely to work in collaboration with an engineer-in-chief who supervises the whole operation of the ship. They assume the management and operation of communications. In addition, they maintain the radio communication section equipment — that is, all telecommunication equipment (understood as the transmission or reception of signals, writings, signs, images, sounds or information of any kind) that work using radio waves — and other equipment commissioned to them. They develop professional services at sea-based radio communications stations or on board civilian ships. They are known as ETOs (Electro-technical officers) and are in charge of **relatively new functions and responsibilities**, since the interaction of electrical systems with information and communication technologies opens up new technological possibilities. Although their workplace is not necessarily in a ship, this professional profile is increasingly present in the shipbuilding industry due to the need to implement new knowledge in electrical and electronic systems.

Finally, it is also worth mentioning that jobs related to **naval architecture and engineering in naval systems and technology have good job prospects**, as there is a need to have environmentally friendly vessels and systems for transporting energy products around the globe, as well as to modify existing vessels and their systems due to new regulations on emissions and pollution of freight transport. Finally, in line with the trends in the Blue Economy sector explained in the previous section, there is also a noticeable **demand for jobs** related to **marine biology, oceanography, maritime archaeology and aquatic veterinary**.

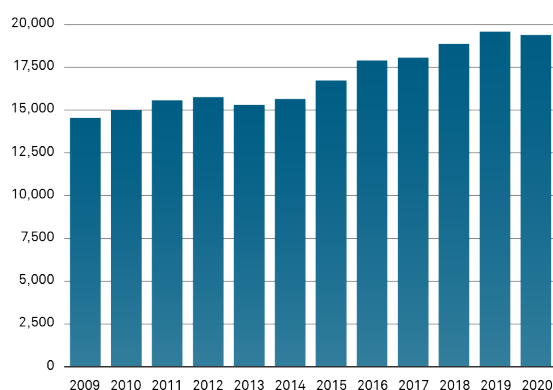


# The sector in figures

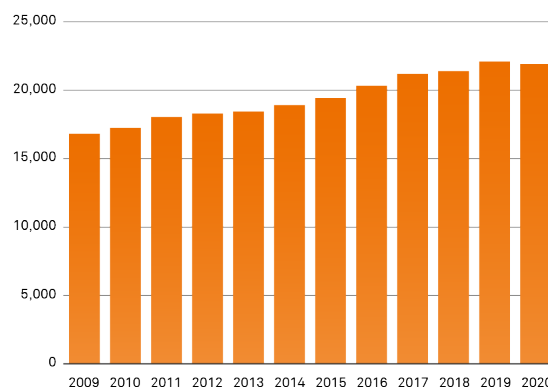
Statistically, there is no official data on the Blue Economy sector as a whole, since the definition of the sector is, in itself, a **new conceptualisation** of the diversity and potential for growth and transformation of economic activities linked to seas and oceans. However, there are data which indirectly allow us to measure the main variables in the sector. The European Union is fostering **Blue Economy** and has been issuing an annual report for a number of years, which is the only one containing specific data from this sector at European level. Thus, **in terms of Gross Value Added or generated production value**, and in terms of **employment**, data shows the following:

- In relation to **living marine resources** —which include the harvesting and capture of renewable biological resources (fish and aquaculture), their transformation into food and animal feed, and their distribution along the supply chain— the behaviour of the Gross Value Added remains upwards for the period considered and the average remuneration per employee also maintains a rising trend (expressed in thousands of euros).

**Figure 1.** Evolution of Gross Value Added (in millions of euros) generated in the area of marine living resources in the EU



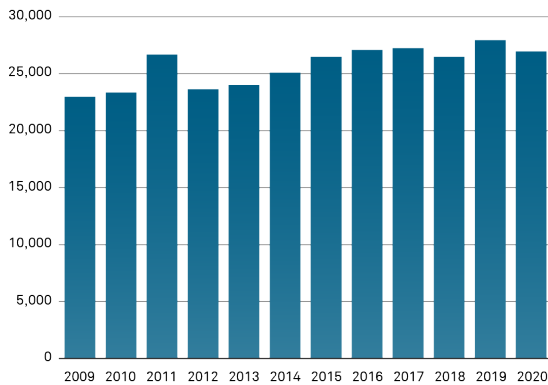
**Figure 2.** Evolution of average remuneration (in euros) per employee in the area of marine living resources in the EU



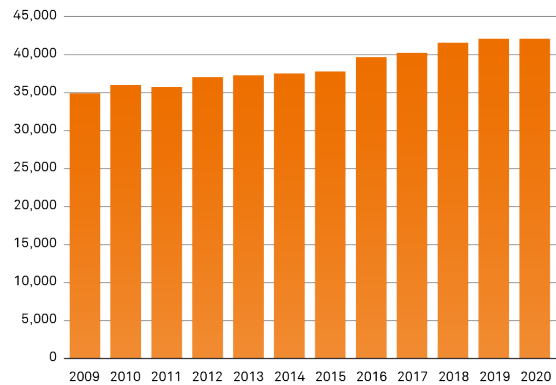
Source: Prepared by the authors, based on data from the EU Blue Economy Report 2023

- Ports act as a trade hub in Blue Economy. In relation to **port activities** — which include loading and unloading services, vessel mooring, passenger transport and support services such as customs and transitory and consignment companies, as well as the customs service, among others — they show rising figures in terms of Gross Value Added and average remuneration per employee for the period in question.

**Figure 3.** Evolution of Gross Value Added (in millions of euros) generated in the field of port activities in the EU



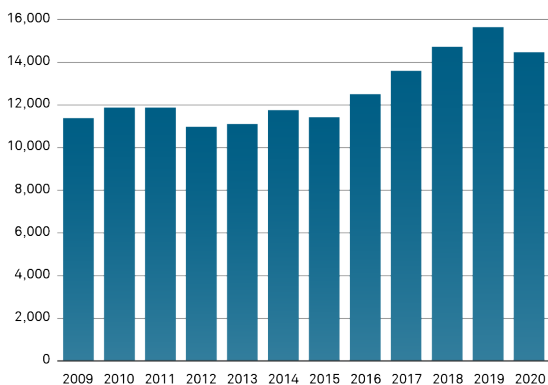
**Figure 4.** Evolution of median remuneration (in euro) per person employed in port activities in the EU



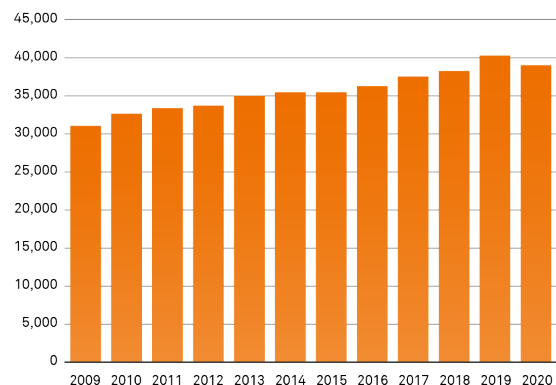
Source: Prepared by the authors, based on data from the EU Blue Economy Report 2023

- Regarding the **construction and repair of vessels**, data provided by the European Union indicate that the small-scale shipbuilding industry — as opposed to large vessels, cruise ships, etc. — is a dynamic and competitive sector in Europe. This sub-sector is focused on the construction of recreational vessels, mainly yachts of different lengths. Europe concentrates a market share of around 6% of the world’s orders, and 19% in terms of value. In relation to marine equipment, the EU’s market share is increasing by up to 50%. The EU is therefore an important player in the global shipbuilding industry, albeit far from the production of large vessels concentrated in South-East Asia.

**Figure 5.** Evolution of Gross Value Added (in millions of euros) generated in the field of ship construction and repair in the EU



**Figure 6.** Evolution of median remuneration (in euro) per person employed in the field of ship building and repair in the EU

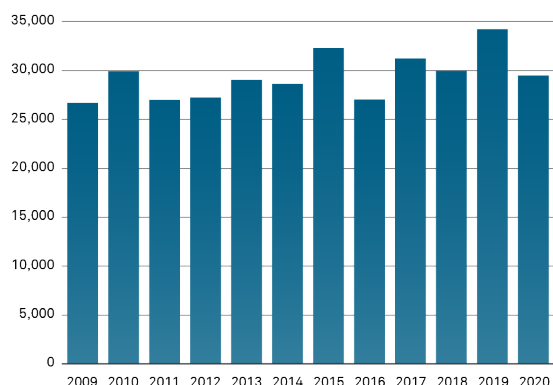


Source: Prepared by the authors, based on data from the EU Blue Economy Report 2023

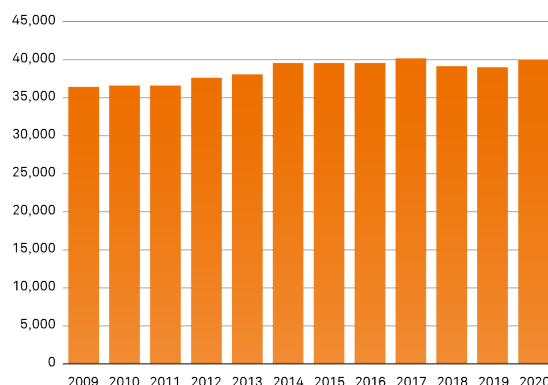
- With regard to the specific activity of **maritime transport**, this sub-sector has a role in the global economy and makes a crucial contribution to decarbonisation, given that ship transport remains the most efficient method of transport in terms of CO2 emissions and accounts for less than 3% of the annual global greenhouse gas emissions. Thus, it produces fewer nitrogen oxides, hydrocarbons, carbon monoxide and sulfur dioxide per tonne transported per kilometre than air or road transport.

Maritime transport has grown considerably in recent decades because of globalisation and productive decentralisation processes, and it is estimated that it still has growth prospects. Thus, despite the criticisms that this sub-sector may receive, it remains indispensable for the transport of raw materials and goods.

**Figure 7.** Evolution of Gross Value Added (in millions of euros) generated in the field of maritime transport in the EU



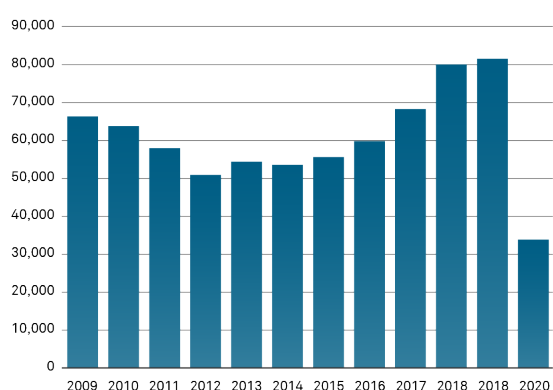
**Figure 8.** Evolution of median remuneration (in euro) per person employed in maritime transport in the EU



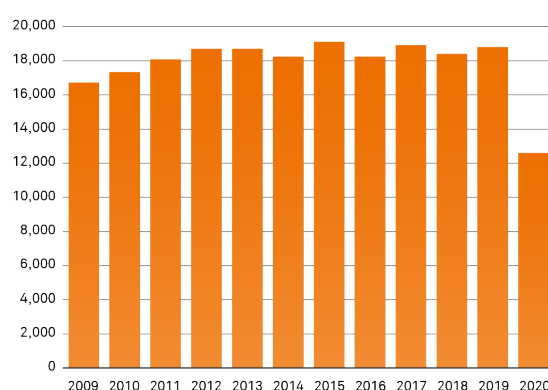
Source: Prepared by the authors, based on data from the EU Blue Economy Report 2023

- In relation to **tourism activity**, data show that it is the largest subsector in the Blue Economy in terms of GVA, although the average remuneration per employee shows the lowest remuneration compared to the other sub-sectors. Cruise ship tourism grew by 53% over the last decade in Europe, and in 2019 the total economic impact of this activity was EUR 127.1 billion worldwide, creating 1.16 million jobs. Despite the economic benefits, the cruise industry contributes substantially to air and water pollution, which has an impact on health, the environment and climate change and is therefore a major concern at EU level.

**Figure 9.** Evolution of Gross Value Added (in millions of euros) generated in the field of tourism in the EU



**Figure 10.** Evolution of the minimum wage (in euro) per person employed in the EU

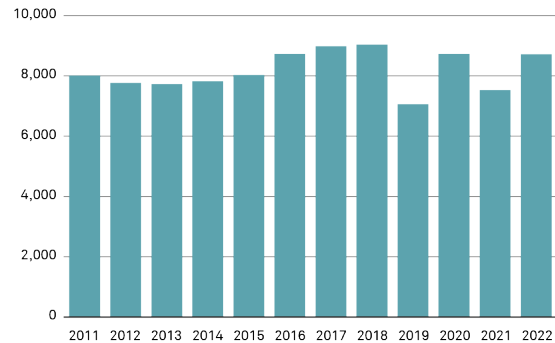


Source: Prepared by the authors, based on data from the EU Blue Economy Report 2023

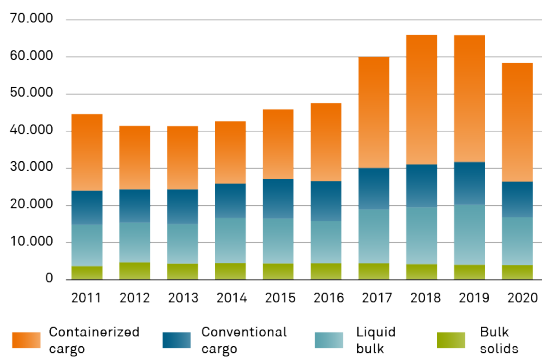
More specifically, part of the **data from the Port of Barcelona** shows the strength of the sector. Thus, the **approximate value of all goods** that passed through the Port of Barcelona in 2022 was **EUR 120,686 billion**. Port of Barcelona is the first port of the Spanish state in terms of goods value. The value of the goods passing through the port has been consolidated upwards in recent years.

The same pattern is repeated by the evolution of shipping traffic in the last decade. In relation to the **structure of freight traffic** also over the last decade, there is a remarkably strong upward trend of container traffic and the slow sustained growth of the remaining types of freight traffic (conventional freight and liquid and solid bulk freight). In relation to **passenger transport**, it is important to note the ascending evolution over the 2011 – 2022 period, the strong halt following the COVID-19 pandemic, and the recovery of recent years, which is approaching to levels before 2019. Thus, in 2022, a total of 3,922,079 passengers have been recorded, of which 1,592,747 have travelled on regular line ferries and the rest have been on cruise ships, with even greater impact. In any case, data shows the enormous briskness of the transport of goods and people. The Port of Barcelona is operated by about **500 companies** and generates a job of almost **40,000 direct and indirect jobs**

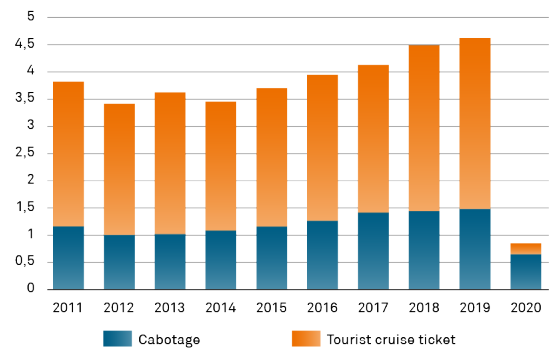
**Figure 11.** Evolution of the number of ships in the Port of Barcelona (2011-2022)



**Figure 12.** Evolution of the freight traffic structure, 2011-2021 (thousands of tonnes)



**Figure 13.** Evolution of passenger movement 2011-2022 (millions of people)



Source: Prepared by the authors, based on data from the Port of Barcelona.

# Projection

# and future scenarios

About 70% of the Earth's surface is water, and sustainably making use of this resource is one of the greatest challenges that our society is facing in the 21st century. The concept of Blue Economy — which combines the potential for economic growth of activities that have the marine environment in common with the important role they can play in the transition to environmental and energy sustainability — has been growing in recent years.

## Opportunities

- The **sustainable management of fishing banks** ensures their continuity as well as the incomes of coastal communities and economies who depend on fishing. Similarly, **food production through aquaculture** will continue to have sustained demand, which also guarantees the future of the sector.
- The **race for decarbonisation** is now a reality and big shipping companies are implementing alternatives for the propulsion of large vessels with the aim of reaching zero emissions by 2050. Energy alternatives focus on liquefied natural gas, methanol (alcohols), ammonia, biogas and hydrogen. Big shipping companies are already committing large investments in this direction.
- In Blue Economy there are many possibilities of **“marinising” jobs that traditionally come from the field of industrial maintenance**. Thus, workers specialised in boilermaking, welding, painting, polishing, electricity or woodworking — among others — can have an opportunity in the maritime sector if they meet the relevant retraining standards to adapt to the sector's specific needs. In addition, the salaries paid in this sector are higher than their counterparts in other sectors.

## Threats

- The current process of **climate change** will have consequences that are not still exactly known, as is the case with the extent of its economic, social and environmental impact. The main threats are plastic pollution, **over-exploitation of fishing banks** and **CO<sub>2</sub> emissions** from the energy that ships are moving. Governance for a global, coordinated and effective response to this challenge is not there yet.
- In some segments of Blue Economy, especially in freight transport, there are **difficulties in covering the supply of the labour market** in professional profiles linked to seamen trades. Some of the causes would be demanding working conditions (physical and mental fatigue, long stays at sea). In addition, any employment at sea is highly regulated for reasons of safety, taxation and regulation at work, among others.

- Developments of all kinds in infrastructure and equipment required by the Blue Economy sector **can generate public rejection and opposition**: extensions of port areas, wind farm projects at sea and tourist flows that alter the urban balance, among others. Consequently, optimum governance systems need to be deepened which provide compatible and acceptable solutions for all the actors involved.

## Strengths

- **The alliance between ports and cities**, which have traditionally turned their backs on each other, is a factor in urban transformation, which improves environmental sustainability, quality of life and job creation. Attracting new tourist flows and new developments within the nautical subsector are key aspects of the Blue Economy of Barcelona and its metropolitan area.
- In relation to the nautical subsector, there is **great growth in both leisure and repairing & refitting of all types of ships**. Access by the general population to the nautical world has an impact on the services that need to be provided (training, leisure activities, moorings, boat rental, maintenance and repair and supplies, among others) in marinas and nautical clubs. On the other hand, **Barcelona is well positioned in the superyacht industry**, which are large luxury leisure vessels with a great demand for services.
- **World trade of both goods and people will continue to increase in the coming years** and the demand for jobs in Blue Economy will continue. Consequently, there is also a great opportunity to make decisive progress in the energy and environmental transition. Blue Economy also has strong links to the digital transition process and the intensive use of new technologies.

## Weaknesses

- While the European Union aims to be neutral in terms of CO2 emissions by 2050, it is true that **Blue Economy still contributes to emissions by extracting oil and natural gas as sources of energy or using fossil fuels for ships**. In order to achieve this target, major investments in low-carbon new technologies, improved energy efficiency in ships and port infrastructure will be required in the coming years.
- Working in the maritime sector requires commitment and dedication, and so **the vocational component is essential**, which is difficult to achieve if the sector and the jobs linked to it are little known to the public. In general, in any of the sub-sectors that make up Blue Economy there are **difficulties in filling the jobs available**, both because of the lack of professional qualifications specialised in the sector and the usually demanding working conditions.
- Blue Economy, in its diversity, employs a large number of professional profiles for all levels of qualification. **Having an advanced level of English and speaking it fluently is required**, with more or less intensity, in all jobs. The Blue Economy sector is absolutely internationalised and the working language is English, either to work in customer service on a cruise, repairing a yacht's electrical system or interpreting the loading and unloading plan in a terminal for a merchant ship.

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- [Medcruise, The Association of Mediterranean Cruise Ports](#)
- [Instituto Marítimo Español \(IME\)](#)
- [Green Port, Insight for Port Executives](#)

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