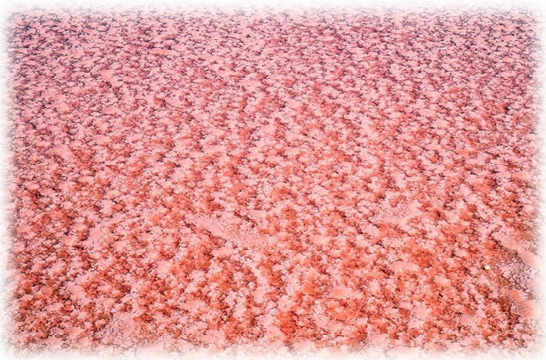
French Maritime Economic Data 2021






Régis Kalaydjian, Adeline Bas
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French Maritime Economic Data 2021

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<tr><td colspan="2">Résumé
Les « Données économiques maritimes françaises », publiées périodiquement par l'Ifremer depuis 1997, évaluent le poids économique des activités maritimes françaises, leur rôle dans l'économie nationale, leur place dans la concurrence internationale, ainsi que l'importance des services publics non marchands. La description des secteurs maritimes est effectuée à l'échelle nationale. Les activités maritimes du secteur industriel sont évaluées à l'aide d'indicateurs standard pour faciliter la mise à jour périodique du rapport : chiffre d'affaires, valeur ajoutée, emploi, nombre d'entreprises, exportations. Le secteur public est décrit par les budgets, les effectifs et les coûts de personnels dévolus aux différentes missions. Des indicateurs régionaux sont donnés sur les secteurs pour lesquels ils sont pertinents et disponibles. Par ailleurs le rapport prend en compte la dimension européenne des activités maritimes.</td></tr>
<tr><td colspan="2">Abstract
The "French Maritime Economic Data" report is periodically published by IFREMER since 1997. It presents an economic assessment of France's maritime activities, their significance in the domestic economy, their competitiveness at world scale, as well as the economic significance of non-market public services. Private maritime businesses are assessed using a standard metrics to facilitate the periodical update of the report: turnover, gross value added, employment, number of enterprises, exports. The public sector is described on the basis of annual budgets, number of staff and personnel costs, broken down into different functions of public services. If relevant and available, regional economic indicators are presented on maritime activities. In addition, the report takes into account the European dimension of maritime activities.</td></tr>
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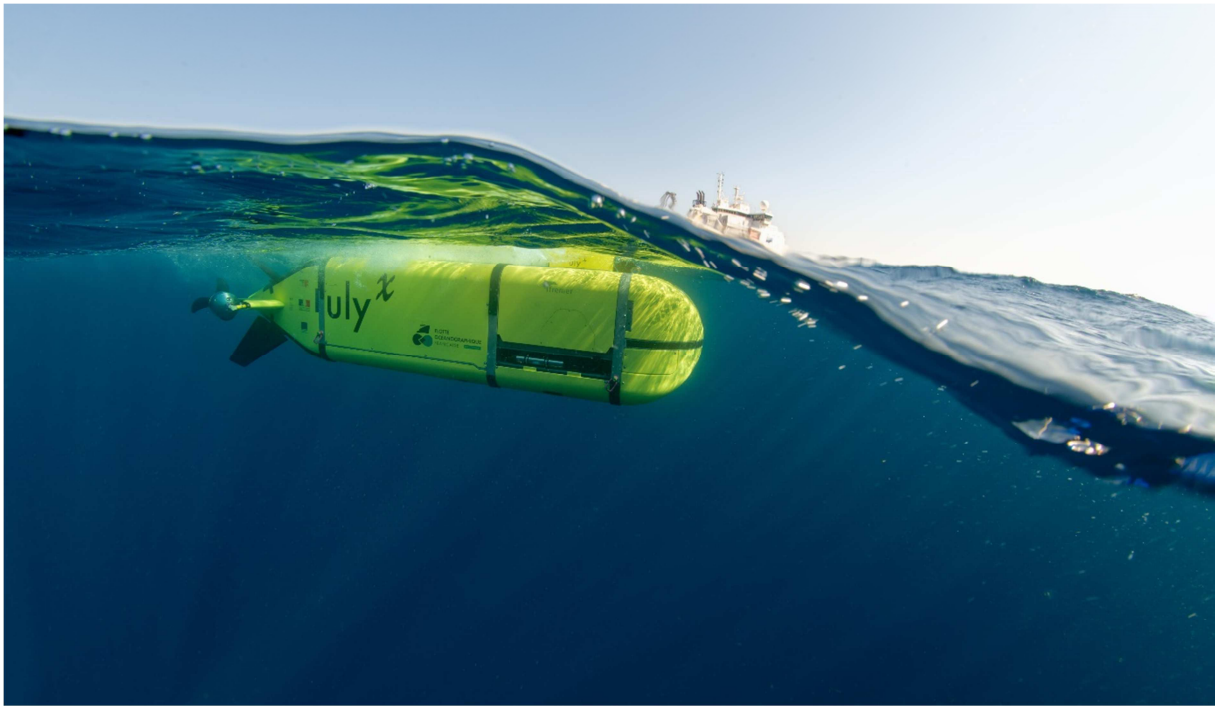

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Contents

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Introduction

Since 1997, the year of publication of the first report, the objective of the "French maritime economic data" report has been to assess, on the basis of a set of indicators, the economic weight of French maritime activities and their place in international competition. The indicators are national, European and, in certain cases, regional. The European dimension of maritime activities has been highlighted as much as possible.

In the series of FMED reports, maritime economy is defined as the set of activities linked to the sea, that is to say:

- the extraction of biological, mineral and energy raw materials;
- the exploitation of marine spaces as vectors of transport and places for installing energy networks, cables and infrastructures;
- the exploitation of remarkable sites for tourism and nautical activities;
- industries using and processing marine resources;
- manufacturing sectors and industrial and financial services associated with the exploitation of the sea;
- public action and government intervention at sea: defence, safety at sea, the social protection of seafarers, environmental protection, scientific research.

This wide definition includes a diversity of activities grouped within a private industrial sector and a public sector. The report is structured according to these sectors:

Industrial sector:

- Seafood products: maritime fishing, aquaculture, commerce, algae, seafood processing;
- Sea salt;
- Extraction of marine aggregates;
- Energy production: coastal electricity power plants, marine energies;
- Ship building and repair, boat building;
- Maritime and river works;
- Submarine cables;
- Offshore oil and gas services;
- Coastal tourism;
- Maritime transport and river transport;
- Marine insurance.

Non-commercial public sector:

- National navy;
- Public intervention in the maritime domain: signalling, safety and security, training of seafarers, social protection;
- Coastal and marine environmental protection;
- Marine research.

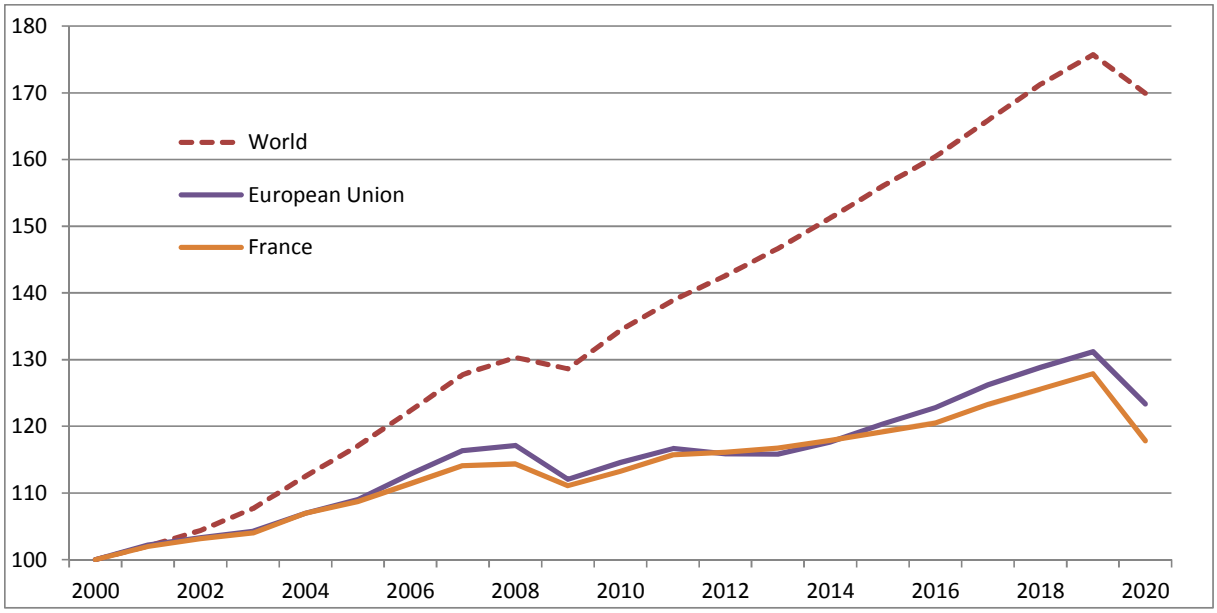
Regarding the assessment of the maritime economy, pioneering works were carried out in the United States starting in the 1980s. In the end of the 1990s, works were mostly American, Canadian, British and French. During the 2000s and 2010s, several contributions were made

in addition: Australia, China, South Korea, Indonesia, Ireland, Philippines, etc., as well as the European Union.

The principle of the FMED report is to use existing data. Each activity of the industrial sector is described using "key figures": turnover by sector, value added, employment, number of companies, exports. Non-monetary data (physical units produced, transported, extracted, etc.) can be indispensable additional items of information. The public sector responds to another rationale: for each category of service, the indicators selected essentially concern budgets, work forces, labour costs.

For the most part, the collection of indicators took place in 2021. Given the lag of about two years between the year of collection and the most recent data available, the indicators presented here only take partial account of the effects of the Covid-19 epidemic whose impact was felt since the beginning of 2020. In the present report, the maritime economy is described as growing in the end of the decade 2010-2020 in the European Union following the sovereign debt crisis. The indicators presented will serve as the baseline before the health crisis. Certain chapters nonetheless give a glimpse of changes occurring in 2020.

Global, EU and French gross domestic product.
Index 100 in 2000 based on constant USD.



Source: World Bank

The essential characteristics of the maritime economy were highlighted by the previous issues of the FMED and confirmed by this new report:

- The maritime economy represents a modest share of the national economy: this is the case in particular of the United States, France and Germany (about 1.5% of GDP); however, the shares are higher in countries and regions with a long coastline in proportion to the size of the country, and in which maritime trade plays a historically important role: United Kingdom, Italy, Schleswig-Holstein, Norway.

- Among the maritime activities in France, coastal tourism, a diversified constellation of small companies, is the predominant sector in terms of value added and employment.

- The other maritime activities reveal five main groups of activity: naval construction; offshore oil production; maritime and river transport; seafood production, processing and trade; sea-related public sector.

- Marine energies, an emerging activity in France, can only be dealt with succinctly at this stage. More detailed figures can be supplied in subsequent editions of the report, once the commercial phase of certain production sites has been reached. Electric power plants operating on the coast can be represented by the permanent direct employment they generate.

- The sensitivity of maritime activities to the international economic context can be explained by their export potential: maritime transport, tourism, maritime insurance, nautical construction, maritime works, submarine cables. The period of growth observed during the previous decade has obviously bolstered the results of these activities.

Due to the small share of the maritime economy in the national economy, the assessment is especially sensitive to the estimation methods used. This problem is general since the international studies mentioned above have all been confronted with the problem of assessing the maritime part of the economy, partially recorded in official statistics. Without going into detail, we feel that several comments are required on the working conditions encountered to advise the reader to take care in interpreting the variations observed from one edition of the FMED to another.

The first comment concerns the statistical coverage of the maritime economy. To ensure consistency, the report primarily relies on public statistics: structural business statistics, national accounts, satellite accounts (transport, environment), budgetary documents of financial laws, statistics of ministerial departments, Eurostat bases. Data from companies and professional federations are useful additions. However, several maritime activities are not indicated directly by structural statistics; they are incorporated in groups that include maritime and non-maritime activities and which are indicated (manufacture of cables, extraction of aggregates, tourism, etc.). The maritime shares of these groups have to be estimated. This is done sector by sector for want of a general method of estimation.

The second comment concerns the evolution of the French structural business statistics: since 2017, they use a definition of the company that conforms to decree 2008-1354 relating to categories of company according to the law on economic modernisation (2008-776). According to this decree, in conformity with European regulation 696/93 of 1993, the company is defined as “the smallest combination of legal units that form an organisational unit of production of goods and services endowed with relatively independent decision-making, in particular relating to the assignment of its current resources”. The company is therefore:

- either a legal entity identified by its administrative number (previous definition),
- or a group of legal entities belonging to the same group of companies; in practice this usually implies a company and its subsidiaries.

This approach leads to a reduction of the number of companies in the structural business statistics. The users – including the FMED – are therefore faced with a higher risk of data confidentiality.

The third comment concerns the recent revision of the tourism accounts. As explained in the chapter “Coastal tourism”, the assessment of overnight stays was revised upwards in 2017 by basing it exactly on the expenses related to commercial accommodation as documented in the Service Accounts. The resulting increase in tourism consumption was as considerable for the maritime economy, given the position of coastal tourism.

These comments illustrate the importance of methodological questions in the assessment presented here. Our metadata therefore include the explanations necessary regarding the sources of the statistics and their utilisation in the estimation procedures. Through the metadata, the series of FMED reports permits monitoring these procedures, their changes and their constants, understanding the main global and sectoral aspects of the maritime economy, and communicating with our international counterparts on the principles of the assessments, and questions of method.

Industrial sector

1. Seafood production

Activities relating to seafood production include fishing, marine aquaculture, wholesaling and retailing, and seafood processing. This grouping concerns the production of commodities and foodstuffs, commercial services and the manufacturing industry. Here, each component is treated separately.

1.1. Maritime fishing

Commercial maritime fishing is practised in a natural environment with the objective of exploiting live resources that are landed in the form of fresh or frozen products: fishes, cephalopods, crustaceans, shellfish, seaweed. It includes several categories of activity that differ greatly in their range of action, the distance from the coast and the size of the vessels used, from small coastal fishing boats to ocean going tuna fishing boats.

Table 1. Key figures of maritime fishing*

	2014	2015	2016	2017	2018	2019
Production (1) ('000 tonnes)	527	518	540	556	571	519
Turnover (2) (million euros)	1 211	1 242	1 337	1 320	1 314	1 229
Value added (million euros)	594	672	757	742	707	592
Number of fishermen (3)	13 685	13 581	13 623	13 540	13 267	13 119
of which: overseas (3)	3 928	3 996	3 943	3 853	3 623	3 566
Employment (FTE) (4)	8 301	7 878	8 125	7 985	7 817	7 533
of which: overseas	1 762	1 543	1 649	1 458	1 398	1 447
Number of active vessels	5 824	5 787	5 717	5 739	5 570	5 551
of which: overseas	1 769	1 771	1 731	1 759	1 630	1 595

(1) Landings of fresh and frozen products, including tuna and marine seaweed.
(2) Sales in fish markets, direct sales, sales to the processing industry, exports.
(3) Onboard personnel, all nationalities, all trip durations.
(4) FTE: full time equivalent.
*Field: mainland France and overseas, excluding vessels less than 12m in Martinique, Mayotte, Reunion.
Source: Agreste, Data Collection Framework. CSTEP, Annual economic report on EU fishing fleets, various years.

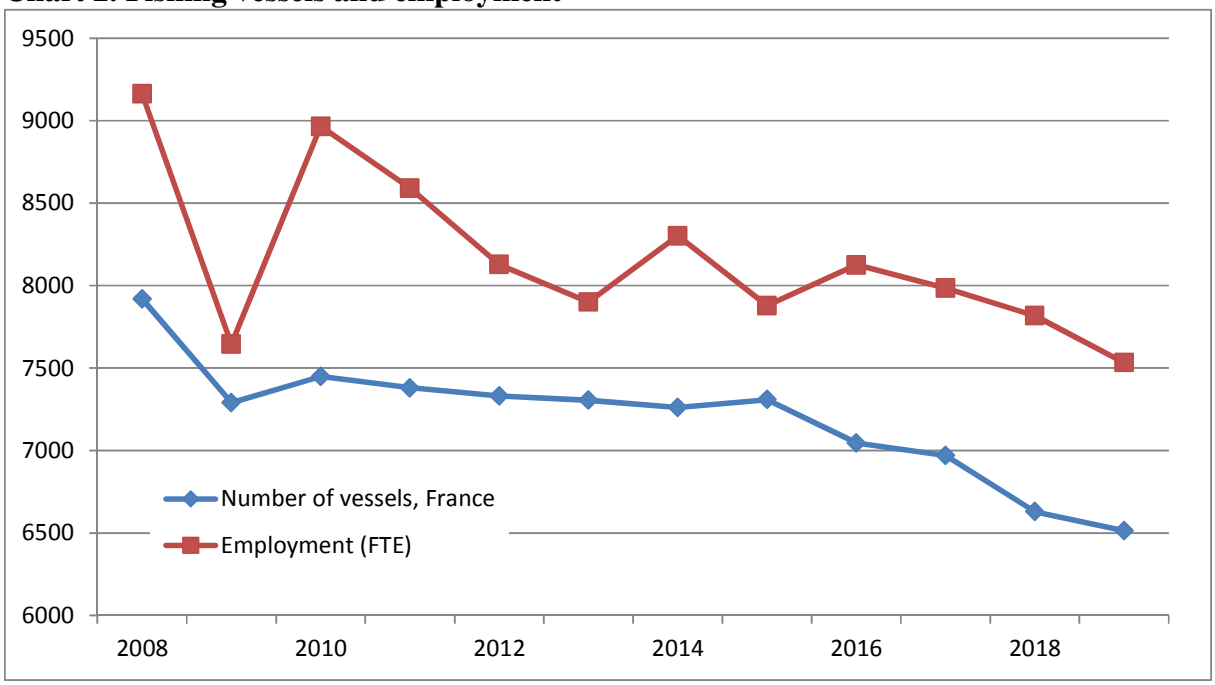
1.1.1. General evolution of the activity

- Professional fishing in France generates a turnover of around 1.2 to 1.3 billion euros, for a value added of 600 million euros.
- A slight increase in production in terms of volume and in value has been observed since the late 2000s. But employment and the number of vessels continue to decrease, falling

respectively from about 12,000 full-time jobs in 2005 to around 7,500 in 2019, and from about 7,800 vessels to 6,500 over the same period.

- Fishing capacity, measured in total tonnage, roughly follows this decrease in the workforce, falling from 210,000 GT in 2008 to 180,000 GT in 2019, i.e., a decrease of 14% in ten years. By contrast, the total engine power of active vessels in France exceeded 1.1 million kW in 2000, slightly over one million until 2017, slightly under one million more recently, i.e., a reduction limited to a little over 10% over two decades, indicating an increase in the average engine power per boat (source: European Commission / Scientific, Technical and Economic Committee for Fisheries - STECF).
- The number of fishing companies operating a single vessel fell by about 25% over the period 2008-2020, whereas those operating more than two vessels and more than five vessels remained more or less stable (source: STECF).

Chart 2. Fishing vessels and employment



Source: STECF (2021).

Constraints to development

- During the most recent period, the main constraints affecting French fishing activities concern access to resources on the one hand, working conditions and logistics linked to the health crisis on the other. The issue of access to resources encompasses local aspects, such as sharing coastal waters with emerging projects like offshore wind farms, and marine aggregate extraction areas. The problem could worsen if the number of offshore energy projects increases, especially in the case of floating wind farms.
- The issue of access takes on an international dimension with access to British fishing areas in the context of Brexit, which affects the issue of licences demanded by several EU member States. This subject was being negotiated at the time of writing this report. According to the STECF, the fishing quota redistribution procedure should result in a total estimated loss of about EUR 70 million for the companies of EU member States by 2025

(of which EUR 5 million for the French fishing industry). This small amount masks local variations and considerable impacts for the fisheries most involved in British waters.

- The health crisis and prevention and lockdown measures have had negative effects on activity at sea and the sales chain despite the support given to the fishing sector (support for investments and information to consumers). According to the preliminary estimations of the STECF – which do not provide a precise study of the impacts – the decrease in fishing trips in 2020 was about 10.6% in volume in comparison to 2018 and 9.7% in value. This loss was partially offset by a reduction in fuel purchases (source: STECF, 2021). Regarding French fisheries, the fall was estimated by IFREMER at 14% in volume and 13% in value for 2020.

1.1.2. French commercial fishing production

- Although French production changed little in terms of quantities sold, the production costs of the fishing and aquaculture sector have been increasing over several years. From an index of 96 in 2015, they rose to 117.7 in September 2021 and to 119.2 in November 2021. However, changes in price can differ considerably from one species to another.

Distribution by species

- Tuna is the species sold most among fishing and aquaculture products; in 2018, with 133,500 tonnes, it represented 17.8% of the total (source: FranceAgriMer).
- Regarding fresh fish declared and auctioned at market, scallop, sardine, hake, angler fish and mackerel were the species with the largest volumes in 2020; scallop, sole, anglerfish, hake, crayfish and bass were the highest in value.
- Seaweed harvests in France are composed of brown seaweed (mostly laminaria), harvested off the Brittany coast, and on land on the Brittany coast for smaller volumes. French production of this species is the highest in Europe, exceeding that of Ireland; in 2019 and 2020, it reached slightly over 50,000 tonnes a year (40,000 tonnes in 2018), for a value of EUR 2.1 million in 2019 (source: Eurostat, Agreste).

Regional distribution

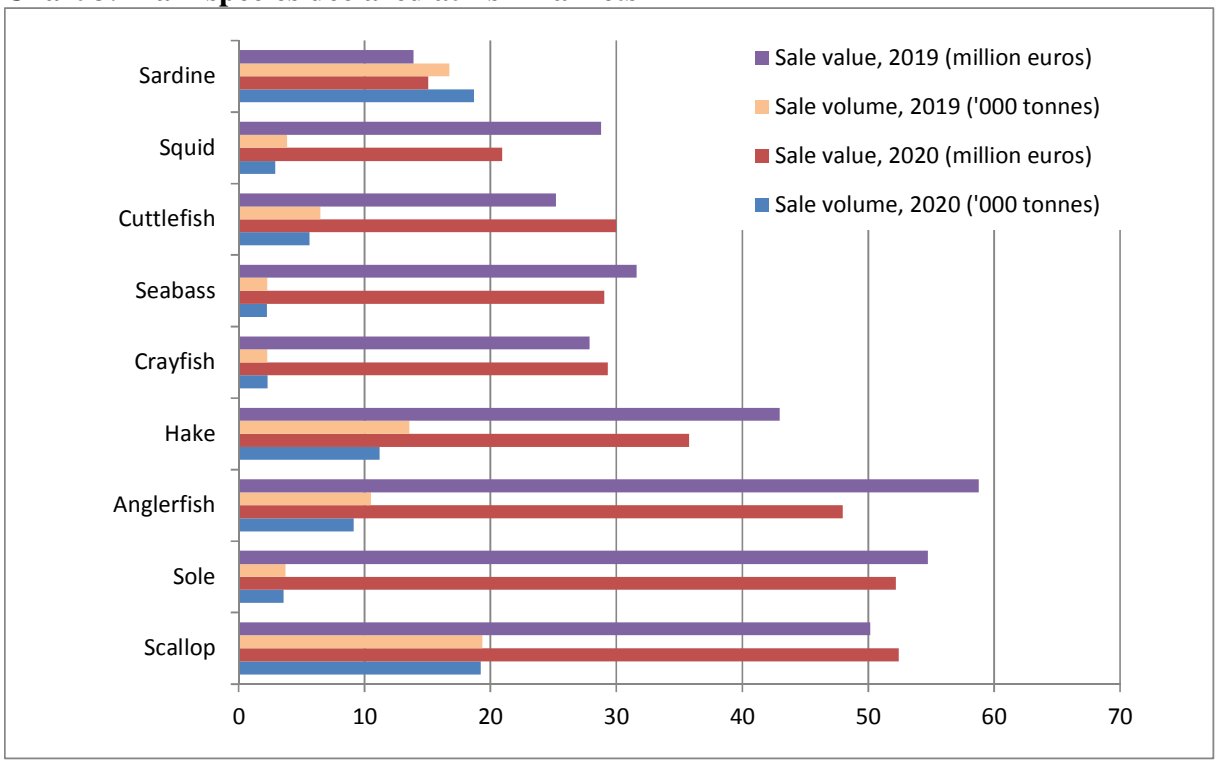
- The ranking of producing regions has varied little over recent years.
- Brittany remains by far the most productive region, with production amounting to more than 50% of total mainland production in quantity and more than 40% in value.
- The figures for 2020 illustrate the effects of the health crisis on the fall in production, which varied as a function of region.

Structure of the fishing fleet

- The fleet is described herein according to three main segments of length that correspond to a rough distinction between less than 12 metres (small coastal fishing), 12-24 metres (artisanal fishing), and more than 24 metres (high seas fishing). For each segment are given the number of vessels, the tonnage, and the engine power that characterise the fishing capacity. The different “metiers” and fishing gears are not characterised here. For additional information see IFREMER’s Fishing Information System: https://sih.ifremer.fr.

- The downsizing of the fishing fleet has resulted, since the 1990s, in a fall in the number of vessels, affecting every segment of the fleet, especially artisanal fishing offshore.
- The engine power and tonnage of each segment have decreased in smaller proportions over the period, indicating the improved average performance of vessels.

Chart 3. Main species declared at fish markets



Source: FranceAgriMer

Table 4. Fresh and frozen fish per region*

Units: tonne, million euros.

	2018		2019		2020	
	Quantities**	Values	Quantities**	Values	Quantities**	Values
Hauts-de-France	12 271	53	27 908	67	15 367	34
Normandy	37 113	91	36 659	93	36 907	93
Brittany	76 810	255	127 753	375	121 720	235
Pays de la Loire	19 280	96	22 076	100	20 152	89
Nouvelle-Aquitaine	15 873	81	17 671	90	15 409	76
Occitanie	7 718	34	9 188	42	7 700	35
Provence-Alpes-Côte d'Azur	1 442	6	1 884	9	954	5

*Excluding seaweed and freshwater fishing.
** Live weight equivalent.
Source: Franceagrimer

Table 5. Structure of the French fishing fleet

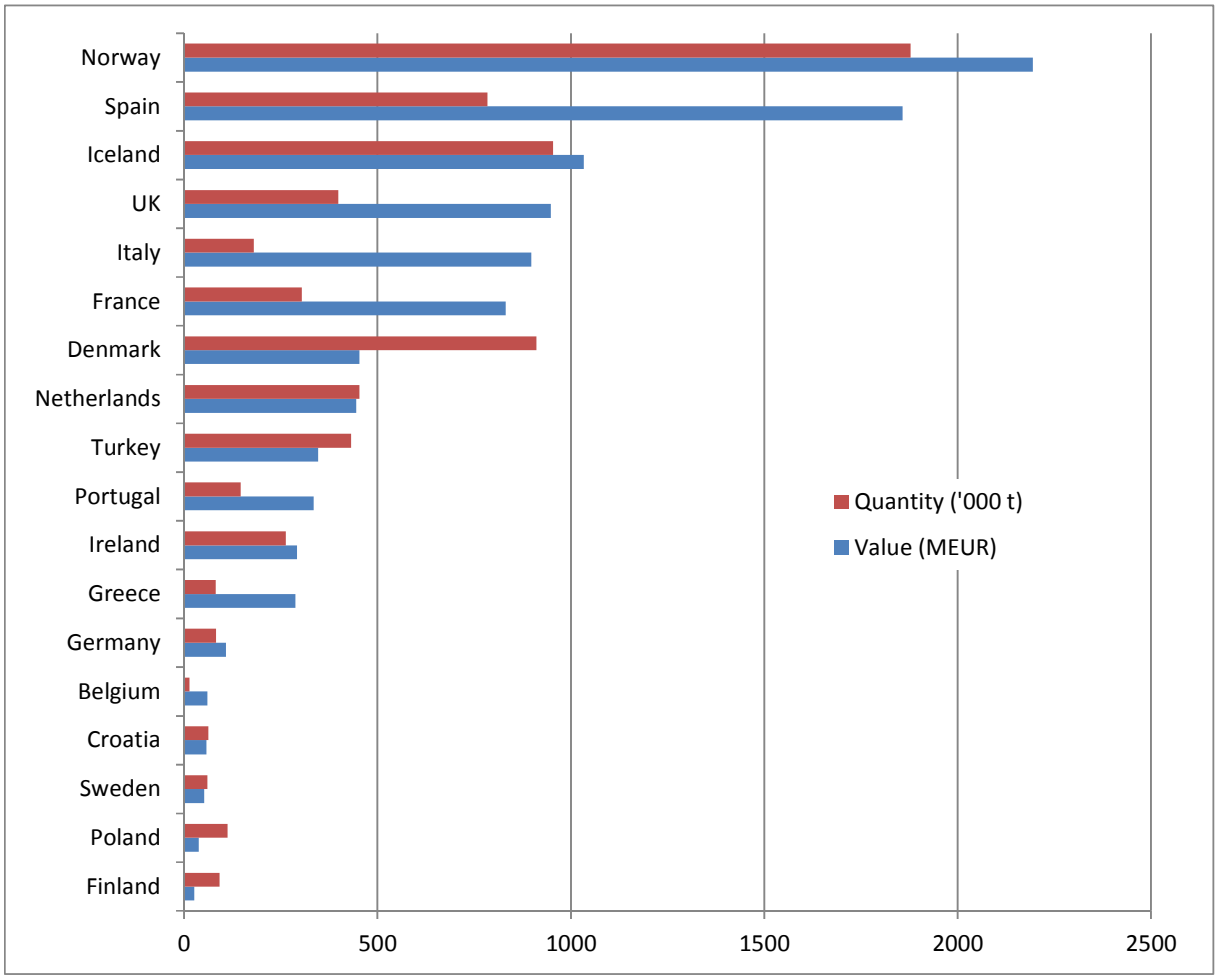
	1990	2000	2010	2019	2020
Number of vessels					
Total	8 771	8 229	7 216	6 237	6 224
Under 12 m	6 657	6 612	6 164	5 364	5 352
From 12 to under 24 m	1 781	1 341	839	678	679
24 m and over	333	276	213	195	193
Gross tonnage (GT)					
Total	209 673	226 424	172 830	172 217	175 010
Under 12 m	31 395	26 697	24 609	23 393	23 466
From 12 to under 24 m	70 543	81 950	58 361	49 626	49 936
24 m and over	107 732	117 777	89 859	99 199	101 608
Engine capacity (kW)					
Total	1 157 032	1 113 642	990 816	954 981	962 229
Under 12 m	409 405	483 210	570 059	563 791	568 036
From 12 to under 24 m	453 252	385 134	243 100	199 788	200 472
24 m and over	294 375	245 298	177 657	191 402	193 721

Source: Eurostat.

1.1.3. Fishing sector in Europe

- European maritime fishing (EU 28 + Norway + Iceland) landed 6.96 million tonnes in 2019 (7.8 million in 2015, 7.7 in 2010, 7.9 in 2006) for a value of €9.97 billion (10.1 in 2015, 9.1 in 2010, 9.2 in 2006) – source: Eurostat. These figures include Croatia since 2011. The value of production has therefore remained stable despite a reduction of the annual quantities landed over fifteen years.
- The average unit prices of landings declared can differ considerably from one country to another but, with the exception of several fishing fleets of small size (Slovenia, Cyprus), they have varied little over the past fifteen years.
- Regarding the quantities landed, Norway and Iceland are the two leading European countries. In value, Norway, Spain and Iceland represent nearly 50% of catches declared by European countries in 2020 (source: Eurostat).
- Regarding fishing fleets and fishing effort, the largest workforces are in the Mediterranean and Southern Europe (Greece, Italy, Spain, Portugal). The largest capacities are in Northern and Western Europe: Norway, Spain, United Kingdom and France have the largest fleets in terms of capacity and engine power. In certain countries, the average capacity has increased over the last decade in tonnage and engine power (Norway, France, Belgium, and to a lesser extent United Kingdom, Iceland) – source: Eurostat.

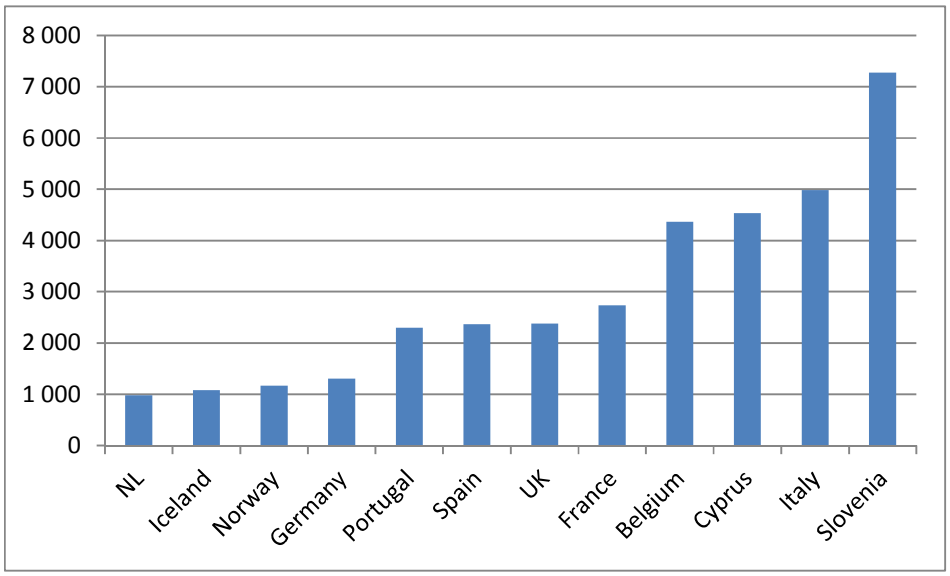
Chart 6. Landings of maritime fishing products in 2019* in the main European countries



*Vessels flying all flags, all aquatic products, all types of packaging and processing.
Data for 2017 for Ireland.
Data for 2020 for Denmark.
Source: Eurostat

Chart 7. Average price in 2019 of fishing products landed

Unit: EUR/tonne



Source: Eurostat

Tab. 8. European fishing fleets 2020

	Number of vessels	Tonnage (GT)	Engine power (kW)
Norway	5 857	439 426	1 375 287
Spain	8 839	329 906	772 749
UK*	5 905	198 303	754 841
France	6 224	175 010	962 229
Iceland	1 561	148 486	425 773
Italy	12 152	146 647	935 130
Netherlands	834	117 308	303 536
Portugal	7 714	86 369	344 869
Greece	14 625	69 019	415 023
Denmark	2 033	67 693	213 653
Ireland	2 033	65 062	190 094
Germany	1 292	58 397	131 057
Croatia	7 543	43 444	343 382
Lithuania	139	36 264	42 354
Poland	822	32 371	80 262
Sweden	1 136	27 144	146 472
Latvia	663	23 551	41 420
Estonia	1 828	17 593	49 728
Finland	3 137	15 768	169 050
Belgium	64	12 478	41 229
Malta	883	6 429	71 934
Bulgaria	1 825	5 991	53 008
Cyprus	806	3 800	38 826
Romania	175	1 620	6 278
Slovenia	136	671	8 845

*Data for 2019 for United Kingdom.

Source: Eurostat

1.1.4. The fishing sector on the international scale

- Worldwide, commercial fishing production amounted to 80.5 million tonnes during the period 1986-1995 (annual average), to 81.2 Mt in 2017 and 84.4 Mt in 2018 (source: FAO).
- Sustained growth has been observed for Asian and Russian production over the last four decades. Some Far Eastern countries (mainly China) and Russia have become major producers, overtaking Japan, the United States and Norway.
- The production of Peru is rather particular, mainly influenced by variable landings of Peruvian anchovies that depend on El Niño episodes. Apart from anchovy, the annual production of Peru was about 2.5 Mt in the 1980s; it is now 1Mt.

Tab. 9. Main fishing countries

Unit: million tonnes, live weight.

	Production annuelle moyenne			Production annuelle	
	1980-1990	1990-2000	2000-2010	2015	2018
Chine	3,82	9,96	12,43	14,39	12,68
Pérou	4,14	8,10	8,07	4,79	7,15
Indonésie	1,74	3,03	4,37	6,22	6,71
Russie	1,51	4,72	3,20	4,17	4,84
Etats-Unis	4,53	5,15	4,75	5,02	4,72
Inde	1,69	2,60	2,95	3,50	3,62
Viet Nam	0,53	0,94	1,72	2,71	3,19
Japon	10,59	6,72	4,41	3,37	3,10
Norvège	2,21	2,43	2,52	2,29	2,49

Source: FAO.

1.2. Marine aquaculture

In France, marine aquaculture for human consumption includes:

- shellfish farming (mainly oysters and mussels),
- fish breeding and production (bass, sea bream, salmonids, turbot) and shrimps (mainly tropical shrimps in New Caledonia).

It also includes oyster farming for pearl production in French Polynesia.

1.2.1. Mariculture in France

Shellfish farming is the largest marine aquaculture sector in France, with 91% of turnover and 95% of jobs (full-time) in 2018. Shrimp farming and seaweed farming are very modest. The first survey of seaweed farming took place for 2018 (macro-algae, micro-algae and cyanobacteria), followed by an annual survey for 2019 that confirmed that low level of current development of this sector in marine production.

The second sector is marine fish farming, which produces bass, bream, meagre, turbot and salmonids. This sector was targeted in priority by the “National long-term strategic aquaculture development plan” 2014-2020. The last results of the fish farming survey 2018

and the aquaculture survey 2019 nonetheless showed that the recovery of this sector remains very limited.

Tab. 10. Key figures of French marine aquaculture (1)

Unit: million EUR.

	2018	2019
Mainland turnover (2)	754.5	853.7
Overseas turnover (2)	90.1	71.0
Total turnover (2)	844.6	924.6
Gross value added (3)	464.3	503.7

1-Detailed data are available only for 2018 and 2019.
2-Turnover for shellfish farming and fish farming calculated on the basis of sales for consumption (volume of shellfish sales).
3-Value added rate estimated at 55% for farming oysters and other shellfish, 50% for mussel farming, 35% for sea fish farming. VA rates for pearl culture and shrimp farming remain estimated at 70%, for lack of updated information.
Sources: Fisheries and Aquaculture administration /aquaculture survey on mainland productions; ISPF (pearl culture); ISEE (shrimp farming New Caledonia).

Overseas, the fall in the total value of production between 2013 and 2021 was mainly due to the reduction of French Polynesia's raw pearl exports; shrimp production and export from New Caledonia were stable until 2020. Regarding the first item, the reduction concerned both quantities and export prices (source: ISPF French Polynesia Statistics Institute). The simultaneous decrease in Polynesian exports of pearl products (-43% in value from 2011 to 2020) does not point to the existence of an alternative Polynesian value added to exports of raw products.

Tab. 11. Volumes of sales for consumption of French marine aquaculture products

	Quantity (tonnes)				Value (million EUR)			
	2016	2017	2018	2019	2016	2017	2018	2019
Shellfish farming*	**128 021**	**135 264**	**145 130**	**148 216**	**519**	**551**	**498**	**543**
- Oyster	*75 439*	*80 974*	*92 947*	*85 947*	*383*	*402*	*380*	*398*
- Mussel	*50 339*	*51 432*	*48 844*	*60 255*	*120*	*131*	*101*	*134*
- Other shellfish	*2 193*	*2 801*	*3 295*	*1 946*	*15*	*18*	*16*	*10*
- Crustaceans, including shrimp	*50*	*57*	*44*	*69*	*1*	*1*	*1*	*2*
Marine fish farming	**4 269**	**3 890**	**4 442**	**5 707**	**37**	**33**	**41**	**51**
- seabass, bream	*3 332*	*2 947*	*3 329*	*4 229*	*27*	*22*	*28*	*35*
*- other***	*937*	*943*	*1 113*	*1 478*	*10*	*11*	*12*	*16*
Total sales for human consumption	**132 290**	**139 154**	**149 572**	**153 923**	**556**	**584**	**538**	**594**

* Including shrimps, excluding seaweed.
** Other sea fish: meagre, salmon, turbot, sole, sea trout.
Source: Agreste / Aquaculture surveys 2016, 2017, 2019; Shellfish farming survey 2018; fish farming survey 2018.

Tab. 12. Turnover in French mariculture

	2018		2019	
	million EUR	%	million EUR	%
Shellfish farming turnover	**686**	**100%**	**776**	**100%**
- Consumer sales	497	72%	542	70%
- Adult shellfish sales between producers	146	21%	174	22%
- Half raising farm and nursery product sales	16	2%	28	4%
- Seed sales (from hatchery and natural collection)	27	4%	32	4%
Fish farming turnover	**69**	**100%**	**78**	**100%**
- Consumer sales of fish	41	59%	51	66%
- Sales to hatcheries	28	41%	27	34%
Total mariculture	**755**	**100%**	**854**	**100%**
% shellfish farming		91%		91%
% fish farming		9%		9%

Source: Agreste / Aquaculture surveys 2016, 2017, 2019; shellfish farming survey 2018; fish farming survey 2018.

1.2.2. Employment in marine aquaculture

Shellfish farming represents at least 95% of full-time equivalents (FTEs) in mariculture. Employment in shellfish farming and fish farming taken together reached 8,810 FTEs in 2019, down by 7% in comparison with 2018. Jobs created in sea fish farming represented barely 400 FTEs in 2019 and follow a downwards trend in the short and medium terms.

The 28 fish farming companies identified in 2019 are larger than shellfish farming companies, and have an average of 14 employees. Distribution by size also varies considerably: the great majority of shellfish farming companies employ fewer than 5 FTEs (38% work with fewer than 2 FTEs), and the category with more than 20 FTEs represents 1% of companies and 14% of full-time jobs; conversely, in sea fish farming, this category groups 18% of the population of companies and 69% of FTEs.

Regarding shellfish farming areas, nearly a quarter of companies and a third of jobs are located in Charente-Maritime.

Tab. 13a. Companies and employment in marine aquaculture

	2018	2019	2019/2018 change	2019/2013 change
Shellfish farming				
Number of companies	2 542	2 281	-10%	-19%
Persons employed	16 865	16 281	-3%	0%
Employment (FTE)	8 952	8 421	-6%	-4%
Number of jobs per company	3,5	3,7	5%	38%
Fish farming				
Number of companies	31	28	-10%	4%
Persons employed	813	667	-18%	24%
Employment (FTE)	476	389	-18%	-22%
Number of jobs per company	15,4	13,9	-9%	-25%

Sources: Agreste / Aquaculture surveys 2017, 2019; shellfish farming survey 2018; fish farming survey 2018.

Tab. 13b. Shellfish farming companies and employment by region in 2019

Shellfish farming region	Number of companies		Number of persons employed	Number of FTEs	
North and Normandy	279	12%	2 809	1 269	15%
North Brittany	208	9%	2 665	1 138	14%
South Brittany	346	15%	1 719	1 110	13%
Pays de la Loire	209	9%	1 344	800	9%
Charente-Maritime	643	28%	5 482	2 582	31%
Aquitaine	215	9%	922	601	7%
Mediterranean	381	17%	1 340	922	11%
Total	2 281	100%	16 281	8 422	100%

Source: Agreste / Aquaculture survey.

1.2.3. Mariculture in Europe and the world

World aquaculture production in seawater, excluding seaweed, increased from 20 to 32 Mt over the decade from 2010 to 2019. In value, it increased over the same period, from USD 53 to 107 billion in current values (source: FAO). It should be noted however that it remains lower in quantity and value to aquaculture in inland waters, which produced 53 million tonnes in 2019.

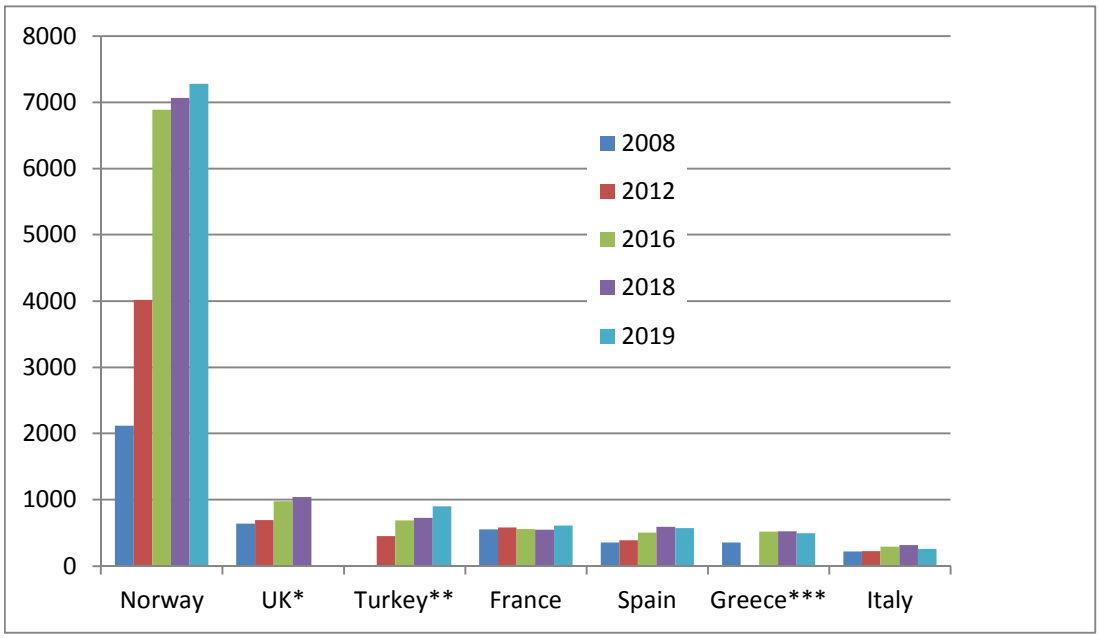
Seven countries taken together represent more than 90% of European marine aquaculture production in quantity and value: Spain, Greece, France, Italy, Norway, United Kingdom, Turkey. This group of producers is dominated by Norway, as it represented about 55% of the quantities and 65% of the value produced in Europe in 2019. Starting from low levels in the 1990s, Greek and Turkish productions have also progressed considerably over three decades. Although Greek production has stabilised that of Turkey has continued to increase.

Aquaculture production in Asia – especially China – predominates on the international level, regarding both marine waters and continental waters. World aquaculture production statistics show that China represented 57% of quantities and 58% of the value produced in 2019. The same year, eight countries generated 86% of production in quantity and 84% in value.

The charts and data presented here concern shellfish farming and fish farming, two types of production that are not very comparable.

Chart 14a. Main producing countries in Europe: production values

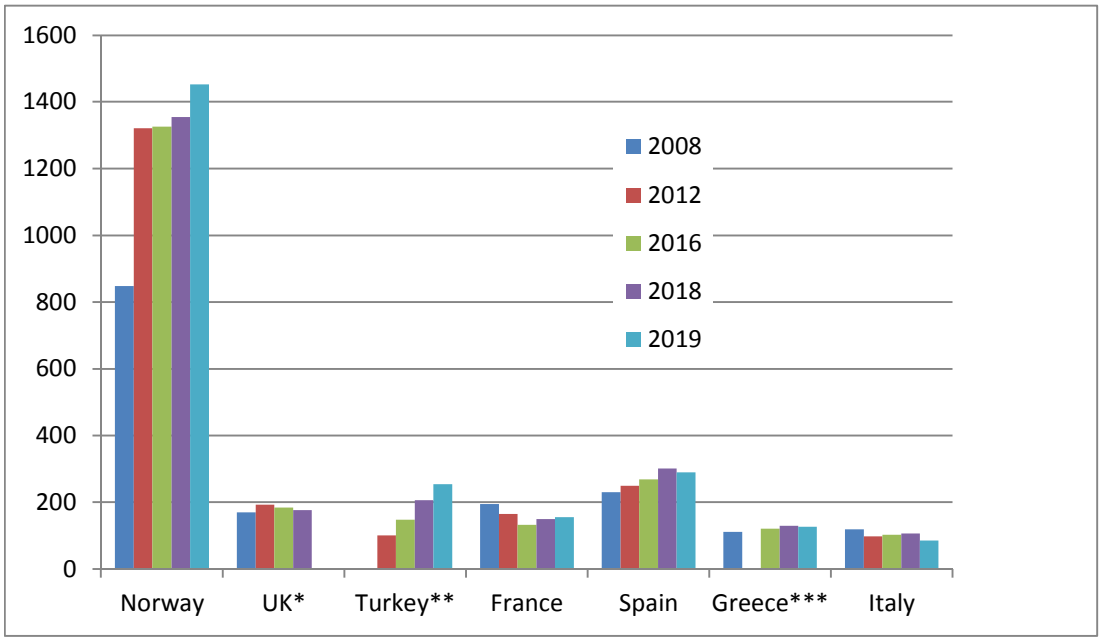
Unit: million euros



*Data lacking for 2019. ** Data lacking for 2008. *** Data lacking for 2012.
Aquaculture production except hatcheries and nurseries. Seawater and brackish water. All aquatic organisms.
Source: Eurostat

Chart 14b. Main producing countries in Europe: quantities of production

Unit: thousand tonnes



* Data lacking for 2019. ** Data lacking for 2008. *** Data lacking for 2012.
Aquaculture production except hatcheries and nurseries. Seawater and briny water. All aquatic organisms.
Source: Eurostat

Tab. 14c. World aquaculture production: main countries

All aquatic animals (fish, crustaceans, molluscs), continental and marine waters.
Unit: thousand tonnes, million USD

	2010		2019	
	Quantity	Value	Quantity	Value
World	57 744	131 222	85 336	259 547
China	35 513	70 830	48 246	150 751
India	3 786	7 073	7 795	14 515
Indonesia	2 305	4 894	5 950	13 062
Vietnam	2 683	5 980	4 442	12 040
Bangladesh	1 309	2 840	2 449	6 050
Egypt	920	1 679	1 642	2 862
Norway	1 020	5 081	1 453	8 152
Chile	701	3 753	1 385	10 898
Other	9 508	29 093	11 974	41 218

Source: FAO / annual statistics.

1.3. Seafood trade

This activity includes:

- wholesalers and retailers,
- fish auction markets,
- fish traders.

The fish (auction) markets are markets in which fish traders, fish mongers and wholesalers procure French and foreign products landed and which come under the authority and control of producers' organisations regarding withdrawal prices.

The fish traders, or fishmongers, are middlemen between producers on the one hand and wholesalers, retailers and hypermarkets on the other. They carry out batching, simple processing and packaging, as well as trading operations.

Tab. 15a. Key figures of seafood wholesale trading (1)

Units: million euros, number of jobs, FTE

	2014	2015	2016	2017	2018	2019
Number of companies	918	811	876	786	775	766
Turnover before taxes	4 132	4 126	4 706	3 669	3 810	3 742
Value added before taxes	409	387	453	446	452	435
Number of employees (2)	7 075	6 784	7 344	6 322	6 596	6 689
Number of employees (FTE)	5 981	5 718	6 264	5 337	5 620	5 687
Exports	417	458	495	341	396	388
Export on turnover ratio	10,1%	11,1%	10,5%	9,3%	10,4%	10,4%

(1) Including fishmongers and auction markets.
(2) Number of employees as of 31December.
Sources: Insee/Structural Business Statistics / NAF 46.38A.

Tab. 15b. Key figures of seafood retailing

Units: million euros, number of jobs, FTE.

	2014	2015	2016	2017	2018	2019
Number of companies	1 984	1 990	1 906	1 945	1 919	1 891
Turnover before taxtes	772	842	828	751	835	914
Value added before taxtes	194	218	208	195	217	243
Number of employees (1)	3 643	2 944	3 345	2 852	3 315	4 089
Number of employees (FTE)	2 650	2 755	2 812	2 478	2 867	3 614
Exports	7	6	5	2	9	7
Export on turnover ratio	0,9%	0,7%	0,6%	0,3%	1,1%	0,7%

(1) Number of employees as of 31 December.

Sources: Insee/Structural Business Statistics /NAF 47.23Z.

Observation

- The number of fish auction markets fell from 42 during the 1990s to 37 in 2015, but has been stable since then. Also, no trend of concentration of the activity has been observed in recent years, as shown by the value of sales.

1.3.1. Fish markets in France

	2005	2012	2015	2020
Share of the value of sales of the ten leading markets	59%	62%	60%	58%
Share of the value of sales of the five leading markets	41%	43%	39%	38%

Source: Franceagrimer

Concentration of fish trading occurred in the past and the number of companies has decreased. The volume of activity has remained stable.

Evolution of fish trading companies*

	2006	2009	2011	2015
Number of companies	374	305	306	278
Turnover (M EUR)	2 225	1 945	1 932	2 384
Number of employees	5 500	4 700	4 584	5 945

*Companies whose core activity is fish trading, whether or not they also carry out processing.

Source: Franceagrimer.

Tab. 16. Regional distribution of fish trading in 2016

	Number of companies	Employment	Turnover
H-de-France	12%	14%	18%
Normandy	17%	11%	7%
Brittany	34%	34%	28%
P de la Loire, N-Aquitaine	19%	21%	20%
Mediterranean	12%	7%	8%
Other, including overseas	6%	13%	20%

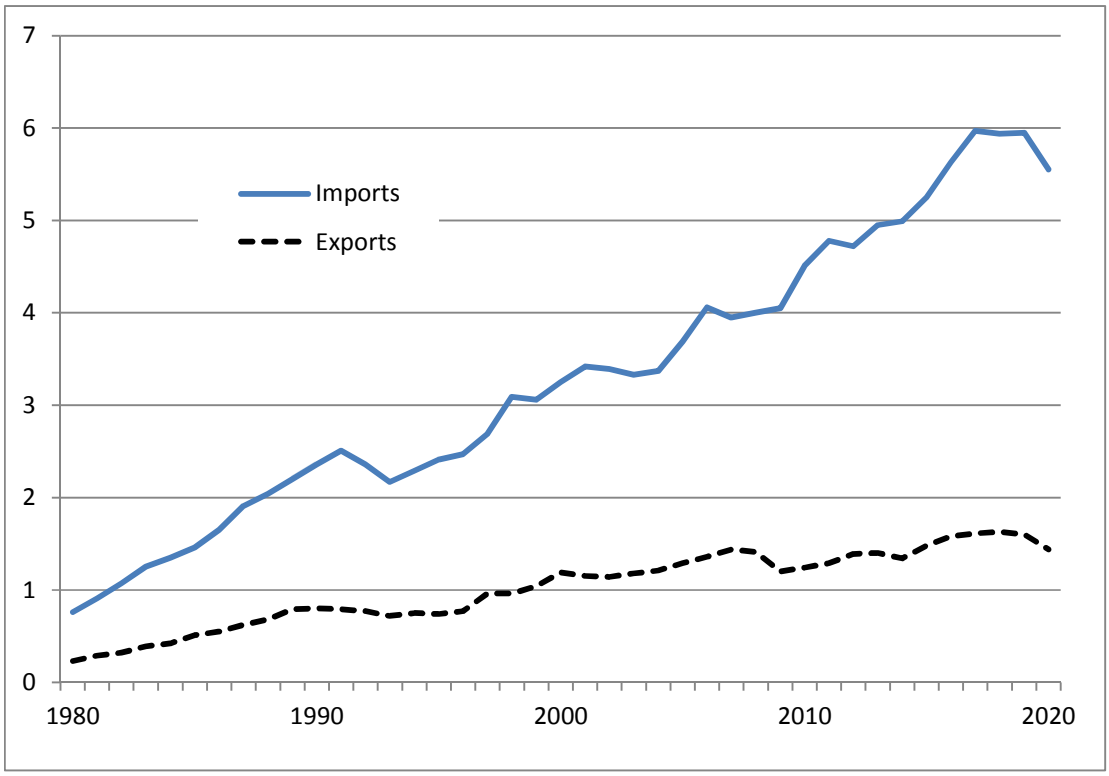
Source: FranceAgriMer

1.3.2. Foreign trade

Data for the whole activity take into account all the products traded, including aquaculture products and the commodities used by seafood processing companies. The total of the seafood products imported and exported by France shows a structural deficit which is increasing.

Chart 17. French foreign trade in fish* and mariculture products

Unit: billion EUR current value



*Including fishmeal, fat, oil, seaweed and ornamental fish

Source: FranceAgriMer

1.4. Seaweed production and processing

Production is mainly intended for the extraction of gelling agents (colloids). Seaweed processing is an activity requiring research input. The outlets are mainly:

- colloid production (alginates, carrageenin, agars): texture agents used for human and animal foodstuffs, pharmaceuticals, agriculture (fertilisers, treating the erosion of arable land), medicine (dressings, dental moulds), cosmetics, textiles;
- food seaweed (processing, food preservation, packaging).

1.4.1. Seaweed harvesting

Activity in France

It is estimated that 70 to 90,000 tonnes of seaweed a year are harvested (seabed seaweed, shore seaweed); 72,000 t in 2015 of which 90% in Brittany.

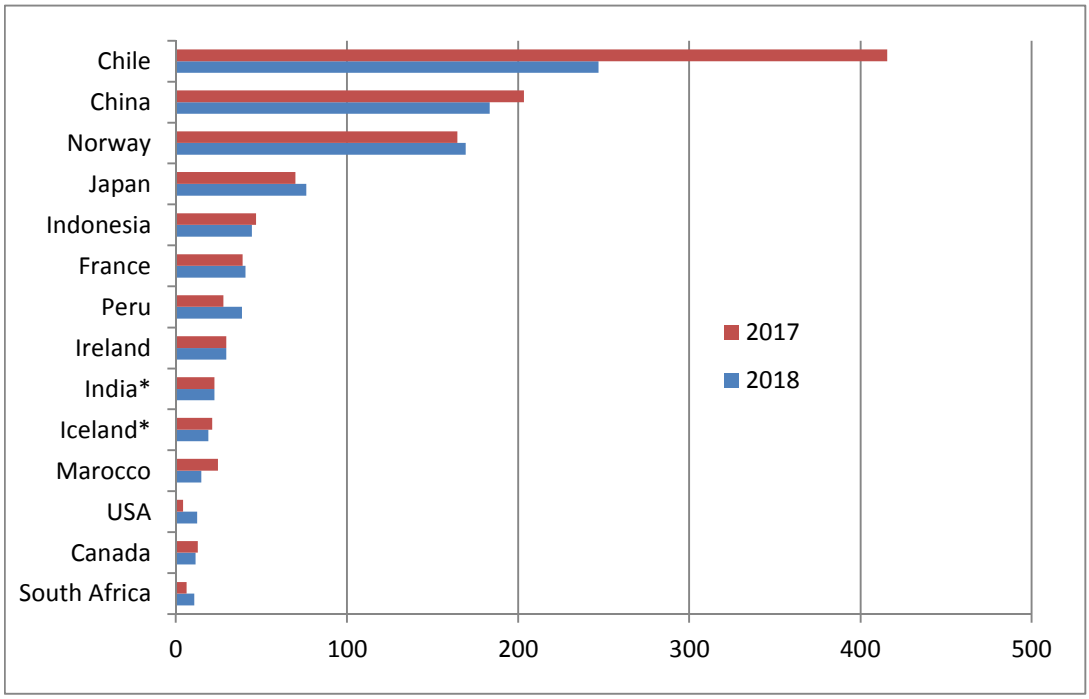
- About 60,000 tonnes of oarweed (*Laminaria digitata* from May to October, *Laminaria hyperborea* in winter) is harvested at sea under 35 licences by seaweed harvesting vessels off the west coast of Brittany (Finistère) for a turnover estimated at EUR 1.7 to EUR 2.7m. The archipelago of Molène is the largest laminaria meadow in Europe. About 1,000 t of red seaweed (*Gelidium imperial*) is harvested off the Basque coast (Hendaye).
- About 4,500 to 6,000 tonnes of around twelve species authorised for human consumption – mainly fucales – are harvested by hand on the foreshore, mostly in Finistère. In Brittany, the activity involves 79 companies, 277 harvesters, including 140 professionals working year-round, and nearly as many seasonal workers. Sources: report of the Seaweed Biomass programme, Idealg project, Sensalg' project.

The jobs of the seaweed sector (sailors and harvesters) are included in the key figures for the fishing sector (see above).

Activity worldwide

For more than a decade, the harvesting of wild seaweed has fluctuated between 1 and 1.3 million tonnes. In 2018, it was below a million tonnes for the first time during the period.

Chart 18a. Seaweed harvesting, all fishing areas: main countries
Unit: thousand tonnes



* FAO estimations.
Source: FAO / statistics annual.

1.4.2. Seaweed farming

The farming production of seaweed and other aquatic plants has increased by about 6 to 7% a year in quantity and value for more than a decade to reach more than 32 Mt and over USD 13 billion in 2018. Asia produced 99% of quantities in 2018 and 70% of the value. French production has been about 500 tonnes for ten years for a value close to USD 300,000.

Table 18b. World production of aquaculture of aquatic plants: main producing countries

Units: thousand tonnes, million dollars

	Quantity 2005 ('000 t)	Quantity 2014 ('000 t)	Quantity 2018 ('000 t)	Value 2018 (million USD)
China	9 494	15 022	18 575	9 494
Indonesia	911	10 077	11 050	1 383
S Korea	621	1 087	1 710	813
Philippines	1 339	1 550	1 478	207
N Korea	444	491	553	83
Japan	508	374	390	1 213

Source: FAO / statistics annual.

1.4.3. Seaweed processing

The economic indicators of this activity are taken into account in the seafood processing key figures (see following section). In France, in recent years, it has involved:

- nearly 80 companies,
- more than 1,600 jobs,
- for a turnover estimated at EUR 424 million in 2012 (source: Idealg project).

In France, the production of colloids and chemical processing (cosmetics, pharmaceuticals) are performed by companies belonging to international groups. The processing of edible seaweed is mainly done by local companies. Nearly three quarters of production is used in the agrifood industry, chemicals and microbiology; nearly a quarter by agriculture, water treatment and cosmetics; a small proportion is used as food products for culinary preparations. On the international level, close to three quarters of production is exploited for food products.

1.5. Seafood processing

The seafood processing industry groups companies that make, process or preserve products intended for human food based on fish, crustaceans, molluscs, cephalopods and other products from fishing and aquaculture.

Tab. 19. Key figures of seafood processing

Units: million euros, number of jobs, FTE

	2014	2015	2016	2017	2018	2019
Number of companies	327	380	495	322	316	333
Turnover before taxes	3 512	3 677	4 173	4 455	4 829	4 823
Value added before taxes	640	662	687	744	810	827
Number of employees (1)	12 480	12 073	13 641	12 003	13 524	12 915
Number of employees (FTE)	10 954	11 218	12 665	11 021	12 255	11 769
Exports	307	332	365	574	549	532
Export on turnover ratio	9%	9%	9%	13%	11%	11%

(1) As of 31 December.

Sources: Insee/Structural Business Statistics (NAF 10.20Z). The statistics exclude the manufacture of fish-based dishes and fish and chips.

1.5.1. Distribution of the activity in France

The distribution of turnover by products does not refer to the same group of companies as that of the key figures. It takes into account pre-cooked fish-based dishes which make up a significant share of production.

Tab. 20. Distribution of turnover by type of product, 2018*

Salted products, in brine, dried, smoked	31%
Prepared or preserved products, excluding pre-cooked dishes	29%
Whole, fresh, frozen products (1)	22%
Pre-cooked dishes, fish fingers	17%
Co-products	1.1%
Liquid products in soup form	0.8%
Seaweed, subproducts, other products	0.07%

*Estimations based on a limited sample.
(1) Fileting, slicing, shelling, packaging, freezing.
Source: FranceAgriMer

Tab. 21. Regional distribution of activity

	Number of companies 2018	Turnover 2018	Turnover 2013
North, Picardy	20%	18%	10%
Normandy	5%	5%	7%
Brittany	26%	27%	34%
Pays de la Loire, Nouvelle-Aquitaine	16%	17%	26%
Languedoc-Roussillon, Provence-Alpes-Côte d'Azur	9%	5%	3%
Other regions including overseas	25%	28%	20%

Source: FranceAgriMer

Comments

- According to the data of FranceAgriMer, the share of prepared products in the total turnover is increasing and became the largest item from 2012 onwards. The share of more traditional products (preserves, shrimps) and products of first-stage processing fell in 2013, before increasing slowly in recent years.
- Brittany is the leading region in terms of the number of seafood processing companies and of share of national turnover. This share has tended to decline in recent years since 2013.

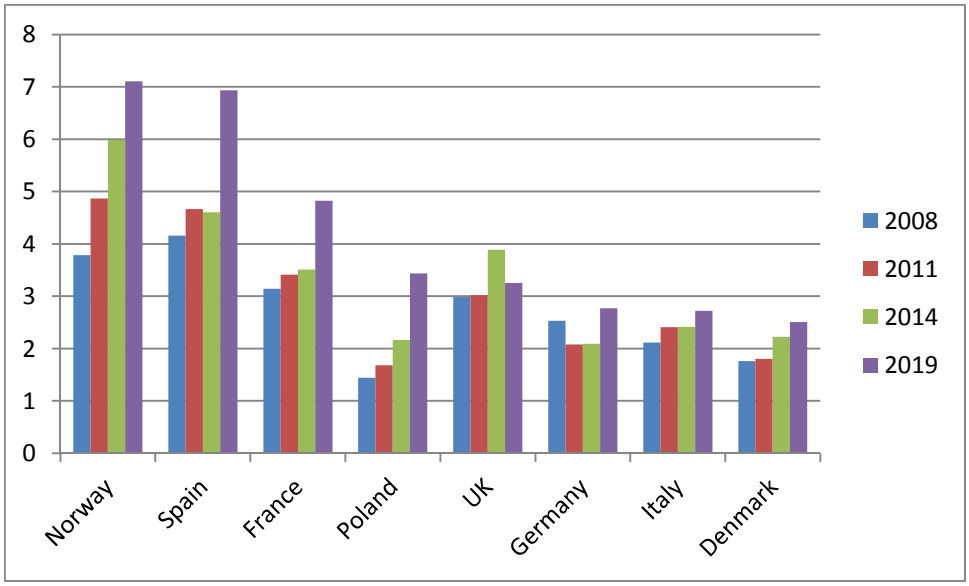
1.5.2. Seafood processing in Europe

The activity is concentrated in several countries. Six countries – Germany, Denmark, Spain, France, Italy, Poland, United Kingdom and, outside the EU, Norway – together contributed to more than 95% of the total turnover of the EU-28 in 2019.

During the recent period since 2008, the turnover of the main industries in the countries of the group has increased, especially those of Norway, Spain and France, as well as Poland. On the contrary, employment has not increased significantly except in Spain and Poland. Everywhere else over the same period it has stagnated, decreased or is increasing slightly. The Norwegian industry recorded a particularly high turnover per employee ratio.

Tab. 22a. Seafood processing industry in Europe: turnovers of the main producing countries

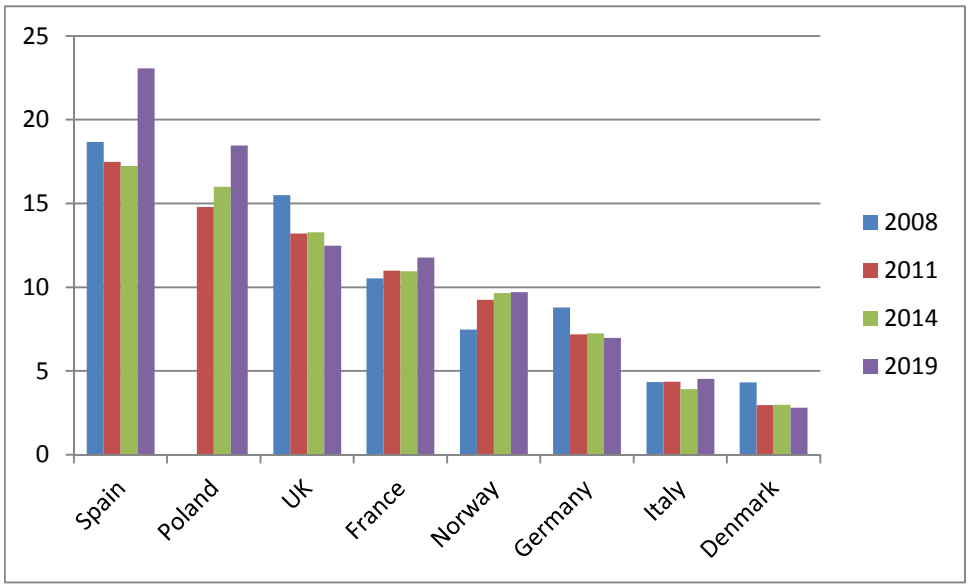
Unit: billion euros



Data for 2019 not available for the UK; replaced by data for 2018.
Source: Eurostat / Structural business statistics (SBS), NACE 10.20.

Tab. 22b. Seafood processing industry in Europe: employment in the main producing countries

Unit: thousand FTEs



Data for 2019 not available for the UK; replaced by data for 2018.
Source: Eurostat / Structural business statistics (SBS), NACE 10.20.

Dugornay Olivier

2. Extraction of marine aggregates

The marine materials exploited in mainland France comprise silica sands and gravels on the one hand, and limestone sands and marl on the other. The other types of materials are exploited in Guadeloupe (mixed volcanic and limestone sands for construction) and in Saint-Pierre-et-Miquelon (silica sands and gravels). The products are mainly used for construction, principally for the fabrication of concretes (silica granulates), the amendment of agricultural soils (limestone granulates and marl), nourishing beaches threatened by erosion and, in lower volumes, for market gardening (silica sands), treating drinking water and bone surgery (marl).

Tab. 1. Key figures for marine aggregate production

	2012	2013	2014	2015	2016	2017	2018	2019
Silica sand and gravel ('000 tonnes), of which:	5 398	4 926	4 498	4 187	4 278	4 952	5 613	5 475
English Channel	1 155	1 197	1 342	1 102	1 139	1 660	2 020	1 892
Atlantic	4 243	3 729	3 157	3 085	3 139	3 292	3 593	3 583
Limestone - Brittany (1) ('000 tonnes)	235	285	261	326	345	733	261	261
Estimated production value (2) (million EUR)	71	67	61	57	56	65	73	72
Estimated gross value added (3) (million EUR)	23	21	18	17	17	20	23	23

(1) Shelly sand and marl. Tonnages estimated from authorised quotas (in cubic meters) from 2014 onwards, for reasons of confidentiality.
(2) Estimation based on effective total production and average commercial prices after consultation of the industry.
(3) Estimation using Structural business statistics, NACE 08.12.
Note: data on beach nourishment are excluded, due to their fragility.
Sources: DREAL, INSEE.

2.1. The activity in France

In volume, the production of marine granulates represents about 1.5% of the total production of granulates in France.

19 companies and 16 sand dredgers operate 16 silica concessions close to the Channel and Atlantic coasts. The main unloading ports are Dieppe, Le Havre, Brest, Quimper, Lorient, Nantes, Les Sables d'Olonne, and La Rochelle. Initial processing of the silica sand and gravel is done at about thirty coastal sites before being sold. Five shelly sand sites are open to exploitation off the Brittany coast, with production subject to treatment in two plants located on the north coast of Brittany. The workforce employed is about 655 people onboard and on land (source: CGEDD and CGE, 2017).

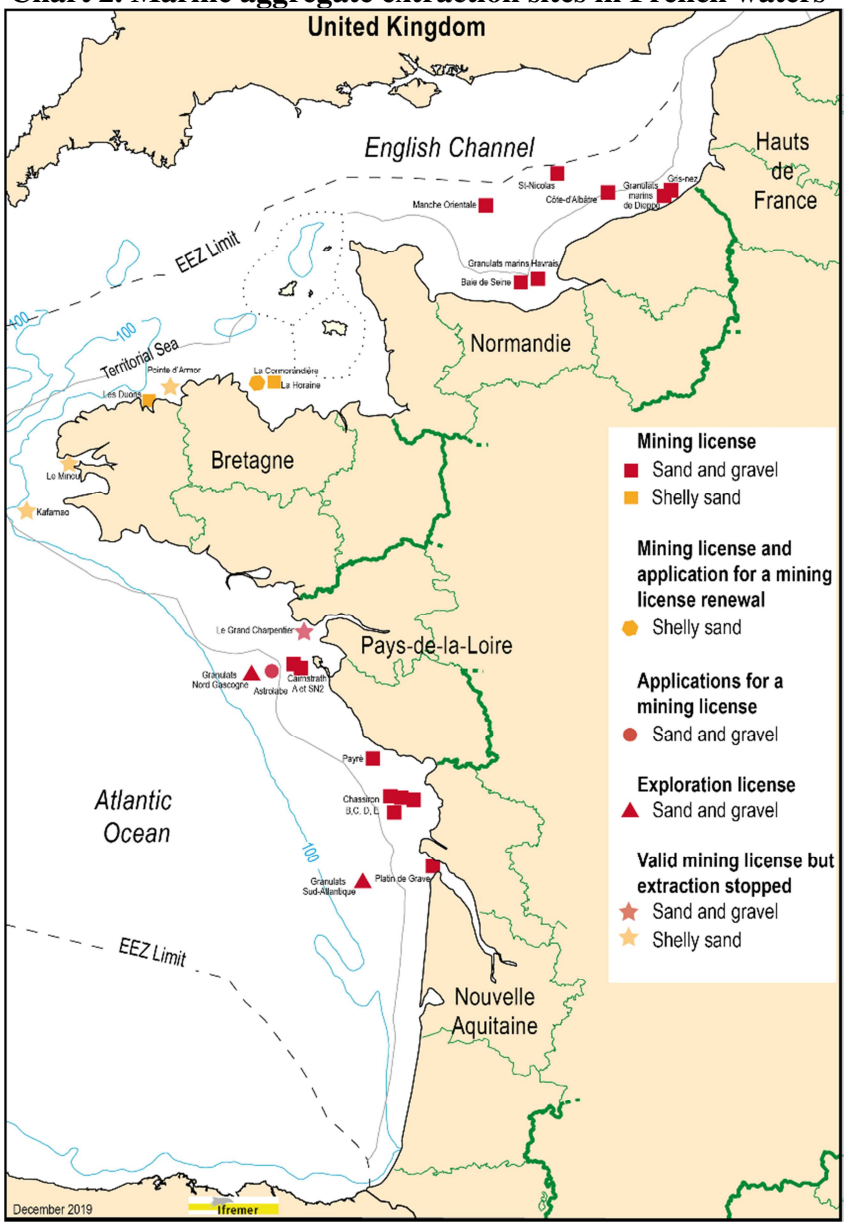
In 2018, French imports of marine aggregates from Belgium, the Netherlands and the United Kingdom were estimated at more than 370,000 m^3, i.e. about 10% of France's production (source: ibid.).

Following the Habitats directive (92/43/CEE), compliant with the OSPAR convention, marl extraction was reformed in 2013 "with a vision of the whole maritime environment", as

extraction authorisations were limited to "only satisfying utilisations with low quantitative demand", in the terms of law no. 2009-967 relating to the implementation of the Grenelle Round Table on the Environment, article 35.

There is no extraction of marine granulates on the Mediterranean coast, except for a few occasional extractions for beach replenishment.

Chart 2. Marine aggregate extraction sites in French waters



Source: IFREMER / Laure Simplet, in *ICES Working Group on the Effects of the Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) Report 2019*.

2.2. Extraction of granulates in HELCOM and OSPAR zones

The North Sea, and to a lesser extent, the Baltic Sea and the Channel, are subject to sustained exploitation by the neighbouring countries. Extractions of shelly sand and rocks remain modest in comparison to those of silica.

The use of aggregates (construction, nourishment, fill) varies according to country, zone and period. By comparison, France generally exploits little for nourishment and fill.

During periods of major public works, Dutch extractions can exceed a hundred million tonnes a year. British extractions have stabilised at high levels in the zone under the licence of the Crown Estate. The Netherlands, United Kingdom and Belgium are major exporters, especially Belgium, in their share of total extractions.

The data of the International Council for the Exploration of the Sea (ICES) used here concern extraction in the waters of each country, independently of the nationality of companies.

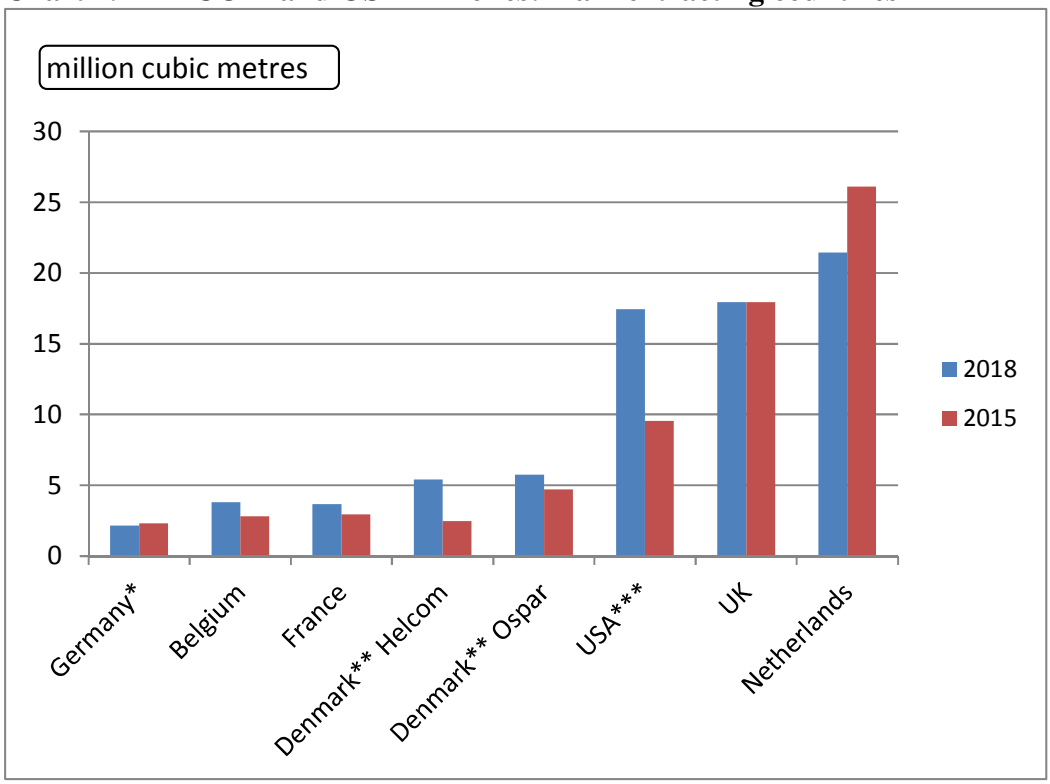
Tab. 3. Main zones of extraction of marine materials in the HELCOM and OSPAR zones, 2018

Unit: thousand m^3

	Construction /industrial aggregates	Coastal protection (4)	Construction fill / land reclamation	Rock, shell, marl	Total extracted	Of which: Exports
Germany (1)	21	1 149	0	0	1 169	0
Belgium	2 801	988	0	0	3 789	1 075
France	3 476	nd	nd	200	3 677	0
Denmark (2)	3 991	3 901	2 249	0	10 141	479
USA (3)	0	16 928	526	0	17 454	0
UK	15 590	1 248	1 088	0	17 926	1 297
Netherlands	0	12 374	8 947	135	21 457	3 262

1 OSPAR zone only. HELCOM data not available.
2 Overall amounts for Denmark take account of the overlap between HELCOM and OSPAR zones in Kattegat.
3 Northeast coast, north of Cape Hatteras.
4 Beach replenishment, coastal erosion prevention projects, coastal infrastructure protection.
Source: ICES / WGEXT Report.

Chart 4. HELCOM and OSPAR zones: main extracting countries



*Years 2015 and 2017.
**HELCOM and OSPAR zones overlap in Kattegat, Denmark.
***Northeast coast, north of Cape Hatteras.
Source: ICES/WGEXT Report, various years.

3. Salt production

All salt production is taken into account here, that is to say extraction from salt mines (rock, evaporated, dissolution) and the exploitation of salt marshes.

Tab. 1. Key figures of salt production in France

Units: million euros, number of persons

	2014	2015	2016	2017	2018	2019
Number of companies	129	310	167	172	89	77
Turnover before taxes	235	239	219	16	c	520
Value added before taxes (1)	17	78	11	6	c	216
Number of employees (2)	756	743	729	90	321	c
Number of employees (FTE)	741	734	711	82	279	c
Exports	20	23	25	3	c	62

1 Including all other operating revenue and expenses.
2 As of 31 December.
c: confidential data.
Source: INSEE/Structural Business Statistics, NAF 08.93Z. Excluded: a) processing of salt for food consumption, b) desalination of seawater, c) support activities of salt production. Break in statistics in 2017: see comments in introduction.

3.1. Production of salt in France

French production has risen considerably recently, rising from nearly 6 million tonnes in 2018 to nearly 7 million in 2019 (versus nearly 8.5 million in 2006). Most of the salt produced in France comes from underground deposits. Salt marsh production reached a million tonnes in 2013. Foreign trade is conducted mainly with the countries of the European Union; they are in deficit:

- exportations were lower than 200,000 tonnes in 2019 but slightly higher than in 2018;
- imports were higher than 460,000 tonnes in 2016, and recorded a decrease mainly due to non-food salts (-30% versus the previous year).

Tab. 2. Salt production in France

Units: thousand tonnes, thousand tonne salt equivalent

	2018	2019
Salt production	5 987.7	6 953.4
Including:		
Rock salt	4 075.5	4 249.5
Salt by dissolution	1 912.2	2 703.9
Exports	172.6	189.3
Including:		
Food salt	65.5	69.4
Non-food salt	107.1	119.9
	2015	**2016**
Imports	667.5	464.4
Including European Union	83.4%	93.6%
Food salt	570.9	367.1
Non-food salt	96.5	97.3

Source: Sels de France, General Direction of Customs and Indirect Duties.

3.2. Salt production in the world

The main uses of salt are chemicals and the fabrication of chlorine products (60% of consumption), food and snow clearing (14% each). World production is around 270 million tonnes (source: United States Geological Survey – USGS).

Tab. 3. Main salt producing countries

Unit: million tonnes

	2010	2015	2019 (4)	2020 (4)
World	269,0	292,0	283,0	270,0
China	70,4	66,7	59,0	60,0
USA (1)	43,3	45,1	42,0	39,0
Europe (2)	52,4	52,2	nd	nd
India	17,0	24,2	29,0	28,0
Germany (3)	19,7	14,2	14,3	14,0
Australia	11,5	11,4	13,0	12,0
Canada	10,4	14,3	11,0	10,0
Mexico	8,4	9,1	9,0	9,0

1 Including Porto Rico.

2 EU, Switzerland, Serbia, excluding Byelorussia and Ukraine.

3 Including installations in different countries.

4 Estimations.

Source: USGS.

4. Electricity production

This chapter concerns electricity production units installed on the coast and projects relating to marine energy. Choosing a production site often depends on the possibilities of cooling and diluting the effluents of a power plant. The sea, a cold, natural and stable source, makes the area adjacent to the coast an interesting place for installing thermal and nuclear power plants. This proximity also allows reducing fuel transport costs. Lastly, winds, sea currents, and waves are sources of energy.

Coastal and marine electricity production is affected, as is electricity production in general, by national and international decisions motivated by the combat against climate change. Therefore, projects for installations that harness marine energies are increasing in countries endowed with sea coasts.

4.1. Electricity production installed on the French coast

Among the recent proposals that will affect coastal electricity production, mention must be made of law 2019-1147 of 8 November 2019, relating to energy and the climate, called the "energy-climate" law. It plans for the shutdown of coal-fired power plants by 2022 and a ceiling on the greenhouse gas emissions of power plants using fossil fuels of 0.55 CO_2/MWh equivalent. The law targets a reduction of 40% in fossil fuel consumption by 2030 in comparison with that of 2012. It formalises:

- France's commitments to the Paris Agreement on the Climate during the COP 21 (Conference of the Parties to the Framework Agreement on Climate Change, December 2015),
- the transposition in France of EU's "Green Deal" – COM(2019) 640 final of 11 December 2019 – whose goal is to reach carbon neutrality for the European Union by 2050.

The operational documents are the "multi-annual energy programmes" (PPE) of mainland France, Corsica and the overseas regions. The PPEs are framed by the law on energy transition for green growth (law 2015-992 of 17 August 2015). On the demand side, they orient electricity production facilities towards progressive lowering of carbon intensity, and they plan for the imminent shutdown of coastal coal-fired plants and the modernisation or replacement of old thermal plants.

Tab. 1. Coastal electricity plants

Site	Units	Net power (MW)	Energy source	Operation start	Headcount (1)	As of (headcount reference date)	Footprint (ha) *(of which: area reclaimed from the sea)*
Continental metropolitan France							
DK6 Dunkirk (port) (2)	1 and 2	2 * 394	Natural and blast-furnace gas combined-cycle	2005	80	2017	4,5
Gravelines	1 to 6	6 * 900	Nuclear (PWR pressurized water reactor)	1980-1985	2 812	2019	150 *(100)*
Penly	1 and 2	2 * 1300	Nuclear (PWR)	1990-1992	1 137	2019	230 *(70)*
Paluel	1 to 4	4 * 1300	Nuclear (PWR)	1984-1986	2 137	2019	160
Le Havre - port (3)	1	600	Coal	1983	234	2019	33
Flamanville	1 et 2	2 * 1330	Nuclear (PWR)	1985-1986	1 174	2019	120 *(60)*
	3	1 650	Nuclear (EPR European pressurized reactor) (4)	2022	421	2019	
Rance estuary (5)		240	Tidal power plant	1966	90	2019	6
Dirinon (6)		170	2 domestic fuel oil combustion turbines	1980-1981	7	2019	
		1,7	2 onshore wind turbines	2004			
Cordemais (7)		2 * 600	Coal	1983-1984	620	2019	150
Le Blayais	1	900	Nuclear (PWR)	1981	1 989	2019	227
	2	900	Nuclear (PWR)	1982			
	3 et 4	2 * 900	Nuclear (PWR)	1983			
Martigues		2 * 465	Natural gas combined cycle gas turbines	2012-2013	95	2018	52
		0,1	Solar panels	2013			
Islands and overseas regions not connected to the continental metropolitan electricity grid (main coastal generation units)							
Corse - Le Vazzio (8)		132,3	7 low-speed diesel engines	1979	na		
Corse - Lucciana A		105	4 fuel oil combustion turbines	1992-2008	na		
Corse - Lucciana B		112	7 very low sulfur content diesel generators	2014	na		
Guadeloupe - Pointe Jarry		220	12 diesel engines	2015	na		
Guadeloupe - Le Moule (9)		102	Bagasse-coal cogeneration	1998	94	2017	
Guadeloupe - Bouillante (10)	1 et 2	15	Geothermal plant	1986 et 2005			
Martinique - Bellefontaine 2		211	12 diesel generators	2013	100	2019	
Martinique - Pointe des Carrières		81,2	2 diesel generators	1996	92	2019	
		66	3 light fuel oil combustion turbines	2012			
Martinique - Galion	1	40	Fuel oil combustion turbine	2007	40	2018	
	2	40	Bagasse cogeneration	2018	40	2018	
Guyane - Dégrad-des-Cannes		67,4	9 heavy oil medium-speed diesel engines (11)	1982-1987	na		
	10	20	Light fuel oil combustion turbines	1991	na		
Guyane - Kourou	4	20	Light fuel oil combustion turbines	1993	na		
Réunion - Le Port-Est		211	12 diesel generators	2013	na		11
Réunion - La Baie		80	2 fuel oil combustion turbines	2002-2009	na		
Réunion - Bois rouge	1 et 2	97,2	Bagasse-coal cogeneration	1992-2004	na		
St-Pierre-et-Miquelon - St-Pierre		21	6 very low sulfur content diesel generators	2015	na		
St-Pierre-et-Miquelon - Miquelon		5,2	7 diesel generators		na		
Total in operation		**25 080**			**11 162**		

(1) Full-time personnel (operatives, external service providers) and apprentices. Workers on construction sites and renovations are excluded.
(2) Utilisation of gas from a neighbouring steelworks and gas terminal.
(3) Dismantled in April 2021.
(4) Under construction.
(5) Workforce including those of the plant and maintenance.
(6) IFREMER estimation of average workforce on site.
(7) Operation under low capacity from 2022 onwards. Dismantling scheduled for 2026 at latest.
(8) Shutdown scheduled for end of 2023 and replacement by a gas-fired plant.
(9) Abandon of coal as fuel scheduled for 2023.
(10) Tripling of installed capacity (45 MW) scheduled for 2023, with the Bouillante 3 project.
(11) Shutdown in 2024, replacement by a new unit built at Larivot.
na: not available.
Source: EDF, Engie, Albioma.

4.2. Marine renewable energies

The development of renewable energies is increasing considerably worldwide in the context of the combat against climate change and following the Paris agreement mentioned previously.

The objectives of the European Commission regarding marine renewable energies were made public in the communication COM(2020) 741 final of 19 November 2020: "An EU strategy to harness the potential of offshore renewable energy for a climate neutral future":

- 300 GW installed capacity in the EU-27 for offshore wind energy by 2050 (in comparison to 25 GW at present, including the production of the United Kingdom),
- 40 GW on the same date for the other marine energies (wave energy converters, marine turbines, tidal turbines, floating wind turbines, algae biofuels).
- The Commission estimates that the cumulated cost of such investments and infrastructures that they require (underwater and terrestrial electric connections) is about EUR 800 billion.

The PPE in force for mainland France for 2019-2028 (decree 2020-456 of 21 April 2020) plans for the acceleration of marine energy projects: in this area, France is bereft of operational equipment in commercial phase, although several projects are being developed.

4.2.1. Wind power at sea

State of development of offshore wind

In Europe wind power has reached industrial and commercial maturity. Europe, a pioneer of offshore wind power, had connected 5,402 turbines to the grid by the end of 2020 and it represented 75% of global offshore installed capacity at the end of 2019 (source: Global Wind Energy Council - GWEC). These are fixed foundations turbines (tower fixed to a base placed on the seafloor) of wind farms, most of which are installed in the shallow waters of the Baltic, North and Irish Seas. Investments in 2013 in offshore wind power in Europe were estimated at EUR 4.6 to 6.4bn; in 2020, they reached EUR 26.3bn (source: WindEurope). The United Kingdom was the earliest and largest market in Europe, representing 42% of installed capacity in 2020. Its objective is 40 GW in 2030.

In France: the construction of the equivalent of 3 GW was launched at six offshore sites following three calls for tender from 2011 to 2016. The long-term programme plans for six calls for tender for wind farms from now to 2023, in addition to the six projects now being developed and a sixth attributed in 2019, i.e. an additional installed capacity of 3.75 GW.

Outside Europe, the Chinese market has become preponderant. 3rd worldwide in 2019 with 23% of cumulated global capacity, it rose to 2nd in 2020 behind the United Kingdom. In terms of annual installed capacity per country, it has been in first place since 2018; in 2020, it represented more than half the world total (source: GWEC).

Tab. 2. Offshore installed wind power capacity in Europe (MW)

1993	5	2007	1 120
1994	7	2008	1 469
1995	12	2009	2 083
1996	29	2010	3 014
1997	29	2011	3 830
1998	32	2012	5 002
1999	32	2013	6 608
2000	36	2014	8 060
2001	86	2015	11 073
2002	256	2016	12 631
2003	532	2017	15 780
2004	622	2018	18 499
2005	712	2019	22 072
2006	801	2020	25 014

Source: WindEurope

Tab. 3. Offshore installed wind power capacity in Europe: main countries (MW)

	2013	2020
GB	3 681	10 428
Allemagne	520	7 689
Pays-Bas	247	2 611
Belgique	571	2 261
Danemark	1 271	1 703
Suède	212	192
Finlande	26	71
Irlande	25	25
Portugal	2	25
Espagne	5	5
Norvège	2	2
France	0	2

Source: WindEurope

Tab. 4. Investments in offshore wind power in Europe (billion EUR)

2010	8,4	2016	18,2
2011	6,1	2017	7,5
2012	5,0	2018	10,3
2013	7,2	2019	6,0
2014	8,8	2020	24,2
2015	13,1		

Source: WindEurope

Tab. 5. Offshore installed wind power capacity in China (MW)

2010	100
2011	210
2012	291
2013	417
2014	440
2015	559
2016	1 480
2017	2 788
2018	4 588
2019	5 930
2020	9 898

Source: GWEC, IRENA

Floating wind turbines (tower fixed to a floating or semisubmersible base anchored to the seabed), better adapted to deep waters (from 50-60 metres depth), cost more than fixed wind turbines: the most frequent hypotheses estimate the LCOE ("levelized cost of energy", i.e. "updated average cost over lifetime") for the first at 58-71 euros/MWh versus 35-54 for the second by 2050 (source: Ademe). Europe is the global pioneer of floating wind turbines (62 MW installed capacity).

Projects for commercial floating wind farms exist in several countries in and outside Europe. At the end of 2019, for a global capacity of 65.7 MW, the United Kingdom represented 49%, Japan 29%, Portugal 16%, Norway and France slightly over 3% each (sources: WindEurope, Global Wind Energy Council - GWEC). In France, three sea-based wind power projects out of six due to be launched from now to 2023 are announced as floating wind farms (two in the Atlantic, offshore at Groix and Belle-Île islands; the other in the Mediterranean, offshore at Gruissan).

The offshore wind power industry

This sector comprises several segments linked to initial investment, operation period, and final decommissioning:

- manufacturing segment
  - manufacture of rotors;
  - manufacture of mechanical, pneumatic, electric and electronic components installed in the nacelle;
  - manufacture of towers and fixed and floating bases;
  - manufacture of cables linking the turbines together and with the substation offshore, and the export cables transporting the energy landwards.
- services linked to the installation, connection to the grid, logistics and maintenance
  - installation and laying foundations, turbines, blades, wind farm and export cables;
  - installation of offshore and onshore substations (the latter most usually installed and operated by the grid operator);
  - logistic services from specialised port terminals;
  - construction and operation of windfarms, construction supervision, maintenance service management.

The increase in size of offshore wind turbines has been considerable and fast, not without impacts on the necessary logistic capacities. In the 2000, the power of the turbines did not exceed 5 MW for blades having a length shorter than 50 m; the most recent constructions of offshore wind turbines (end of 2020) have reached capacities from 13 to 15 MW for blades exceeding 100 m. The load factors of offshore wind power are favoured by the regularity of sea winds. They generally reach from 35% to 50%, and even higher for certain British wind farms, versus about 25% on average for land-based wind farms (reference year: 2018-2020, sources: WindEurope, GWEC).

The decommissioning of wind turbines and its cost are all the more important issues that the earliest farms are nearing the end of their operational life. In France, the decree of 22 June 2020 on certain "electricity generation installations utilizing wind energy" regulates the dismantling of wind turbines in function of their operation start dates and the recycling of dismantled material, with entry into force on July 1st, 2022. Entirely reclyclable blades are now available on the market; their cost is still discussed.

4.2.2. Other marine renewable energies

Marine turbines. The marine turbine potential of Europe (about 12.5 GW installed capacity) is distributed between the United Kingdom (75%), France (20%), Greece, Italy and Norway (source: IFREMER). Powerful sea currents close to coasts and limited depths (from 30-50 m) are necessary.

- French waters favourable for the installation of marine turbines are Cotentin (Raz Blanchard, Raz de Barfleur), Brittany (Fromveur, Paimpol-Bréhat) and Gironde. At each of the two sites of Brittany, following several phases of starting and stopping projects, a 1 MW demonstrator is undergoing tests and is supplying electricity to the grid; the fabrication and operating principles of the two prototypes are different. Furthermore, a concession has been granted for the installation of four 2 MW turbines at Raz Blanchard (Cotentin).

- Abroad, although several sites in the world are favourable, the most advanced projects can be found in Scotland, where four 1.5 MW turbines have started supplying electricity to the grid.

The main problem with the marine turbine sector is that the costs are still too high (LCOE from about EUR 300 to 500/MWh) with the requirement for considerable commitments, through time, in R&D and funding to obtain economies of scale and reduce these costs.

Tidal turbines. Following the first large installation in France – the plant of Rance (240 MW) – installed in the 1960s, globally the sector has seen a limited number of investments, the most recent being the plant at Lake Sihwa, in South Korea, 254 MW (2011). The new projects are of relatively small size with the exception of a plant with a capacity of 1320 MW announced in Korea. There is no new project in France.

The other marine energy technologies are at the research or pilot project stage:

Wave energy converters. Several processes have been studied around the world and several prototypes have been installed off Portugal, the United Kingdom (marine area of the Orkney Islands), Denmark, Belgium, Sweden, Australia, United States.

Ocean thermal energy conversion. This technique uses the difference in temperature between warm and cold sources, which can be harnessed in particular in tropical regions. South Korea seems to have reached the commercial phase. The United States and Japan are ahead with the study of demonstrators. A French company is studying a prototype in the waters of the island of Reunion.

Marine biomass. Many species of marine micro-algae are potential producers of fatty acids that can be exploited as algal biofuel whose yield is among the highest compared with biofuels produced from terrestrial oleaginous plants.

Osmotic energy. The difference in salinity between freshwater and seawater, especially at the mouths of rivers, produces energy that can be recovered by osmotic pressure on a semi-permeable membrane that separates freshwater from seawater. Another recovery technique is based on inverse electrodialysis, which recovers an electric current from ionic currents through membranes.

5. Shipbuilding

This sector groups the construction, repair and maintenance of merchant, military, fishing, pleasure and utility vessels, as well as the transformation, reconstruction and outfitting of pleasure boats. It does not include the manufacture or repair of ship and boat engines.

5.1.Building of ships and floating structures

This activity includes the construction of ships for transporting passengers and goods, military ships, fishing vessels, factory ships, utility vessels (port services, dredging, logistic support, other services). It also includes the construction and transformation of floating structures (docks, pontoons, barges, lighters, etc.) and drilling platforms. There is a risk of redundancy with offshore oil rigs (cf. below), which also includes the construction-installation of drilling platforms.

Tab. 1. Key figures of the building of ships and floating structures

Units: million euros, number of persons.

	2014	2015	2016	2017	2018	2019
Turnover before taxes	4 158	4 565	c	6 057	5 124	6 479
Value added before taxes	1 124	1 187	c	1 616	1 877	2 152
Number of employees as of 31 December	14 547	14 565	14 800	16 965	17 587	20 366
Number of employees (FTE)	13 579	13 617	13 676	15 669	16 209	18 774
Number of companies	163	160	145	c	c	167
Exports	907	2 604	c	3 046	2 219	3 155
Export / turnover	22%	57%	na	50%	43%	49%

c: confidential.

na: not available.

Sources: INSEE/Structural Business Statistics, NAF 30.11Z.

French production increased significantly during the five or six years prior to the health crisis. This increase was above all due to orders for cruise ships, whose workforces also concern other European countries, simultaneously with a reduction of international orders for cargo ships.

On the scale of Europe, the main shipyards are in Germany, France, Italy, Norway and the United Kingdom. European shipbuilding is relatively modest compared to international competitors: in 2018 and 2019, it represented less than 2% of new orders, i.e., a little less than 4 million dwt (source: Barry-Rogliano-Salles - BRS). It is mainly specialised in building cruise ships, services and defence.

The largest shipbuilders are in Asia. They dominate the market for cargo ships: oil tankers, LPG tankers, bulk carriers, chemical tankers, LNG tankers, container ships, roll-on-roll-off ships, car carriers. China's order book represented about 45% of the market share in 2018-2019, i.e., from 90 to 100 million dwt, Korea 27-28%, Japan from 22 to 25% (source: BRS).

Recently, the trend has been towards the concentration of shipbuilding yards in Asia and Europe for several reasons. The prices of ships are not very profitable in relation to the costs of materials and labour, in a context of fierce competition in a market in which new construction has slowed down since 2015-2016, and for which technical, energy and environmental regulations are increasingly severe.

Tab. 2a. Shipbuilding: turnover of the main European countries

Unit: million euros

	2011	2015	2019
France	3 840	4 565	6 497
Norway	8 393	8 301	6 382
Germany	3 598	2 982	6 039
UK*	3 917	6 134	5 011
Italy	3 819	5 594	4 932
Spain	2 773	1 837	2 367
Finland	506	902	1 804
Poland	957	838	910
Romania	825	1 021	673
Sweden	286	298	395
Croatia	528	324	245

*Data for 2019 unavailable, replaced by 2018.

Source: Eurostat

Tab. 2b. Shipbuilding: employment in the main European countries

Unit: number of employees (FTE)

	2011	2015	2019
UK*	21 219	na	24 680
France	11 379	13 617	18 869
Norway	21 530	24 014	18 187
Germany	13 185	12 732	18 054
Romania	16 184	18 284	16 546
Italy	11 477	12 823	15 656
Spain	9 991	7 461	8 367
Poland	8 066	4 167	4 985
Croatia	8 841	4 587	4 352
Finland	3 826	3 251	4 092
Sweden	1 280	1 297	1 647

na: not available.

*Data for 2019 not available, replaced by 2018.

Source: Eurostat.

Tab. 2c. International markets for cargo ships, 2019

Unit: million dwt

	Bulk carriers	Oil tankers & liquid bulk tankers	Container ships
Active fleet	867.8	608.6	275
Order book	92.1	59.7	27.5
Including the yards of:			
China	58.1	18.7	10.2
Korea	3.7	27.3	12.0
Japan	27.5	10.5	4.6

Source: BRS

- On the technological level, the energy efficiency of propulsion and the limiting of pollutant fuel emissions have become major objectives. Besides the new standards for sulphur content (OMI, 2020), the measure of energy efficiency (introduced in annex VI of the Marpol convention) and the limitation of carbon emissions have led to the study of new propulsion techniques. Orders for new ships show an increasing share of ships supplied with LNG (cruise ships and ferries). Other fuels are being studied: synthetic LNG, bio-LNG; as well as carbon-free alternatives: green hydrogen (produced by carbon-free technology), green ammonia, electric propulsion, sails. The costs of these emerging sectors are evolutive, although some bio-fuels can already be used without modifying engines.

5.2. Naval equipment

"Naval equipment" includes the production and supply of equipment goods and services to ship building and repair yards. The supply of equipment comprises two categories:

- the manufacture of technical equipment, notably engines, electric and electronic equipment, handling equipment on board, navigation and bridge equipment, pumps, ventilation and air conditioning; the fabrication of paints, coatings of decks, cockpits and floors of ships;
- the fabrication of assembled and tested equipment, in the form of modules in their technical setting, or prefabricated equipment, and complete systems such as the installation of ventilation and air-conditioning systems and the fitting of public areas and cabin areas of passenger ships.

The supply of services comprises consultancies and engineering companies.

The "naval industry sector" is wider and defined as including companies involved in building or equipment manufacturing: shipyards, equipment suppliers, installers and fitters, consultancies and engineering services, including naval architecture. This grouping, in which certain products are not specific to the maritime sector, has a workforce estimated by the industry at 20,000 jobs for shipbuilding, 26,000 jobs for the other activities, and a cumulated turnover of EUR 11.25 billion in 2020 (source: GICAN – Association of naval construction industries).

5.3. Ship repair and maintenance

The scope of this activity comprises:

- the regular repair and maintenance of ships,
- the repair and maintenance of pleasure boats.

It excludes the factory conversion of ships, the repair of ship and boat engines, and ship dismantling.

Tab. 3. Key figures of ship repair and maintenance in France

Unit: million euros.

	2014	2015	2016	2017	2018	2019
Turnover before taxes	1 088	1 055	972	979	1 091	1 174
Value added before taxes	312	341	302	309	344	341
Number of employees as of 31/12	5 320	c	5 334	5 100	5 309	5 415
Number of employees (FTE)	4 869	c	4 616	4 529	4 652	4 772
Number of companies	3 477	2 761	2 833	2 307	2 337	2 431
Exports	9	209	170	142	184	236
Export / turnover	1%	20%	17%	14%	17%	20%

c: confidential

Sources: INSEE/Structural Business Statistics, NAF 33.15Z.

In France, the solid growth of the activity during the period 2016-2019 can be explained mainly by the market for large and small cruise ships, until the health crisis and its negative effects on the cruise market. It can also be explained by the growth of demand for specialised ship repair (LNG tankers, military ships, service ships) and by local markets. The trend was observed for other European shipyards. The relatively favourable situation of these markets did not exclude mergers and takeovers, as observed in Europe in recent years.

The slowdown in the construction of cargo ships during roughly the same period (cf. above) led shipbuilding yards, especially in Asia, to merger, reduce their production capacities or seek additional activities in repairing ships of the same type. Hence there is fiercer competition on this market to the benefit of shipyards with low-cost labour and to the detriment of European shipyards. The latter sought to diversify in the dismantling-recycling market. French shipyards were not very concerned by this trend.

Tab. 4a. Ship repair in Europe: number of companies in main producing countries

	2011	2015	2019
UE-28	14 226	16 117	17 078 (1)
Turkey	na	1 709 (2)	na
Poland	2 459	2 762	3 171
France	2 080	2 761	2 431
Spain	1 636	1 910	2 382
Italy	2 107	2 029	2 263
Sweden	998	965	862
Norway	672	690	710
UK	423	536	670 (1)
Germany	418	419	568
Croatia	281	290	357

1-Data 2018; 2-data 2014.

na: not available.

Source: Eurostat

Tab. 4b. Ship repair in Europe: turnover in the main producing countries

Unit: million euros

	2011	2015	2019
UE-28	7 621	10 123	10 449 (1)
Germany	697	879	1 411
Spain	953	1 153	1 358
France	911	1 055	1 143
Italy	1 005	887	1 141
Norway	1 459	1 221	1 129
Poland	417	899	764
UK	448	1 292	711 (1)
Turkey	na	724 (2)	na
Denmark	300	413 (2)	479
Sweden	321	301	417

1-Data 2018; 2-data 2014.
na: not available.
Source: Eurostat

Tab. 4c. Ship repair in Europe: number of employees in the main producing countries

Unit: FTE

	2011	2015	2019
Turkey	na	25 932 (1)	na
Spain	9 249	9 256	11 942
Poland	5 979	7 074	7 277
Italy	5 781	5 212	7 040
Germany	4 534	4 539	6 990
Romania	6 102 (2)	8 168	4 877
France	4 478	na	4 703
Norway	4 297	4 086	4 406
UK	3 857	5 873	4 337 (3)
Croatia	2 884	2 708	2 337

1-Data 2014; 2-data 2010; 3-data 2018.
nd: not available.
Source: Eurostat

5.4. Dismantling and recycling

In the structural business statistics, ship dismantling-recycling is included in the more general activity of "dismantling of wrecks" (automobiles, ships, computers, televisions and other equipment). Data are therefore lacking to establish key figures of the activity relating to ships.

Up to the middle of the 20th century, the dismantling of cargo ships took place in ports, close to shipyards. Standards applicable to safety and reducing pollution adopted in Europe and North America, and labour costs, led owners to displace operations to South and East Asia. The activity remains pollutant – the structures of ships can contain hazardous substances – but environmental regulations have toughened due to the conventions of Hong Kong (in the process of ratification), Basel (in force) and to the directives of the International Maritime Organisation (IMO) relating to technical standards and controlling the activity. In the EU, regulation (EU) 1257/2013 of 20/11/2013 applicable to dismantling operations, specifies the

inventory and control of hazardous materials, imposes a recycling plan for each ship, and limits authorised shipyards to a list in compliance with the conventions of IMO and the International Labour Organisation.

The activity is job-generating (a workforce estimated at 40,000 at the largest Indian dismantling yard) and produces recyclable metals at energy costs much lower than those for the production of metals from ore.

The main countries dismantling large cargo ships are: India, Pakistan, Bangladesh, China and Turkey. However, China is quickly reducing its capacities while Turkey is increasing its own. In Europe, the activity has recently developed in Norway. Regarding small ships (services, pleasure, fishing) and military vessels, the activity obeys a different rationale and is often developed locally.

Tab. 5. Ship dismantling and recycling*: main countries and regions
Unit: GT

	2014	2016	2018	2020
World	22 561 239	29 414 749	18 973 089	17 400 564
Bangladesh	4 420 911	9 530 262	8 638 560	7 004 595
India	6 927 837	9 478 084	4 677 963	5 295 403
Pakistan	4 140 448	5 480 339	3 985 841	3 023 775
Turkey	933 489	980 047	782 124	1 598 348
China	5 341 265	3 517 762	465 710	195 486
Europe, of which:	72 219	76 000	93 297	116 182
Norway	5 297	6 401	1 939	68 423
Western Europe**	14 648	27 783	17 180	17 320
Northern America, of which:	113 417	60 547	99 521	41 778
USA	90 875	32 235	63 889	35 298
Latin America and the Carribean	54 303	79 313	44 875	15 410
Africa	32 677	5 432	39 778	862

*Seagoing propelled merchant ships of 100 gross tons (GT) and above, excluding inland waterway vessels, fishing vessels, military vessels, yachts, and offshore fixed and mobile platforms and barges (with the exception of floating production, storage and offloading units – FPSOs - and drillships).
**Belgium, France, Germany, Netherlands.
Source: UNCTAD

5.5. Boat building

Boat building includes the construction of boats, rubber dinghies, sailing boats with or without an auxiliary engine, motorised pleasure boats (yachts, outboard engine powered boats, etc.), pleasure hovercraft, marine engines, other pleasure and sports craft (canoes, kayaks, rowing boats, skiffs, etc.). It also comprises the transformation, reconstruction and fitting of pleasure boats. The activity does not include the fabrication of parts of pleasure boats (sails, anchors, engines), windsurfing boards and surfboards. The repair and maintenance of pleasure boats are included in ship repair (cf. above).

Tab. 6. Key figures of boat building

Unit: million euros, number of people and FTE, percentage

	2014	2015	2016	2017	2018	2019
Turnover before taxes	1 052	1 211	1 297	1 557	c	1 894
Value added before taxes	337	411	446	517	c	611
Number of employees as of 31 Dec	6 917	6 944	7 132	8 363	9 013	8 860
Number of employees (FTE)	6 436	6 458	6 497	7 655	8 124	8 019
Number of companies	376	340	304	328	351	352
Exports	627	754	804	890	c	1 090
Export / turnover	60%	62%	62%	57%	c	58%

c: confidential.

Sources: INSEE/Structural Business Statistics, NAF 30.12Z.

Main aspects of boat building in France

- The activity is concentrated in the Atlantic regions. According to a study by INSEE in 2015, 90% of jobs were located along the Atlantic coast, mainly in Pays de la Loire.

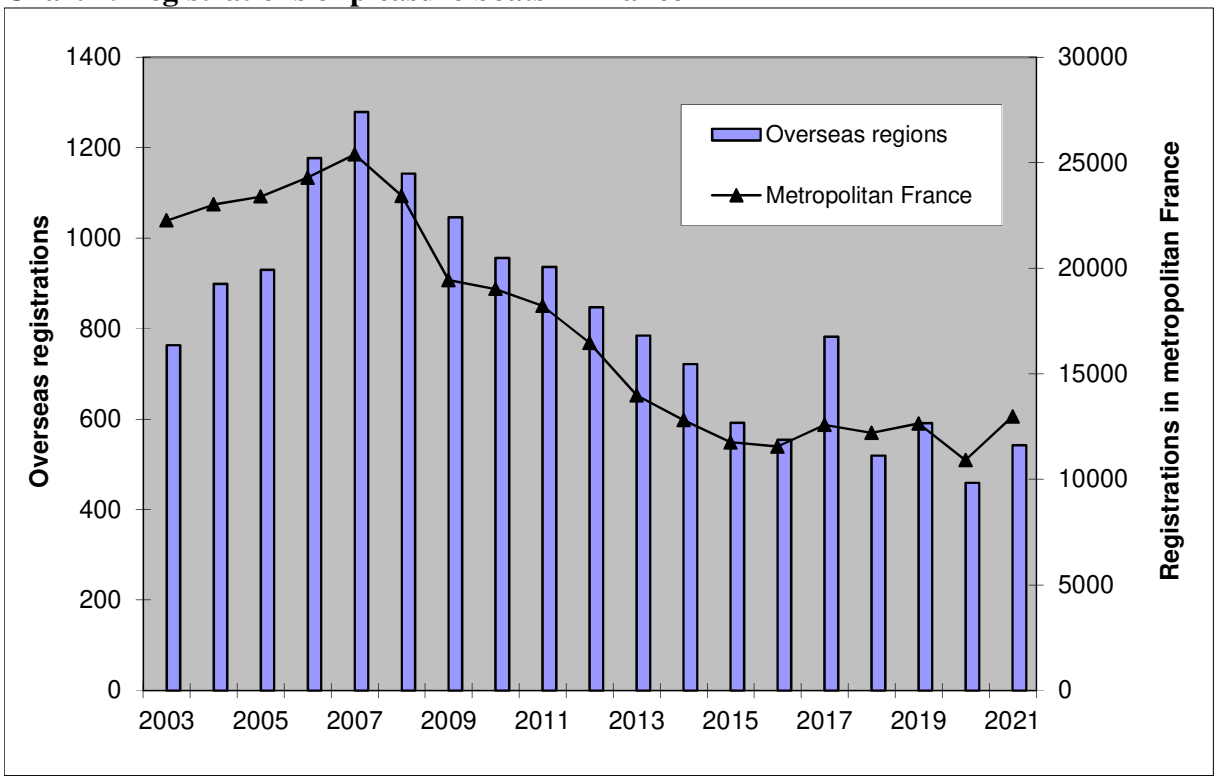
- French production is specialised in sailing boats which made up two thirds of sales in 2015, motor boats made up a much lower share – about a quarter. Subject to regular growth since 2013, in 2019 the turnover of nautical construction returned to levels reached before the subprime crisis. However, the level of employment remained below 9,000 jobs in 2019 versus almost 13,000 before 2008. The increase of value added is considerable over the decade from 2010, for a smaller number of employees per company. The effects of the health crisis have not yet been included in the key figures.

- Regarding demand, the continuous decrease in annual registrations in France from 2007 to 2015 appears to have stopped in 2016. The boat building's exports are on the increase: the rate of exportation is around 60% versus about 50% during the decade from 2000-2010.

- The nautical industry is defined as including marinas, boat building, equipment manufacturers, associated services (architecture, maintenance, commerce, nautical sports, etc.). Its turnover is estimated (by the industry itself) at EUR 4.7 billion, down by 11% in comparison to 2019. Employment fell by 5.4% to 41,400 people in 2020 (source: Federation of Nautical Industries - FIN).

- Statistics on pleasure boat dismantling and recycling are included with those of dismantling of wrecks (see above). In France, dismantling and recycling are subject to "extended producer responsibility" (EPR), a provision introduced by the law on energy transition for green growth of 2015 (articles L541-10 of the Environment code). A decree established the scope of the EPR for pleasure boats (articles R 543-297 and following of the Environment code): boat building companies must ensure the dismantling or recycling of pleasure boats at the end of their lifetime.

Chart 7. Registrations of pleasure boats in France



Source: Direction of Maritime Affairs.

European context

The average profile of the European boat building industry is more or less the contrary of that of the French industry, with motor boats representing about two thirds of production, and that of sailing boats nearly a quarter. Italy, Germany and the Netherlands dominate the first market, while France and the United Kingdom the second.

Although the fall in production was considerable in France during the economic downturn until 2013-2015, the activities of other European countries were hard hit, as indicated by the fall in production and employment. High production levels returned to all the countries up to 2019, although with few jobs, placing France in phase with the rest of Europe. The recovery of production was remarkable in Italy and Poland after 2015.

Tab. 8. Boat building in Europe. Indicators of the main producing countries

Number of companies

	2011	2015	2019
Italy	694	547	842
Netherlands	905	848	782
UK*	552	501	499
Sweden	576	517	467
Poland	354	315	441
Germany	337	375	405
France	394	340	352
Finland	254	213	188

Turnover. Unit: million euros

	2011	2015	2019
Germany	2 047	1 920	3 072
Italy	2 517	1 733	2 707
France	1 238	1 211	1 877
UK*	1 011	1 144	1 149
Poland	275	290	638
Finland	284	298	366
Sweden	292	193	248
Netherlands	na	na	na

Value added**. Unit: million euros

	2011	2015	2019
Italy	375	339	587
France	351	390	572
Germany	409	462	572
UK*	331	423	424
Poland	80	90	204
Finland	77	95	100
Sweden	79	52	66
Netherlands	na	na	na

Employment. Unit: FTE

	2011	2015	2019
UK*	10 178	nd	9 585
France	6 822	6 458	7 925
Italy	7 454	5 101	7 679
Germany	5 661	7 330	7 341
Poland	3 910	4 576	7 279
Netherlands	4 170	4 062	4 857
Finland	1 861	1 698	1 719
Sweden	1 482	962	1 065

*Data for 2018 replacing those for 2019.
**Value added at factor cost.
na: not available.
Source: Eurostat

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6. Maritime and river civil engineering

Maritime and river civil engineering groups the construction and works performed at sea, on rivers or on inland lakes: for example, navigable waterways, ports, river structures, marinas, locks, dams and levees, offshore oilrigs; dredging of navigable waterways, carrying out works in water: cofferdams, piers and bridges. It concerns construction and maintenance and also includes cleaning ditches, the development of banks, underwater works, and hydraulic engineering works.

Tab. 1. Key figures of maritime and river civil engineering

Units: million euros, number of jobs, FTE.

	2014	2015	2016	2017	2018	2019
Turnover before taxes	1 293	1 758	1 176	1 997	1 962	1 954
Value added before taxes	437	382	93	593	550	671
Number of employees as of 31 Dec	3 600	6 456	3 070	3 832	3 966	3 569
Number of employees (FTE)	3 487	3 607	2 880	3 603	3 729	3 346
Number of companies (1)	241	228	205	185	193	198
Exports	943	1 071	661	1 467	1 444	1 420
Exports / Turnover	73%	61%	56%	73%	74%	73%

1-Companies active as of 31/12.

Source: INSEE/Structural Business Statistics (NAF 42.91Z).

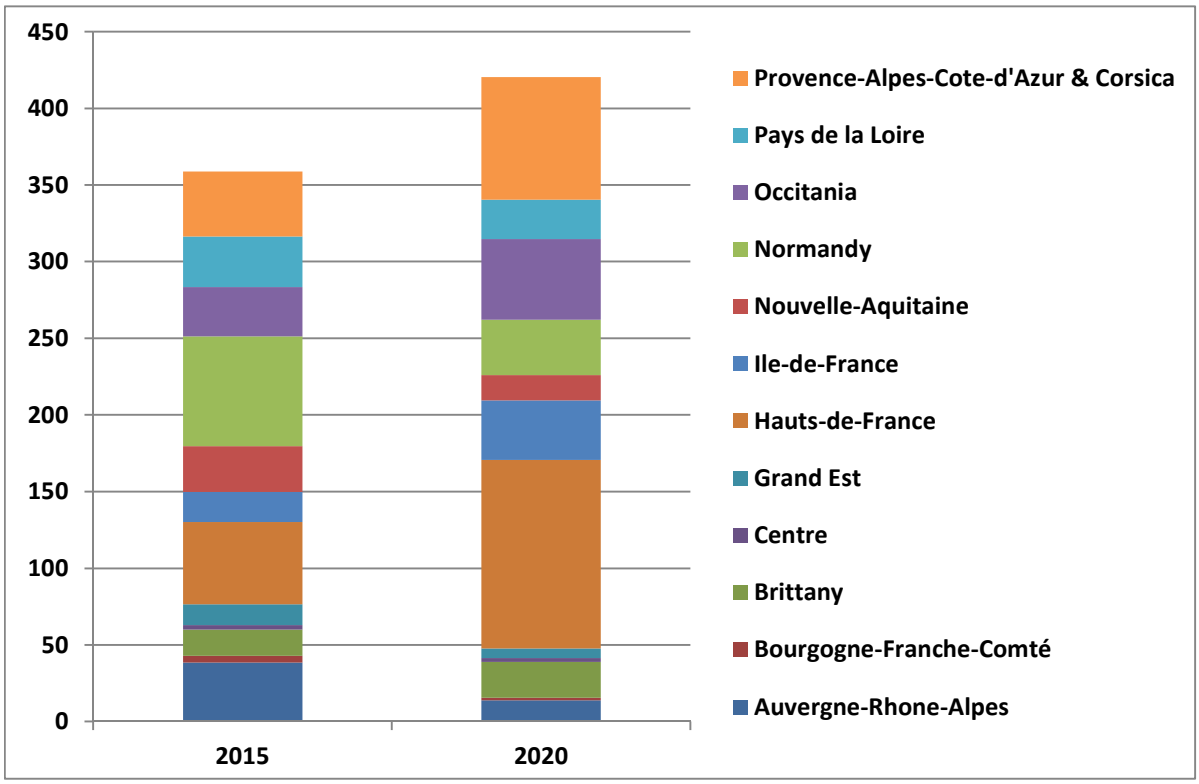
6.1. Activities in metropolitan France

Public maritime and river works make up a small share of public works in France: on average about 1% of the total turnover in metropolitan France (source: FNTP civil engineering industry association). Port works represent a major share of the activity. A reduction in the number of offshore oilrigs is foreseeable for the years to come but the installation of marine energy equipment should provide a promising market. Companies in the sector export much of their activity.

Surveys published by the industry show strong variability according to year of the distribution of maritime and river construction sites in the different regions of metropolitan France. However, the north, northwest (Normandy, Hauts-de-France) and southeast (Provence-Alpes-Côte-d'Azur - PACA) gather a considerable share of these sites.

Tab. 2. Maritime and river works: distribution by metropolitan regions

Unit: million euros



Source: FNTP.

6.2. Activities in Europe

Belgian and Dutch companies dominate the European dredging markets for coastal areas, ports and navigable waterways, whereas several EU countries (Spain, Italy, Belgium, Netherlands, France) are active in the markets for works, industrial and port site developments, earthworks, maritime and underwater structures. European companies are active on international markets, although Chinese companies also hold a strong position in international competition.

Tab. 3. Maritime and river civil engineering: activities in Europe

Turnover (million EUR)

	2011	2015	2019
Belgium	3 167	3 551	4 321
Netherlands	1 686	1 306*	3 223
Spain	2 324	1 885	2 007
France	1 391	1 758	1 954
Italy	1 608	1 248	1 066
Germany	362	449	788
UK	566	527	658**
Poland	886	652	418
Romania	512	536	194
Hungary	129	195	144
Bulgaria	102	392	80

Number of employees (FTE)

	2011	2015	2019
Spain	16 833	12 631	12 549
Netherlands	5 792	7 153	7 694
Belgium	2 802	2 821	6 476
Italy	6 244	5 365	5 368
Poland	9 194	6 609	5 028
Romania	12 482	6 143	3 459
France	4 056	3 607	3 343
Germany	1 946	2 449	2 628
Hungary	3 969	2 758	1 923
Bulgaria	2 598	3 314	1 593
UK	1 203	1 775	1 460**

*Data for 2016. **Data for2018. Source: Eurostat

The activity responds to a demand including several components that should continue and develop in the coming years; some components are associated with specialised services:

- Port activity, especially containerisation and cruise ships, lead to a demand for port developments adapted to increasingly large ships and deep draughts;
- The growth of the coastal population and the development of tourism lead to increased demand for coastal urban, port and airport developments, possibly claimed from the sea;
- Exacerbated by climate change, rising sea levels and the higher frequency of severe storms in certain regions of the world (hurricanes) lead to greater demand for classical protection structures (levees, riprap and other types of protection structure);
- The increasing number of maritime structures (bases for wind turbines, protection structures) leads to a demand for maritime and underwater engineering for analysing the resistance of installations;
- Environmental constraints on greenhouse gas emissions and the protection of marine fauna and flora oblige operators to manage the ecological impacts of works: for example, the limitation of CO_2 emissions and the effects of operations on water turbidity and beach stability.

Dugornay Olivier

7. Submarine cables

This activity is herein defined as comprising the manufacture, laying and maintenance of submarine cables submerged at depth and generally buried, designed to transmit communications or electricity. The commercial services associated with project preparation are included in the activity; engineering and cable route survey are not.

Manufacturing cables on the one hand, and laying and maintaining them on the other, are very different activities: leading edge manufacturing and production technology for the former and specialised works at sea for the latter.

Tab. 1. Key figures of the manufacture, laying and maintenance of submarine cables

Unit: million euros, jobs

	2014	2015	2016	2017	2018	2019	2020
Estimated turnover	542	722	1095	999	872	1254	1489
Estimated value added	98	142	220	212	160	203	44
Estimated jobs	1501	1546	1849	1747	1890	2783	1317

Sources: INSEE/Structural Business Statistics/NAF 27.31Z and 27.32Z; Sycabel and companies; IFREMER (for the estimations).

Observations on data sources and estimates

- The public statistics of companies do not make the distinction between the manufacture of submarine cables and the manufacture of cables in general; the profession makes the distinction by the value of production.
- The laying and maintenance of submarine cables is an activity partially accounted in the activity of installing electricity power lines and telecommunication cables, and partially in that of maritime transport. This breakdown results from the core activities of the companies concerned, which fall into either of these two categories. The key figures presented here underestimate the importance of the submarine cable activity.
- The manufacture of umbilical cables is included in the offshore oil and gas services sector.

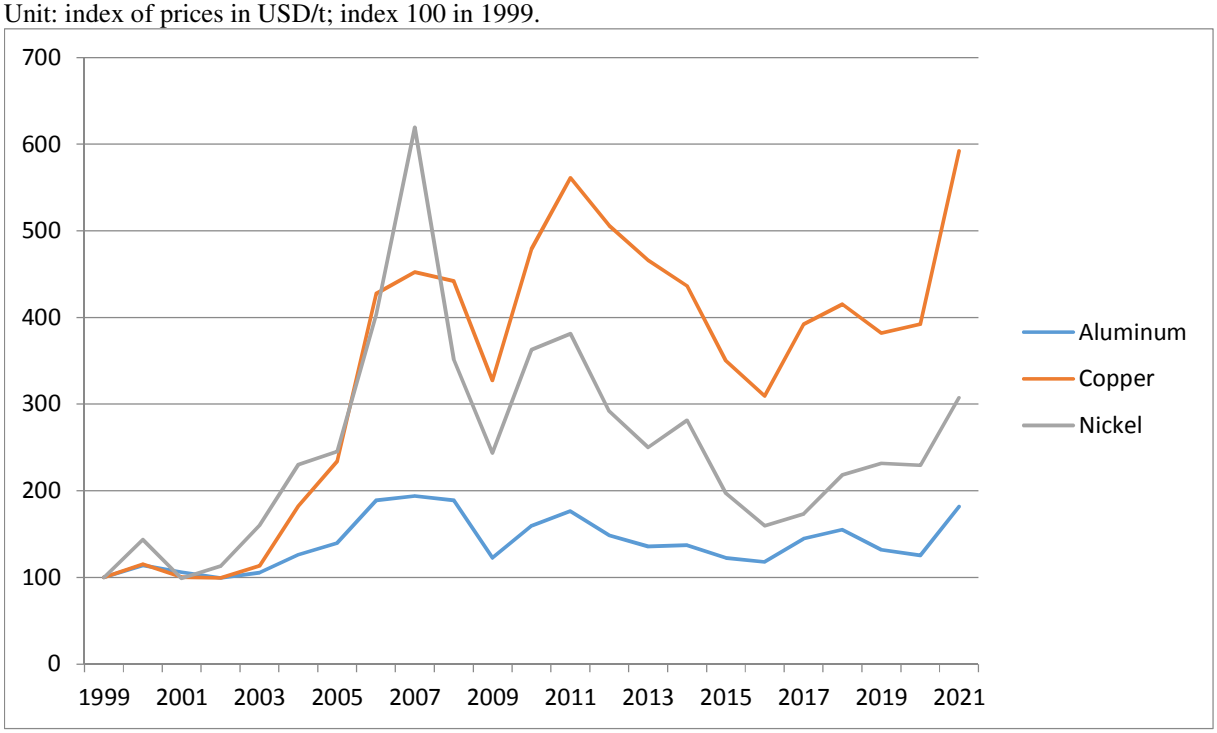
Observations on economic trends

- The growth of the telecommunications cable market is mostly linked to investments made by digital content companies that seek to secure the transmission of information flows to their data centres.
- The main investments in telecommunication cables are concentrated in Africa to improve service between this continent and Europe (Equiano – commissioning due in 2022, 2Africa commissioning due in 2023) and the Middle East (SeaMeWe-5 – 2016, Africa-1 commissioning due in 2023,). Asia is also greatly involved in major investments, notably in Indonesia (Apricot is due for commissioning in 2024, CAP-1 in 2023). Lastly, there is the construction of direct links between the countries of the south (SACS in 2018 between Brazil and Angola; Tannat in 2018 between Brazil, Uruguay and Argentina; SAIL in 2020 between Brazil and Cameroun) (Source: Telegeography).

- The growth of the submarine electricity cable market is mostly driven by the development of marine renewable energy (RME). The ambition announced by the European Commission to reach an installed capacity of 300 GW for offshore wind turbines from now to 2050 (versus 12 GW in 2020) should lead to major investments regarding links and connections between wind turbines. Regarding France, investments in electric connections are estimated at EUR 7 to 8bn from now to 2030 (source: RTE). European investments in electric connections are therefore mainly driven by the development of MRE and, more generally, renewable energies, for example, between the United Kingdom and Norway (North Sea Link) and between Germany and Norway (Nord Link).
- American, Finnish and French companies along with those of Japan remain the main manufacturers of telecommunication cables, despite the increasing presence of Chinese companies in this market.
- The activity is sensitive to the prices of raw materials: energy and oil prices – oil is strategic for making certain plastics and additives used in special cables and connection materials; then there are the prices of the metals used in the manufacture of cables, especially copper, aluminium and nickel. A fall in the prices of metals in the context of an economic downturn was followed by a rise starting in 2016, slowed by the health crisis, and then by steep rises since the second semester of 2020. Energy prices have increased since 2021 after a fall during the pandemic. Recent and current changes are correlated with the subsidence of the latter, to the effects of energy transition and to armed conflicts underway. Their impacts on the prices of cables will depend on magnitude and duration of tensions on the markets for raw materials and the conditions of supply available to the manufacturers.

Graph 2. Prices of strategic metals for manufacturing submarine cables

Unit: index of prices in USD/t; index 100 in 1999.



Source: World Bank

8. Offshore oil and gas support activities

This sector includes the supply of services and equipment used to support the exploration and production of oil and gas offshore. Certain services supporting refining and petrochemicals are part of the oil and gas service and supply sector without specifically concerning offshore activities. Works and equipment involving transport (installation of pipes, oil and gas pipelines, natural gas liquefaction and regasification) are taken into account. They partly concern offshore activities. Fuel distribution, utilisation and transport are excluded from the sector.

In other terms the sector comprises: a) services upstream of exploration and drilling; b) services downstream mainly to support refining: engineering is dominant among these services; c) equipment design and manufacturing present throughout the upstream and downstream chain. The sector does not include oil services to refineries.

Tab. 1. Key figures of offshore oil and gas support activities
Units: billion euros, thousand jobs

	2013	2014	2015	2016	2017	2018	2019
Investissements internationaux d'exploration-production (EP) en pétrole et gaz (1)	860	884	658	502	522	558	543
CA estimé du parapétrolier-paragazier (2)	39	41,3	36,3	32,7	31,7	34	33
CA estimé du parapétrolier-paragazier offshore (3)	17,6	18,6	16,3	14,7	14,3	15,2	14,8
Valeur ajoutée estimée : parapétrolier et paragazier offshore	6,2	6,8	5,7	5,1	5,4	6,0	5,7
Taux de valeur ajoutée estimé (4)	35%	36%	35%	34%	38%	39%	39%
Emploi estimé (5)	29,3	29,3	26,9	27,0	22,6	22,5	22,5

(1) Source: IFPEN.
(2) Source: EVOLEN for 2013-2017. Rate of annual growth 2018-2020 estimated as a function of those of oil exploration investments.
(3) Share of offshore gas and oil service and supply activities estimated from IFPEN and EVOLEN data. For want of updated data, the rate of 45% observed in 2017 is kept constant after this year.
(4) IFREMER estimations according to a) the distribution of turnover between the supply of engineering services and equipment estimated at 49%-51%, for want of data updated after 2013 (sources: IFPEN, EVOLEN), and b) the rates of value added (INSEE/Structural Business Statistics) of sectors specific to engineering services and equipment (NAF codes 26, 27, 28, 71.12B).
(5) IFREMER estimations derived from EVOLEN estimations of the oil services and supply sector and the share of turnover of offshore oil service and supply activities in the whole sector.
Sources: IFPEN, EVOLEN/annual surveys in the oil services and supply sector, INSEE/Structural Business Statistics, IFREMER estimations.

Observations

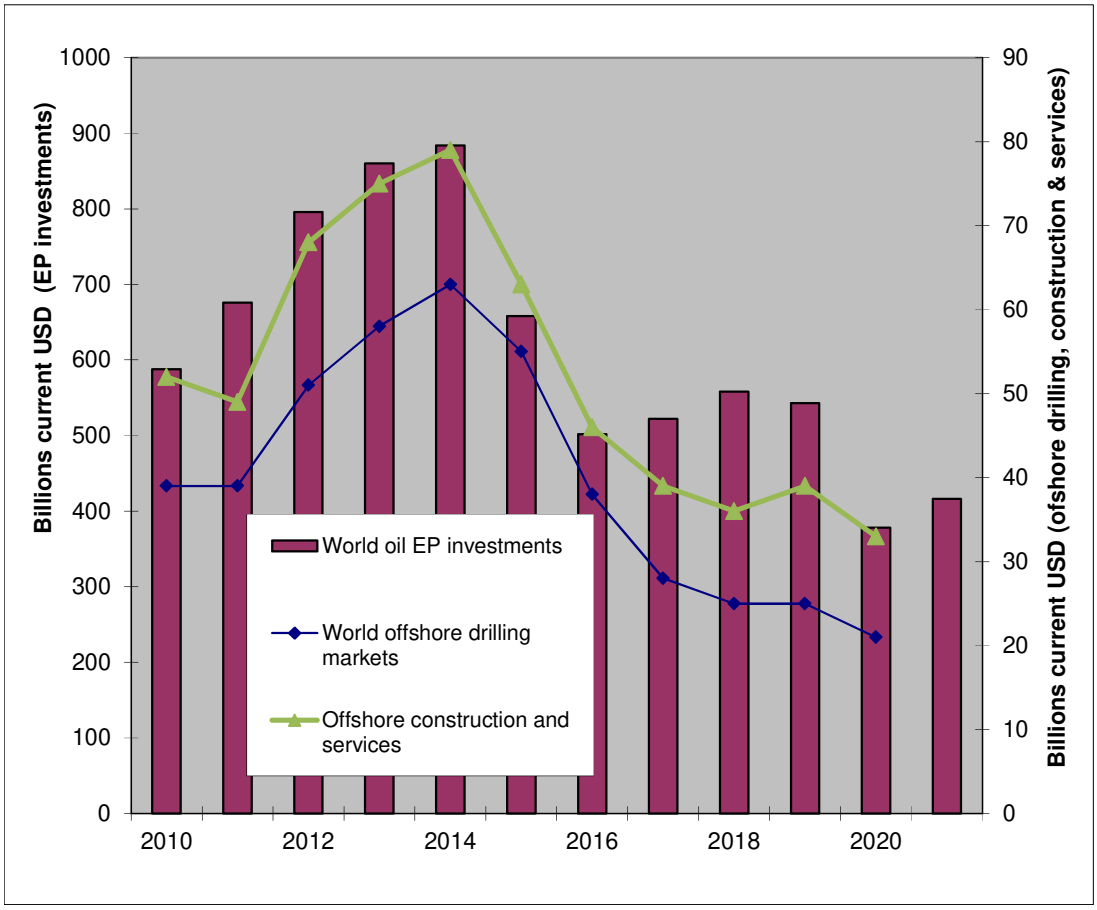
- Offshore oil markets are linked to exploration and production investments in general and to offshore activities in particular.
- The same company can operate in offshore and onshore service businesses; it is therefore difficult to divide its activities among each of these sub-sectors.

- There is a risk of double accounts between the offshore oil sector defined in this way and the sector of maritime works (interventions on offshore oil rigs).

8.1. Evolution of offshore oil and gas activities

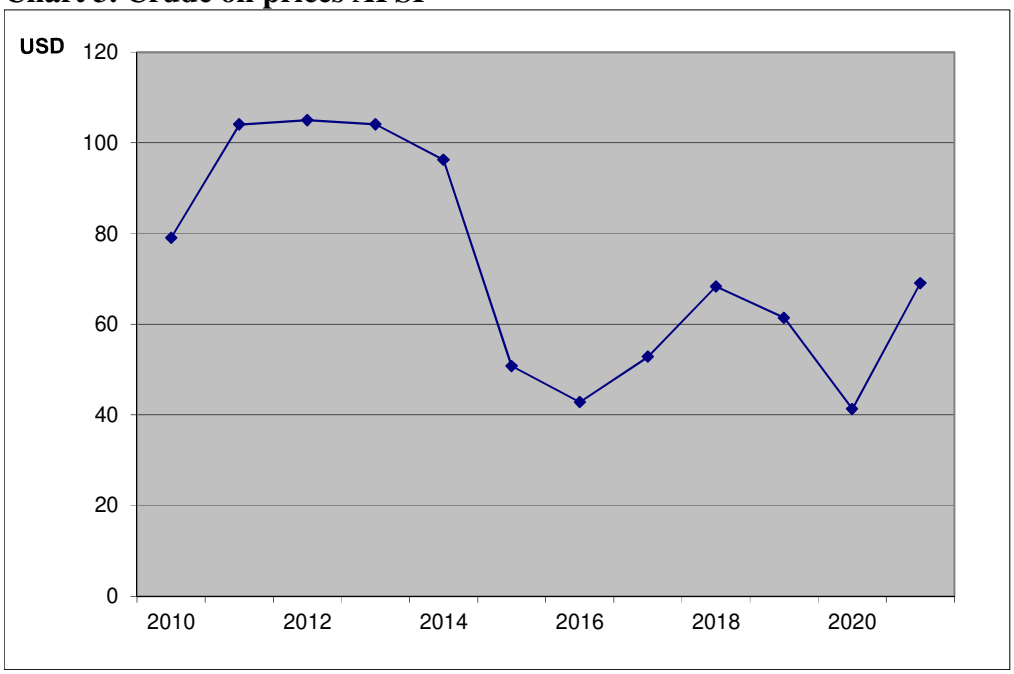
- The cycle of exploration & production (EP) and refining investments – that determines the evolution of oil and gas activities – follows quite closely the annual averages of the spot price of crude oil. The progression of the annual volumes of these investments during the two decades, 1990s and 2000s, benefited the growth of the oil sector mentioned in the previous editions of the present report. With the subprime crisis of 2008 and its aftermaths, the prices of crude oil and the volumes of investments and oil activities began to fluctuate.
- Up to 2014, EP investments, driven by increased prices, once again progressed in the United States, Asia, the Middle East and Europe (investments in marginal areas). They then fell along with crude oil prices in a complicated geopolitical environment, placing several oil companies in difficulty and leading the sector to undergo major consolidations. The slow recovery of crude oil prices in 2016 and at the beginning of 2017 favoured a recovery of EP investments and the oil market up to 2019. The health crisis and the economic downturn once again led to a fall in fuel prices and a sudden drop in EP investments in 2020. The increase in crude oil prices observed in 2021 could lead to the renewal of EP investments. Simultaneously with these recent fluctuations, the development of marine energy projects offers complementary markets with those of oil activities (offshore rigs and other facility projects), although in still modest volumes.
- In the medium term, changes in the industry will be influenced by the climate change policy, which, through the budgetary and fiscal incentives made available to alternative energies, will have impacts on the demand for oil products, EP investments and the development of marine renewable energies.

Chart 2. Oil EP investments, offshore drilling markets, offshore construction and services market



Estimation for 2021.
Source: IFPEN.

Chart 3. Crude oil prices APSP*



*Average petroleum spot price (APSP): equal weighting of three spot prices: dated Brent, Dubai Fateh, West Texas Intermediate.
Source: IMF.

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9. Coastal tourism

Tourism is defined as “the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited” (World Tourism Organisation - UNWTO). Here “activities” are individual pursuits.

Travellers practising tourism are “visitors” who fall into two categories: tourists, who spend at least one night (and less than a year) away from their usual environment; excursionists, who do not spend any night away from their usual environment. Tourism supply includes different types of commercial accommodation and a range of services for private individuals including restaurants, cafés and travel agencies.

Coastal tourism is herein defined as tourism in “coastal areas” according to the definitions of coastal area, used by the French statistical services (i.e. in most statistical studies, the coastal “labour market areas” as delimited for France mainland and overseas). Eurostat provides an alternative definition of the term (see below). In France, summer holidays by the sea are the most common form of tourism.

Tab. 1. Key figures of coastal tourism

Units: billion euros, thousand FTE.

	2014	2015	2016	2017	2018	2019 (6)
Estimated coastal tourism consumption (1)	46,3	46,7	46,0	48,1	50,3	50,5
Estimated value added (2)	17,1	17,5	17,3	18,1	22,9	24,4
Estimated employment ('000 FTE) (3)	325,1	317,8	309,2	318,1	331,7	337,5
Estimated "Internal tourism consumption / coastal tourism consumption" ratio (4)	28,8%	29%	29%	29%	29%	29%
Coastal tourism, excluding waterborne transport (5)						
Estimated value added	17,0	17,4	17,3	18,0	22,9	24,3
Estimated employment ('000 FTE)	324,5	317,1	308,4	317,5	331,2	337,0

(1) IFREMER estimation of the amount of internal tourism consumption (ITC) imputable to coastal tourism as a function of the “coastal ITC/total ITC” ratio. Maritime and river passenger transport is included in ITC and in the turnover of maritime transport (see this chapter). The estimations for the whole period have been revised following the revision of accommodation statistics in the tourism accounts.

(2) Share of the value added of activity branches whose production is included in coastal tourism consumption. The value added per branch is estimated as a function of the production share of the branch imputable to the internal tourism consumption. The branches considered in the estimation are those considered in the tourism satellite accounts.

(3) Share of employment of activity branches whose production is included in coastal tourism consumption. The employment share of each branch is estimated in function of the production share of the branch imputable to the coastal ITC.

(4) Ratio estimated as a function of the distribution of ITC by area (coast, rural, urban, mountain) given by the tourism accounts up to 2008, and the annual distribution of overnight stays by area (source: INSEE).

(5) The consumption of maritime and river passenger transport is deleted from coastal tourist consumption in view to avoiding double accounting.

(6) Data from the 2019 tourism satellite accounts, excluding taxi, other urban transport and other personal services expenses.

Sources: DGE/Tourism accounts; INSEE/National accounts.

The key figures of coastal tourism are built using internal tourism consumption (ITC) assessed in the tourism accounts. ITC includes several products and services: accommodation, catering, cafés; transport from place of residence to place of stay, local transport, hire of property; services of travel agents and tour operators; cultural, sports, leisure services; several items of consumption including: fuel, tolls, food, taxis, certain durable consumer goods, automobile and motorcycle repairs, health, certain personal services.

ITC has been revised upward since the 2017 tourism accounts. The valuation of hotel night spending is now based on the overall commercial accommodation expenses as they are assessed in the national accounts. Therefore, in the key figures above, the increase in coastal tourism consumption from 2016 to 2018 is partly due to the statistical methodology.

The key figures use the distribution of consumption by "area" (i.e. urban, coastal & lake, mountain and countryside areas) for resident visitors, done in the tourism accounts up to 2007. Coastal tourism is therefore estimated as a fraction of total tourism. The distribution of resident visitors' consumption by area is extrapolated to all visitors, for want of a distribution of the same type for the consumption of non-resident visitors (foreigners staying in France).

9.1. Regional distribution of overnight stays

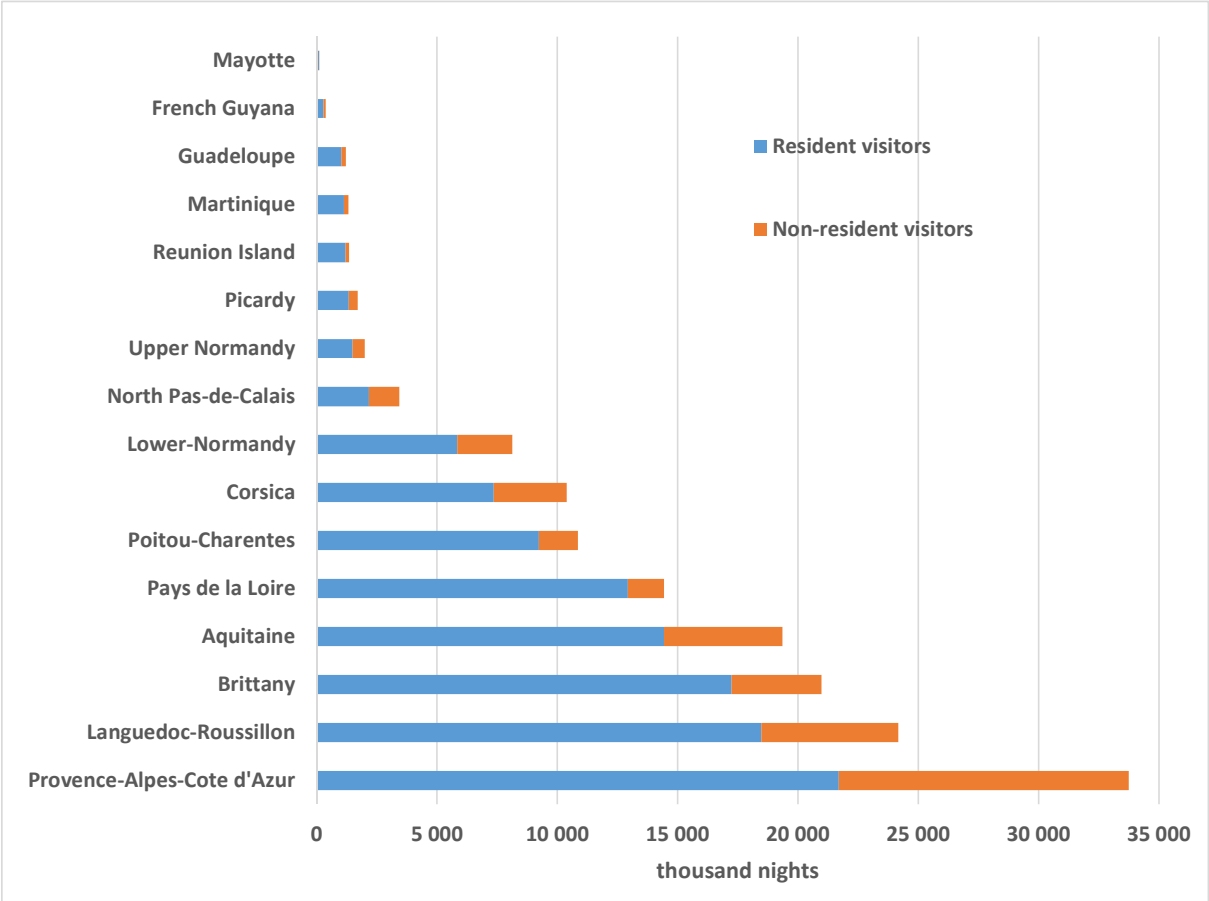
Geographical specificities

- The ranking of French regions has changed little over time.
- Tourist reception capacity is unequally distributed in mainland France. It is predominantly concentrated in rural and coastal areas: 40% of tourist accommodation is located in coastal municipalities (in the meaning of the coast law) and nearly 30% are located in mountain municipalities. The majority of coastal municipalities of the Atlantic seaboard and the Mediterranean have a high tourist density of more than 100 beds per km² (source: SDES, Spatial concentration and touristic intensity of territories, 2019).
- More than half of bed-places are in coastal areas for the PACA, Aquitaine, Languedoc-Roussillon, Pays-de-la-Loire, Poitou-Charentes, Basse-Normandie and Bretagne regions, the latter counting 87% of its bed-places in the coastal area (source: Eurostat).
- The PACA region is that which receives the most foreign visitors in mainland France and overseas (32% of overnight stays) (Source: Eurostat).

Recent development

- The number of places-beds in French coastal areas remained stable between 2012 and 2019 (+1%). Likewise at the scale of France (+2%). The number of overnight stays (resident and non-resident visitors) rose moderately in French coastal areas by 17% over the period 2012-2019 (Source: Eurostat).
- Tourism activity was hard hit by the Covid health crisis. In mainland France, hotel nights fell by half in 2020 in comparison to 2019 due to the closure of establishments and the lockdown in March 2020. The decrease was very high in Ile de France (-65% of hotel nights) linked to the absence of foreign visitors. Seaside and rural destinations suffered less during summer 2020 due to the effect of foreign visitors being replaced by French resident ones who preferred to holiday in France (INSEE, 2020 Tourism Report).

Chart 2. Tourist overnight stays in coastal areas* of mainland France and overseas departments, 2019



*Coastal areas, according to the Eurostat definition, include municipalities: a) with a seafront, b) without a seafront but with at least 50% of their territory at 10 km or less from the seafront.
Source: Eurostat

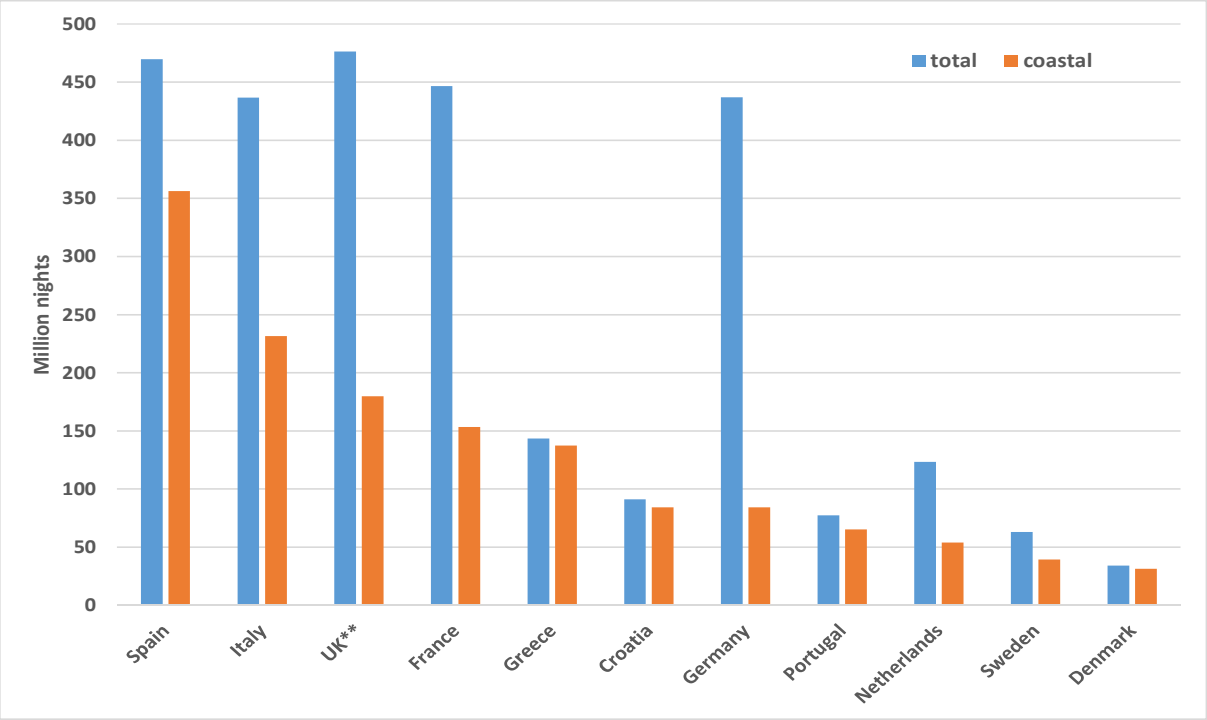
9.2. International and European tourism

Between 2012 and 2019, EU-28 countries recorded a 32% increase in the number overnights stays in coastal areas. This growth was driven by the Netherlands (+112%), Greece (+79%), and Portugal (+61%). Over the same period, the European countries with the most tourists to their coasts also recorded an increase in the number of nights in coastal areas: Spain (+18%), Italy (+12%), Germany (+39%), Croatia (+43%).

The considerable increases in the number of overnight stays are not always correlated with a noticeable increase in accommodation capacity (number of bed-places in coastal areas) over the same period: Netherlands (+26%), Greece (+13%), Portugal (40%), Spain (+5%), Italy (+10%), Croatia (+39%), Germany (+22%) (source Eurostat).

International tourism has been also affected by the Covid health crisis. Initial estimations from UNWTO point to a fall of 72% of arrivals of international tourists in 2020 in comparison to 2019, with arrivals more or less stopped during April and June 2020. This has resulted in a considerable reduction of the export receipts of international tourism of $935 billion, i.e., ten times the decrease recorded in 2009 due to the impact of the world economic crisis. At the European level, the number of arrivals of international tourists fell by 68%.

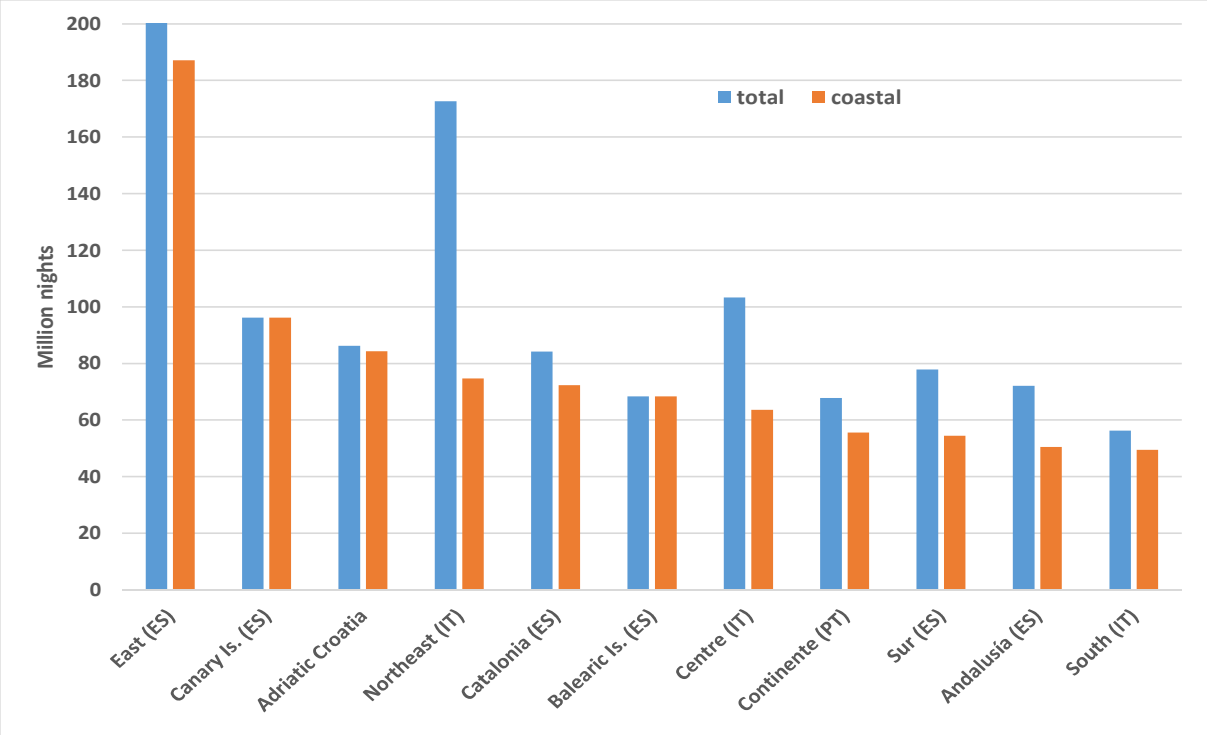
Chart 3a. Overnight stays* in Europe: main countries, 2019



*Nights spent in the country and in coastal areas. Coastal areas include municipalities: a) with a seafront, b) without a seafront but with at least 50% of their territory at 10 km or less from the seafront.
**2016 data. Data for the UK not available from 2017. - Source: Eurostat

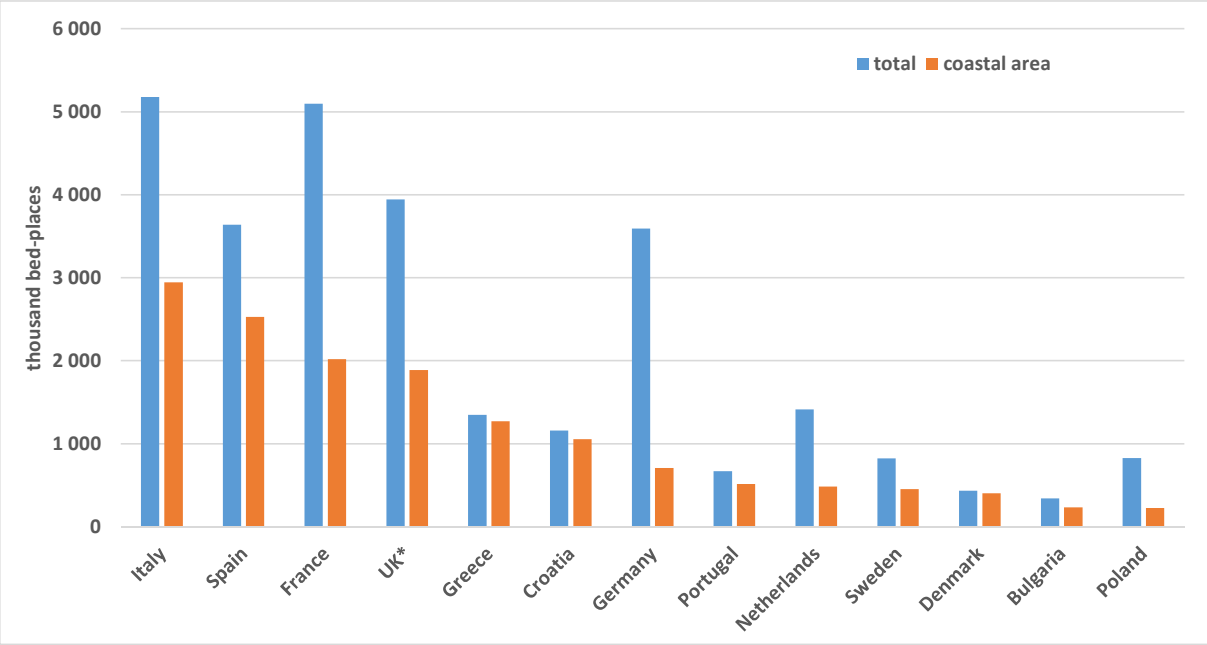
Chart 3b. Overnight stays in Europe. Main regions* of the European Union, 2019

Unit: number of overnight stays in hotels; tourist accommodation and other short-stay accommodation; camp sites and caravan and camping car parks.



*Regions in the meaning of NUTS 2 in the European nomenclature. - ES: Spain; IT: Italy; PT: Portugal.
Nights spent in the region and in its coastal areas. Coastal areas include municipalities: with a seafront, b) without a seafront but with at least 50% of their territory at 10 km or less from the seafront.
Source: Eurostat

Chart 3c. Tourist accommodation capacity (1) in Europe: main countries, 2019
Unit: thousand bed-places (2)



1-Capacity in hotels, tourist accommodation and other short-stay accommodation, camp sites and caravan and camping car sites.
Accommodation in the country and on its coast. The coast includes municipalities: with a seafront, b) without a seafront but with at least 50% of their territory at 10 km or less from the seafront.
2-Number of bed-places: number of people that can spend the night in beds installed in the establishment or site. Double beds count as two bed-places. A site for a tent, caravan, camping-car and other similar shelter, and a berth for a boat generally count as four bed-places if the real number is unknown.
*2016 data. Data for the UK not available from 2017.
Source: Eurostat.

9.3. Cruise ship tourism

Cruise tourism is taking up an increasing importance in international tourism and is becoming a major component of coastal tourism. From 2016 to 2019, the demand for cruise ships at the global level has risen by 18% with stronger growth on the North American market (+ 24%) compared to other regions of the world: +14% in Europe; 10% for regions outside Europe and North America (source: CLIA, Global Passenger Report). At the global level, France ranked 9th in 2019 with 545,000 passengers (for a global total of 29.7 million cruise passengers) (CLIA 2019 Global Economic Impact Study).

According to the CLIA, cruise ship tourism generated 554,000 FTE jobs (direct employment – jobs on land and on board) in 2019 at the global level (versus 360,000 FTE jobs in 2015). The average expenditure of a cruise tourist in a port is higher before boarding (USD 385 in 2019) than during a call (USD 100 in 2019) (source: CLIA, State of the Cruise Industry Outlook 2021).

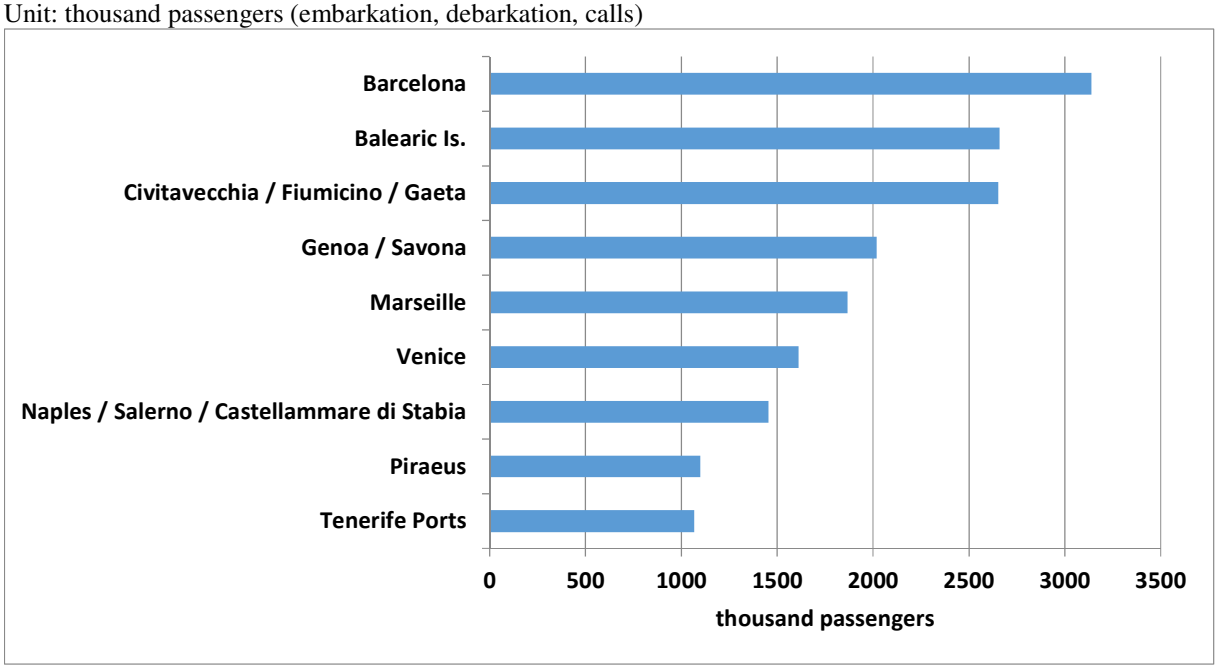
In the period prior to the Covid epidemic in Europe, the demand for cruise ship tourism was predominantly located in Northern Europe: Germany and the UK made up 61% of the number of European passengers. They were followed by Italy (12%), Spain (7%) and France (7%)

(CLIA 2019 Europe Market Report). The capacity deployed by cruise companies is mainly located in the Mediterranean with 61% of bed-days, versus 31% in Northern Europe. The Mediterranean is a relatively autonomous market as most of the cruise itineraries start and end in the region. No major change has been observed in comparison with previous years for the main ports of embarkation (Barcelona, Civitavecchia, Palma (Majorca), Venice, Piraeus, Genoa and Savona) and ports of call (Marseille, Tenerife, Naples, La Valette and Dubrovnik). Likewise for the main North European ports of embarkation (Stockholm, St. Petersburg, Lisbon, Rostock/Warnemünde, Tallinn, Helsinki and Bergen) (source: CLIA 2019 Global Economic Impact Study).

With the total shutdown of activity between mid-March and September 2020, cruise tourism was very severely affected by the health crisis. The number of cruise passengers collapsed in comparison to 2019: -91.9% for Spain, -80.8% for the United States, -79.5% for Germany, -73.2% for France (CLIA 2021 Global Passenger Report).

Chart 4a. Main cruise ship ports in the Mediterranean, 2019

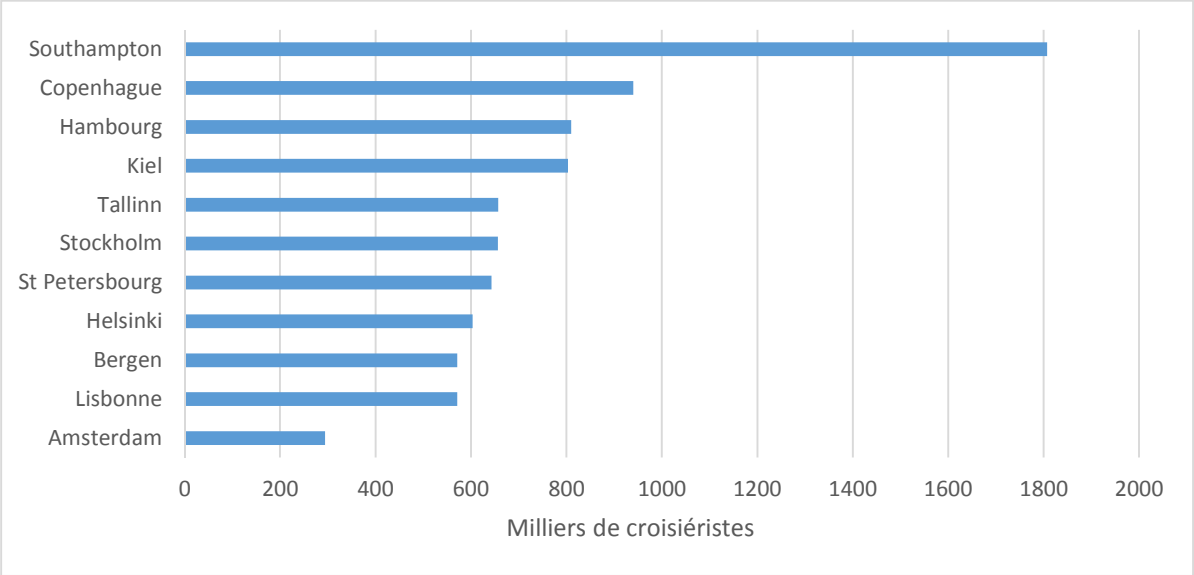
Unit: thousand passengers (embarkation, debarkation, calls)



Source: MedCruise

Chart 4b. Main cruise ship ports in Northern Europe and the Atlantic, 2019

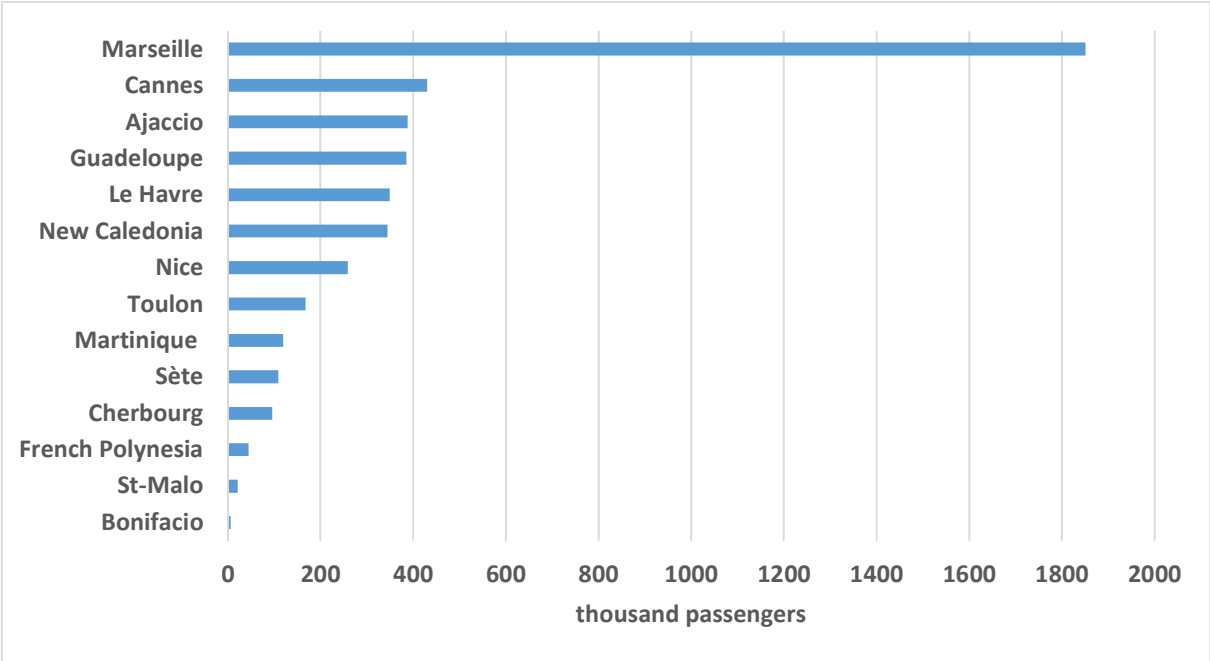
Unit: thousand passengers (embarkation, debarkation, calls)



Sources: Cruise Europe for Copenhagen, Hamburg, Kiel, Tallinn, Stockholm, St Petersburg, Helsinki, Bergen, Lisbon, Amsterdam; port of Kiel; UK Department of Transport for Southampton.

Chart 4c. Main French cruise ship ports, 2019

Unit: thousand passengers (embarkation, debarkation, call)



Sources: Transport satellite accounts 2020, INSEE for Martinique and Guadeloupe, ISEE, ISPF.

9.4. The boating sector in France

Tab. 5. Key figures on boating in France

		Reference year
Regular boaters	4 000 000	2019-2020
Boating fleet: number of registered marine boats	1 049 340	31/08/2021
New registrations	10 913	2019-2020
of which power boats	77%	*2019-2020*
of which under 6 metres	47%	*2019-2020*
Second-hand boat transactions (transfer of ownership)	79 677	2019-2020
Number of maritime pleasure boat marinas (mainland France)	462	2018
Maritime pleasure boat marina capacity (number of berths oustide dry ports)	217 300	2018
Number of river pleasure boat marinas	323	2018
River pleasure boat marina capacity (number of berths outside dry ports)	19 900	2018
Number of berths in dry ports (maritime areas)	10 950	2018
Number of berths in dry ports (river areas)	550	2018
Nautical industry* - estimated number of companies	5 668	2020
Employment in nautical industry - estimated number of employees	41 361	2020
Turnover of the nautical industry - estimate (million EUR)	4 724,9	2020
Turnover of the boat building industry (million EUR)	1 894,5	2019
Employment in boat building industry (number of employees)	8 860	2019
Employment in maritime pleasure boat marinas - estimate (FTE)	3 900	2018
Employment in river pleasure boat marinas - estimate (FTE)	700	2018

*Thirty business categories including boat building, importing, equipment, trading, maintenance, schools, security, architecture, engineering offices, press, brokerage, insurance, transport, conveyancing, rental, technical expertise, engineering, ports, specialised service stations. Some companies have activities outside boating.

Sources: FIN (Key boating figures 2019/2021), MTES Ministry of Environment/Marina observatory, Ministry of the Sea (Boating in figures, 2020-2021), INSEE/Structural Business Statistics.

10. Maritime and inland waterway transport

Maritime and inland waterway transport groups merchant maritime and inland waterway fleets and ports. The activity of the fleet comprises the transport of goods and passengers. The activity of maritime and river ports groups the general operation and organisation of ports, port services for vessels, and goods. Military ports are excluded.

10.1.Port activities

Tab. 1. Key figures of maritime and inland port services*

Units: million EUR, number of jobs, FTE.

	2014	2015	2016	2017	2018	2019
Turnover (1)	1 640	1 734	1 747	1 416	1 576	1 497
Value added (1)	783	830	935	701	1 003	973
Number of employees as of 31/12	8 473	9 981	8 137	7 300	7 961	6 928
Number of employees FTE	8 250	8 993	7 725	7 081	7 497	6 556
Number of companies	566	505	405	321	299	303
Exportations	342	311	297	311	326	321

*The activity includes the operation of maritime and inland ports, terminals, wharfs, waterways, locks; the activities linked to navigation, piloting, towing, mooring; salvaging and refloating, lighterage; signalling by lighthouses and beacons; shipping agencies.

(1) Turnover and gross value added excluding tax.

Sources: INSEE/Structural Business Statistics, NAF 52.22Z.

Tab. 2. Key figures of maritime port handling*

Unit: million EUR, number of jobs, FTE.

	2014	2015	2016	2017	2018	2019
Turnover (1)	1 605	1 642	1 615	1 327	1 462	1 442
Value added (1)	562	565	581	494	548	550
Number of employees as of 31/12	6 374	6 201	5 365	5 286	5 540	5 046
Number of employees FTE	5 125	5 186	4 516	4 772	4 950	4 535
Number of companies	280	253	185	86	74	79
Exportations	346	343	339	95	101	140

*Maritime port handling only, excluding river port handling.

(1) Turnover and gross value added excluding tax.

Sources: INSEE/Structural Business Statistics, NAF 52.24A.

In this section, the following activities are not reported: maritime and inland waterway transport logistics activities and those of customs officers and maritime freight transport commissioners. In the Structural Business Statistics, they are included in classes that include similar activities for other modes of transport which are not taken into account here.

10.1.1. Goods traffic in French ports

The volumes of goods handled in all French ports have fallen over the last ten years. The fall in liquid bulk traffic observed recently is mainly due to the evolution of markets for oil and gas. Traffic in dry bulk products linked to steelmaking and agro-foodstuffs has stagnated over

the last decade. The share of general cargo traffic, which has increased, accounts for a small share of total traffic (sources: SDES, transport accounts, Eurostat). Details are given below.

- After a fall from 400 to 344 Mt from 2007 to 2012, the traffic of French ports rose to nearly 370 Mt in 2018, and decreased again to 360 Mt in 2019 and to 310 Mt in 2020 during the pandemic. As a share of EU-28 traffic, French ports also recorded a downturn: from 9% to 7.4% of the European total from 2008 to 2018. The downturn was important for liquid bulk traffic, which fell from 12% to 9.3% of the European total for the same period, but more limited for dry bulk and general cargo (container and ro-ro traffics) – sources: SDES, Eurostat.
- In volume, French port traffic is mostly conducted in imports (two thirds of traffic in 2017), with this dissymmetry becoming even greater for dry and liquid bulk. On the contrary, container and ro-ro traffics were conducted mostly by exports, reaching about 55%.
- For the period 2008-2020, liquid bulk traffic fell by a third in volume and, in this category, crude oil traffic fell by more than 60%.
- Dry bulk traffic, highly dependent on steel and agro-foodstuffs (notably cereals) returned, in 2018-2019, to levels recorded ten years earlier, but decreased by 20% in 2020.
- General cargo traffic and especially ro-ro traffic increased from 2008 to 2018-2019 and returned, in 2020 to levels recorded in the beginning of the period. The share of French ports in the EU-28's container traffic remained low: less than 5% in 2019.
- The three main French ports, Marseille, Le Havre and Dunkirk, saw a 29% fall in their total annual traffic, from 2008 to 2020. The fall was greater for imports (23%) than for exports (7%). This total traffic fell from 60 to 55% of national traffic for the same period: whereas the main European ports increased their total share of the market in the EU, this phenomenon was the contrary on the scale of French ports.

Tab. 3. Traffic of different categories of goods in French ports*

*mainland and overseas ports

Unit: million tonnes

	2008	2010	2012	2014	2016	2018	2019	2020
Liquid bulk	181	157	147	133	135	140	140	119
Dry bulk	83	80	77	79	75	82	76	67
Containerized general cargo	44	43	45	50	50	55	55	48
Non-containerized general cargo	82	78	75	84	85	91	87	77
Total general cargo	126	121	120	134	135	146	143	125
Total	390	359	344	346	345	368	360	312

Source: Transport satellite accounts.

Tab. 4. Goods traffic in the main French ports
Unit: million tonnes

	2008	2010	2012	2014	2016	2018	2019	2020
Marseille	96	86	86	79	81	80	79	69
Le Havre	81	70	64	67	65	71	66	52
Dunkirk	58	43	48	47	47	52	53	45
Nantes-Saint-Nazaire	34	31	30	26	25	32	31	28
Rouen	23	27	21	22	21	23	23	22
Bordeaux	9	9	8	9	8	7	7	6
La Rochelle	8	8	8	9	9	10	10	9
Mainland "Grands ports maritimes"*	**307**	**274**	**264**	**259**	**256**	**275**	**268**	**231**
Calais	40	38	34	43	43	46	44	40
Other mainland maritime ports	31	36	34	32	33	34	35	28
Overseas ports	11	11	12	12	13	13	13	12
Total	**390**	**359**	**344**	**346**	**345**	**368**	**360**	**312**

*Group of main ports including Marseille, Le Havre,Dunkirk, Nantes-St-Nazaire, Rouen, Bordeaux, La Rochelle and several overseas ports, with a specific legal status as public establishments and a state governance.
Source: Transport satellite accounts.

10.1.2. Passenger traffic in French ports

Passenger traffic includes two categories: traffic excluding cruise, and cruise traffic. The two categories show different trends.

The total passenger traffic excluding cruise slowly decreased from 26 to 23 million passengers over the 2008-2019 period. The three main components were cross-Channel, Mediterranean and overseas traffic. The first, by far the largest, fell from 66% to 60.5% in share of number of passengers (Brexit being a possible explanation), while Mediterranean traffic remained almost stable in volume, and increased its share from 30.3% to 34.6% of which the main part was due to Corsica-mainland links. Although Calais remained the leading port for this activity, its share of the total fell from more than 44% to nearly 39%. Overseas traffic increased but remained lower than 5% of the total. According to provisional data, a 50% fall in the overall passenger traffic in 2020 was mainly caused by the health crisis. The most important impact was on the port of Calais; all modes of cross-Channel passenger traffic were impacted.

Evolutions of cruise traffic (mainland and overseas) were significant. In terms of number of passengers, growth reached 140% over the 2008-2019 period; the share of cruise shipping in total passenger traffic increased from 7% to nearly 16%. The cruise traffic from Mediterranean ports (Corsica and mainland) doubled although its share in total traffic fell from 82% to 72%. The port of Marseille recorded remarkable results for the period examined: an increase of 250% in terms of number of passengers, its share rose from 34% to more than 57% of the Mediterranean total. Growth was also important for cruise shipping in the Channel and overseas, in terms of number of passengers and as a share of the total. The pandemic led to a sudden and considerable fall in cruise traffic in 2020 at the European scale, with that of the French ports being divided by 7 according to provisional data.

Tab. 5. Passenger traffic in French ports

Unit: thousand passengers

	2008	2010	2012	2014	2016	2018	2019	2020 (p)
Passenger traffic, excluding cruise	**25 774**	**25 585**	**24 069**	**25 550**	**24 254**	**24 521**	**22 907**	**10 250**
Overseas	902	857	891	865	945	1 075	1 133	616
Mainland (17 ports)	24 872	24 727	23 179	24 685	23 309	23 446	21 774	9 634
North Sea and Channel (8 ports)	17 068	16 339	15 254	16 835	15 469	15 081	13 850	4 992
Calais	*11 000*	*10 236*	*9 345*	*10 703*	*9 092*	*9 118*	*8 478*	*3 269*
Share of Calais in mainland passenger traffic	*44%*	*41%*	*40%*	*43%*	*39%*	*39%*	*39%*	*34%*
Mediterranean (9 ports)	7804	8388	7925	7850	7840	8365	7924	4611
Marseille	*1 521*	*1 383*	*1 552*	*1 160*	*1 119*	*1 273*	*1 269*	*611*
Cruise traffic	**1 871**	**2 288**	**2 922**	**3 332**	**4 112**	**4 442**	**4 471**	**624**
Overseas	223	216	282	478	688	930	792	452
Mainland	1 649	2 073	2 640	2 854	3 424	3 512	3 679	171
North Sea and Channel (8 ports)	119	170	256	329	423	510	468	5
Calais	*2*	*0*	*0*	*19*	*26*	*0*	*0*	*0*
Mediterranean (9 ports)	1 530	1 902	2 384	2 525	3 001	3 002	3 211	167
Marseille	*526*	*685*	*890*	*1 303*	*1 595*	*1 713*	*1 851*	*128*

(p) provisional data

Source: Transport satellite accounts.

Tab. 6. Cross-Channel passenger traffic via France

Unit: thousand passengers

	2000	2010	2018	2019	2020 (p)
Eurotunnel	18,409	18,295	21,546	21,308	7,939
Ferries (1)	20,647	16,339	15,081	13,850	4,992
Air transport	6,202	6,020	8,883	8,865	2,085
Total	45,258	40,654	45,510	44,023	15,015

(1) Including links with Ireland and the Channel Islands, excluding cruise ships. 8 ports are involved: Caen-Ouistreham, Calais, Cherbourg, Dieppe, Dunkirk, Le Havre, Roscoff and Saint-Malo.

(p) provisional data.

Source: transport satellite accounts, Eurotunnel, Transport Ministry statistics.

10.1.3. International goods traffic

Traffic of European ports

In the traffic of European ports, short sea shipping should be distinguished from deep sea shipping. The first category comprises maritime links between the ports of the EU and with the ports of the Mediterranean and the Black Sea.

The two categories of traffic progressed in parallel during the fifteen years before the health crisis, the first representing on average about 60% of the goods traffic of European ports in volume. This proportion varies between countries, since more than 85% of the activity of Scandinavian ports is short sea shipping, while the two categories of traffic to the large international ports of the north (Belgium, Netherlands, Germany) and Spain are handled equally.

Short sea shipping has progressed in most European countries over the period, in particular in Belgium and Greece (about 30%), Spain and the Netherlands (about 20%), as well as Finland, Norway, Sweden. A significant evolution was observed for Turkey: over the decade preceding the pandemic, the ports of Turkey increased their short sea traffic by more than 50% with traffic in 2019 higher than the other European countries (320 Mt). Among the countries with considerable traffic, the highest reductions in short sea traffic over the period 2005-2019 were observed for French (-21%) and British (-13%) ports.

The total traffic of European ports (EU-28) grew slowly by just under 20% over the decade 2009-2019, following the effects of the financial crisis of 2007-2009. The differences were significant between countries: the ports of Belgium and the Netherlands increased more or less regularly over the period; several Mediterranean ports (Spain, Turkey, Piraeus) presented strong growth; Italian and German ports' growth was close to zero or slightly negative on average; and traffic for France and the United Kingdom fell. Some countries whose traffic represented a more modest share in the European total saw considerable growth, in particular Poland and Greece.

Tab. 7. Short sea shipping in the main European countries

Gross weight of goods throughput in main ports (inbound and outbound)
Unit: million tonnes

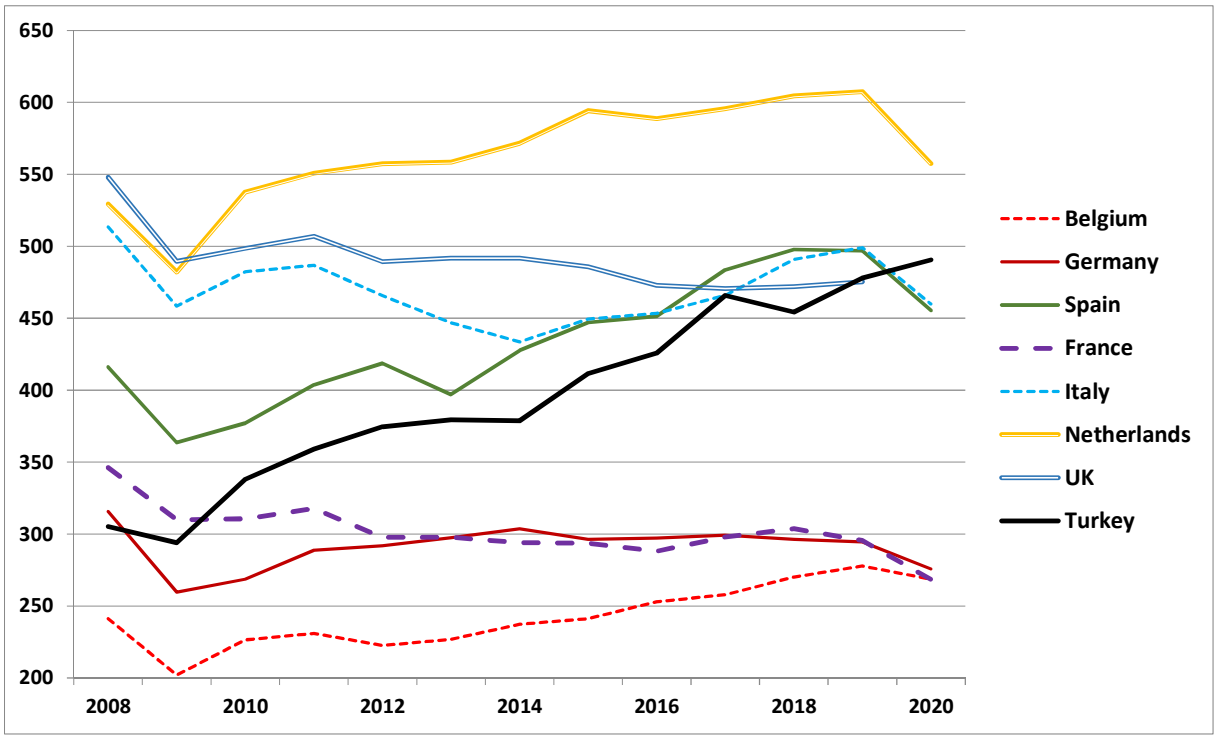
	2008	2010	2012	2014	2016	2018	2019	2020
Belgium	129	130	124	134	143	136	143	143
Germany	190	158	170	177	178	175	171	158
Spain	187	177	191	194	195	211	236	211
France	222	194	171	170	165	178	170	160
Italy	334	311	285	262	283	313	311	287
Netherlands	251	276	263	273	286	294	300	283
UK	348	316	311	316	315	314	307	na
Turkey	211	243	255	259	274	295	321	326

Source: Eurostat

Chart 8. Cargo traffic in European ports

Gross weight of goods throughput in main European ports

Unit: million tonnes



2020 data not available for UK

Source: Eurostat

In detail, the following should be noted:

- a downwards trend in liquid bulk traffic in Germany, France and the United Kingdom, and slow growth in the other main countries;
- for dry bulk traffic, the considerable growth of the Turkish ports (whose traffic almost doubled over the period 2009-2019) contrasts with the moderate growth of Europe as a whole (15% over the period);
- for containerised traffic, general growth, in phase with the international growth of the activity: a little more than 50% over the period 2009-2019 for the EU-28. This growth was contrasted: regular and moderate (more than 40%) in Belgium and the Netherlands, stronger in the Mediterranean ports that play the role of international hubs (Spanish ports, Turkish ports, Piraeus); the slowest growth (less than 30%) was seen in Germany, Italy, United Kingdom, France.

Tab. 9. Container traffic of the main European ports

Total annual traffic of containers with or without cargo
Unit: million TEU

	2010	2015	2019	2020
Rotterdam	11,0	11,6	13,5	13,3
Antwerp	8,1	9,4	11,7	12,0
Hamburg	7,9	8,8	9,3	8,6
Piraeus	0,9	3,4	5,6	5,2
Valencia	4,2	4,6	5,4	5,4
Algeciras	2,8	4,5	5,1	5,1
Bremerhaven	4,9	5,5	4,9	4,8
Felixstowe	3,4	4,0	3,8	na
Barcelona	1,9	2,0	3,3	3,0
Ambarli	2,5	3,1	3,1	2,9
Gioia Tauro	3,9	3,0	3,0	3,3
Le Havre	2,4	2,6	2,8	2,2
Genoa	1,0	2,1	2,2	2,5
Southampton	1,6	2,0	1,9	na

na: not available.
Source: Eurostat

Traffic of world ports

At the international scale, traffic of all goods recovered a regular growth following the financial crisis 2007-2009. Over the past fifteen years, note can be taken of the growing preponderance of Asian ports in international trade, since their share exceeded 50% in volume from 2015 onwards, whereas the positions of the European ports progressively declined, falling under 20% of volumes in traffic from 2013. This reduction was more marked for dry bulk but concerned all types of cargo.

The impacts of the health crisis continued during the first six months of 2021, varying between ports. The slowdown of activity at certain container terminals, especially in China, led to great tension on the container hire market.

Tab. 10. Traffic of all maritime ports

Annual traffic* by region
Unit: million tonnes

		2010	2012	2014	2016	2018	2019	2020
World	Liquid bulk**	5 662	5 826	5 771	6 291	6 588	6 531	6 004
	Dry bulk***	11 101	12 487	13 765	14 259	15 448	15 628	15 275
	Total: all cargo	16 763	18 313	19 536	20 550	22 036	22 159	21 279
of which:								
Africa		1 127	1 143	1 183	1 174	1 265	1 267	1 246
Northern America		1 609	1 687	1 659	1 726	1 912	1 956	1 926
Latin America & the Carribean		1 538	1 815	1 873	1 921	2 023	2 008	1 959
Asia		7 994	8 853	9 770	10 417	11 225	11 331	11 361
Europe		3 457	3 668	3 657	3 790	3 883	3 881	3 158
Oceania		1 040	1 147	1 395	1 522	1 728	1 717	1 630

*Cargo handled in ports (loaded and unloaded).
**Liquid bulk: crude and refined oils, chemical products.
***Dry bulk: solid raw materials, containers, general cargo and other minor dry bulk.
Source: UNCTAD

Tab. 11. International container traffic

Annual traffic by region

Unit: million TEU

	2010	2012	2014	2016	2018	2019	2020
World	543	618	681	704	796	825	816
China & Hong Kong	156	182	207	217	253	260	263
Europe (1)	90	102	111	114	126	123	117
Asean & East Timor	75	86	95	99	111	111	109
Asia-Pacific	50	55	61	62	67	66	64
Northern America	47	49	52	54	62	62	61
Latin America & The Carribean	36	43	44	45	51	60	59
Middle East	34	38	40	42	44	44	nd
Africa	23	26	29	29	30	33	33
Indian Subcontinent	17	18	20	23	30	30	29
Oceania (2)	10	11	12	12	14	13	13

(1) Including Faroe Isles, Turkey; excluding Greenland, Antilles, New Caledonia.

(2) Including Polynesia, New Caledonia.

Source: UNCTAD

10.2.Maritime shipping and merchant fleets

Maritime shipping includes:

- Sea and coastal transport of passengers: operations of excursion, cruise, and sightseeing boats; operations of ferries, water taxis, etc.; rental of pleasure boats with crew for sea and coastal water transport; ferry transport of cars with driver;
- Sea and coastal transport of freight; transport by towing or pushing of barges, oil rigs, etc.; rental of vessels with crew for sea and coastal water transport; ferry transport of cars without driver;
- Rental and operational leasing of water transport equipment (commercial boats and ships) without operator.

The structural business statistics related to maritime and inland waterway transport have a number of data gaps due to confidentiality. The key figures of “waterborne transport” (i.e. maritime, coastal and inland waterway transport of cargo and passengers) presented in this section mitigate the confidentiality problem and limit the number of data gaps.

Tab. 12a. Key figures of water transport

Unit: million euros, number of persons/FTE

	2014	2015	2016	2017	2018	2019
Turnover excl. tax	14 862	16 390	13 913	18 521	20 726	22 113
Value added (1)	1 328	1 354	496	1 744	1 347	1 418
Numbre of employees as of 31 Dec	c	c	14 287	16 399	17 569	17 869
Number of employees (FTE)	c	c	13 592	15 502	16 674	17 138
Number of companies	1 981	1 962	1 962	1 659	1 697	1 778
Exportations	11 670	13 934	11 909	14 678	16 791	17 820

1-Gross value added excluding tax, including other income and expenses.

c: confidential

Source: INSEE/Structural Business Statistics, NAF 50.

Tab. 12b. Key figures of sea and coastal passenger water transport

Units : million euros, number of persons/FTE.

	2014	2015	2016	2017	2018	2019
Turnover excl. tax	1 386	1 541	1 606	1 653	c	1 842
Value added (1)	239	380	402	264	c	265
Numbre of employees as of 31 Dec	5 144	c	4 892	4 742	4 956	5 204
Number of employees (FTE)	5 464	c	4 922	4 874	5 097	5 407
Number of companies	720	742	778	615	671	762
Exportations	789	965	1 024	645	c	714

1-Gross value added excluding tax, including other income and expenses.

c: confidential

Source: INSEE/Structural Business Statistics, NAF 50.10Z.

Tab. 12c. Key figures of sea and coastal freight water transport

Units : million euros, number of persons/FTE.

	2014	2015	2016	2017	2018	2019
Turnover excl. tax	12 773	14 159	11 675	c	c	c
Value added (1)	842	720	-149	c	c	c
Numbre of employees as of 31 Dec	7 761	8 324	5 934	8 291	8 743	8 729
Number of employees (FTE)	7 214	7 423	5 092	6 950	7 426	7 408
Number of companies	164	173	164	91	91	102
Exportations	10 762	12 837	10 752	c	c	c

1-Gross value added excluding tax, including other income and expenses.

c: confidential

Source: INSEE/Structural Business Statistics, NAF 50.20Z.

Tab. 12d. Key figures of rental and leasing of water transport equipment

Units : million euros, number of persons/FTE.

	2014	2015	2016	2017	2018	2019
Turnover excl. tax	552	632	535	136	182	155
Value added (1)	477	538	460	63	120	76
Numbre of employees as of 31 Dec	69	56	127	c	123	191
Number of employees (FTE)	93	101	107	c	128	179
Number of companies	552	548	481	358	345	352
Exportations	161	177	268	33	82	57

1-Gross value added excluding tax, including other income and expenses.

c: confidential

Source: INSEE/Structural Business Statistics, NAF 77.34Z.

10.2.1. French merchant fleet

On 1 January 2021, France ranked 27th among merchant fleets by flag. In Europe, it ranked 12th by flag. French tonnage represented 0.4% of world tonnage of which 60.6% is under the first five flags (Panama, Liberia, Marshall Islands, Hong Kong and Singapore).

The average age of the French transport fleet was 8.6 years on 1 January 2022. The age of the world fleet was 15.5 years. The average age of the European Union fleet was 16.6 years.

Cruise shipping and ferry transport were severely hit by the health crisis following a decade of stability (source: Ministry of the Sea, Merchant fleet under the French flag on 1 January 2021 and on 1 July 2021).

Tab. 13. Merchant fleet under the French flag

Vessels of more than 100 UMS equipped for the transport of passengers, deep sea freight shipping or cabotage. Service vessels of more than 100 UMS for international cabotage or deep sea operations.

	01/01/2022		
Catégories	**Number of vessels**	**Capacity ('000 UMS) (1)**	**Deadweight ('000 dwt)**
Oil & gas carriers - total	**43**	**2 600**	**4 004**
Oil carriers	32	1 762	3 343
LNG carriers	11	838	661
Cargo carriers	**70**	**3 845**	**3 697**
Bulk carriers	-	-	-
Other dry bulk carriers	2	5	6
Containerships (fully containerized)	32	3 651	3 600
Ro-ro ships	20	149	65
Cargo ships	15	31	21
Other	1	9	5
Passenger ships - total	**79**	**1 004**	**182**
Cruise ships	16	172	23
Ro-pax	47	*823*	156
Passenger launches	16	9	3
Total cargo and passenger ships	**192**	**7 449**	**7 883**
Specialized service vessels - total	**37**	**142**	
Cableships	12	115	
Maritime work support vessels	13	3	
Seismic research vessels	-	-	
Sand carriers	5	11	
Training ships	2	1	
Research vessels	5	12	
Offshore service vessels - total	**55**	**137**	
Platform supply vessel	18	51	
AHTS (Anchor service tugs supply)	16	30	
Multi-purpose supply vessels	5	30	
Special-purpose passenger transport vessels	5	1	
Other	11	25	
Other service vessels	**141**	**98**	
Dredgers	14	36	
Tugboats	117	59	
Buoy tenders	9	3	
Pilote boats	1	0	
Service vessels - total	**233**	**377**	

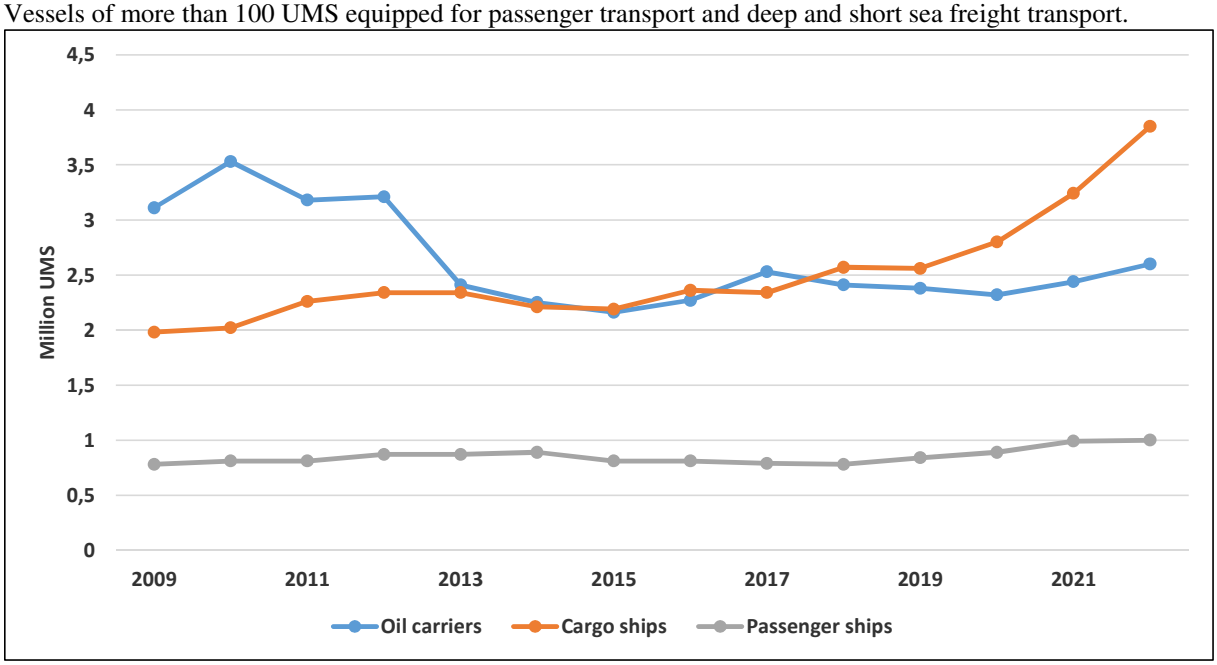
(1) Upright font: UMS. Italic: GT.

Source: Ministry of the Sea, “Merchant fleet under French flag as of 1 Jan. 2022”.

Graph 13b. Evolution of the merchant fleet under the French flag

State on 1 January of each year.

Vessels of more than 100 UMS equipped for passenger transport and deep and short sea freight transport.



Source: Transport statistics / "Merchant fleet under French flag".

The total number of seafarers on merchant vessels registered in France varied over the decade 2009-2019 around 13,000-14,000. It was at its highest in 2010 (nearly 14,300) before reaching a low point in 2017 (slightly over 13,200) to increase afterwards, up to nearly 14,000 in 2019. No strong correlation between workforce and fleet capacity can be observed.

10.2.2. World merchant fleet

Capacities of the international merchant fleet

In 2020, the carrying capacity of the world fleet exceeded 2,000 million dwt, an unprecedented level. Its pace of growth has nonetheless slowed in recent years, the annual rate of growth falling below what it was in the period 2004-2016. At the beginning of 2020, the age of the world fleet was 21.3 years on average for vessels and 10.8 years in weighted average by carrying capacity.

Regarding the structure of the merchant fleet, bulk carriers make up the largest category by their carrying capacity, increasing from a quarter to more than 40% of the total over the period 1980-2020. The share of oil tankers decreased substantially over a long period, while that of container vessels increased regularly: marginal in 1980, it was close to 15% in tonnage in 2020. Since 2010-2015, the structure of the world fleet has changed little (source: UNCTAD).

Tab. 14a. Structure of the world merchant fleet

Unit: million dwt

	1990	1995	2000	2005	2010	2015	2020	2021
Oil tankers	236	271	283	341	450	491	601	619
Bulk carriers	224	250	274	326	457	762	880	913
Conventional cargo ships	100	104	102	92	108	76	77	77
Container ships	22	39	64	100	169	228	275	282
Other ships	48	56	71	49	92	195	239	244
Total fleet	630	719	794	907	1 276	1 753	2 072	2 135

Data relating to the beginning of the year indicated. Vessels of 100 GT and more, excluding river and military vessels, yachts, fixed and mobile offshore platforms. Fishing vessels excluded since 2011.
Source: UNCTAD

Activities of the international merchant fleet

Over the last four decades, international maritime traffic has evolved at almost the same rhythm as world GDP, since the rate of the annual growth of the latter was estimated at 3% in constant dollars, that of the former, in tonnage, was close to this rate, only slightly lower.

Structurally, maritime traffic has changed considerably, with bulk liquids making up more than half the tonnage in 1980 and less than a third in 2020. Conversely, the traffic of various goods (including containers) made up less than a third of traffic in 1980 and nearly 40% in 2019.

Regarding the impacts of the health crisis 2019-2020, the available data show a significant slowdown of activity in 2020: world traffic decreased by 4% in volume in 2020 as compared to 2019 according to UNCTAD. To focus on Europe, the figures of the European Maritime Safety Agency (EMSA) show a reduction of 10.2% of the number of calls from 2019 to 2020; intra-EU maritime trade was down 7% in volume, imports into the EU and exports from the EU were down 12.2% and 4.3% respectively.

Tab. 14b. World maritime traffic by category of cargo

Unit: million tonnes

	1990	2000	2005	2010	2015	2019	2020
Crude oil, oil products, gas, chemical products	1 755	2 163	2 422	2 752	2 932	3 163	2 918
Main dry bulk*	988	1 186	1 579	2 232	2 930	3 218	3 181
Other dry bulk**	1 265	2 635	3 108	3 423	4 161	4 690	4 549
Total	4 008	5 984	7 109	8 408	10 023	11 071	10 648

*Iron ore, cereals, coal, bauxite and alumina, phosphates. From 2006, bauxite and alumina belong to other dry bulk.
**Other minerals, containers, general cargo.
2019: estimations.
Source: UNCTAD

Recent environmental measures applying to maritime transport

Besides dossiers on maritime safety and working conditions, those relating to the environment and in particular atmospheric pollution due to marine fuels have become crucial at the international scale. Lowering carbon and sulphur intensity have become major goals in the maritime transport sector, which contributes to an estimated 2.5% of global greenhouse gas

emissions (GHG). The regulatory initiatives listed below are giving rise to innovative projects in the area of propulsion.

- Atmospheric pollution standards have been adopted by the International Maritime Organisation (IMO), annexed to the Marpol convention (Annex VI), via emission ceilings for sulphur, nitrogen oxide and particles emitted by the combustion of marine fuel, in emission control areas - ECAs. The maximum sulphur content of marine fuel was progressively reduced from 0.50%, weight for weight, in 2016; in sulphur related ECAs (SECAs), to 0.1% starting from 2015; this ratio also concerned combustion particles. In the ECAs related to nitrogen oxides, measures concern the engines of vessels built from 2016 onwards. Other measures concern gases harmful to the ozone layer and other pollutant substances emitted by vessels.
- In Europe, the Channel, the North Sea and the Baltic Sea are SECAs. Directive 2012/33/UE strengthens and generalises this standard to all the maritime areas of the EU.
- Regarding the carbon emissions of maritime transport, the negotiations of the IMO resulted in consensual and limited conclusions. In 2018, the 72nd session of the Marine Environment Protection Committee (MEPC72) adopted an "initial strategy" and announced an objective to lower total CO_2 emissions by 70% by 2050 in comparison to 2008 and GHG emissions by at least 50% within the same period. In 2021, the 76th session of the committee (MEPC76) agreed to a reduction of 11% from now to 2030 and the use of vessel energy efficiency indicators. The implementation of a carbon tax and the creation of an R&D fund for vessel propulsion systems, initially considered and supported by the European countries, were rejected.
- The EU projects go further. 1) In December 2019, the Commission published the *Green Deal* - COM(2019) 640 – which announced the goal of climat neutrality in 2050. 2) A new text – COM(2020) 563 final – proposed a reduction of emissions of at least 55% by 2030. 3) "Sustainable blue growth" was the subject of a communication in May 2021 (COM(2021) 240), which extended the objective of carbon neutrality to maritime transport by 2050.
- Following the green deal, the initiative "*Fit for 55*" of 14 July 2021 aims at a reduction of 55% of GHG emitted in the EU for 2030 in comparison to 1990. Certain provisions concern maritime transport. 1) The carbon emissions of marine fuels are integrated in an EU "emission quota trading system" for vessels entering EU ports. Maritime transport is also subject to the gradual reduction of the emission ceiling associated with the system. 2) A regulation project of the Parliament and the Council ("*FuelEU Maritime*" - COM(2021) 562 final) provides incentives for vessels stopping over in EU ports to use land-based electricity supply for all their energy requirements. 3) The taxation of energy will be adjusted by directive to the climate policy, in particular via the elimination of exemptions. Bunkers will be incorporated in this revision. The latter proposal has given rise to debates as to its coherence and its application to international maritime transport.

10.3.River transport

River transport is the transport of goods and passengers on rivers, canals, lakes and other inland waterways, including ports and docks. It also includes rental of merchant vessels and pleasure boats with crew for river transport.

River transport is generally included in studies on the European maritime economy due to its importance in Northern Europe and its communications with maritime transport. In France's

structural business statistics, river port handling is merged with road, railway and airport handling. Therefore, it is not taken into account in our key figures.

Tab. 15a. Key figures of inland passenger water transport in France

Unit: million euros, number of persons/FTE

	2014	2015	2016	2017	2018	2019
Turnover before tax	324	349	359	341	353	c
Value added (1)	133	141	142	143	143	c
Number of employees as of 31 Dec	2 189	2 247	2 424	2 007	2 281	2 296
Number of employees FTE	2 473	2 619	2 707	2 414	2 697	2 763
Number of companies	348	309	308	259	261	254
Exportations	96	110	110	118	129	c

1-Gross value added excluding tax, including other products and expenses.
c: confidential.
Source: INSEE/Structural Business Statistics, NAF 50.30Z.

Tab. 15b. Key figures of inland freight water transport in France

Unit: million euros, number of persons/FTE

	2014	2015	2016	2017	2018	2019
Turnover excl. tax	379	341	274	319	397	382
Value added (1)	113	113	101	120	166	149
Number of employees as of 31 Dec	c	c	1 038	1 360	1 589	1 641
Number of employees FTE	c	c	871	1 264	1 455	1 560
Number of companies	749	738	712	694	674	660
Exportations	23	23	23	na	103	na

1-Gross value added excluding tax, including other products and expenses.
c: confidential
na: not available
Source: INSEE/Structural Business Statistics, NAF 50.40Z.

10.3.1. River traffic in France

In 2019, 2% of inland freight transport was performed by waterway, measured in tonnes-km, excluding oil pipelines. The volumes of inland water cargo traffic have evolved little over the last decade; after rising slightly in 2010, they then fell slowly until 2016-2018 before rising strongly in 2019, close to the level reached ten years earlier (source: Eurostat, SDES, VNF).

The two main items of national traffic are minerals and mined materials (a third of the overall traffic in tonnes-km in 2019), with a slight increase over the past decade, and agricultural and forestry products (28%) for which traffic stagnated over the same period. The transport of coal and oil products has fallen by three quarters since 2009.

The Seine river basin has the busiest traffic (40% tonnes-km in 2019). That of the Rhone and the lower Saone represent a sizeable share (17%), as does the Rhine (15%, excluding Rhine transit).

Tab. 16. Inland cargo water traffic France, excluding Rhine transit

Unit: million tonnes-km

	2010	2012	2014	2016	2018	2019	2020
Total	8 060	7 830	7 752	6 836	6 702	7 358	6 522
Containers	751	827	824	709	600	622	490

Source: transport satellite account.

Tab. 17. Inland cargo water traffic by basin*

*Including the Rhine and the Moselle, excluding Rhine transit

Unit: million tonnes-km

	2000	2010	2015	2016	2017	2018	2019	2020
Seine	2 661	3 057	2 860	2 774	2 492	2 726	2 972	2 782
Rhone and Lower Saone	784	1 408	1 266	1 103	1 084	986	1 217	950
Rhine	1 231	1 111	1 097	941	1 112	1 133	1 124	979
North-Pas de Calais	821	934	992	913	883	794	784	868
North and East of Paris	1 050	836	774	709	717	672	723	590
East	679	648	452	360	403	335	521	338
Waterways of central France	28	25	19	28	20	45	19	15
Southwestern waterways	7	2	1	1	1	1	1	0
Western waterways	0	38	0	0	0	0	0	0
TOTAL	**7 261**	**8 059**	**7 461**	**6 829**	**6 712**	**6 692**	**7 361**	**6 522**

Source: transport satellite account.

10.3.2. Inland cargo water traffic in Europe

The main infrastructures used by European river transport are the basins of the Rhine (40 billion tonnes-km) and Danube (25 billion) and, linked to them, the inland waterways of Germany (about 10 billion), the Netherlands and Belgium (more than a total of 50 billion), and the Seine. The Finnish network, which is large due to its total length, is used seasonally.

In volumes of traffic, transport by inland waterway oscillated around 140 billion tonnes-km over the period 2008-2019 (source: Eurostat). It dropped to 131 billion in 2018, since a period of low water affected the upper reaches (Rhine and Danube). The increase in 2019 brought traffic to a level close to that before the beginning of the period. Germany and the Netherlands dominate the activity, with each country making up about 35% of European traffic in 2018. The other countries with significant activity are Romania and Belgium (nearly 10% each), France and Bulgaria (5% or less).

The main cargo transported are:
- metal ores and other mined products (25%), the traffic of which fell by 14% over the period;
- refined oil products (16%) whose traffic increased slightly over the period;
- chemical products and agricultural-forestry-fish products (12%) whose traffic increased by 20% over the period.

Container traffic increased by 22% over the period but represented only about 10% of total traffic in tonnes-km. It fell in the traditional Rhine basin in 2018 during the low water episode but remained stable elsewhere, including in the basin of the lower Rhine. Contrary to Germany and to the French reach of the Rhine, Belgium, the Netherlands and other French basins – Seine, Rhone, North – did not undergo this climatic episode (source: Central Commission for Navigation on the Rhine – CCNR).

Tab. 18. Navigable waterways* in Europe: main countries

*Total length of waterways used.
Unit: km

	2010	2015	2019
Finland	8 006	8 127	8 125
Germany	7 728	7 675	7 675
Netherlands	6 104	6 261	na
France	5 110	4 822	4 827
Poland	3 659	3 655	3 722
Hungary	1 864	1 864	1 860
Romania	1 779	1 779	2 635
Italy	1 562	1 562	1 562
Belgium	na	na	1 532
UK	1 050	1 050	na
Croatia	805	1 017	1 017

na: not available
Source: Eurostat, Belgian Waterway System

Tab. 19. Inland waterway traffic in the EU: main countries

Unit: million tonnes

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
UE-28*	527	535	538	537	551	544	548	553	506	521	504
Belgium**	162	173	190	187	190	188	193	201	152	156	156
Germany	230	222	223	227	228	221	221	223	198	205	188
France	73	68	69	69	65	63	65	63	60	64	56
Netherlands	347	345	350	356	367	360	361	366	357	357	349
Romania	32	29	28	27	28	30	30	29	30	33	31

*For 2010-2013: additional data from the countries which became EU members in 2013. EU-27 in 2020.
**Statistical disruption for EU and Belgium in 2018.
Source: Eurostat

11. Marine insurance

Marine insurance includes direct business and inwards (reinsurance), domestic and cross-border business for two categories:

- hull (ocean hull, fishing vessel, inland hull and pleasure craft), including road civil liability and offshore energy insurance: the category includes the coverage of container terminals, ports, offshore platforms and underwater pipelines;
- maritime, inland waterway and road carried cargo, and the civil liability insurance of land transport.

The perimeter therefore includes associated land operations that are integrated in insurance policies.

Tab. 1. Key figures of marine and transport insurance

Units: million euros (all currencies converted), FTE.

	2014	2015	2016	2017	2018	2019
Hull - gross premiums (1)	392	452	404	384	373	413
Cargo - gross premiums (2)	653	669	656	644	671	685
Total marine and transport gross premiums - hull and cargo	1 045	1 121	1 060	1 028	1 044	1 098
Net premiums - estimate (3)	897	960	874	840	859	887
Production value - estimate (4)	726	782	694	689	726	688
Gross value added - estimate (5)	160	180	157	134	172	126
Number of employees FTE - estimate (5)	2 676	2 723	2 418	2 345	2 142	2 188

(1) Gross premium income. Merchant and fishing hull, energy, inland waterway hull and pleasure craft, inland hull civil liability, excluding space and aviation. Direct business.
(2) Gross premium income. Maritime, airborne, road and waterway cargo, inland transport civil liability. Direct business.
(3) Net premiums: estimate based on OECD statistics of gross and net non-life insurance.
(4) Production value: estimate based on INSEE/national accounts/ insurance branch (net premiums and production).
(5) Gross value added and employment: estimates based on INSEE/ national accounts/ insurance branch.
Sources: FFA (gross premiums of maritime and transport insurance), OECD (insurance sector statistics), INSEE/national accounts.

Remarks

- The annual amounts of the gross premiums of maritime insurance are published by the industry, from which the key figures present estimations of the activity's contribution to the value added and employment in the insurance sector.
- The key figures cover only insurance business in France due to the available data, whereas French companies are active outside France. Furthermore, they cover the major share of business in France (around 90%) but not all of it.

11.1.French market

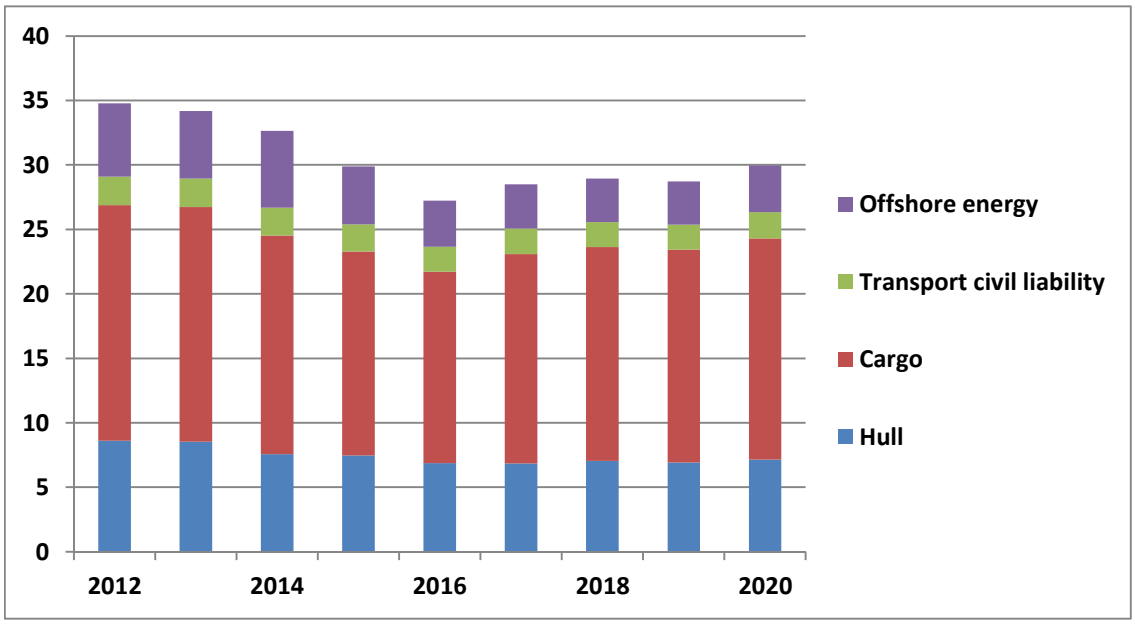
- Marine and transport insurance represented about 1.4% of non-life premiums on the French market in 2019. With a broad meaning of marine insurance (P&I, offshore energy, hull, cargo, civil liability), the equivalent ratio was about 2% in Italy, more than 3% in the Netherlands, more than 5.5% in the UK (Lloyd's and IUA), 9% in the Scandinavian countries (Cefor) – sources: International Union of Marine Insurance (IUMI), Insurance Europe.
- The companies active in France operate on cargo, hull and civil liability markets. They are not significantly active on other marine insurance markets, notably offshore energy (drilling platforms, etc.).

11.2.International markets

- The evolutions during the period 2012-2020 show a contraction of maritime insurance markets until 2016, followed by slow growth – all currencies converted into USD. Evolutions may differ in local currencies.
- On the international scale, more than half the gross premiums stem from cargo insurance (goods transported), close to 60% in 2020. The second category of market is hull insurance which makes up nearly a quarter of gross premiums. The share of offshore energy insurance is about 12% and that of transporters' civil liability is estimated at about 7% (source: IUMI).
- Despite uncertainty regarding estimations, cargo insurance is seen to have grown during the period observed in gross amounts and in market shares for all maritime insurance, especially since 2015, linked partly to a higher number of claims in the Asia-Pacific region up to 2018 (source: IUMI). A marked improvement in the situation occurred from 2019 onwards. However, the pandemic led to new uncertainties for maritime freight: the local saturation of ship traffic, the accumulation of goods, and losses due to delayed deliveries.
- The period was also marked by a reduction of offshore energy premiums since 2014, which has slowed since 2017-2018. This evolution can be correlated with oil and gas prices, which fell from 2014 to 2016, then from 2019 to 2020. The increase in crude oil prices since mid-2020 is still too recent to augur new evolutions.
- Europe dominates the marine and transport insurance market. However, its market share fell during the period observed and dropped to less than half of the total amount of gross premiums, in direct business, in 2020, although the recent depreciation of the euro in comparison with the dollar has favoured European companies. Offers from China, Brazil and Singapore in particular, compete with those of European companies. Of the latter, British companies are by far the largest with more than 60% of offshore energy premiums in 2020, more than 10% of cargo premiums and more than 15% of hull premiums (gross premiums, direct business).

Chart 2. Gross premiums of marine and transport insurance: main markets*

Unit: billion USD current value.

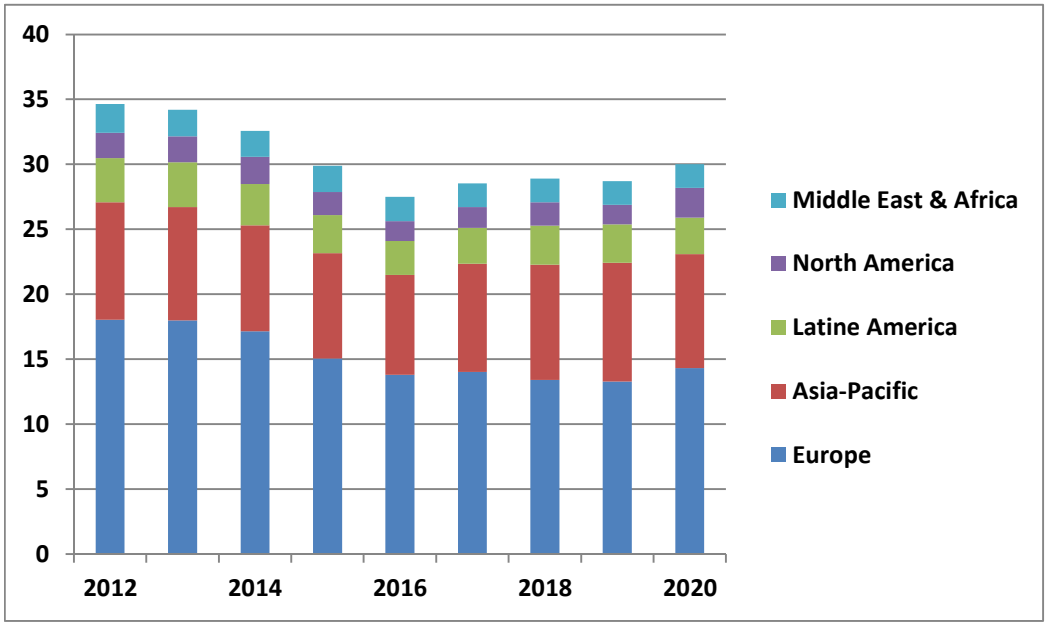


*Estimations of total gross premium income. Possible double counting in the amounts of gross premiums.

Source: IUMI

Chart 3. Gross premiums of maritime and transport insurance*: distribution by main regions

Unit: billion USD current value.



*Estimations sensitive to exchange rates.

Source: IUMI

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Public Sector

12. French Navy

The French Navy contributes to national defence and security at sea through the operational action of armed naval forces. It participates in defence strategy by way of permanent and non-permanent missions.
Permanent missions:
- Dissuasion is based on the oceanic and the airborne components. The former, represented by the strategic ocean force, includes four nuclear powered missile carrying submarines. The second, the nuclear aeronaval force, is the Navy's contribution to the airborne component.
- Maritime security includes the action of the State at sea and the maritime defence of the territory. 1) Under the authority of the maritime prefect on the mainland and the government delegate overseas, State action at sea covers maritime missions in the public interest performed by the State. The Navy supplies naval, airborne and land-based resources, ensuring the performance of public service and policing activities at sea (fishing police, response to pollution at sea, combatting illegal trafficking, search and rescue at sea, disarming ancient explosive devices). 2) The maritime defence of the territory is aimed at monitoring French coasts and their approaches, informing the authorities of suspicious or hostile activities at sea and threats of maritime origin, and opposing actions against national territory initiated from the sea.
- The deployment of vessels contributes to knowledge, anticipation and prevention: knowledge of areas of potential crises, anticipation of the occurrence of conflicts, independence of assessment, decision and action, positioning in areas of strategic interest.

Non-permanent missions:
- interventions: operations of major coercion, crisis management (remote deployment of combat units and rapid support with capacity to employ lasting effort).

The Navy's action covers all the oceans, due to the situation of France's overseas territories.

12.1.Budget and manpower

The reduction of Naval manpower since 2008 continued until 2019, in phase with the White Book on Defence of 2013 and the law on military planning (LPM) 2014-2019. The LPM 2019-2025 foresees a moderate increase of manpower.

The Navy renews 10% of its manpower per year, and recruits and trains 4,000 people aged from 16 to 30 years old every year. In a context of recruitment problems affecting the Ministry of the Armed Forces and competition from the public and private sectors to attract high level technical skills, the Navy made a budgetary effort to recruit and train sailors and support the attractiveness of professions (improvement of living conditions onboard and on land, digitisation, changeover to double crews on certain vessels).

Tab. 1. Budget of the Navy

Unit: million euros

	2014	2015	2016	2017	2018	2019	2020
Wages and social security charges	2 489	2 493	2 618	2 658	2 736	2 747	2 770
Specific costs	50	47	39	75	77	85	85
Operational activities	274	279	249	240	245	217	231
Dissuasion	336	340	313	323	386	426	559
Maintenance of equipment	1 167	1 180	1 214	1 234	1 404	1 468	1 483
Infrastructure, accompanying equipment, and staff dedicated material (1)	140	113	121	128	134	185	253
Total	4 316	4 338	4 433	4 530	4 848	4 943	5 381

1-Some budget lines are not individualised by armed (land, air and naval) forces. The related budget shares awarded to the Navy are not included in this line.

Sources: Navy chief of staff; Ministry of Economy/Budget reports.

Tab. 2. Workforce of the Navy

Unit: FTE

	2015	2016	2017	2018	2019	2020	2025 (2) (3)
Military staff	35 411	35 552	35 327	35 113	34 676	34 825	32 293
commissioned officers	4 495	4 492	4 459	4 559	4 629	4 689	4 235
non-commissioned officers	23 566	23 328	23 230	23 043	22 724	22 847	20 760
enlisted personnel	6 583	6 870	6 782	6 775	7 095	7 147	6 889
voluntary military personnel (1)	767	862	856	736	228	142	409
Civilian personnel	2 775	2 744	2 624	2 671	2 739	2 669	2 739
Total	38 186	38 296	37 951	37 784	37 415	37 494	35 032

1-Excluding voluntary military service.

2-Workforce in number of persons.

3-Objective of the military planning law 2019-2025.

Sources: Ministry of the Armed Forces; Navy chief of staff.

The civilian personnel are mainly employed in support services (logistics, fleet support, naval air bases). The share of this personnel was reduced to 7% of the workforce in 2017. The military planning law of 2019-2025 aims at 7.8% in 2025.

The operational reserve provides additional resources required during crisis periods or occasionally useful specialists. They filled 6,400 posts in 2008, 7,100 in 2012, then fell to fewer than 4,700 in 2015. A budgetary effort permitted reaching more than 5,900 in 2019 (source: annual budget bills).

12.2.Equipment and military planning law

The downwards adjustment of the form of the armed forces and especially the capacities of the Navy continued over a period of about two decades and ended with the LPM 2019-2025. This provides for “improved equipment” and the “consolidation of the Navy’s workforce” (source: budget bill 2019). It plans for:

- correcting the temporary reduction of capacity (renewal of equipment, renovation),
- increased maintenance of aviation and naval equipment (increased maintenance budget lines, revision of maintenance organisation),

- strengthening the workforce annually until 2025, and improving the living conditions of sailors and their career paths.

Tab. 3. Naval and aeronaval equipment of the French Navy

Main equipment	31/12/2018	31/12/2025*	Observations
Aircraft carrier	1	1	Embarked air group: 40 aircrafts (Rafale marine, Hawkeye, helicopters).
Maritime patrol aircrafts (ATL2)	22	18	ATL2s due to be renovated in 2025.
Maritime surveillance and intervention aircrafts	13	11	Of which 8 FALCONs in 2025 and 3 AVSIMARs.
Embarked combat and rescue helicopters	36	27	22 units NH90 NFH (1) in 2019, 27 in 2025.
Light helicopters	45	45	
Nuclear-powered ballistic missile submarines	4	4	
Nuclear-powered attack submarines	6	6	6 RUBIS in 2019, 2 in 2025 and 4 BARRACUDAs.
Mine countermeasures ships	15	10	* 11 CMTs and 4 BBPDs (2) in 2019 * 5 and 3 (respectively) in 2025, 2 carrier vessels and 4 drone systems
Anti-aircraft frigates (FAA), air defence frigates (FDA), mid-size frigates (FTI)	4	4	* 2 FAAs and 2 FDAs in 2019 * 2 FAAs and 2 FTIs in 2025
Multi-missions frigates (FREMM), anti-submarine frigates (FASM), La Fayette frigates (FLF)	13	13	* 5 FREMMs, 3 FASMs, 5 FLFs in 2019 * 8 FREMMs, 5 FLFs in 2025
Surveillance frigates	6	6	
Command and force projection ships	3	3	
Supply tankers	3	3	
Patrol boats and overseas supply ships (3)	16	18	* including 2 PLGs in 2019 * including 3 PLGs and 2 BATSIMARs in 2025
Support, surveillance, rescue and salvage vessels	5	8	* 3 multi-missions vessels and 2 offshore support, assistance and rescue vessels in 2019 * 4 and 4 in 2025.

*End of the military planning law.
(1) Nato Frigate Helicopter (NFH): one of the two versions of the NH90 equipping naval and land forces.
(2) Tripartite class mine-hunters (CMT) of type Eridan; vessels for bomb-disposal divers (BBPD).
(3) including patrol boats - Antilles - French Guiana (PLG), BATSIMAR patrol boats.
Source: Law 2018-607 relating to military programming for the years 2019 to 2025.

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13. State intervention at sea

The State acts in several sectors of maritime activity. It ensures the safe and unhindered circulation on the sea of goods and persons. It essentially acts in four areas:

- maritime security and safety: surveillance and rescue at sea, maritime signalling, the safety of ships and navigation conditions (maritime transport, ports, fishing, aquaculture, tourism);
- the promotion of seafarers and employment: the education and training, improvement of working conditions, developing information procedures, reducing administrative workloads, social protection;
- supporting the merchant fleet and promoting the French flag;
- controlling activities at sea: the protection of aquatic and fishing resources, combatting pollution, preserving the marine environment.

13.1.Public effort in the maritime sector

Public effort in these four areas can be assessed using budget lines from the Finance Ministry's budget reports: these include Maritime Affairs, fishing and aquaculture management, and public support for infrastructures and maritime transport services. The latter funds the maintenance of access and structures giving access to large maritime ports, in particular through dredging, and therefore intersects with maritime safety objectives.

Tab. 1. Public budget effort in the maritime sector

Units: million euros, FTE

	2015	2016	2017	2018	2019	2020
Maritime Affairs and fishing and aquaculture management	175	158	168	187	192	194
of which:						
Maritime safety and security	23	26	25	32	30	37
Training and education of seafarers	29	27	26	26	25	26
Merchant fleet	66	63	72	85	83	70
Inter-ministerial maritime policy	8	9	7	11	11	17
Policy support expenses	9	9	9	9	9	9
Fishing and aquaculture management	40	24	29	24	35	35
Transport infrastructures et services / maritime ports (1)				151	144	138
Personnel dedicated to Maritime Affairs						
Staff cost	198	197	205	185	182	178
Number of staff (FTE)	2 936	2 899	2 942	2 780	2 540	2 475

1-Before 2018: budget line merged with other lines for waterway and airport infrastructures. Since 2018: identified separately.

Source: Finance Ministry / annual budget reports.

Remarks

- Over five years, Maritime Affairs and fishing and aquaculture management saw an increase of over 20% in its allocation and an almost three-fold increase in investment expenses (modernisation of the nautical and computer resources of Maritime Affairs). In this programme, apart from the high level of expenditure required for actions benefiting

fishing enterprises in 2015, due to the inclusion of credits made available by the European Maritime and Fishing Fund – EMFF (around EUR 15m), allocations for maritime safety and fishing management increased by more than 40%. The allocation for inter-ministerial action for the sea more than doubled from 2015-2020.
- During the period, the number of personnel assigned to the programme fell by about 15%, with a reduction in labour costs of about 10%.
- Credits made available for ports decreased in comparison to recent years, although port infrastructures were also funded by support funds from the French Transport Infrastructure Funding Agency (AFITF). The sum of these amounts has remained more or less constant in recent years. Exceptional support in the framework of the recovery plan recently adopted brought the total to over EUR 200m for 2021 (source: draft budget laws for 2019, 2020, 2021).

13.2.Administration of Maritime Affairs

13.2.1. Maritime Affairs services

The central administration is the Department of Maritime Affairs (DAM), currently part of the Ministry of the Sea. Its scope of action includes maritime security and safety (signalling, rescue, surveillance), control of the marine environment and fishing, planning maritime space, training and education, the social protection of seafarers, support for the merchant fleet and monitoring boating activites.

Local and regional services – Inter-regional Maritime Departments (DIRM) and overseas Maritime Departments (DM) – intervene in maritime security, maritime education and issuing maritime licences, maritime signalling and the combat against accidental coastal pollution by oil products (POLMAR-terre). The DIRMs ensure the general coordination of the maritime policy relating to the coasts of their jurisdiction.

13.2.2. Personnel

The personnel of Maritime Affairs ensure:
- missions for the benefit of seafarers (working conditions, training, medical fitness, social protection, disciplinary and penal measures);
- technical missions in the area of vessel security and in that of maritime navigation;
- control and surveillance missions (fishing, the marine environment, nautical events) that make up a large share of the State's actions at sea;
- economic missions (regulation of maritime fishing and aquaculture, management of the public maritime domain used for aquaculture, health and technical controls of seafood products, fishing statistics and quotas);
- police missions and functions in maritime and commercial courts;
- maritime signalling ("Lighthouses and Beacons" administration), consisting in studying, proposing and implementing adapted nautical (types of navigation aid) and physical (capstan, buoy) solutions; maintenance of navigation aids and the dissemination of nautical information (works, faults, repairs);
- regarding accidental marine pollution, the management of interdepartmental storage centres for pollution clean-up materials (eight centres in mainland France, six overseas), and a contribution to local training centres' exercises.

13.3.Resources implemented for maritime security and safety

Maritime security and safety are subject to action by the State on three levels:
- as flag State, it ensures conformity with international standards on board vessels flying the French flag;
- as port State, it controls foreign merchant vessels calling at French maritime ports;
- as coastal State, it ensures and coordinates search and rescue operations off the French coast, secures shipping routes and access to ports with beacons, monitors circulation in traffic separation zones, supplies information to crews on nautical conditions.

Tab. 2. Maritime Security and Safety expenditure

Unit: million euros

	2015	2016	2017	2018	2019	2020
Operation expenses	18.72	18.14	17.82	20.21	18.91	22.62
Investment expenses	1.45	3.81	3.10	5.00	4.70	3.51
Complementary expenses (1)	2.58	4.45	4.50	6.64	6.42	11.15
Total	22.75	26.40	25.42	31.85	30.03	37.28

1-Mainly: subsidy to the SNSM National Sea Rescue Society.
Source: Finance Ministry / annual budget reports.

13.3.1. Signalling

The maritime signalling and nautical information of mainland and overseas coasts is ensured by more than 6,100 “maritime signalling establishments” whose resources include, among other things, 135 land and sea-based lighthouses and 1,512 lights. These are operated by APB (Lighthouse and Beacon Service), a specialised administrative body. Aid for navigation is also provided by radionavigation systems including the land-based stations of EGNOS (European Geostationary Navigation Overlay Service) – a satellite geolocation system funded by the European Union and complementary to GPS – and about twenty RACON type beacons.

Maritime signalling policy (creation, elimination, modification of ESM, modernisation, maintenance, control) is implemented in the DIRM and DM with the support of a technical and training network reporting to the ministry. It is coordinated with the IMO and the International Association of Marine Aids to the Navigation and Lighthouse Authorities (IALA). The 38 operational vessels are managed by APB, which is also responsible for the crews on board (training and equipment).

13.3.2. Security, surveillance, rescue

Specialised services under the authority of the DIRM and DM, the five mainland Maritime Rescue Co-ordination Centres (MRCCs of Gris-Nez, Jobourg, Corsen, Etel and La Garde) and the two overseas MRCCs (Antilles-French Guiana and Reunion) ensure, in their jurisdictions, the search and rescue of persons at sea; the surveillance of maritime navigation, maritime fishing, marine pollutions; the collection, processing and dissemination of marine security data; monitoring ship safety alerts.

An MRCC at Nouméa and a Joint Rescue Coordination Centre – JRCC at Tahiti have missions similar to those of the mainland ones, and coordinate search and rescue operations in

areas under the responsibility of government representatives for their respective search and rescue regions (SRR) and regional representatives for territorial waters. The total workforce of the MRCCs is about 300 (source: MRCC publications).

The MRCCs possess detection, transmission and communication equipment. The radio component of the network is extended by a global satellite section, integrated in the Global Marine Distress and Safety System (GMDSS). They can obtain the naval and airborne resources of the administrations that carry out the actions of the State at sea (French Navy, air force, the national gendarmerie, customs, civil security, maritime affairs), and the resources of the National Sea Rescue Society (SNSM).

The TSS: the MRCCs Gris-Nez, Jobourg and Corsen are responsible for the surveillance of traffic in the three traffic separation schemes (TSS) of Pas de Calais, Casquets and Ushant (dissemination of information to vessels, conformity with navigation regulations, recording of vessels and hazardous cargoes).

The international dimension of maritime rescue: among the tasks shared between the MRCCs, one of them (Gris-Nez) is the French point of contact of the international network set up by the Hamburg Agreement (1979): the seas are subdivided into search and rescue regions (SRR) for which the MRCC responsible transmits and coordinates rescue operations. It is also a search and rescue contact point – *SAR Point of Contact* (SPOC) – for France, relating to the processing of the global beacon alert and location network Cospas-Sarsat: it receives and processes alerts transmitted by French vessels.

Tab. 3. Maritime security performance indicators

	2015	2016	2017	2018	2019	2020
Indicator of people rescued (1)	98.8%	98.5%	98.7%	98.6%	98.3%	98.6%
Rate of identification of vessels causing pollutant and illegal discharges at sea (2)	NA	20.0%	12.0%	9.3%	5.1%	14.0%

1-Ratio of the number of people found, assisted and rescued (according to maritime rescue categories) by the "search and rescue" system coordinated by the MRCCs, to the number of people involved, to which are added people who have disappeared or died, in a maritime accident.
2-Ratio of the number of POLREP (network of data exchanges between coastal States on marine pollution events and threats) messages with identification of the source of the illegal discharge, to the total number of confirmed POLREP messages, and excluding accidental pollutions, issued by MRCCs. Maritime regions of mainland France, French Giuana, the Antilles, and Reunion.
NA: not applicable.
Sources: MRCCs, Finance Ministry / annual budget reports.

13.3.3. The National Sea Rescue Society

The SNSM, a non-profit association, ensures, under the control of the MRCCs, 50% of off-shore rescue operations in France (apart from interventions on beaches). It prevents risks, carries out rescue operations at sea by volunteers, and trains volunteer lifeguards who ensure the safety of beaches on behalf of coastal municipalities.

Nearly half the SNSM's budget is funded by private donations while the rest comes from subsidies from the government, and regional and local authorities. The SNSM has 9,030 voluntary workers.

Tab. 4. The SNSM in figures (2020)

Number of interventions	7,833
Including interventions by onboard lifeguards	*4,083*
Including interventions by lifeguards	*3,750*
Number of lifeguards active in 2020	4,514
Including off-shore	*3,134*
Including on beaches	*1,380*
Lifeboat and rescue stations	214
Beach lifeguard huts	256
Training and intervention centres*	33

*Including a national training centre.
Source: SNSM

13.4. Resources dedicated towards education and training of seafarers

The education system trains seafarers for the merchant navy, fishing, professional pleasure cruising and shellfish farming, from secondary school level to BSc graduate level for merchant navy officers, in initial and continuous education in mainland France, and in the overseas territories for certain training categories. The network of maritime establishments comprises:

- twelve professional maritime high schools (LPM) providing the initial and continuous education to qualified seafarers, shellfish farmers and certain fishing vessel officers; they received a total of 1,730 pupils in September 2020;
- several private and associative education and training establishments (source: Ministry of the Sea).

Tab. 5. Budget resources for education and training of seafarers
Unit: million euros

	2015	2016	2017	2018	2019	2020
Operation	19.17	19.54	19.20	19.12	19.19	19.13
Including ENSM subsidy	*18.04*	*17.68*	*17.94*	*18.07*	*17.82*	*18.02*
Investment	0.00	0.00	0.00	0.27	0.01	0.00
Complementary expenses	9.49	7.33	6.51	6.24	5.92	6.80
Including initial and continuous education (1)	*9.28*	*7.32*	*6.25*	*5.84*	*5.87*	*5.29*
Total	28.66	26.87	25.71	25.63	25.12	25.93

1-Mainly includes an allocation to several schools and training organisations in mainland France and overseas.
Source: Finance Ministry / annual budget reports.

Resulting from the merger of four national merchant navy schools (Le Havre, Nantes, Saint-Malo, Marseille) in 2010, the National Advanced Maritime School (ENSM) provides training for officers of the merchant navy and maritime engineers. It comprises a research branch. It receives on average of 1,200 students at its four sites every year for initial and professional courses and 3,000 trainees for continuous education (source: ENSM).

Tab. 6. Maritime education: performance indicators

Unit: FTE and %

	2015	2016	2017	2018	2019	2020
Jobs ENSM	223	229	230	222	231	222
Percentage of maritime jobs ENSM (1)	83.5%	79.9%	77.1%	82%	100%	na
Percentage of maritime jobs LPM (2)	61.3%	60.6%	57.1%	52%	95%	na

1-Percentage of maritime jobs among graduates from the ENSM (initial education) 3 years previously.
2-Percentage of maritime jobs among the graduates of LPM (initial education) 3 years previously.
na: not available.
Source: Finance Ministry / annual budget reports.

13.5.Budget resources for the "merchant fleet" activity

Tab. 7. Intervention regarding the merchant fleet

Unit: million euros

	2015	2016	2017	2018	2019	2020
Budget support	65.74	62.69	72.04	85.23	82.51	70.35

Source: Finance Ministry / annual budget reports.

Budget support to the merchant fleet is mainly aimed at compensating government social insurance organisations with the exoneration of social charges to the benefit of merchant navy companies. The procedure is allowed under the transport legislation. In particular, seafarers affiliated with social insurance organisations must sail on board ships under the French flag. Support for the merchant fleet comes in addition to fiscal aid not accounted here (tonnage tax, for example).

13.6.Resources of inter-ministerial action for the sea

Tab. 8. Budget assigned to inter-ministerial action for the sea

Unit: million euros

	2015	2016	2017	2018	2019	2020
Operation	7.12	7.00	5.50	6.57	6.01	5.49
Investment	0.99	1.40	1.54	4.27	4.59	11.48
Complementary expenses	0.23	0.33	0.33	0.20	0.19	0.26
Total	8.34	8.73	7.36	11.04	10.79	17.23

Source: Finance Ministry / annual budget reports.

The essential characteristic of this budget is the importance taken by the funding of the "control and surveillance system" (DCS – see below), to which most of the operation (about 60 to 80%) and almost all the investment is assigned.

13.6.1. Control and Surveillance System

The Control and Surveillance System contributes to the State's action at sea:

- it carries out the functions of policing sea shipping, sea fishing, and the marine environment;
- it participates in assistance operations at sea and in the surveillance of maritime approaches to the territory;
- it also participates in emergency plans (POLMAR-Terre, passenger emergency plans, etc.).

It is composed of an ocean fleet (three patrol boats), three regional surveillance boats and twenty “Maritime Affairs coastal units” (ULAM): local Maritime Affairs services with skilled personnel and equipped with nautical resources.

13.6.2. POLMAR-Terre

The POLMAR system, set up to respond to marine pollution on the French coast, and englobed since 2005 in the Civil Security Response Organisation (ORSEC), has two components: POLMAR-Mer and POLMAR-Terre.

POLMAR-Terre mobilises several organisations with local and national missions, in particular storage centres assigned to POLMAR-Terre, and commercial fishing ports managed by the local authorities concerned. The system is aimed at maintaining equipment in operational condition and training the personnel of local authorities. Training is ensured by the Centre of Documentation, Research and Experimentation on accidental water pollution (Cedre), the Centre of studies on risks, environment, mobility and development (Cerema) and the personnel of storage centres.

13.7.ENIM

ENIM, a public establishment, manages the social security and pension scheme for seafarers, common to the professionals of the merchant navy, fishing and pleasure boating sectors. The scheme covers all health and pension categories except family allowances, and provides protection for:

- risks of disease, maternity, disability, death and work accidents;
- ageing-related risks.

The persons insured are:

- seafarers on board merchant and pleasure vessels, fishers and shellfish farmers and seafarers authorised to validate services on land, and their beneficiaries;
- students following maritime education (ENSM, professional schools);
- pensioned seafarers and their beneficiaries.

Tab. 9. ENIM workforce and financial accounts

Unit: FTE, million euros

	2015	2016	2017	2018	2019	2020
Number of employees	363	354	335	317	303	290
Expenses	**1670.6**	**1629.4**	**1590.6**	**1604.9**	**1552.8**	**1564.0**
Interventions (1)	1637.2	1596.8	1560.2	1573.7	1521.4	1532.9
Operating expenses	33.4	32.4	30.3	31.2	31.4	31.1
Including personnel expenditures	*21.7*	*21.0*	*20.3*	*19.9*	*19.9*	*18.9*
Receipts	**1663.6**	**1605.4**	**1588.1**	**1601.9**	**1520.3**	**1575.4**
Government subsidies	894.2	865.1	868.6	865.6	867.4	859.2
Tax allocation (2)	16.1	16.0	35.1	52.1	40.4	36.0
Other public subsidies (3)	313.8	325.8	439.6	449.6	442.5	505.4
Income from activities and other products	439.5	398.6	244.8	234.6	220.0	174.8
Including social charges	*155.7*	*156.6*	*155.0*	*155.0*	*138.3*	*132.3*

1-Services, health care and social assistance, transfers.

2-Allocation from the "CSG" general tax on income.

3-Including subsidy to the health care intervention segment from the general social security system (it covered 100% of this amount in 2015, 80% in 2020).

Source: ENIM / activity reports; Finance Ministry / annual budget reports.

Tab. 10. Active, affiliated and pensioned seafarers

December of year n	2015	2016	2017	2018	2019	2020
Number of active seafarers	31,000	30,814	30,400	30,130	30,302	28,645
Number of seafarers affiliated to health insurance (1)	95,986	97,050	96,069	95,781	92,764	89,794
Number of pensioners (2)	116,635	115,738	114,892	113,540	112,117	109,920

1-Insured and beneficiaries.

2-Pensioners and disabled pensioners.

Source: ENIM / activity reports.

14. Protection of the coastal and marine environment

Marine ecosystems and coastal areas are subject to many disturbances of natural origin or linked to human activities. Faced with the impacts of these disturbances, environmental protection policies have been implemented at the national level and in the framework of the international institutions in which France participates. In particular they concern the prevention, reduction and elimination of pollution; damage repair; the acquisition, processing and diffusion of environmental information.

Here, the public effort to protect the coastal and marine environment is estimated via:
- public expenditure devoted to the objectives of protection,
- public expenditure devoted to public agencies and private companies involved in the treatment of marine and terrestrial effluents that degrade marine and coastal habitats.

This chapter focuses on certain essential aspects of the subject: the budgetary effort, certain costs specific to management (wastewater, marine pollution), the protection of coastal and marine areas, international measures.

14.1.Operators and budgetary effort

Budget programme 113, "Landscape, water and biodiversity", provides the budgetary support for public action to manage water resources, natural spaces, terrestrial and marine biodiversity, landscapes, and marine non-energy mineral resources. It represents a significant indicator of the government's effort to support environmental development and protection policies, especially regarding the marine environment. It involves water agencies, national parks, the French Biodiversity Office (OFB), the Coastal Area and Lake Shore Conservatory (CELRL), government regional and departmental services, partnerships with territorial authorities, and companies and associations. Note that the OFB, a public agency, was created in 2020 from successive mergers of former biodiversity and marine protection public bodies.

Programme 113 aims in particular at the application of European directives in the sectors of water and nature, the implementation of the National Strategy for Biodiversity 2011-2020, the Biodiversity Law of 2016, the Biodiversity Plan of 2019, and international actions for water and biodiversity.

Table 1. Credits assigned to programme 113 "Landscapes, water and biodiversity"
Unit: million euros

	2015	2016	2017	2018	2019	2020
Credits to programme 113	256,5	242,7	266,0	150,8	159,4	190,6
incl. credits to marine environment (1)	*12,9*	*13,0*	*11,9*	*16,1*	*16,9*	*14,4*
Personnel expenditures (2)	213,6	240,0	259,8	285,5	278,4	280,9

(1) Operating credits for the protection and management of coastal sites, marine environment and landscapes. This budget lines covers part of the expenses of marine environment protection.
(2) Administrative personnel working for the implementation of programme 113.
Source: Finance Ministry / annual budget reports.

Specific measures relating to marine areas and habitats concern:
- the implementation of the Marine Strategy Framework Directive (MSFD),
- the public maritime domain (studies, maintenance, safeguarding, protection works),
- the Natura 2000 policy for the sea, the study and knowledge of marine habitats,
- the preservation of marine species,
- response to marine pollutions.
- Since 2019, Programme 113 has also included measures related to the management of non-energy marine minerals (formulation of quarry plans, studies).

Tab. 2. Number of jobs linked to programme 113 Landscapes, water and biodiversity*

*Administrative jobs and those in the main organisations operating in programme 113, paid by these organisations, the government or other organisations.

Unit: FTE

	2015	2016	2017	2018	2019	2020
Administrative personnel working for the implementation of programme 113	3 194	3 600	3 837	4 027	3 833	3 863
Water agencies	1 756	1 720	1 688	1 634	1 578	1 531
CELRL	185	193	191	186	186	180
OFB (1)	2 722	2 718	2 759	2 804	2 794	2 765

1-Before 2020: number of FTEs in the agencies finally merged to create OFB.

Source: Finance Ministry / annual budget reports.

14.2. Specific management costs

Two important areas of programme 113 are detailed in this section: wastewater management and marine pollution management.

14.2.1. Wastewater management

Wastewater management concerns the collection, transport and treatment of wastewater. It includes collective sewage treatment carried out by companies specialised in such operations, industrial sewage treatment by companies emitting effluents (non-specialised in these operations), non-collective sewerage by households not connected to collective networks.

Expenditure pertaining to wastewater management amounted to nearly EUR 12.9 billion in 2017, i.e., representing an annual increase of about 2% since 2000. It includes operating expenses and investment expenses.
- The former (about 60% of the total) concern the collection and treatment of household wastewater. The contribution of households to financing this activity rose from 55% in 2000 to 65% in 2017, an increase that occurred relatively regularly over the period. Companies finance the difference; their contribution decreased accordingly.
- The latter (about 40% of the total) concern the upgrading of wastewater treatment plants and conformity with the Water Framework Directive (2000/60/CE of 23 October 2000). Nearly 70% of investments were financed by public administrations in 2017, with this share reaching 75% in certain years. The contribution of companies, which increased during the period, rose to about 20%, while that of households fell to 10%.

Tab. 3. Public budget for wastewater management expenses

Unit: million euros

	2000	2005	2010	2015	2017p
Total	9 641	11 410	12 669	12 189	12 857
Operating expenses	5 816	6 572	7 457	7 766	8 023
share of total	60%	58%	59%	64%	62%
*incl. from public administrations**	-	-	-	-	-
incl. from companies	*2 616*	*2 925*	*3 054*	*2 733*	*2 773*
incl. from households	*3 201*	*3 647*	*4 403*	*5 033*	*5 250*
Investment expenses	3 825	4 838	5 212	4 425	4 835
share of total	40%	42%	41%	36%	38%
*incl. from public administrations**	*2 654*	*3 634*	*3 862*	*3 362*	*3 302*
incl. from companies	*503*	*457*	*757*	*651*	*1 017*
incl. from households	*668*	*746*	*592*	*412*	*515*

p: provisional data.

*Water agencies, local and regional authorities.

Source: Environment satellite account 2019.

14.2.2. Management and prevention of marine pollutions

Public action regarding marine pollution, in terms of analyses and prevention and treatment measures, is funded by programme 113, for instance the implementation of the MSFD, or accidental marine pollution response schemes. Outside programme 113, the management of macroalgal blooms (green tides) is a particular section of marine pollution management.

Marine strategy framework directive

The MSFD (2008/56/CE of 17 June 2008) aimed at the good ecological state of marine waters by 2020. After this deadline, the directive continues to be implemented in the member States. In France, the "marine environment action plans" (PAMM) apply the provisions of the directive to the four marine sub-regions of mainland France under national jurisdiction (Channel-North Sea, Celtic Sea, Bay of Biscay, Western Mediterranean). In practical terms, at regional scale, the MSFD is implemented in combination with the Maritime Spatial Planning Framework Directive (2014/89/UE of 23 July 2014).

Programme 113 contributes to funding the implementation of the MSFD: scientific and technical expertise, assistance to the owner, computerised measurement tools.

Support of programme 113 to the implementation of the MSFD

Operation and investment expenses, and transfers to companies and local authorities

Unit: million euros

2016	2017	2018	2019	2020
2.84	5.08	7.26	6.73	6.83

Source: Finance Ministry / annual budget reports

Accidental marine pollution

The ORSEC maritime system (2005) includes, among other things, the following components:

- POLMAR-Mer: the maritime section of the action plan against marine pollution by chemical products and fuels. It concerns the activation of anti-pollution and marine safety measures; POLMAR-Terre is the terrestrial section that organises action on the coast;
- Samar (air-sea search and rescue) concerns aircraft in distress;
- Nucmar mer (maritime nuclear) concerns an accident during the transport of radioactive material at sea;
- SAR (search and rescue of people);
- ANED (assistance to vessels in difficulty).

The contribution of programme 113 to funding POLMAR varies as a function of the annual frequency of triggering the system.

Support of programme 113 to POLMAR

Operating, investment and intervention expenses (transfers to companies and local authorities).
Unit: million euros

2016	2017	2018	2019	2020
1.80	0.06	2.65	4.71	1.91

Source: Finance Ministry / annual budget reports

The CEDRE

The Documentation, Research and Experimentation Centre on accidental water pollution (CEDRE), a non-profit association founded on 25 January 1979, is responsible for the permanent documentation, research and experimentation dedicated to techniques, materials and products used to fight accidental pollution in water, as well as operational advice in emergency situations. Its actions concern marine waters and inland surface waters. The CEDRE also implements measures to improve the recovery of macro-wastes and plastic particles in rivers and streams before they are discharged into the sea.

Table 4. Budget of the CEDRE

Unit: million euros, FTE

	2010	2015	2018	2019	2020
Budget	4.80	4.65	5.22	5.33	4.67
Subsidies*	1.92	1.87	2.14	2.36	2.71
Average workforce (FTE)	50	46	50	48	49
Personnel expenses	na	na	na	na	2.83

na: not available.
*Public subsidies, and subsidy from the French oil industry association (UFIP).
Source: CEDRE / annual activity reports

The budget specific to the CEDRE varies around EUR 5 million. It receives an annual subsidy from the ministry responsible for ecology, local authorities of northern Brittany, and the UFIP. It has about 50 permanent staff.

Green tides

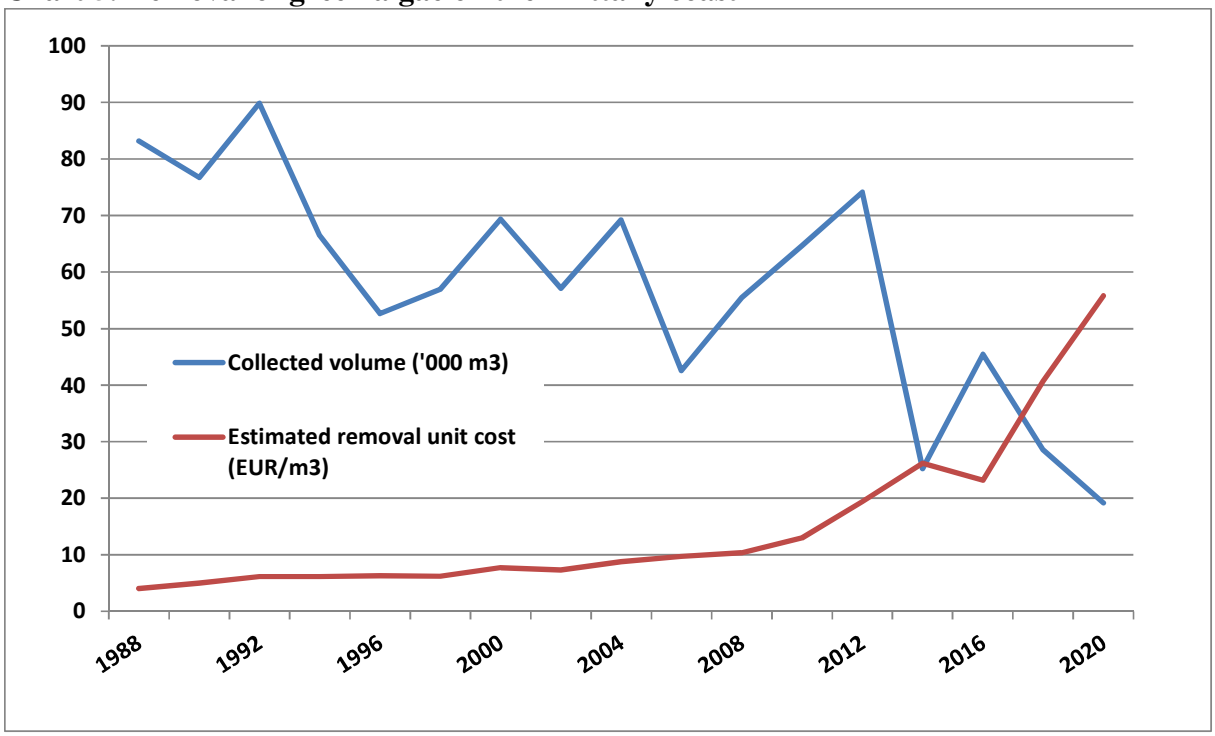
"Green tides" are proliferations of macrophyte algae affecting a large number of European coastal sites. In France the coasts of Brittany, Normandy, the Pays de la Loire region, the basin of Arcachon, and the lagoons of Languedoc are impacted.

The phenomenon is compounded by the physical-climatic characteristics of the coast and the excessive contribution of nitrates and nutrients from rivers. Besides the impacts on the foreshore and the benthic ecosystem, toxic sulphurous volatile compounds can be released into the atmosphere by algae washed ashore. Green tides have impacts on regional tourism and shellfish farming.

The programme to combat green tides in Brittany, Prolittoral (2002-2007), was supported by the region, the departments, the water agency and the Algae Study and Exploitation Centre (CEVA). It represented the first stage of the campaign against green tides. Since 2010, the two "anti-green algae plans" (PLAVs) 2010-2015 and 2016-2020 included a preventive section that encouraged the reduction of flows of nitrogen to the sea by providing assistance to agriculture, a corrective section of algae removal, transport and treatment of algae washed ashore, a scientific section dedicated to the study of algae proliferation and treatment techniques. They benefitted from government budget support.

The volumes collected up to now have tended to decline despite considerable fluctuations, whereas the unit cost of removal has increased sharply: 4 EUR/m^3 in 1988, nearly 10 in 2006, more than 25 in 2014, 55 in 2020.

Chart 5. Removal of green algae on the Brittany coast



NB: from 2015, cost estimated on the basis of funds granted to PLAVs, excluding additional funding sources.
Sources: Algae Study and Exploitation Centre (CEVA), Senate report (Finance Commission, "Green algae in Brittany", April 2021), Finance Ministry / annual budget reports, State regional services in Brittany.

14.3.Protection of coastal and marine areas

Programme 113 is the main channel via which public subsidies for managing national parks in general and those of marine areas in particular are distributed: about 90% of allocations in 2019 and 2020 for all the parks.

There are currently nine natural marine parks: estuaires picards-mer d'Opale, Iroise, bassin d'Arcachon, Gironde-Pertuis, golfe du Lion, cap Corse-Agriate, Mayotte, Glorieuses, Martinique. To this list must be added the marine mammal sanctuary of Agoa des Antilles, a marine area classified under the "Specially Protected Areas and Wildlife" protocol of the Cartagena convention. The OFB is responsible for the management of the parks.

Tab. 6. Budget of national parks from programme 113
Unit: million euros, FTE.

	2016	2017	2018	2019	2020
Support from Programme 113	66	66	5	5	4
Contribution from OFB (1)			63	63	67
Receipts collected	70	76	76	79	81
Expenses	75	74	77	78	81
Personnel expenses	*52*	*50*	*52*	*53*	*54*
Operation expenses	*17*	*15*	*16*	*18*	*17*
Diverse support expenses	*2*	*2*	*2*	*2*	*2*
Investment	*4*	*6*	*7*	*6*	*7*
Workforce (FTE)	918	842	843	842	863

1- OFB or former agency merged into OFB.
Source: Finance Ministry / annual budget reports.

14.4.Management of the public maritime domain

The public maritime domain (DPM) is the shoreline strip periodically covered and uncovered by the sea. It is legally defined as a state-owned area. Budgetary funds for managing the DPM are allocated from programme 113 for the most part. The action of the Coast and Lakeshore conservatory (CELRL) is one of the main instruments.

The CELRL, a public agency created in 1975, implements a land purchasing policy to protect coastal fauna, flora and landscapes. It is endowed with the legal and financial means to purchase lands amicably (80% of operations), by pre-emption or by expropriation, as well as the assignment, attribution or the enforcement of right of way on land and at sea. The acquired land is restored if needed and then open to the public.

Land purchased by the CELRL (2018)	750 sites, 203,762 ha, 1,450 km of coastline (13% of total French coastline).
Value of the CELRL's assets (2018)	EUR 700 million (estimate)
Management of the CELRL's land (2018)	250 managers, including: ▪ 43% departments or joint departmental syndicates, ▪ 14% municipalities of local joint syndicates, ▪ 13% authorised associations (e.g., LPO bird protection

	society), ▪ 5% public establishments (e.g., National Park of Port-Cros), ▪ 900 shore guards recruited by local authorities and other management structures.
Staff of CELRL	Average 2015-2020: about 185 FTEs (Rochefort, Paris, regional delegations).

Source: CELRL.

Tab. 7. CELRL budget and personnel

Unit: million euros, FTE.

	2015	2016	2017	2018	2019	2020
Expenses, of which:	**57**	**55**	**55**	**50**	**51**	**50**
Coastal site acquisition (1)	28	26	28	20	21	20
incl. acquisition of land and buildings	*24*	*23*	*24*	*17*	*17*	*17*
Works on sites (2)	19	22	21	24	24	24
Personnel expenses	9	10	10	10	10	10
Receipts, of which:	**44**	**49**	**47**	**45**	**48**	**50**
Allocation of tax proceeds (3)	37	39	38	38	38	38
Number of personnel (FTE)	**185**	**193**	**191**	**186**	**186**	**180**

1-Total expenses: operation and investment.
2-Works in sites, restoration, maintenance (total costs).
3-Tax for registration of pleasure boats under French flag.
Source: Finance Ministry / annual budget reports.

14.5.International management measures

This section focuses on measures or international projects of measures linked to marine environment and coastline management objectives. Some measures are taken by the European Union, others by the IMO member States.

14.5.1. Hong Kong Convention

The Hong Kong Convention (IMO, May 2009) relating to the ecological risks of dismantling-recycling merchant ships, is linked in particular to hazardous substances contained in wrecks. This activity is modest in Europe, where the most important sites are in Belgium, Italy, and the Netherlands. Dismantling-recycling capacity is greater in Asia: Bangladesh, China, India and Pakistan.

The convention provides for controls on ships during their lifecycles, and the recycling yards. At the beginning of 2022, 17 countries had ratified the convention. It will enter into force 24 months after its ratification by at least 15 member States representing together at least 40% of the tonnage of the world merchant fleet, and whose recycling activity during the ten years preceding their signatures represents at least 3% of the tonnage of their fleets.

14.5.2. Convention on ballast water management

Ballast water is the main factor behind the spread of potentially invasive species. The Ballast Water Management Convention (OMI, 2004), which came into force in September 2017, sets out for each ship:

- a ballast water management plan, involving resources onboard for treating water to prevent the presence of harmful organisms and pathogenic agents;
- the progressive adjustment of technical standards;

- a register and an international certificate of ballast water management.

14.5.3. Polar code

The IMO's Polar Code is motivated by climate change and melting ice which opens up certain maritime routes north of Canada and Russia. In force since January 2017, it includes two main sections on safety and the prevention of pollution:
- The section relating to the safety of ships is included in the SOLAS (*Safety of Life at Sea*) convention;
- The section relating to the prevention of pollution is annexed to the MARPOL convention; this regulates the fuels used by ships, lubricants, discharges of wastewater and other wastes.

14.5.4. Marine fuels, atmospheric pollution and energy efficiency

Regarding greenhouse gas emissions (GHG), in 2016 the IMO adopted measures for the obligatory collection of data for ships with more than 5,000 UMS. These data mainly concern the quantities of fuel consumed and indicators on transport operations, for the purposes of formulating policies. The IMO simultaneously adopted a road map for 2017-2023 for setting up a strategy to reduce GHG from maritime transport.

The regulatory initiatives of the EU run parallel to those of the IMO:
- Directive 2012/33/EU limits the content of sulphur in marine fuels in the territorial waters, exclusive economic zones and sulphur emission control areas (SECAs) of the member states, as well as in ports.
- Directive 2014/94/EU of 22 October 2014 "on the deployment of alternative fuels infrastructure" applies in particular to maritime ports. Each member state must adopt a plan for installing infrastructures and fuelling points regarding alternative fuels and electricity supply.

14.5.5. European Green Deal

The European Green Deal (COM(2019) 640 final) aims at carbon neutrality in the EU by 2050. Its application to the maritime economy ("blue economy") was the subject of a communication of the EC, COM(2021) 240 final of 17 May 2021. To sum up, it considers the blue economy 1/ as a resource making it possible to achieve the objectives of the Green Deal, 2/ as a group of activities to be regulated and adapted to environmental objectives:
- It entails promoting the role of the blue economy in achieving "climate neutrality" by 2050 through the development of marine renewable energies whose capacities must be multiplied 30-fold;
- Lowering maritime (and other modes) transport GHG emissions by 90%, by using marine fuels with low carbon contents and the extension of emission quota exchange system to maritime transport; the SECA regulation is to be extended to other marine zones of the EU;
- Increasing the role of maritime ports as energy hubs for electricity, marine energies and hydrogen, ship dismantling and recycling hubs, and clusters of telecommunication infrastructures.
- Marine waters are considered to be environment to be managed, hence the works in progress to formulate standards on discharges into the sea of microplastics, various wastes and nutrients, which lead to eutrophication.

15. Marine research

Marine research groups several specialities most often developed in the framework of international programmes. The scope of this activity is large, from the standpoint of the research topics studied and the disciplines involved. In particular, it groups the biological and physicochemical study of the marine, coastal and ocean environment, and marine mineral and biological resources, including living resources.

The public and civil part of research is carried out by several public and university research bodies that are often multidisciplinary and involved in many other research fields. Therefore, defining the scope of marine research is complex, as well as the assessment of the workforce and funds devoted to it. The lack of data leads to limiting the assessment to the main entities for which information is available.

IFREMER, the oceanography laboratories of universities and the CNRS National Institute of Sciences of the Universe (INSU), the Naval Hydrographic and Oceanographic Service (SHOM), the Institute of Research for Development (IRD) and the French Polar Institute Paul-Emile-Victor (IPEV) are the main scientific bodies around which public oceanographic and marine research is organised. Oceanographic research also includes a space component with Earth observation satellites funded by the National Space Studies Centre (CNES), generally in the framework of bilateral and multilateral partnerships. It should be noted that SHOM is taken into account in the activities of the French Navy in this report.

The other public bodies involved in marine research are mainly Météo-France (French Meteorological office), the National Research Institute for Agriculture, Food and Environment (INRAE), the Ecology and Environment Institute (INEE) of the CNRS, the Agricultural Research Centre for International Development (CIRAD), the French Geological Survey (BRGM).

The university component is especially active in marine research (marine biology and oceanography), especially through the network of sixteen “marine universities” integrated in the European Marine Board. The lack of data leads to limiting the present account to the universities that work with the INSU.

The data presented here take into account the researchers, teachers, engineers and technical support personnel. Genavir, which operates the French oceanographic fleet, is taken into account. For some of the scientific bodies, if data are difficult to estimate, the administrative support personnel are not included. The expenses of the bodies relating to scientific vessels are included in their total expenses.

Tab. 1. Marine research effort of the main public bodies

Unit: million euros, FTE, number of jobs

	Total budget	Including personnel expenses	Number of personnel (3)		Year of reference
Ifremer (1)	228	95	1549	FTE	2020
CNRS-INSU-universities (2) (4)	175	132	1671	annual average	2017-2020
IPEV	20	5	97	FTE	2020
IRD (5)	24	20	250	FTE	2020
INRAE (4)	14	9	151	FTE	2020
Genavir	47	28	368	annual average	2020
SHOM (6)	61	43	536	FTE	2020
Total (SHOM not included)	509	289	4086		

(1) All IFREMER's activities excluding the Genavir contract and administrative support. Estimated workforce and personnel costs. Source: IFREMER, financial accounts.

(2) Data on workforce in 2017 and estimations of expenses for 2020 relating to the research activities of CNRS-INSU/Ocean-Atmosphere: permanent personnel (researchers, engineers, technicians) of CNRS-INSU/OA units; personnel (same categories) of partner organisations working in these units: universities, CEA, CNES, CERFACS, Météo-France, CEREGE, Geoazur, LPC2E. The personnel of the IRD and IFREMER working in these units are included in lines relating to these two institutes. The expenses of INSU are estimated on the basis of a workforce excluding the latter two categories of personnel.

(3) Number of employee researchers, engineers, teachers, technicians, excluding administrative support unless otherwise specified.

(4) Estimation of personnel costs pro rata the workforce, excluding administrative support.

(5) Estimations relating to the "Oceans" department, research personnel and technical and administrative support.

(6) SHOM is included in this table for information. Figures are taken into account in the Navy chapter. SHOM total budget funded at 70% by government budget.

Sources: the above listed scientific research bodies, Finance Ministry / annual budget reports, Moulinier et al. (2020), INSU (2017) (see references).

16. Summary

	French maritime economy 2018	French maritime economy 2019
Value added	**EUR 40.6 billion**	**EUR 43.3 billion**
Employment	**519,000**	**525,000**

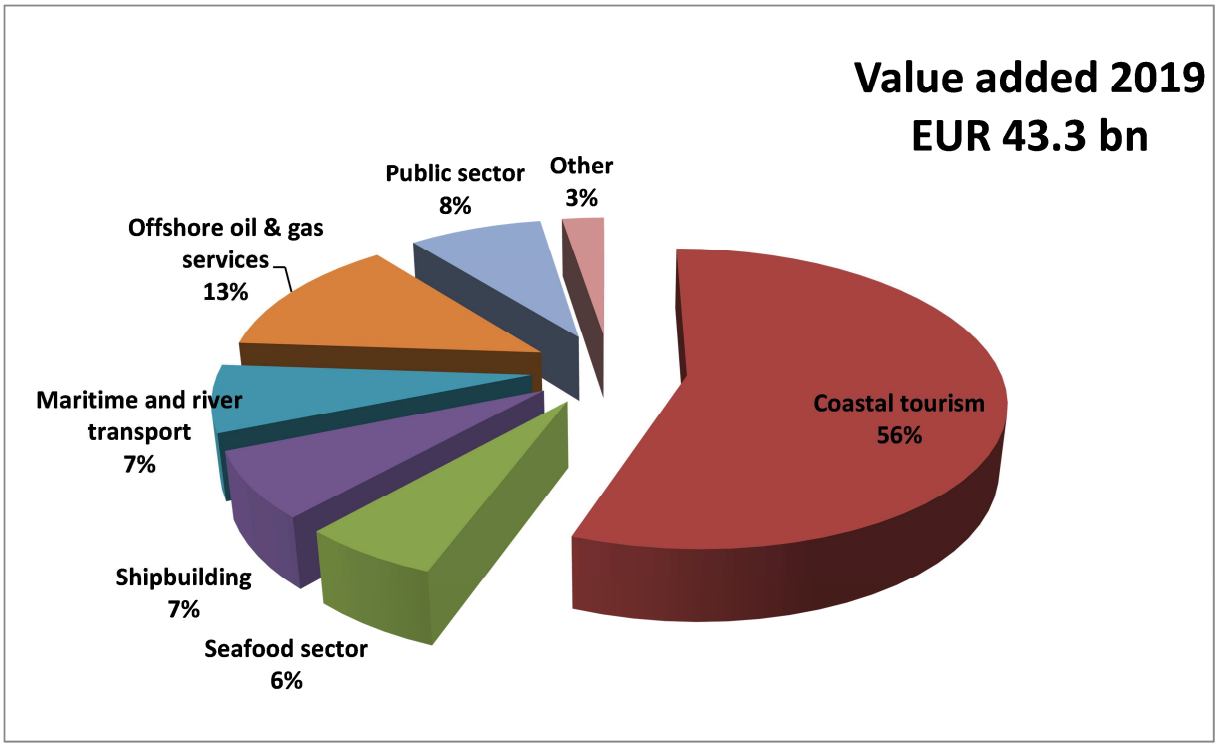
Maritime activities

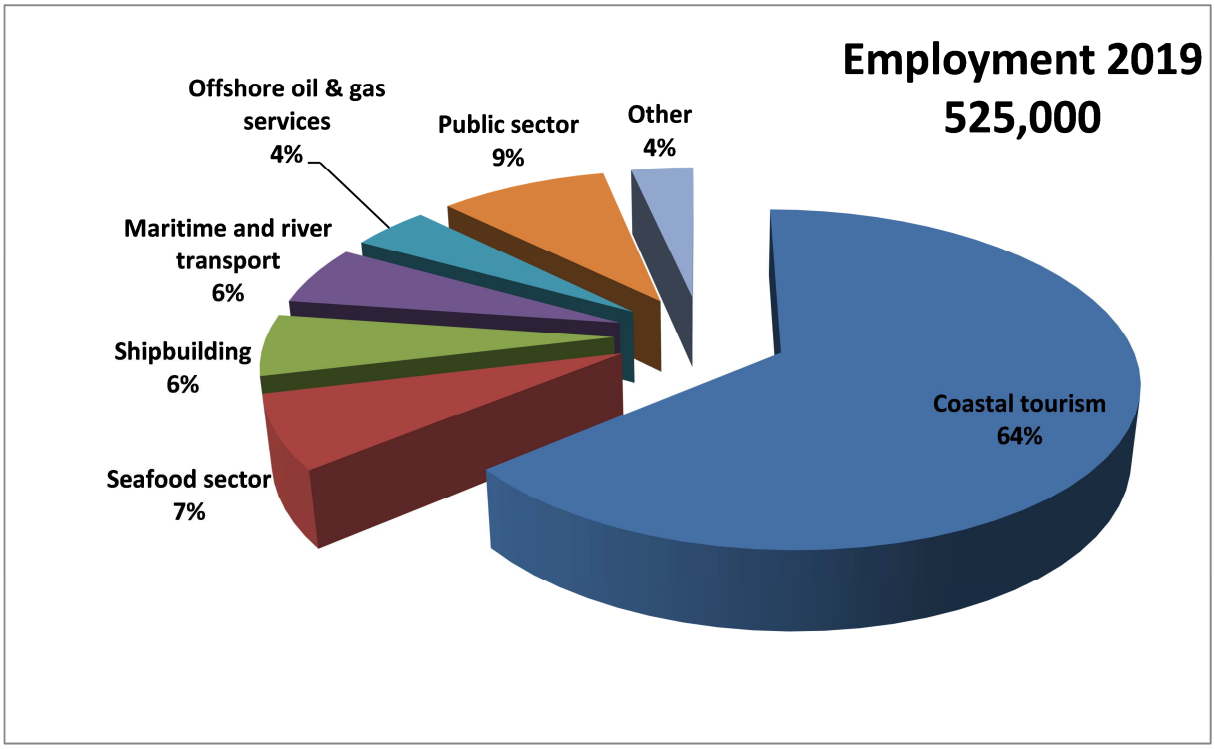
Units: million EUR, FTE, number of jobs

	2018			2019		
	Turnover (million euros)	Gross value added (million euros)	Employment	Turnover (million euros)	Gross value added (million euros)	Employment
Industrial sector		**37 119**	**470 032**		**39 760**	**476 715**
Coastal tourism (1)	**50 257**	**22 325**	**331 738**	**50 489**	**24 100**	**336 700**
Seafood sector (2)		**2 650**	**37 987**		**2 600**	**37 413**
Maritime fishing	*1 314*	*707*	*7 817*	*1 229*	*592*	*7 533*
Mariculture	*845*	*464*	*9 428*	*925*	*503*	*8 810*
Wholesale trade	*3 810*	*452*	*5 620*	*3 742*	*435*	*5 687*
Retail trade	*835*	*217*	*2 867*	*914*	*243*	*3 614*
Seafood processing	*4 829*	*810*	*12 255*	*4 823*	*827*	*11 769*
Shipbuilding sector (2)		**2 221**	**28 985**		**3 104**	**31 565**
Building of ships and floating structures	*5 124*	*1 877*	*16 209*	*6 479*	*2 152*	*18 774*
Repair and maintenance of ships and boats	*1 091*	*344*	*4 652*	*1 174*	*341*	*4 772*
Building of pleasure and sporting boats	*nd*	*nd*	*8 124*	*1 895*	*611*	*8 019*
Waterborne transport sector (2)		**3 190**	**31 391**		**3 143**	**30 596**
Maritime and inland waterway transport (3)	*20 726*	*1 347*	*16 674*	*22 113*	*1 418*	*17 138*
Rental and leasing of water transport equipment	*182*	*120*	*128*	*155*	*76*	*179*
Marine insurance (4)	*726*	*172*	*2 142*	*688*	*126*	*2 188*
Maritime and inland waterway port services	*1 576*	*1 003*	*7 497*	*1 497*	*973*	*6 556*
Maritime port handling	*1 462*	*548*	*4 950*	*1 442*	*550*	*4 535*
Salt (2)	**nf**	**nf**	**279**	**520**	**216**	**na**
Marine aggregate extraction (5) (6)	**73**	**23**	**650**	**72**	**23**	**650**
Electricity production (6)	**nf**	**nf**	**11 162**	**nf**	**nf**	**11 162**
Maritime and river works (2)	**1 962**	**550**	**3 729**	**1 954**	**671**	**3 346**
Submarine cables	**872**	**160**	**1 890**	**1 254**	**203**	**2 783**
Offshore oil and gas services (6)	**15 200**	**6 000**	**22 500**	**14 800**	**5 700**	**22 500**
Public sector (7)		**3 529**	**49 230**		**3 530**	**48 411**
Navy		**2 736**	**37 784**		**2 747**	**37 415**
State action at sea		**205**	**3 097**		**202**	**2 843**
Marine environment protection (8)		**299**	**4 263**		**292**	**4 067**
Marine research (9)		**289**	**4 086**		**289**	**4 086**
Grand total		**40 648**	**519 262**		**43 290**	**525 126**

(1) Internal tourism consumption (ITC) used to replace turnover. ITC 2019 assessed excluding urban services and personal services.
(2) Employment expressed in full-time equivalents (FTE).
(3) Maritime, coastal and river cargo and passenger transport.
(4) "Production" of maritime insurance used to replace turnover.
(5) Extraction of materials and primary processing.
(6) Employment expressed in average number of employees over the year.
(7) Estimation of the gross value added of public services based on labour costs.
(8) Utilisation of average workforces and labour costs of: personnel working for programme 113, Cedre, CELRL.
(9) According to research organisations: averages of 2017-2020 or data for 2020.
nd: not available; nr: not filled-in.

Maritime economy 2019





Comments

- 2018 and 2019 were the most recent years for which it was possible collect maritime activity indicators.
- As compared to the previous FMED reports, the scope of the maritime economy has been only slightly modified. 1) "Naval equipment" for which quantified information remains sparse is not taken into account. 2) There is more systematic accounting for budget programmes for public service, in particular for environmental protection.
- A revision of the method for assessing tourist accommodation expenditure in the tourism account led to a significant increase in internal tourism consumption estimates for France and consequently our estimations of expenses devoted to coastal tourism.
- The objective is to express employment in FTE; however, the expression in number of jobs remains inevitable for certain activities.

Results

- As a consequence of changes of methodology, the quantified results of this report are comparable with those of the previous FMED reports for some sectors only.
- Regarding the general results, we obtain higher gross value added and employment than in our previous assessment for economic and statistical reasons: value added of EUR 43.3 billion in 2019 versus EUR 35.6 bn in 2013; employment estimated at 525,000 in 2019 versus 460,500 in 2013. The 2019 estimated value added accounts for around 1.5% of France's GDP, and employment, 1.7% of France's total workforce.
- The value added and job increase from 2018 to 2019, reflects a situation of maritime economic growth. These figures provide an initial baseline prior to the health crisis. The first data that we were able to collect for 2020, especially those relating to tourism, appear to show a significant impact of the crisis on the maritime economy.
- In 2019, as before, coastal tourism was the dominant sector of the French maritime economy. This dominance increased; it was mainly due to a major statistical revision in the tourism accounts. Coastal tourism makes up more than half the maritime value added and two thirds of jobs.
- Other important groups of activities:
  - Shipbuilding, maritime and river transport, seafood: the relative weight of these three sectors in the maritime economy has declined in comparison to previous editions of the report, but they are roughly comparable in terms of gross value added (from 6 to 7% of the maritime economy) and jobs (from 5 to 7%).
  - Offshore oil and gas services, with a relatively small workforce, represent a major share of maritime value added.
  - The public sector, of which the main contributor is the French Navy, represents from 8 to 9% of the maritime economy in terms of value added and jobs.
  - Marine energy: at this stage of development of marine renewable energies, it is too early to identify an impact in terms of permanent jobs. On the contrary, the electricity generating plants installed on the coast have a measurable employment effect.
  - Other sectors, of more modest size, make a non-negligible combined contribution to the overall maritime value added and employment: submarine cables, maritime and river works, aggregate extraction. They highlight the diversity of the French maritime economy.

Dugornay Olivier

Acronyms

Ademe	Ecological Transition Agency
AFITF	French Transport Infrastructure Funding Agency
Agreste	Food and agriculture database
ANED	Assistance to vessels in difficulty
APB	Lighthouse and Beacon Service
APSP	Average petroleum spot price
AVSIMAR	Maritime Surveillance and Intervention Aircraft
BATSIMAR	Maritime Surveillance and Intervention Vessel
BBPD	Vessel for bomb-disposal divers
BRGM	French Geological Survey
BRS	Barry Rogliano Salles SAS
BSAH	Support, assistance and rescue vessel
CCNR	Central Commission for Navigation on the Rhine
Cedre	Documentation, Research and Experimentation Centre on accidental water pollution
CEFIC	European Chemical Industry Council
CEFOR	Nordic Association of Marine Insurers
CELRL	Coast and Lakeshore Conservatory
CEREGE	European Centre for Research and Teaching in Environmental Geoscience
CEREMA	Centre of studies on risks, environment, mobility and development
CERFACS	European Research and Advanced Study Centre on Scientific Computing
CEVA	Algae Study and Exploitation Centre
CGE	General council on economy, industry, energy and technologies
CGEDD	General council on environment and sustainable development
CIRAD	Agricultural Research Centre for International Development
CLIA	Cruise Lines International Association
CMT	Tripartite class mine-hunter
CNES	National Space Study Centre
CNRS	French National Centre for Scientific Research
COP	Conference of the Parties - UNFCC
DAM	Department of Maritime Affairs
DIRM	Inter-regional Maritime Department
DM	Overseas Maritime Department
DPM	Public maritime domain
DPMA	Fisheries and Aquaculture Department
dwt	Deadweight tonne
EC	European Commission
ECA	Emission Control Area
EEC	European Economic Community
EGNOS	European Geostationary Navigation Overlay Service
EMFF	European Maritime and Fishing Fund
EMSA	European Maritime Safety Agency
ENIM	Social security and pension administrative department for seafarers
ENSM	National Advanced Maritime School
EP	Exploration & Production
EPR	European Pressurized Reactor
EU	European Union
EU-28	28 member states European Union

EuCIA	European Composites Industry Association
EUR	Euro
EVOLEN	French Association of Energy Companies
FAA	Anti-aircraft frigate
FAO	Food and Agriculture Organization
FASM	Anti-submarine frigate
FDA	Air defence frigate
FFA	French Insurance Federation
FIN	Federation of Nautical Industries
FLF	La Fayette frigate
FMED	French Maritime Economic Data
FNTP	Civil engineering industry association
FPSO	Floating production, storage and offloading unit
FREMM	Multi-missions frigate
FTI	Mid-size frigate
GDP	Gross Domestic Product
GHG	Greenhouse gas
GICAN	Association of naval construction industries
GMDSS	Global Marine Distress and Safety System
GT	gross tonnage
GW	Gigawatt
GWEC	Global Wind Energy Council
HELCOM	Helsinki Commission
IALA	International Association of Marine Aids to the Navigation and Lighthouse Authorities
ICES	International Council for the Exploration of the Sea
IFPEN	French Petroleum Institute
IFREMER	French Research Institute for the Exploitation of the Sea
IMO	International Maritime Organisation
INEE	Ecology and Environment Institute
INRAE	National Research Institute for Agriculture, Food and Environment
INSEE	National Institute for Statistics and Economic studies
INSU	National Institute of Sciences of the Universe
IPEV	Paul-Emile-Victor Institute
IRD	Institute of Research for Development
IRENA	International Renewable Energy Agency
ISEE	Institute of Statistics and Economic Studies
ISPF	Statistical Institute of French Polynesia
ITC	Internal Tourism Consumption
IUA	International Underwriting Association
IUMI	International Union of Marine Insurance
JRCC	Joint Rescue Co-ordination Centre
kW	kilowatt
LCOE	Levelized cost of energy
LNG	Liquefied natural gas
LPC2E	Environment and Space Physics and Chemistry Laboratory
LPG	Liquefied petroleum gas
LPM	Military planning law
Marpol	Marine Pollution
MEPC	Marine Environment Protection Committee

MRCC	Maritime Rescue Co-ordination Centre
MSFD	Marine Strategy Framework Directive
Mt	Million tonnes
MW	Megawatt
MWh	Megawatt-hour
NACE	Statistical Classification of Activities in the European Community
NAF	Statistical Classification of French Activities
NFH	Nato Frigate Helicopter
OCDE	Organisation for Economic Co-operation and Development
OFB	French Biodiversity Office
ORSEC	Civil Security Response Organisation
OSPAR	Oslo-Paris Commission
P&I	Protection and Indemnity club
PAMM	Marine Environment Action Plan
PLAV	Anti-green algae plan
PLG	Guiana type Patrol Boat
POLMAR	Maritime pollution scheme
PPE	Multi-annual Energy Programme
PWR	Pressurized Water Reactor
R&D	Research and Development
RACON	Radar beacon - balise radar
SAR	Search and rescue
SECA	Sulphur Emission Control Area
SHOM	Naval Hydrographic and Oceanographic Service
SNSM	National Sea Rescue Society
SOLAS	Safety of Life at Sea
SPOC	SAR point of contact
SRR	Search and rescue region
STECF	Scientific, Technical and Economic Committee for Fisheries
TEU	Twenty-feet equivalent unit
TSS	Traffic Separation Scheme
UMS	Universal Measurement System
UNCTAD	United Nations Conference for Trade and Development
USD	American Dollar
USGS	United States Geological Survey
VA	Value added
VNF	French waterway utility

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