

# PEER REVIEW OF THE CROATIAN SHIPBUILDING INDUSTRY

Q1 2024



## *Foreword*

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## 1. Executive summary

**Historical significance and modern challenges in Croatian shipbuilding.** With a 1,777-kilometre Adriatic Sea mainland coastline, the Republic of Croatia (hereafter ‘Croatia’) is well located to participate in the shipbuilding industry and has been an important player in the construction of ships since the 19<sup>th</sup> century, both in Europe and worldwide. The privatisation of the sector in 2013, in line with the accession to the European Union, however, was followed by a slowdown in ship production, amounting to a 75% decrease of compensated gross tonnage (CGT) produced in Croatia from the ten years before privatisation compared to 2012-2022. The Croatian marine equipment industry has also faced a decline, primarily due to the reduction in local demand as well as increased reliance on international imports.

**Shipbuilding’s economic contribution and key players.** The Croatian shipbuilding industry accounts for 2% of the country’s gross domestic product in 2023. From 2012 to 2022, an average of 6.5 shipyards were in operation out of the 8 main shipyards: Viktor Lenac, 3. Maj brodogradilište d.d., Uljanik Brodogradnja 1856 d.o.o., Brodosplit d.d., Brodogradilište specijalnih objekata d.o.o., Brodotrogir Cruise d.o.o., MKM Yachts d.o.o. and Tehnomont Shipyard Pula Ltd.. During this period, 13 seagoing vessels above 100 GT were built on average each year.

**Post-privatisation vessel production and emerging environmental trends.** Since the privatisation of shipyards, 38% of vessels produced in Croatia were passenger ships, followed by 23% cruise ships. Croatian shipyards have pivoted towards specialised ‘niche’ markets, emphasising yacht construction and polar cruise ships. In addition, new trends of domestic demand specifically for low-emissions vessels have gained importance, with an increasing number of orders of electrically powered vessels. Croatian ship repair and retrofitting yards place significant emphasis on ballast water treatment systems and alternative fuel conversions.

**Decreased employment and challenges to labour supply.** In 2022, Croatian shipyards employed approximately 3,000 individuals and 1,300 subcontractors, a significant decrease from pre-privatisation figures of 12,000. Despite Croatia’s reputable educational institutions and programmes for marine technology, shipyards face challenges in attracting and retaining skilled labour. In addition, women are underrepresented in the workforce.

**Barriers to productivity and innovation.** Despite its traditional strength in shipbuilding due to its strategic geography, high skilled labour and specialisation in specific ship types, Croatia faces productivity challenges due to outdated technology, low R&D investment, disrupted supply chains, workforce inefficiencies and shortcomings in corporate governance. A lack of robust collaboration among industry stakeholders and initiatives outside EU programs for R&D support further hampers innovation and industrial development.

**Strategies for revitalising Croatia’s shipbuilding industry.** To tackle these challenges, Croatia would benefit from a focused shipbuilding strategy for re-industrialisation and the targeted integration of the sector’s needs into wider industrial strategies. To do so, it could further develop partnerships with research institutions and develop maritime clusters and inter-firm networks to accumulate in-house capability. Together with improving the business climate and fostering institutional capacity, this broader strategy would enable Croatia to leverage on green industrial developments in shipbuilding. Croatia may also establish policies that help to not only train but retain skilled labour within the country.

## 2. Introduction

In 2012, the OECD's Council Working Party on Shipbuilding (WP6), which became the OECD Shipbuilding Committee on the 1<sup>st</sup> of January 2024, introduced a peer review process focused on support measures provided by governments to their shipbuilding sectors. Under this process, each economy participating in the Shipbuilding Committee undergoes an in-depth study of its shipbuilding industry and related government measures. Non-Shipbuilding Committee countries may join the process and can also be the subject of a Shipbuilding Committee review.

The main goal of the peer review process is to strengthen the identification of government policies, practices and measures affecting the shipbuilding sector and to support the discussion of these measures within the Shipbuilding Committee. The analysis of the support measures is accompanied by contextual details of the industry to enable a discussion of shipbuilding policies and their impact. A key element of the process is the active debate and discussion of peer review drafts by Shipbuilding Committee participants, with a view to promoting transparency and sharing experiences.

Croatia, together with Denmark Italy, Poland and Romania, is subject to a Shipbuilding Committee peer review in 2023, following the reviews of Japan (2012), Portugal (2013), Korea (2014), Germany (2015), Norway (2016), Finland (2017), the Netherlands (2019) and Türkiye (2021). In 2018, the Shipbuilding Committee decided to conduct an ad hoc review of the shipbuilding sectors in selected non-Shipbuilding Committee countries, including China, Indonesia, Malaysia, the Philippines, Singapore, Chinese Taipei and Viet Nam. In 2020, the Secretariat also prepared a report on China's shipbuilding industry and policies affecting it.

The information in this report is based on publicly available information, statistical series available to the Secretariat, Croatia's response to the peer review questionnaire, and discussions with government officials and stakeholders during the Secretariat's mission to Croatia (19-21 June 2023). The Secretariat expresses its special gratitude to the government and industry stakeholders who participated in the review and especially the successful mission to Croatia.

The analysis focuses on the shipbuilding and marine equipment industry, but also provides information on the repair and conversion facilities. The report includes three substantive parts: global perspective, the structure and characteristics of the Croatian shipbuilding and marine equipment industry and finally policies affecting the shipbuilding and marine equipment industry.

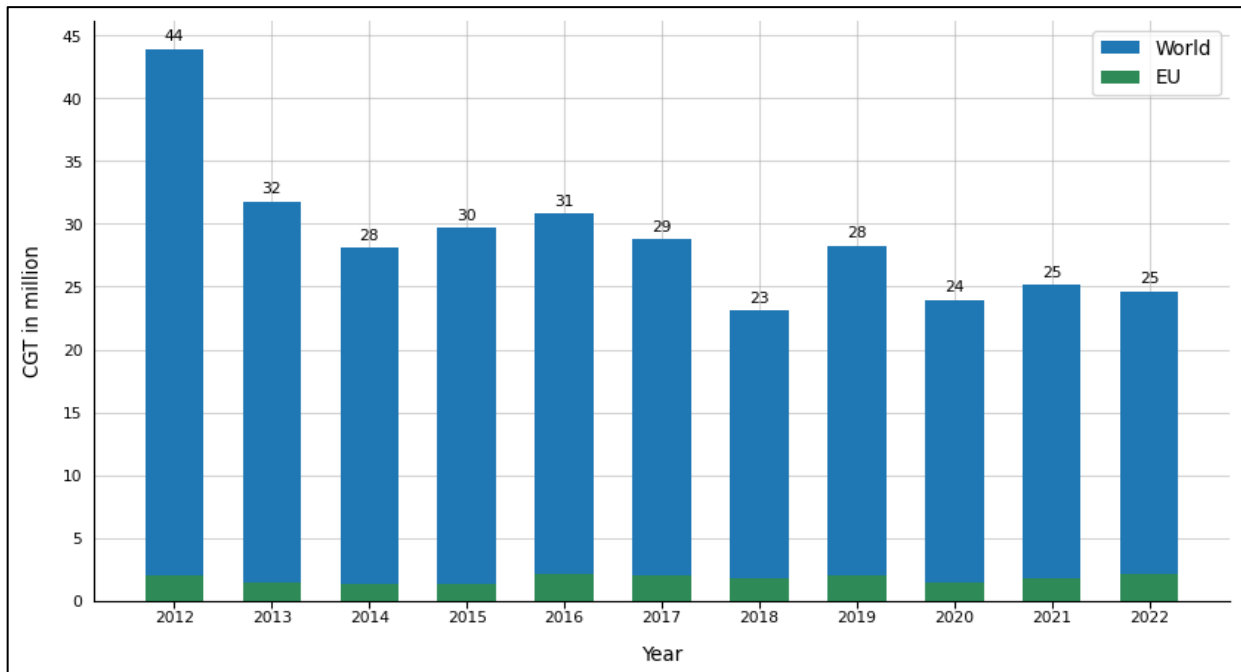
### 3. Global perspective

The COVID-19 pandemic led to a significant economic downturn in Croatia. Among European Union (EU) countries, Croatia was particularly affected, experiencing an approximate 8% decrease in real GDP, which surpassed the OECD average decline of 4% (OECD, 2023<sup>[1]</sup>). This impact was primarily due to Croatia's large tourism sector which accounted for 11.8% of Croatia's GDP in 2019 (OECD, 2021<sup>[2]</sup>). In 2021 and in the first quarter of 2022, the Croatian economy quickly rebounded and recovered from the pandemic. However, Russia's war of aggression against Ukraine and the subsequent surge in global energy and food prices slowed Croatia's strong recovery, largely attributed to high inflation rates and disruptions in trade (OECD, 2023<sup>[1]</sup>).

Croatia joined the European Union in July 2013 (European Commission, 2023<sup>[3]</sup>) and became a part of the Euro Area and Schengen Area in January 2023 (European Commission, 2023<sup>[4]</sup>). The accession to the EU strongly impacted Croatia's economic development and coincided with a restructuring of the shipbuilding industry, which underwent a privatisation of the sector (European Parliament, 2019<sup>[5]</sup>), and saw a decrease in the manufacturing of ships and maritime equipment. The country now mostly focusses on exports of pharmaceuticals, power generating machinery and turbines (European Commission, 2023<sup>[6]</sup>). Globally, the economy faces a tight labour market, with challenges to labour supply also significantly impacting the shipbuilding industry.

In 2022, the EU produced about 9% of the world's CGT of selected vessels (**Table 1**), increasing from 7% in 2021 and 6.3% in 2020 (**Figure 1**). Croatia, represented about 3%, 4.7% and 3% of the EU's CGT production in 2022, 2021 and 2020 respectively (**Figure 2**). Back in 2012, Croatia was responsible for 15% of the EU's CGT production. The decreasing production in terms of CGT of Croatia's shipyard can be explained by the privatisation of the sector.

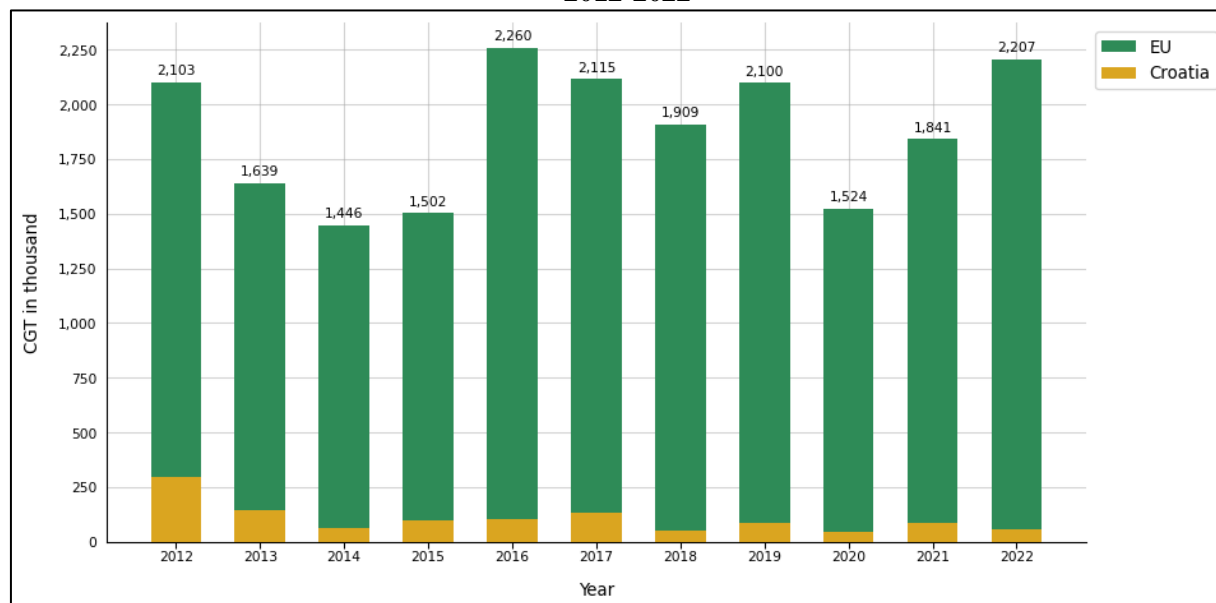
**Figure 1. Completions of selected seagoing vessels worldwide and in the European Union in CGT, 2012-2022**



Note: This Figure includes all seagoing vessels, presented in Table 1, from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (July 2023), *World Fleet Register*

<https://www.clarksons.net/wfr>

**Figure 2. Completions of selected seagoing vessels in the European Union and Croatia in CGT, 2012-2022**

Note: This Figure includes all seagoing vessels, presented in Table 1, from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (July 2023), *World Fleet Register*  
<https://www.clarksons.net/wfr>

From 2012 to 2022, Croatian shipyards accounted for an important share of the European Union's production of pure car carrier (PCC), bulkers and ferries in terms of CGT (**Table 1**), making up 49.4%, 23.6% and 18.7% of EU PCC, bulkers and ferries, respectively. This represents 1.1%, 0.1% and 2.9% of the world's CGT production of these types of vessels. In addition, Croatia has specialised in the production of niche vessels such as polar cruise ships and yachts.

**Table 1. Completions of selected seagoing vessels above 100 GT by ship type in the world, the European Union and by Croatia, 2012-2022**

Ship type	World	European Union		Croatia		
	CGT ('000s)	CGT ('000s)	% of World	CGT ('000s)	% of World	% of EU
<b>Ferries</b>	9 941	1 534	15.4%	287	2.9%	18.7%
<b>Cruise ships</b>	12 976	11 918	91.9%	146	1.1%	1.2%
<b>Tankers</b>	121 123	1 641	1.4%	45	0.0%	2.8%
<b>Bulkers</b>	125 157	368	0.3%	87	0.1%	23.6%
<b>PCC</b>	6 001	129	2.2%	64	1.1%	49.4%
<b>Dredgers</b>	2 356	864	36.7%	57	2.4%	6.6%
<b>Cargo</b>	9 899	440	4.5%	30	0.3%	6.8%
<b>Offshore</b>	24 061	1 698	7.1%	19	0.1%	1.1%
<b>Ro-ro</b>	3 638	539	14.8%	19	0.5%	3.4%

Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (July 2023), *World Fleet Register*,  
<https://www.clarksons.net/wfr>



## 4. Structure and characteristics of the Croatian marine industry

### 4.1. The Croatian shipbuilding industry

With over 1,246 islands and a mainland coastline spanning 1,777 km, Croatia has a deep-rooted history in shipbuilding. The industry has traditionally been an important contributor for the country's economy and employment, especially in its coastal regions. Croatian shipyards, some of which continue operations today, originated in the mid-19<sup>th</sup> to early 20<sup>th</sup> centuries (Institute of Public Finance, 2016<sup>[7]</sup>).

From 1988 to 2015, Croatia solidified its reputation as an important player in global shipbuilding, delivering a total of 478 vessels and other floating objects. During 2005-2015, the shipbuilding sector contributed, on average, 2% per annum to the GDP, engaging 5% of the total industrial workforce and accounting for 10-15% of the nation's overall exports (Croatian Shipbuilding Corporation, 2015<sup>[8]</sup>). However, the industry underwent a transformative shift following the privatisation process in 2013, which included most state-owned shipyards. In alignment with its ambitions to join the European Union (EU), Croatia needed to harmonise its practices with EU state aid rules. This led to the Stabilisation and Association Agreement between the EU and Croatia, EU signed in 2001, which necessitated the restructuring of Croatia's shipyards (for more information see Box 1).

Despite the recent downturn in shipbuilding activity, the industry still holds strategic significance for Croatia, impacting economic dynamics in several regions. Over recent years, Croatian shipyards have primarily concentrated on the construction and repair smaller-sized ships or specialised vessels, underscoring the nation's expertise in niche maritime construction.

#### Box 1. Privatisation and restructuring of the Croatian shipbuilding industry

##### Conditions for privatisation

Prior to joining the EU in 2013, Croatia underwent a significant process of industry privatisation and restructuring, in line with the European Commission's (EC) preconditions for membership. Croatian shipyards historically received subsidies at levels higher than other EU shipyards, which were deemed contradictory to the State Aid rules applying to EU shipbuilding countries. Restructuring aimed to align Croatia's market dynamics with the standards and practices of the EU and transform state-owned shipyards into competitive entities within the market economy.

##### Timeline of privatisation

The 2002 Stabilisation Agreement between Croatia and the EU mandated Croatia to restructure its shipyards within four years (by 2006). As Croatia did not meet the initial restructuring timeline, the process continued through privatisation and restructuring in line with EC's "Guidelines on State aid for rescuing and restructuring non-financial undertakings in difficulty" ("R&R Guidelines").

Most shipyards who were previously state-owned were privatised and restructured. The privatisation took place through a series of competitive rounds between 2009 and 2011, transferring ownership from state hands to private entities. The restructuring of shipyards continued until 2017. The costs involved in restructuring included:

- Granted state aids and shipyard liability write-offs,
- Free capacity costs and capital reimbursements,
- Environmental protection system and standard implementation costs,
- Technological renewal expenses, redundancy costs, and capacity closure costs,

- State guarantees for advance payments, credits without state guarantees, and recapitalisation.

The Croatian Shipbuilding Corporation (CSC) was designated by the Croatian government and the EC to oversee and report on the approved programmes of restructuring and privatisation contracts.

#### Consequences of privatisation

After privatisation Croatia saw a slowdown in ship production, amounting to a 75% decrease of CGT produced in Croatia from the years before privatisation, 2002-2012, compared to 2012-2022. The Croatian marine equipment industry similarly faced a decline, primarily due to the reduction in local demand as well as increased reliance on international imports.

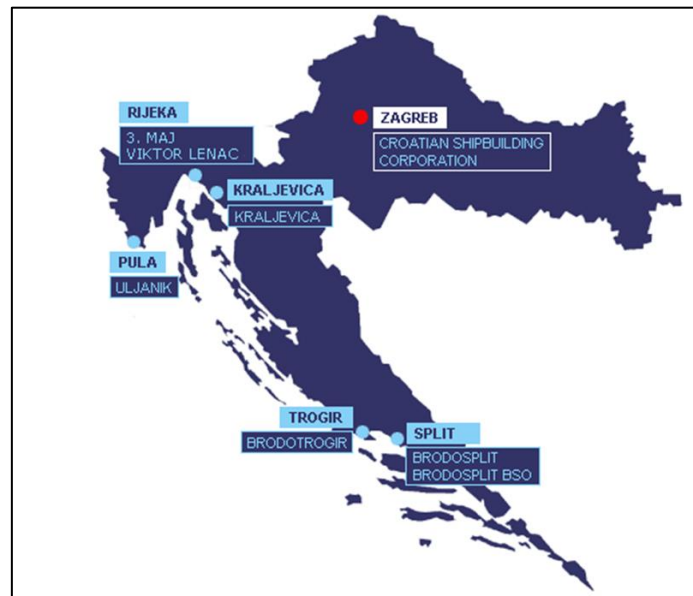
The size of ships has also decreased over the last decade, with average CGT falling from 54,101 between 2002 and 2012 to 12 732 since the privatisation of the industry in 2013. Croatian shipyards further started to focus increasingly on the repair and production of smaller-sized ships or specialised vessels niche vessels.

Source: (Croatian Shipbuilding Corporation, 2015<sup>[8]</sup>), (European Commission, 2014<sup>[9]</sup>), (European Commission, 2023<sup>[3]</sup>), Questionnaire (2023)

#### 4.1.1. Structure of the Industry

Croatian shipyards are located along the Adriatic Sea, including in the cities of Pula, Rijeka, Kraljevica, Trogir and Split (**Figure 3**).

**Figure 3. Geographical locations of Croatia's largest shipping entities**



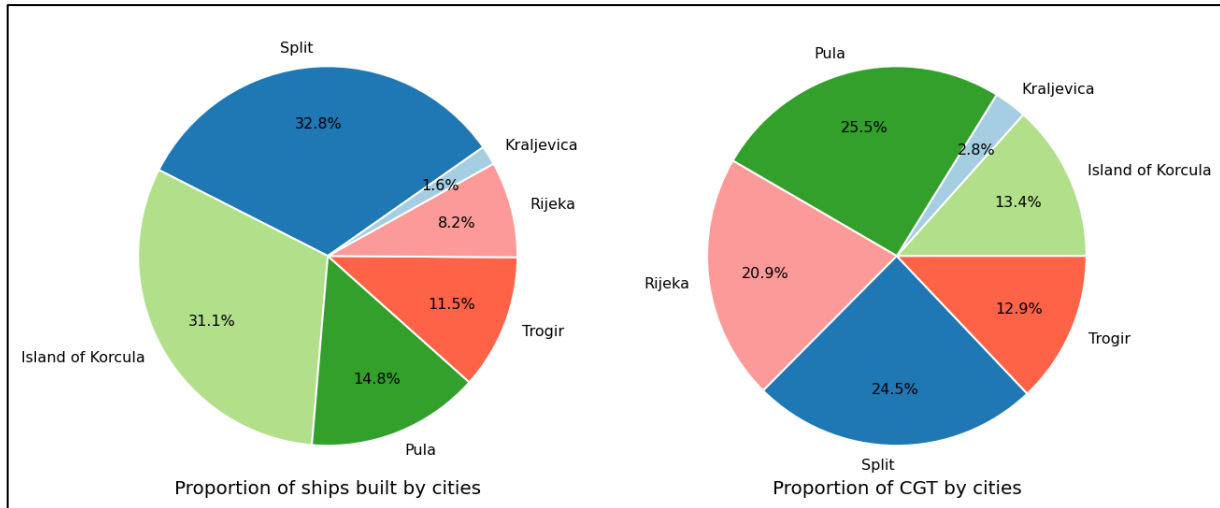
Source: Questionnaire (2023)

Based on OECD calculations, over the past decade, approximately 25.5% of Croatia's shipbuilding activity, measured in CGT for vessels over 100 GT, originated from Pula, where the Uljanik brodogradnja 1856 d.o.o shipyard ('Uljanik') is located. 21% were built in the city of Rijeka, home of three of the biggest shipyards 3. Maj brodogradilište d.d. ('3. Maj'), MKM Yachts d.o.o. ('MKM Yachts') and of Viktor Lenac, and 24.5% in the city of Split (**Figure 4**).

When looking at the number of ships built, Pula and Rijeka represent, respectively, only 15% and 8% of ships built. Approximately 33% of ships were constructed in Split, home to Brodosplit d.d. ('Brodosplit'), and 31% on the island of Korčula, where the Radež d.d. and Leda d.o.o. shipyards are situated, neither of which are counted among Croatia's main large shipyards. This reflects the fact that Rijeka's and Pula's

shipyards are traditionally focused on the construction of larger merchant ships, whereas the shipyards in Korcula are specialised in the construction of smaller and tourist ships. Finally, Trogir, hosting Brodotrogir Cruise d.o.o. ('Brodotrogir'), contributed to about 11.5% of the ship completions and approximately 13% of the CGT constructed during the analysed period.

**Figure 4. Proportion of number of ships built and CGT by regional dispersion, 2012-202**



Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (June 2023), *World Fleet Register*

<https://www.clarksons.net/wfr>

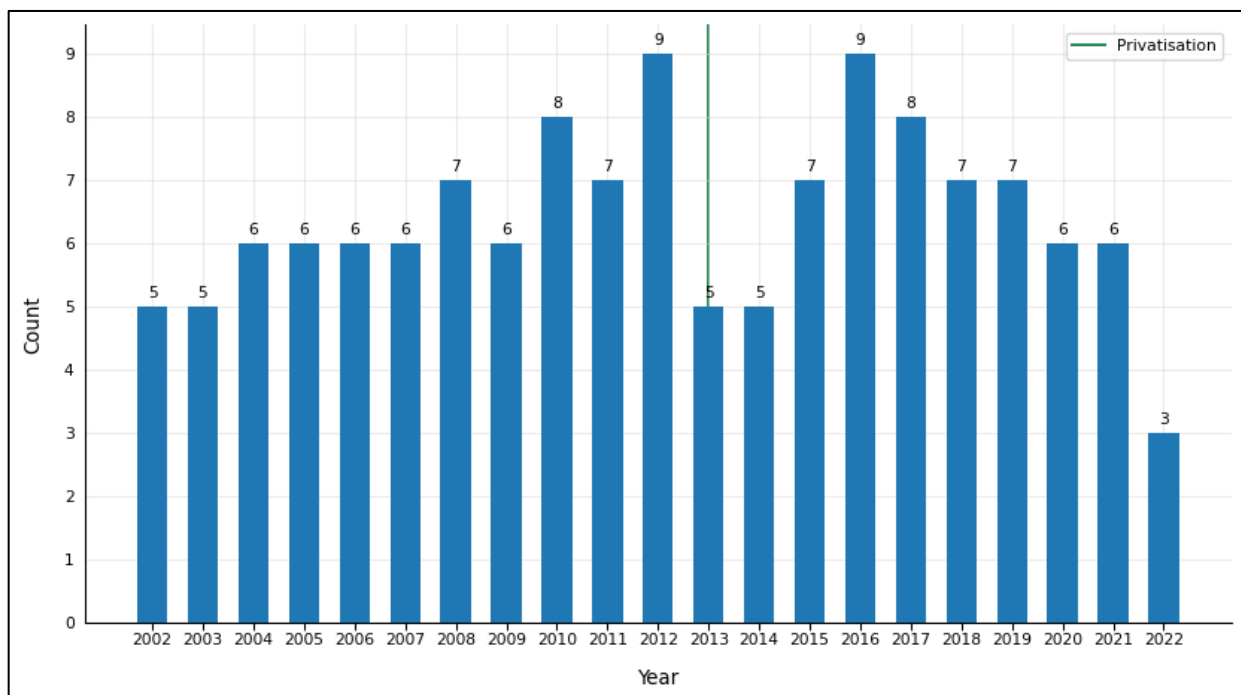
There are currently 8 main shipyards in Croatia. Among these, most specialise in newbuilding, while two also offer ship repair services (Viktor Lenac and Brodotrogir). A quarter of the shipyards are state owned, and the rest are privately owned. Publicly owned shipyards in Croatia are 3. Maj and Uljanik. Together they account for about 50% of newbuilding production in Croatia in the period 2020-2022. Two of the shipyards which focus on ship construction are privately owned by a foreign entity (Viktor Lenac and MKM Yachts). The other four privately owned shipyards, Brodosplit, Brodogradilište specijalnih objekata d.o.o. ('BSO'), Brodotrogir and Tehnomont Shipyard Pula Ltd., are owned by domestic entities (**Table 2**).

**Table 2. Shipyard ownerships status in Croatia**

Shipyards	Production Programme	Ownership	Location
Viktor Lenac	Repair and construction	Private (foreign)	Rijeka
3. Maj brodogradilište d.d.	New construction	State	Rijeka
Uljanik brodogradnja 1856 d.o.o.	New construction	State	Pula
Brodosplit d.d.	New construction	Private (domestic)	Split
Brodogradilište specijalnih objekata d.o.o.	New construction	Private (domestic)	Split
Brodotrogir Cruise d.o.o.	Repair and construction	Private (domestic)	Trogir
MKM Yachts d.o.o.	New construction	Private (foreign)	Rijeka
Tehnomont Shipyard Pula Ltd.	New construction	Private (domestic)	Pula

Source: Questionnaire (2023)

**Figure 5. Number of operating shipyards with orders in Croatia, 2002-2022**



Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (June 2023), *World Fleet Register*  
<https://www.clarksons.net/wfr>.

**Figure 5** illustrates that Croatia accommodated between 3 and 9 shipyards per year for the period 2002-2022. According to IHS data, during the 5 years leading to the privatisation (i.e., 2008-2013) there were on average 12.6 shipyards which were producing vessels, compared to 7.8 in the 5 years after privatisation (i.e., 2014-2019).

The privatisation of the shipbuilding sector significantly impacted shipyards, necessitating increased competitiveness to sustain demand independently of state aid. Despite this, the state has extended guarantees to support the continued operation of shipyards. For instance, these measures have facilitated

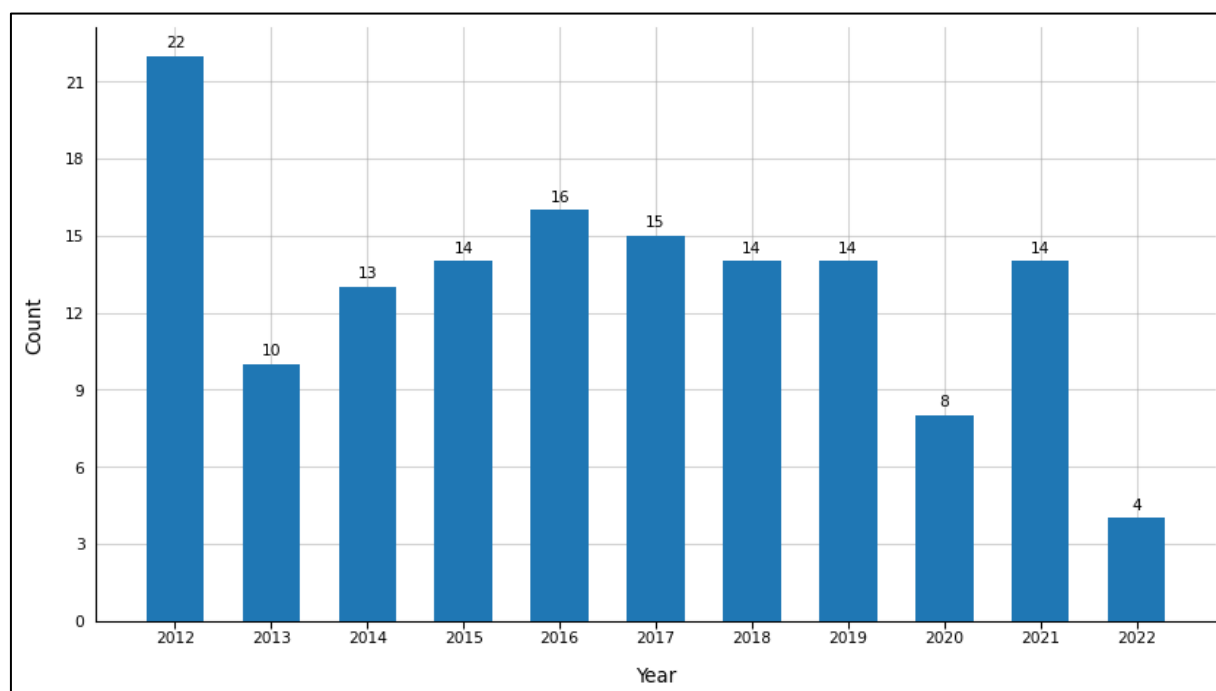


the Uljanik shipyard in maintaining its operations. For additional details on state guarantees, please refer to **4.2. National support measures**.

#### 4.1.2. Production and orders

Between 2012 and 2022, an average of 13 seagoing vessels above 100 GT were built by Croatian shipyards. From 2013 until 2019, there was a pick-up in activity with more vessels being built each year (**Figure 6**). However, following the onset of the COVID-19 pandemic in 2020, the number of vessels built saw a significant drop. Similarly, there was a low count of vessels built in 2022.

**Figure 6. Number of seagoing vessels built in Croatia, 2012-2022**



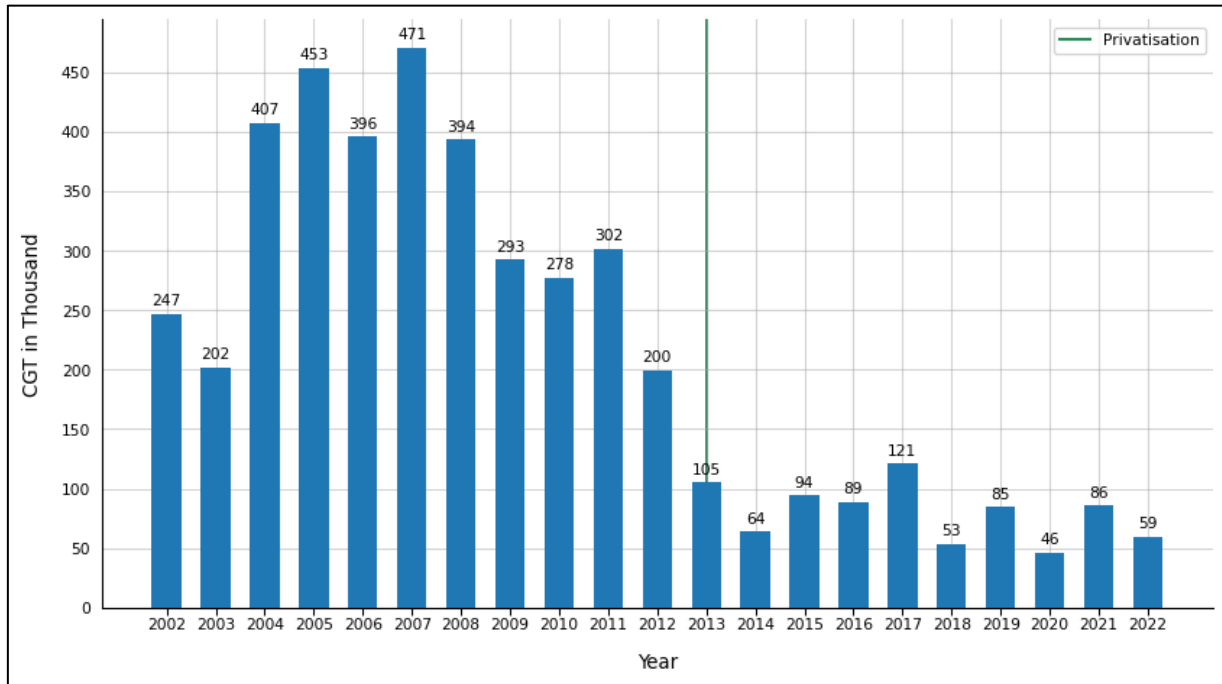
Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (June 2023), *World Fleet Register*  
<https://www.clarksons.net/wfr>.

The size of ships has also decreased over the last decade. After the industry's privatisation in 2013, the average CGT dropped from 54,101 (from 2002 to 2012) to 12,732 (**Figure 7**).

Between 2012 and 2022, the orderbook of new vessels saw an upward trend, peaking in 2017-2018 before declining in 2019. There was a marked drop in new orders from 2020, with numbers falling from 17 to just 9 new contracts. (**Figure 8**). However, the CGT of the new contracts for the last three years showed a slight increase going from 238,315 in 2020 to 246,216 in 2022 (**Figure 9**).

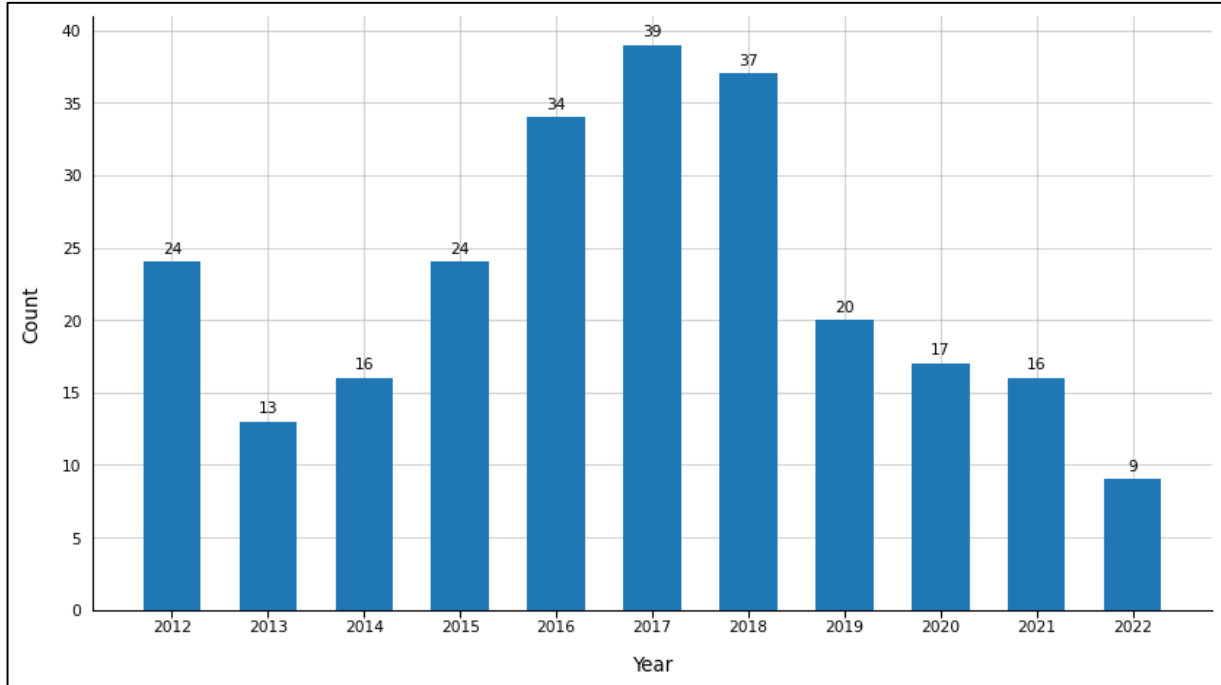
**Figure 7. Completions of seagoing vessels by Croatian shipyards in CGT, 2002-2022**



Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (June 2023), *World Fleet Register*  
<https://www.clarksons.net/wfr>.

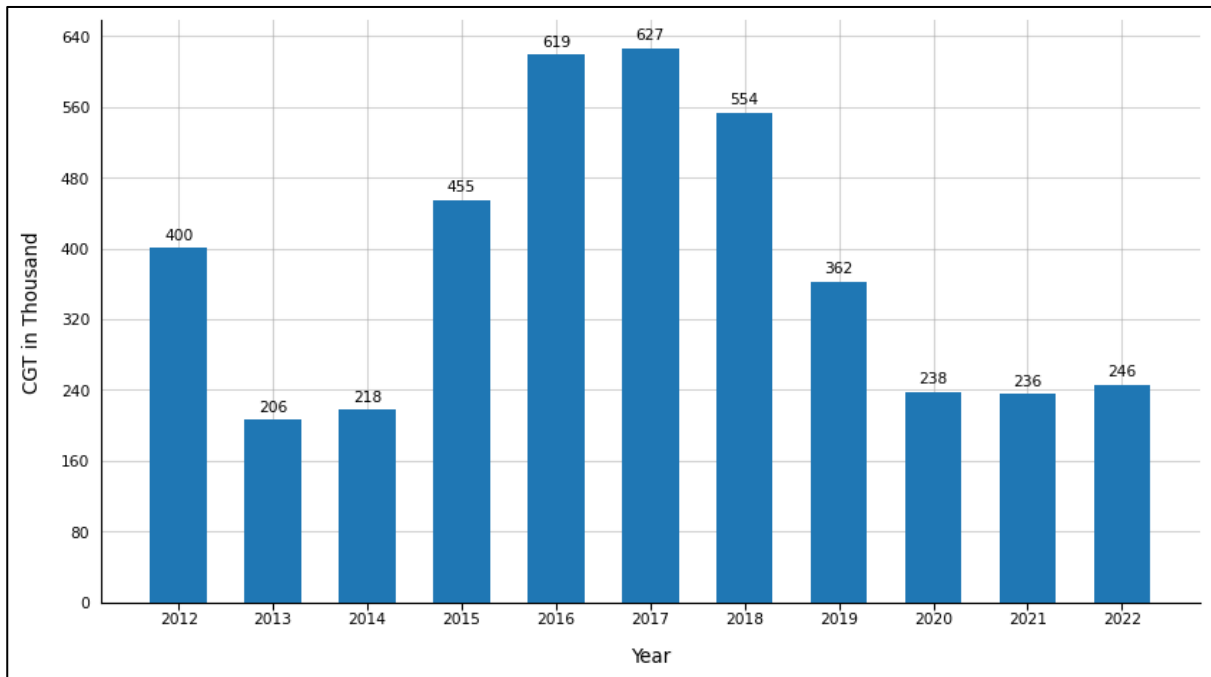
**Figure 8. Number of new contracts in Croatian shipyards, 2012-2022**



Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (June 2023), *World Fleet Register*  
<https://www.clarksons.net/wfr>.

**Figure 9. New contracts in terms of CGT, 2012-2022**

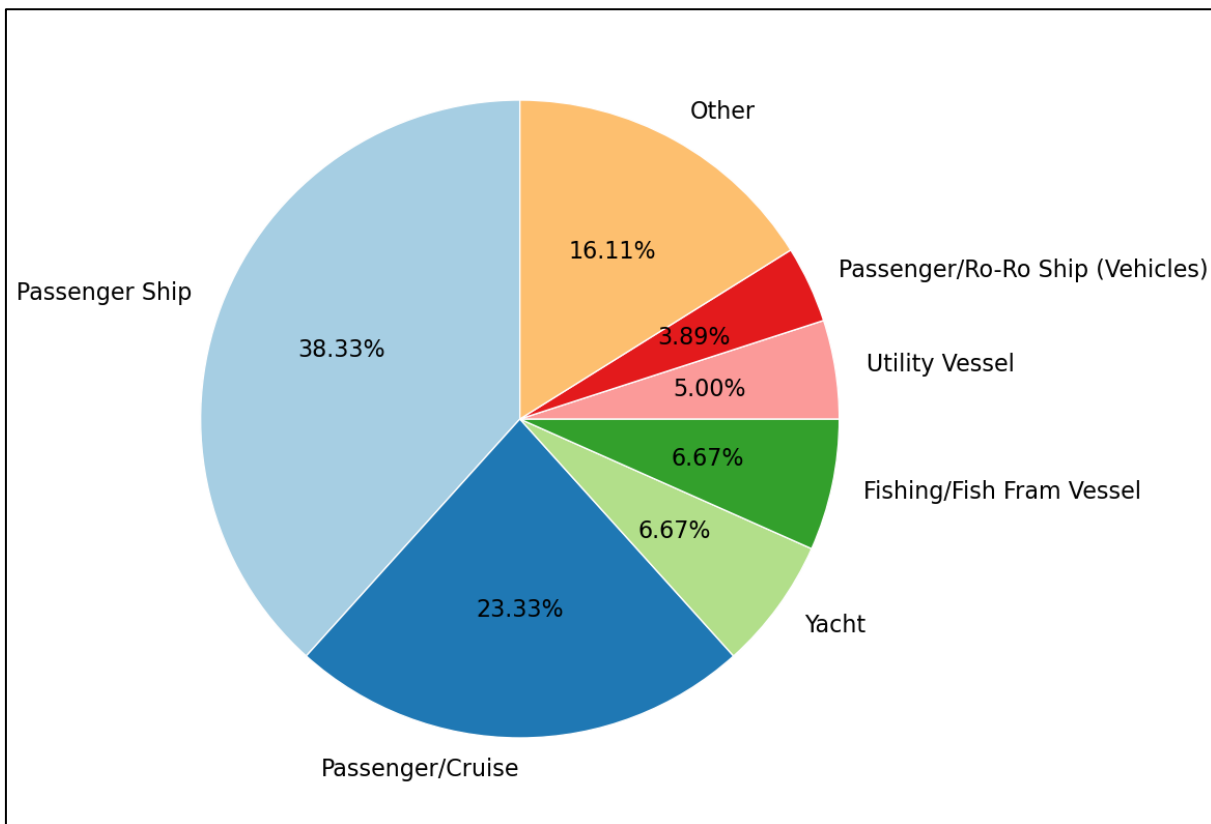


Note: This Figure includes all seagoing vessels from 100 GT.

Source: OECD calculations based on Clarkson Research Services Limited (June 2023), *World Fleet Register*

<https://www.clarksons.net/wfr>.

**Figure 10. Proportion of vessel type, 2012-2022**



Source: OECD calculations based on S&P Maritime Portal, IHS, (June 2023), *Sea Web Ships* <https://maritime.ihs.com/Home>

Despite shipyards seeing a decline in their orderbooks, there are promising avenues in building specialised vessels, including polar sea cruisers and smaller domestic vessels like electrically powered passenger ships, work ships and ferries. While Croatian shipyards have honed their skills in crafting these types of ships, the capacity constraints within shipyards will influence the potential size of such vessels. Considering the capacity of cranes and the length of the slipways for instance, vessel size is expected range between 100 and 200 meters.

Several shipyards have specialised in building smaller vessels tailored to the domestic market, catering to state agencies or public companies. Over the past decade, roughly 70% of vessels built in Croatia have been passenger ships, cruise ships and yachts (**Figure 10**).

#### 4.1.3. Employment and skills

In 2022, the largest Croatian shipyards collectively employed around 3,000 individuals, along with 1,300 subcontractors. The number of employees in the shipbuilding sector in Croatia has seen a decrease over time. Before the industry was privatised, it had approximately 12,000 employees.

A majority of employees in the shipbuilding sector have completed, at a minimum, vocational high school, general high school, or have pursued tertiary education. The field comprises experts in marine technology, including shipbuilding and design specialists, mechanical and electrical engineers, as well as electronic control experts. Out of Croatia's seven public universities, three provide courses relevant to the shipbuilding industry, focusing on areas like marine technology. For instance, the University of Zagreb's Faculty of Electrical Engineering and Computing features a department dedicated to the development and oversight of submersible divers, robots, and other marine technological assets. Shipyards also host training workshops, particularly for roles such as welders, ship fitters and pipe fitters. Despite the available education opportunities, sourcing skilled labour remains a significant challenge for shipyards.

**Table 3. Employees in main shipyards**

Shipyard	Number of employees	Average number of subcontractors
Victor Lenac	320	400
MKM Yachts d.o.o.	70	500
Uljanik brodogradnja 1856 d.o.o.	340	250
3. Maj brodogradilište d.d.	700	300
Brodotrogir Cruise d.o.o.	150	20
Brodosplit d.d. (*2020)	1 500	250
Total	3 080	1 720

Note: Approximative data  
Source: Questionnaire (2023)

Currently in the shipyards of 3 Maj., Brodosplit and Brodotrogir, which account for 70% of the overall employees in the shipbuilding industry, 11.8% of the employees are women. There are no targeted policies to increase employment of women in the industry.

## 4.2. Productivity and Innovation

Productivity remains a concern for Croatia's shipbuilding sector. As of recent data, the sector has experienced lower productivity rates compared to other shipbuilding economies. While global benchmarks indicate a consistent rise in ship completion rates and reduction in build times, Croatian shipyards often lag behind, with extended durations and lesser throughput. Several intertwined factors contribute to this.



While the Croatian shipbuilding industry is undergoing efforts of modernisation and Croatian shipyards are generally comprehensively equipped and proficient in fabricating an extensive range of vessels, some yards have yet to align with global technological standards. This technological disparity risks resulting in a divergence from their international counterparts, not only hampering efficient production but also impacting global competitiveness. Additionally, investment rates in research and innovation are observed to be low, with Research and Development (R&D) expenditure within these enterprises remaining modest (see **Table 4**).

**Table 4. R&D business enterprise expenditure in the Croatian shipbuilding industry, 2015-2020**

Year	Total expenditure (million EUR)
2015	78
2016	93
2017	88
2018	41
2019	70
2020	18

Source: Questionnaire 2023

Logistic operations are pivotal in the shipbuilding lifecycle, with supply chains being a crucial element. In Croatia, the shipbuilding industry has been confronted with disruptions in these supply chains, particularly intensified by the COVID-19 crisis. These disruptions have led to escalating costs and a diminished support system, further slowed by the inefficient dissemination of information and provisioning of shipbuilding materials. The inherent delays and deficiencies in sourcing strategic partners can further amplify these challenges, impacting the preliminary processes and potentially compromising the production cycle.

The workforce, traditionally one of Croatia's strengths in the sector, presents its own set of challenges. The diminishing appeal of shipbuilding as an attractive profession in Croatia has fostered a negative career selection trend, which, if unchecked, threatens the industry's future. Furthermore, as the European Union's labour market becomes more integrated, highly skilled employees from Croatian shipyards are increasingly attracted to better-paying opportunities in other EU countries. Within the Croatian shipbuilding sector, corporate governance and management effectiveness, particularly at intermediate and low levels, also warrant careful attention. Considering the complex nature of shipbuilding operations, there is an evident demand for educated and adept management that adheres to established business practices. Lapses in management strategies might pose risks to productivity. To support effective management, shipbuilding companies in Croatia are equipped with Supervisory Boards and management's mandates often encompass securing new projects and ensuring worker motivation.

While the sector observes collaboration between shipbuilders, subcontractors and research centres, there is potential for deeper synergy between shipyards, related shipbuilding companies, faculties, institutes and research institutions. This limited integration can be partly explained by the financial constraints faced by shipyards, making it challenging to invest in extensive collaborative initiatives. Additionally, there is an opportunity to introduce more structured incentives to foster alignment and drive shared goals. Recognising this, there are ongoing efforts to enhance collaboration, especially in the domains of R&D and innovation, bringing maritime companies and academic faculties closer together, see Box 2.

### Box 2. CEKOM

CEKOM, the Center of Competence for Advanced Mobility, was inaugurated in 2016 to foster innovation, research and development within Croatia's shipbuilding sector. It serves as a collaborative hub where various Croatian faculties and companies congregate for mutual knowledge exchange. Participants include the Faculty of Electrical Engineering, Mechanical Engineering, and Shipbuilding from Split, the Faculty of Mechanical Engineering and Shipbuilding from Zagreb, the Maritime Faculty from Split, and the Faculty of Civil Engineering, Architecture, and Geodesy from Split. Additionally, industry representation is provided by organisations such as Div. Končar EU, Adria Winch, and Klima Oprema.

CEKOM's primary objective is to bolster the sector's competitiveness by enhancing its contributions to Croatia's economic development through a cluster approach. It seeks to establish a platform for research and development and to enact developmental activities. In the long term, it is envisioned that CEKOM's work could catalyse a transformation in the entire Croatian transport sector, transitioning from traditional and technologically outdated production methods to advanced technologies and the creation of globally competitive, innovative products. This vision also includes enhancing the ecological aspects of the shipbuilding process. An example of such an initiative is the "Increasing energy efficiency in the project unit of the company Brodosplit - Shipyard of special facilities d.o.o." project.

Source: Questionnaire 2023

## 4.3. Construction of niche vessels

In recent years, Croatian shipyards have strategically pivoted towards specialisation in 'niche' shipbuilding markets, such as polar cruises and yachts. Several shipyards have refined their production focus, resulting in a surge of orders for these types of vessels. The Croatian shipbuilding sector is also undergoing a discernible shift towards the development and deployment of vessels with reduced greenhouse gas (GHG) emissions.

### 4.3.1. Yachts and (polar) cruise ships

Croatia has strategically positioned itself as an emergent hub within the yachting sector, capitalising on its maritime legacy and geographic advantage. Notably, Croatian yacht builders have diversified their portfolios to encompass sailing yachts, motor yachts and superyachts. A significant segment of these companies not only focus on constructing but also on repairing high-quality yachts, indicating a comprehensive skill set in the luxury yacht domain.

**Table 5** provides an overview of yacht and cruise ship builders in Croatia. Brodosplit shipyard has made a strategic shift from primarily commercial vessels to the luxury yacht market. Their portfolio comprises motoryachts and superyachts, an indication of their adaptation to changing market demands. Nauta Lamjana, for example, has a specific focus on smaller sailing yachts, designed for both personal and charter purposes. This focus suggests a targeted approach to cater to niche segments within the broader yacht market.

An emerging trend in the sector is the emphasis on sustainable technologies in yacht construction. Croatian shipbuilders are exploring environmentally friendly technologies for yachts, including hybrid and electric propulsion systems. This indicates an industry response to global sustainability demands. In a quantitative perspective over the past five years, Croatian manufacturers have been consistent, with an aggregate

delivery of approximately 50 yachts. This figure not only emphasises their output but also highlights Croatia's upward trajectory in the global yachting industry.

Among specialisations in Croatian shipyards, the construction of polar cruise ships stands out. Brodosplit shipyard, for instance, has tailored its capabilities towards building cruisers designed for polar seas. Shipyards like 3. Maj and MKM Yachts have also constructed polar cruise ships and have registered an uptick in orders for these vessels. This trend was underscored in May 2023 when a U.S. firm signalled its intent by placing an order for four polar cruise expedition vessels with a Croatian shipyard. This type of niche demand allows shipyards to leverage their specialised expertise, thereby maintaining competitiveness and operational stability.

**Table 5. Selected examples of yacht and cruise ship builders in Croatia**

Shipyard	Overview	Ownership
Brodosplit d.d.	Building: powerboats, motor yachts, cabin boats, passenger ships, ferries	Private (domestic)
Nauta Lamjana	Building and repair: sailing yachts	Private (domestic)
MKM Yachts d.o.o.	Building: polar cruise ships, motor yachts	Private (foreign)
Brodotrogir Cruise d.o.o.	Building, repair, retrofit: passenger ships, ferries, motor yachts	Private (domestic)

Source: Questionnaire 2023, selected companies' websites

#### 4.3.2. *Low GHG emissions vessels*

Croatian shipyards, in alignment with global environmental imperatives and international regulatory standards, have increasingly ventured into the design and construction of vessels equipped with alternative propulsion systems that offer enhanced environmental performance and reduced GHG emissions compared to traditional systems. Notably, hybrid diesel-electric or fully electric vessels are deployed by government agencies within national parks, a practice that has been instituted for over four decades in certain parks, such as the Plitvice National Park.

Brodosplit shipyard is presently engaged in constructing a passenger vessel that generates zero emissions. This three-masted schooner, co-financed through the EU funding initiative titled "Enhancing the Development of New Products and Services Resulting from Research and Development Activities - Phase II", embodies a project dedicated to crafting a vessel exclusively powered by alternative propulsion technologies, rendering it an emissions-free craft. This shipyard has also embarked on an ambitious endeavour to produce a multipurpose luxury submarine with electric propulsion, which could be adapted for geological or biological research applications. The evolution of electrically powered vessels is anticipated to sustain its momentum, with a notable projection of six orders for electric powered ships by 2026 from the national shipowner Jadrolinija, which specialises in maritime transport across the Adriatic Sea.

Shipbuilders are pivoting in their material choices towards eco-friendly and recyclable options, which diminish the environmental footprint across a vessel's lifecycle. In operations, several shipyards implement waste management protocols and promote recycling practices to minimise environmental impact. Shipyards also undertake efforts to improve energy efficiency, driven by the modernisation of

infrastructure, equipment and machinery, and complemented by an increasing reliance on renewable energy sources.

#### 4.4. Marine equipment industry

Over the past decade, the Croatian marine equipment industry has seen a decline in production. The market, as it is today, consists of very few ship manufacturers, primarily engaged in export-oriented businesses. These entities largely concentrate on the production of small and medium-sized marine diesel engines as well as marine electric motors with permanent magnets, as delineated in **Table 6**. Moreover, the production of other marine equipment, including axial and centrifugal fans, electric motors with converters and reducers, also forms part of their manufacturing portfolio.

The dwindling activity within the Croatian marine equipment industry can be principally attributed to the loss of its domestic market. This decline was precipitated by two main factors. First, local Croatian shipyards have experienced a reduction in their operational scale. Second, there has been a discernible shift towards the importation of marine equipment from international sources. The interplay of these two dynamics has significantly constrained the domestic demand for marine equipment, thus explaining the industry's diminished activity.

**Table 6. Main marine equipment companies**

Company	Ship equipment production	Ownership	Ownership
Končar MES d.o.o.	Marine electric motors	Private (foreign)	Zagreb
Scam marine d.o.o.	Marine engines, cranes, axle lines, winch, rudder	Private (domestic)	Rijeka
Tema d.o.o.	Marine electric engines	Private (domestic)	Pula
JLM Perković d.o.o.	Marine engines,	Private (domestic)	Opatija
Inelteh d.o.o.	New construction and repairs	Private (domestic)	Rijeka
Propeler servis d.o.o.	Ship propellers	Private (domestic)	Rijeka
Adria Winch d.o.o.	Deck equipment	Private (domestic)	Split

Source: Questionnaire (2023)

#### 4.5. Repair and retrofit activities

The Croatian shipbuilding industry includes a significant component of repair and retrofitting functions. Predominantly, these activities focus on the installation and upgrading of ballast water treatment systems, driven by international regulations on maritime environmental practices. Moreover, a rising trend in retrofitting ships for alternative fuels like LNG is observed, in line with global shifts toward sustainable marine transport. Both cargo vessels and passenger ships frequent Croatian shipyards for diverse retrofitting needs, ranging from routine maintenance to specialised system upgrades. The industry also accommodates the retrofitting requirements of naval vessels, underscoring Croatia's strategic maritime position.

An illustrative example is the Viktor Lenac shipyard, a subsidiary of the Palumbo Group, located in Rijeka. In recent years, Viktor Lenac has established a presence in the retrofitting domain, particularly in projects related to ballast water treatment systems. From an initial project in 2015, data reflects a growth trajectory, with the shipyard undertaking six analogous projects by 2020. Such consistent performance points to the



shipyard's proficiency in retrofitting operations. Nonetheless, looking at the broader competitive landscape in the region, other shipbuilding countries also holding significant stakes in the ship repair and retrofitting market. Beyond retrofitting, Viktor Lenac has expanded its portfolio to cater to the burgeoning interest in alternative engine systems, thus diversifying its range of services. An enduring association with the United States Navy, established in 1993, serves as an indication of the shipyard's recognised capabilities on the international shipbuilding stage.

#### 4.6. Competitiveness

**Table 7** provides a SWOT analysis of selected strengths, opportunities, weaknesses and threats of the Croatian shipbuilding industry, revealing insights into its competitiveness. It is based on data and analyses detailed in the previous sections of the report.

**Table 7. SWOT analysis of the Croatian Shipbuilding Industry**

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Geographical location on the Adriatic coast and at the crossroads of central and south-eastern Europe, historic economic ties with several developed and emerging economies</li> <li>• High-skilled labour, including well-trained naval architects</li> <li>• Strategic development of niche sectors + high expertise and specialisation in small tonnage ships (yachts, polar cruises)</li> </ul>	<ul style="list-style-type: none"> <li>• Low investments in R&amp;D and innovation</li> <li>• Relatively high labour costs compared to selected competitors</li> <li>• Difficulty in attracting young talent to the industry, especially women</li> <li>• Lack of domestic marine equipment industry to develop maritime supply chains and technology hubs</li> <li>• Framework conditions for industry competitiveness and innovation, including access to finance, administrative and regulatory barriers to entrepreneurship, and a lack of trust</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Expected increased capacity of Croatian LNG terminal</li> <li>• Increased demand for low-emissions/ zero-emissions ships</li> <li>• Projects co-funded by European Union funds, often to support EU Green Deal</li> <li>• Develop clusters and inter-firm networks, both in Croatia and with companies in the EU as way to accumulate in-house capability in Croatian firms</li> </ul>	<ul style="list-style-type: none"> <li>• Failure to prepare for increased competitive pressure following EU accession and from emerging economies</li> <li>• Difficulty to mobilise human and capital resources for shipbuilding industry and consequently to capitalise on the industry (esp. innovation in the industry) as a source of growth and competitiveness</li> </ul>

The geographical positioning of Croatia on the Adriatic coast and at the crossroads of central and south-eastern Europe provides a competitive edge through historic economic ties. The high-skilled labour force, specialising in small tonnage ships like yachts and polar cruises, further strengthens the industry's standing on a global scale. Potential avenues for enhancing competitiveness include leveraging the expected increased capacity of the Croatian LNG terminal and the global trend towards low or zero-emissions ships.

EU co-funded projects and the development of inter-firm networks within Croatia and the EU could further strengthen the industry's competitive position by enhancing collaboration and in-house capabilities.

Despite these advantages, competitiveness is hampered by several factors. Low investments in R&D and relatively high labour costs weaken the industry's ability to innovate and remain cost competitive. Additionally, the absence of a domestic marine equipment industry and various administrative barriers hinder the development of vital maritime supply chains and innovation, impacting overall competitiveness. Threats to competitiveness include a failure to adapt to increased competitive pressures after EU accession and emerging global markets. The inability to mobilise resources for innovation could also undermine the industry's growth and global competitiveness.

In summary, the Croatian shipbuilding industry's competitiveness is shaped by its strategic geographical and specialised strengths yet challenged by weaknesses in investment and cost structure. Opportunities through EU collaboration, increased clustering of marine industries and global environmental trends provide potential paths to heightened competitiveness, but threats from global market dynamics and resource constraints must be navigated carefully to sustain and enhance the industry's competitive standing.

## 5. Policies affecting the shipbuilding and marine equipment industry

The Croatian government supports the shipbuilding industry's strategic development of high-quality niche sectors and specific market segments to maintain its presence in an increasingly competitive global market. This approach aligns with Croatia's broader "Smart Specialisation Strategy" (S3), which emphasises the localisation of production. The Croatian government currently does not implement a comprehensive industrial and structural policy targeted at the shipbuilding sector but policies relevant to shipbuilding are expected to be part of the new "National Plan of Industrial Development and Entrepreneurship".

### 5.1. EU regulatory framework

As a Member of the EU since 2013, Croatia abides by the common and general regulations, policies, and strategies that are established under the functioning framework of the EU, and that fall within its exclusive competence.

#### 5.1.1. EU treaty provisions

In accordance with Article 3 of the Treaty on the Functioning of the European Union, and considering all possible exceptions, the EU exercises exclusive competence in regulating a number of areas that are relevant but not limited to industry such as (a) common commercial policy; (b) the establishing of the competition rules necessary for the functioning of the internal markets; (c) customs tariffs and duties which shall cover all trade in goods; (d) the conservation of marine biological resources under the common fisheries policy, and (e) the exclusive competence for the conclusion of international agreements when its conclusion may affect common rules or alter their scope, among others.

In what pertains to the areas that fall within the exclusive competence of the EU, Croatia, as an EU Member State, shall legislate or adopt legally binding acts only if so empowered by the EU or for the implementation of EU acts. While the areas that refer to EU common and general regulations, policies, and strategies interact with a broader range of industries, they influence Croatia's shipbuilding industry.

Subsection 2 of Article 2, and Articles 4 and 6 of the Treaty on the Functioning of the European Union, confer a shared competence between the EU and Member States in certain areas where Member States might be able to legislate or adopt legally binding acts to the extent that the EU would not or has not yet exercised its competence, and also to coordinate, support or supplement regulations and policies that are already in place.

Areas of shared competence between the EU and the Member States can cover, for instance, social and employment policy, environmental and industry transition policy, internal market policy, consumer protection policy, and transport policy, among other policy areas, including policies related to specific common safety concerns on security issues and public health matters.

#### 5.1.2. Membership to international organisations

Considering the above-mentioned, Croatia's shipbuilding industry has been shaped around the EU functioning framework. Furthermore, the sector has been influenced by Croatia's membership to International Intergovernmental Organisations (IGOs) such as the World Trade Organization (WTO), where WTO standards, agreements and global rules for international trade have been incorporated and enforced.

Beyond its impact in international trade, Croatia's membership to the WTO has extended its effects in its social and labour standards. This, through the alignment of WTO Member States with international core labour principles outlined by the International Labour Organization (ILO) on areas including freedom of association and no discrimination at work. Moreover, Croatia has adopted the Agreement of Government

Procurement (GPA) to regulate public procurement of good and services based on principles of transparency, openness, and non-discrimination (World Trade Organization, 1996<sub>[10]</sub>).

### 5.1.3. *EU temporary measures and incentives*

It is relevant to mention that, within the framework of the functioning of the EU, and in accordance with what is stipulated in subsection 5 of Article 168 and subsection 4 of Article 2 of the Treaty on the Functioning of the European Union, a number of temporary measures and incentives were deployed to address the exceptional challenges pertaining the Covid-19 pandemic and Russia's war of aggression against Ukraine.

Some of the temporary measures and incentives put in place to tackle the challenges arising from the COVID-19 pandemic and Russia's war of aggression against Ukraine continue in effect and may impact, among others, Croatia's shipbuilding industry.

For instance, strategies such as NextGenerationEU, operating through the Recovery and Resilience Facility (RRF) and within the framework of the EU's post-COVID-19 recovery plan, have set the ambitious goal of making Europe climate-neutral by 2050 by, inter alia, investing in environmentally friendly technologies, which is expected to push forward Croatia's shipbuilding industry transition toward decarbonisation (European Union, 2020<sub>[11]</sub>).

EU State Aid Temporary Framework has also given Croatia a tool to support the economy in the face of the above-mentioned crises by allowing the country to implement support measures that are not specifically directed to the shipbuilding industry but applicable to various sectors. It is important to note that the EU State Aid Temporary Framework expired in June 2022, except in the areas of investment and solvency support, which remain in effect until December 2023 (European Commission, 2020<sub>[12]</sub>).

### 5.1.4. *EU regulation on shipbuilding*

As previously mentioned, the EU has established a set of common general regulations, policies, and strategies that influence industry in general and that affect or are foreseen to affect the Croatian shipbuilding industry. Nonetheless, in addition to the common general regulation, the EU has also issued common specific regulations that exclusively affect the Member States shipbuilding industry.

The common specific regulation on shipbuilding that the EU has put in place and that affects EU Member states including Croatia is the following: i) EU Regulation 1257/2013 on ship recycling, which aims at enhancing the protection of human health and the EU marine environment, particularly regarding the proper management of hazardous materials on ships; ii) EU Regulation 2016/1013 on protection against injurious pricing of vessels, which punishes shipbuilders engaged in unfair pricing; iii) EU Directive 2009/21/EC, which aims to enhance safety and prevent pollution from ships flying the flag of a Member State; iv) EU Directive 2014/90/EU on Marine Equipment, which aims to increase marine safety and reduce the risk of marine pollution, and v) the International Convention for the Safety of Life at the Sea (SOLAS), which was ratified by all EU Member States.

Furthermore, as an EU member state, Croatia is expected to implement EU regulations to encourage the decarbonisation of maritime transport. Starting January 2024, the EU Emissions Trading System (EU ETS) will include maritime CO<sub>2</sub> emissions from all large ships entering EU ports, irrespective of their flag. Additionally, the EU FuelEU Maritime regulation is set to be effective from January 2025, for more details see 5.3.1 (European Council, 2023<sub>[13]</sub>).

## 5.2. National support measures

Croatian government support measures are largely confined to providing state guarantees for shipbuilding. These guarantees cover up to 80% of the contracted ship's value, in line with the European Commission Guidelines' 80-20 ratio (EUR-Lex, 2020<sub>[14]</sub>). Such measures are instituted on a per-project basis by the Government of Croatia, reinforcing the shipbuilding company's bank credibility and ensuring

trustworthiness. The appraisal process for applications for these state guarantees is conducted by the Ministry of Economy and Sustainable Development, while the actual issuance of these guarantees, in accordance with governmental decisions, falls within the purview of the Ministry of Finance.

The Croatian Shipbuilding Corporation (CSC), an entity created by the Croatian government in 1994, supervises production and operations in domestic shipyards. It collaborates with the Ministry of Economy and Sustainable Development in formulating rules pertaining to the issuance of state guarantees for shipbuilding. Once such guarantees are approved for active projects, the Croatian Bank for Reconstruction and Development (HBOR) typically collaborates with the CSC to finance the initiatives safeguarded by these state guarantees.

Furthermore, the HBOR administers two financing programs geared towards the shipbuilding sector. The first, entitled “Credit to the Customer” aims to fortify the international competitiveness of exporters by providing foreign buyers with extended repayment terms, enhancing liquidity, and mitigating risks associated with international trade. The second, the “Supplier Credit for Export Operations” program, offers support to exporters of goods, labour or services that have export contracts with overseas buyers.

As seen in **Table 8**, between 2018 and 2022, Croatian shipbuilding companies were granted state guarantees amounting to approximately EUR 480.3 million. In 2018, a substantial sum of nearly EUR 212.5 million was allocated, representing the peak of state guarantees during this period. Notably, the highest single guarantee in that year was designated to Uljanik Brodogradilište d.d., receiving around EUR 96 million. Subsequent years saw a declining trend in state guarantees. By 2019, the total guarantees decreased to approximately EUR 45.9 million, provided solely to 3. Maj. The trend of decreasing guarantees persists, albeit with slight fluctuations, as evidenced by the total for 2020 being about EUR 63.5 million and further dropping to nearly EUR 61.3 million by 2022.

The company 3. Maj consistently secured state guarantees across multiple years, with its highest allocation in 2022 approximating EUR 59.6 million. This suggests that 3. Maj was the most recurrent beneficiary over the years. Another significant state guarantee during this timeframe was provided to MKM Yachts, which received EUR 80.1 million in 2021.

**Table 8. State guarantees to Croatian shipyards, 2018- 2022**

Year	Shipyard	State guarantee (EUR)
2018	Uljanik Brodogradilište d.d.	96.000.000
	Uljanik Plovidba d.d.	34.725.344
	Uljanik d.d.	13.696.747
	Brodograđevna industrija Split d.d.	68.085.114
	<b>Total 2018</b>	<b>212.507.205</b>
2019	3. Maj Brodogradilište d.d.	45.908.421
	<b>Total 2019</b>	<b>45.908.421</b>
2020	3. Maj Brodogradilište d.d.	31.532.843
	Brodograđevna industrija Split d.d.	32.000.000
	<b>Total 2020</b>	<b>63.532.843</b>
2021	3. Maj Brodogradilište d.d.	986.042
	Uljanik Brodogradnja 1856 d.o.o.	11.137.660
	MKM Yachts d.o.o.	80.080.000
	Brodotrogir Cruise d.o.o.	4.873.231
	<b>Total 2021</b>	<b>97.076.932</b>
2022	3. Maj Brodogradilište d.d.	59.579.433
	Uljanik Brodogradnja 1856 d.o.o.	1.698.480
	<b>Total 2022</b>	<b>61.277.913</b>
	<b>Total 2018-2020</b>	<b>480.303.300</b>

Source: Questionnaire 2023

### 5.3. Decarbonisation and environmental policy

#### 5.3.1. Implementation of IMO and EU regulation on maritime decarbonisation

As a member of the IMO and the EU, Croatia is generally obligated to follow the maritime regulations set forth by these bodies.

Croatia has been actively supporting IMO regulation for green maritime transport since becoming a full member of the IMO in 1992. As the IMO has been implementing increasingly stringent emissions standards under its MARPOL Annex VI regulations, aiming to reduce the environmental impact of shipping (International Maritime Organization, 2023<sup>[15]</sup>), the Croatian government has encouraged the country's shipowners to recognise eco-friendly and low-emissions vessels as a competitive advantage through the implementation of national environmental regulations and policy incentives. The encouragement of safe, reliable and green shipping practices has also been included as a main objective of the Croatian Shipowner Association Mare Nostrum, representing most ocean-going Croatian shipowners, operates 105 vessels with a total of 1,498,288 GT.

Furthermore, as an EU member state, Croatia is expected to implement EU regulations to encourage the decarbonisation of maritime transport. Starting January 2024, the EU Emissions Trading System (EU ETS) will include maritime CO<sub>2</sub> emissions from all large ships entering EU ports, irrespective of their flag. The system covers 50% of emissions from voyages starting or ending outside the EU and 100% of intra-EU port and port-to-port emissions. Further, the EU's FuelEU Maritime regulation is set to be effective from



January 1, 2025. Its goal is to bolster the use of renewable and low-carbon fuels in international maritime transport, thereby aiding in the shipping industry's decarbonisation (European Council, 2023<sub>[16]</sub>).

Further, Croatian shipowners are engaged in several projects co-funded by European Union funds, aimed at enhancing the environmental characteristics of ships. One such initiative is the GUTTA project, which prioritises fuel efficiency and emissions reduction in maritime transport within the Adriatic region. The central goal of the GUTTA project is to diminish the carbon footprint of ferry services connecting Italy and Croatia by utilising automated route optimisation techniques, as well as evaluating the impact of the COVID-19 pandemic on ferry transportation.

### 5.3.2. *Adherence to and implementation of the IMO Ballast Water Management Convention*

Croatia ratified the IMO Ballast Water Convention in 2010 with the aim to enhance environmental protection and control of ballast water and sediments onboard ships navigating in its internal waters, territorial sea, protected ecological and fishing zones. All ships arriving in Croatia from abroad are required to report their ballast water to the competent harbour master's office. Croatian-flagged ships engaged in international navigation and ships calling at Croatian ports with a gross tonnage of 400 and above, constructed for ballast water uptake, must possess an International Ballast Water Management Certificate issued by their flag state's competent authorities (REMPEC, 2010<sub>[17]</sub>).

## 5.4. Social and labour policy

### 5.4.1. *Adherence to and implementation of international health and safety standard*

Croatia supports and promotes the ILO Code of Practice on Safety and Health in Shipbuilding and Ship Repair as an important sectoral code (International Labour Organization, 2019<sub>[18]</sub>). While not legally binding, the code serves as a reference tool for principles guiding safety and health policies in shipbuilding and ship repair in Croatia. The country's laws on occupational safety make employers responsible for organising and implementing safety measures for workers throughout the work organisation and procedures. Shipyards that adhere to higher standards of occupational safety tend to be more successful and sustainable. Ensuring safe workplaces is essential for achieving productivity, competitiveness, economic growth, and development.

Croatia also adheres to and has implemented the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, applying the strictest environmental standards for ship recycling when vessels reach the end of their operational lives (International Maritime Organization, 2019<sub>[19]</sub>). While Croatia does not have shipyards equipped for recycling large ships, smaller ships, such as fishing boats, are recycled in small shipyards under special authorisation from the Ministry of Sea, Transport, and Infrastructure. To obtain this authorisation, shipyards must demonstrate their ability to address all ship recycling-related issues, including environmentally hazardous substances and working conditions.

### 5.4.2. *Government support for skills, labour supply and innovation*

The Croatian government's strategies are predominantly centred on overarching initiatives that facilitate the (re)skilling of its workforce and promote innovation, without explicitly focusing on the shipbuilding sector. Within the shipbuilding industry, there is a self-initiated push towards the reskilling and upskilling of workers, especially in roles experiencing a deficit such as welders, ship fitters and pipe fitters. Although mechanisms for workforce development are in place through the Ministry of Labour, pension system and family and social policies, they are designed with a broad economic perspective rather than targeting the nuanced needs of the shipbuilding sector.

In the domain of innovation, the Croatian government has not developed specialised support schemes for the shipbuilding sector. Instead, shipyards navigate the competitive space of general public innovation calls intended for the wider national economy. It is noteworthy that shipyards like Brodosplit and BSO have procured projects under the “Operational Program Competitiveness and Cohesion 2014 – 2020”. These projects, such as the “Development of a multi-purpose luxury tourist and research submarine” and the “Development of an autonomous unmanned multi-purpose ship”, exemplify the industry’s independent strides in innovation amidst the absence of targeted governmental support.

## 6. Conclusions

With its extended coastline in the Adriatic Sea, Croatia is well located to participate in the shipbuilding industry and has been an important player in the construction of ships since the 19<sup>th</sup> century, both in Europe and worldwide. However, the privatisation of the sector in 2013, in line with the accession to the European Union, led to a 75% **reduction in production** from 2002-2012 to 2012-2022, affecting the type and number of ships made. By 2023, the sector represented 2% of Croatia's GDP and maintained an average of 6.5 operational shipyards annually between 2012-2022. The industry, post-privatisation, has leaned towards '**niche**' markets, particularly in passenger ships, cruise ships and yachts, with a growing emphasis on low-emission vessels.

The Croatian shipbuilding sector currently faces several challenges. Despite its traditional strengths in shipbuilding, Croatian shipyard's face hurdles in increasing productivity and innovation due to outdated technology, low R&D investment and inefficiencies in workforce and governance. The industry's supply chain management also presents difficulties, especially with the COVID-19 exacerbating the **breakdown of supply chains**. This has led to increased costs, vulnerabilities of logistic operations, slower processes and necessitates the search for strategic economic partners.

Another notable challenge confronting the Croatian shipbuilding industry is **labour supply and attracting skilled labour**. Following privatisation, a decrease in production incentivised skilled workers, including naval engineers, to seek jobs abroad. The output per worker in the shipbuilding sector is currently suboptimal. With insufficient training programs and retention efforts, the industry faces diminished expertise and growth prospects. The growing trend of hiring migrant workers reveals a significant challenge in attracting local talent.

Given these challenges, the Croatian government could consider implementing a **targeted shipbuilding strategy** to support re-industrialisation. While the forthcoming "National Plan for Industry and Entrepreneurship" is expected to provide an important roadmap for across-economy industrial development, a strategic, targeted framework for the shipbuilding sector could help foster a maritime cluster and more effectively address the challenges the shipbuilding industry is facing. In this regard, broader investments into decarbonisation initiatives, such as the Integrated National Energy and Climate Plan 2030, should be welcomed and could be employed to support 'green' industrial developments in shipbuilding. Future orientations for the shipbuilding sector could also consider improving the business climate, supporting cooperation across marine industries (including with marine equipment suppliers) and fostering institutional capacity.

To address the sector's critical need of **aligning labour supply and demand**, policies that not only train but retain skilled labour within Croatia should be welcomed. Currently there is an absence of dedicated programs to enhance the labour force specific to shipbuilding, although general support is available for student and apprenticeship training and the Croatian labour market is experiencing an increased interest of young people for specific occupations, crafts and manufacturing.

Finally, **international collaboration** and partnerships present a potential growth avenue. The sector's comparative advantages, such as cost-effective, skilled labour and streamlined concession granting for shipyards, could be strategically leveraged to foster foreign investments and international cooperation.

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## *ANNEX: Peer Review Mission Programme*

### **OECD FIELD MISSION – CROATIA**

**June 20<sup>th</sup> - 21<sup>st</sup>, 2023**

#### **Tuesday, June 20<sup>th</sup>, 2023 - ZAGREB**

**10:00 – 11:00h** Meeting at the Ministry of Economy and Sustainable Development, Radnička cesta 80/22nd floor

**Participants:** State Secretary Mr. Hrvoje Bujanović  
Acting Director-General Mr. Robert Blažinović  
Mr. Darko Bandula, Senior Expert Advisor  
Prof. Pero Prebeg, Deputy Head of Department of Naval Architecture and Offshore Engineering at the Faculty of Mechanical Engineering and Naval Architecture

**11:30 – 12:30h** Meeting at Hrvatska brodogradnja Jadranbrod d.d. (Croatian Shipbuilding Corporation JSC), Avenija Većeslava Holjevcva 22

**Participants:** Director Mr. Rudjer Friganović  
Mr. Blažinović and Mr. Bandula

**13:00 – 14:00** Meeting at the Ministry of Sea, Transport and Infrastructure, Prisavlje 14, Hall 704

**Participants:** Director-General Ms. Nina Perko (tbc)  
Ms. Marijana Iviček, Head of Sector for Maritime Economy  
Mr. Blažinović and Mr. Bandula

**14:30 – 15:30** Meeting at the Ministry of Economy and Sustainable Development, Ulica grada Vukovara 78

**Participants:** Mr. Damir Roje, Director of Croatian Register of Shipping  
Mr. Ivan Bilić-Prcić, Croatian Register of Shipping, Head of Inland Navigation Vessels Sector  
Mr. Blažinović and Mr. Bandula

#### **Wednesday, June 21<sup>st</sup>, 2023 - RIJEKA**

**8:00h** start from the Ministry of Economy and Sustainable Development, Ulica grada Vukovara 78, Zagreb

**10:00h** Meeting at MKM Yachts Ltd. with Director Mr. Saša Čokljat

**12:00h** Meeting at Viktor Lenac Shipyard with CEO Mrs. Sandra Uzelac

**13:30h** Lunch