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WORKING PARTY ON SHIPBUILDING**

PEER REVIEW OF THE GERMAN SHIPBUILDING AND MARINE SUPPLY INDUSTRY

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FOREWORD

This report was prepared under the Council Working Party on Shipbuilding (WP6) peer review process. Delegates discussed a draft at the WP6 meeting on 10 November 2015. No substantive comments were received and delegates agreed to declassify the report. The report will be made available on the WP6 website: <http://www.oecd.org/sti/shipbuilding>.

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SUMMARY AND KEY POINTS

In 2012, the OECD's Council Working Party on Shipbuilding (WP6) introduced a peer review process, focused on support measures provided by governments to their shipbuilding sectors. Under this process, each economy participating in the WP6 will undergo an in-depth study of their shipbuilding industry and related government measures. Germany was the fourth country to be subject to a WP6 peer review, following the reviews of Japan (2012), Portugal (2013) and Korea (2014).

This report¹ has been prepared to support the review, which took place at the 10 November 2015 WP6 meeting. Following are key points:

Industry features

- The German shipbuilding industry is a relatively small component of the German economy as a whole. It is an important economic activity in the Baltic and North Sea area, where shipyards are concentrated. Most of Germany's ship yards are relatively small and family-owned, compared to state-owned yards or yards that are part of big shipyard groups in other countries. While Germany is the sixth largest shipbuilding industry in the world (after China, Korea, Japan, the Philippines and Chinese Taipei), Germany's share is rather low, accounting for less than 1% of global ship completions in 2014.² The supply industry has about three to four times more employees than the ship yards and is located throughout Germany.

Structural change

- The German shipbuilding industry has undergone significant changes during the past 25 years. Following reunification in 1990, special government-led programmes were set up to help restructure, modernise and privatise the yards in East Germany. Throughout the period increased competition from, in particular, China, Japan and Korea resulted in a withdrawal from key markets for large container ships and tankers.
- The global financial crisis in 2007/2008 put further pressure on the industry, resulting in a series of bankruptcies and consolidation. Many of the bankrupt yards were acquired by other yards or investors, leading to the creation of 8 major shipyard groups which together control 24 yards, out of the total of more than 40 yards for ocean-going ships. In contrast, the marine supply industry has not undergone changes of this extent and has maintained its position as a leading supplier of the components and equipment used in shipbuilding to world markets. Within Germany, the supply industry provides shipbuilders with equipment that represents about 70% of the value of final production.

Markets

- The shipbuilding industry has become more specialised, focusing on products which are custom built and require excellent system integration skills. With respect to ocean-going vessels, the industry is a world leader in the construction of large cruise ships, the market for which is small, but highly demanding. The leading position that Germany has taken in this market is one which

has evolved over a lengthy period of time. At present only three other yards, two of which are European, compete in this market.

- In addition to cruise ships, which are only produced by two companies (Meyer Werft and Lloyd Werft), German yards are also focusing attention on other customised products, such as research vessels, ferries, patrol boats, mega-yachts and vessels as well as platforms serving the needs of the offshore oil and gas and offshore wind farm industries. The market for inland vessels, such as barges, cruise vessels and ferries, has also been maintained as it tends to be more localised in nature.

Government support

- Governments, at European, national and regional levels have played an important supportive role for the shipbuilding industry. In the case of the German shipbuilding industry, the federal government has focused on providing the industry with the financial support needed to compete with foreign shipbuilders, through the guarantee of the loans taken out by foreign parties to purchase ships, and through the support of international agreements that discourage interest rate subsidisation. Furthermore, there are government programmes to maintain the industry's edge in research, development and innovation (RDI).
- The German government has also played a significant role in guiding and supporting restructuring in the industry. The most successful efforts have been in instances where assistance was provided to encourage the development of new economic activities in regions that faced economic pressure as a result of intense foreign competition.

Following is a summary of the types of support provided to the industry in recent years:

- *European level.* At European level, special programmes have been maintained for many years to improve the competitive position of the industry. In this regard, the EU has set out the frameworks for R&D support in its member states. On that basis, Germany has pursued possibilities to provide special financial aid for research and development and innovation (RDI), and to provide financial support for exports. The sectoral RDI schemes, however, expired in 2014, so there are no special provisions for shipbuilding in these areas. Instead, RDI aid for the shipbuilding sector is now based on the horizontal (cross-sectoral) RDI provisions. In addition, the European Commission oversees a multi-stakeholder exercise which has developed a vision for the industry for the year 2020, together with a series of recommendations to help realise the industry's RDI projects.
- *Germany.* In Germany, the shipbuilding industry has been a sector of strategic importance for decades. In recent years Federal government, Länder and local governments have widened the political focus to include the maritime industry as a whole, which includes maritime equipment makers and offshore industries, such as the oil, gas and wind energy industries.

Institutional support

- Since 2000, the federal government has convened a national maritime conference that brings together experts from industry, academia, research organisations, trade unions and government to discuss issues and develop proposals for increasing the competitiveness of the German maritime industry. The conference is generally held every two years.

- In 2000, a Maritime Co-ordinator, who holds the rank of State Secretary at the Federal Ministry of Economy and Energy, was created to facilitate co-operation among the different ministries which address maritime issues, and to help ensure that Germany's general goals in the maritime sector are being kept on track. The co-ordinator participates in all decision-making processes by federal government departments that are likely to have an impact on the maritime sector.
- In 2011, a National Maritime Technologies Masterplan (NMMT) was approved by the federal government. The plan is a multi-stakeholder initiative, providing a platform for industry, government, the Länder, the scientific community and maritime associations to come together to address issues. The plan is considered to be a strategic tool for targeted, coordinated and coherent policies in Germany's maritime technologies industry. It seeks to do so by, *inter alia*, strengthening the capacity and policy environment for innovation in the maritime sector and developing new market opportunities. The plan outlines actions in 10 areas of the maritime industry, six of which have links with shipbuilding. The areas include the offshore oil, gas and offshore wind energy sectors.
- The federal government supports the development of export markets for the shipbuilding and marine equipment industries, through the organisation and support of foreign trade fairs, business meetings and conferences.

Financial support

- *Innovation.* The German government maintains an innovation programme, *Innovative Shipbuilding Secures Competitive Jobs*, which is designed to improve the competitiveness of the shipbuilding industry (since 2012 including shipyards building offshore platforms). The federal and Küstenländer (Bremen, Hamburg, Mecklenburg-Western Pomerania, Lower Saxony, Schleswig-Holstein) governments co-fund up to 25% of the eligible costs of approved innovative projects, the ceiling for which can be raised to 50% for small and medium enterprises (SMEs) pursuant to the EU SME-definitions. The programme had an annual budget of EUR 15 million at the federal level in 2014 and 2015. Given a 50% co-funding by the Küstenländer, there was a total annual budget of up to EUR 30 million. The Federal Parliament has increased the federal budget for 2016 to EUR 25 million while lowering the co-financing share of the Küstenländer to one third.
- *Research and development.* The federal government oversees a research programme on *Next-Generation Maritime Technologies*, which originally covered the time period from 2011-2015 and has just been extended to 2017. The programme aims at helping German companies in the maritime sector develop and use high technology to improve their competitiveness in the global market and to secure jobs. Research areas covered include ship technology, production of maritime systems, shipping and ocean engineering. Grants covering up to 100% of eligible research costs can be covered. Some EUR 150 million have been budgeted for the programme for the period 2011 – 2015. The programme is open to all companies in the area of maritime technologies including shipyards and their suppliers. As of April 2015, the share of shipyards in this programme accounted for 9% (17 projects). Some EUR 4.2 million in grants (about 4% of the total) were approved for these projects.
- *Loan guarantees.* The German government provides cover for transactions linked to German exports ("HERMES Cover"). Such export credit guarantees ensure lenders or exporters against the risk of non-payment due to commercial and political reasons. A premium is added to cover these risks. In 2014, the share of the shipbuilding sector and marine supply industry

in export credit guarantees amounted to EUR 5.5 billion which represents 22.2% of all transactions covered.

- *Interest rates.* The Commercial Interest Reference Rate (CIRR) ship financing scheme in Germany provides ship buyers with the possibility to obtain loans at a fixed interest rate, the minimum levels of which are established by international agreement, through the OECD.³ Those loans mostly cover those sums due at the time of delivery. The programme is administered by the Kreditanstalt für Wiederaufbau (KfW) – a German governmental development bank. The interest rate risk of the loans is borne by the federal government (BMWi, 2013 and 2007 guidelines). The maximum liability of the federal government from CIRR interest equalisation guarantees granted in this connection was approximately EUR 5.8 billion at the end of 2014. Until the end of 2014, guarantees representing contract volumes of about EUR 5.6 billion had been returned as buyers preferred floating interest rates.
- *Economic stimulus program during the economic and financial crises.* In 2009-2010, the federal government established a EUR 75 billion loan and guarantee programme to assist firms that had been adversely affected by the financial crisis. The programme was administered in co-operation with the Länder governments with regards to guarantees and the government-owned KfW bank regarding loans. The bank forwarded loans to the borrowing company's bank and assumed up to 90% of the risk. Risk premiums were paid by the firms to cover the guarantees. The program had been set up for different industries and shipyards were among the companies to benefit from it.
- *Working capital and related loans.* Support can be provided by all five Küstenländer for pre-delivery financing in the form of default guarantees of generally up to 80%. Such guarantees have been used to support financing of the building of ships that were on order. Post-delivery financing is possible in principle within most of the existing schemes. In the last years this option has not been used. Länder support in the form of direct loans (at market rates) has also been provided to shipbuilders in a few exceptional cases and concerning relatively small amounts.

PEER REVIEW OF THE GERMAN SHIPBUILDING AND MARINE SUPPLY INDUSTRY

Background

In 2012, the OECD's Council Working Party on Shipbuilding (WP6) introduced a peer review process, focused on support measures provided by governments to their shipbuilding sectors. Under this process, each economy participating in the WP6 will undergo an in-depth study of their shipbuilding industry and related government measures. Non-WP6 economies may also join the process and be the subject of a WP6 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 discussion of these within the WP6. The analysis of support measures is accompanied by contextual detail of the industry, so as to enable a richer discussion of shipbuilding policy and its impact. A key element of the process is active debate and discussion of peer review drafts by WP6 participants, with a view to promoting transparency and experience-sharing.

Germany is the fourth country to be subject to a WP6 peer review, following the reviews of Japan (2012), Portugal (2013) and Korea (2014).

The information in the report is drawn from public information sources, statistical series available to the Secretariat, Germany's response to the generic peer review questionnaire and discussions with government officials and stakeholders. The Secretariat expresses its gratitude to the government and industry stakeholders who participated in the review.

The analysis focuses on the shipbuilding industry (including repair and conversion facilities), but also provides information on the marine supply industry, which manufactures the components that are used in ships. The report has four principal parts:

- *Global perspective*: This part provides a brief overview of the global market and the role that Germany plays in it.
- *Structure and features of the German shipbuilding and marine supply industry*: This part analyses the structure of the German industry and assesses industry and market developments in recent years.
- *Government policies affecting the shipbuilding industry*: This part reviews the policy measures that have been adopted at the European Union (EU) and country levels to support the industry in recent years.
- *Outlook*: This part provides a brief assessment of the current situation and outlook, from the perspective of the German government.

I. GLOBAL PERSPECTIVE

Market and industry trends

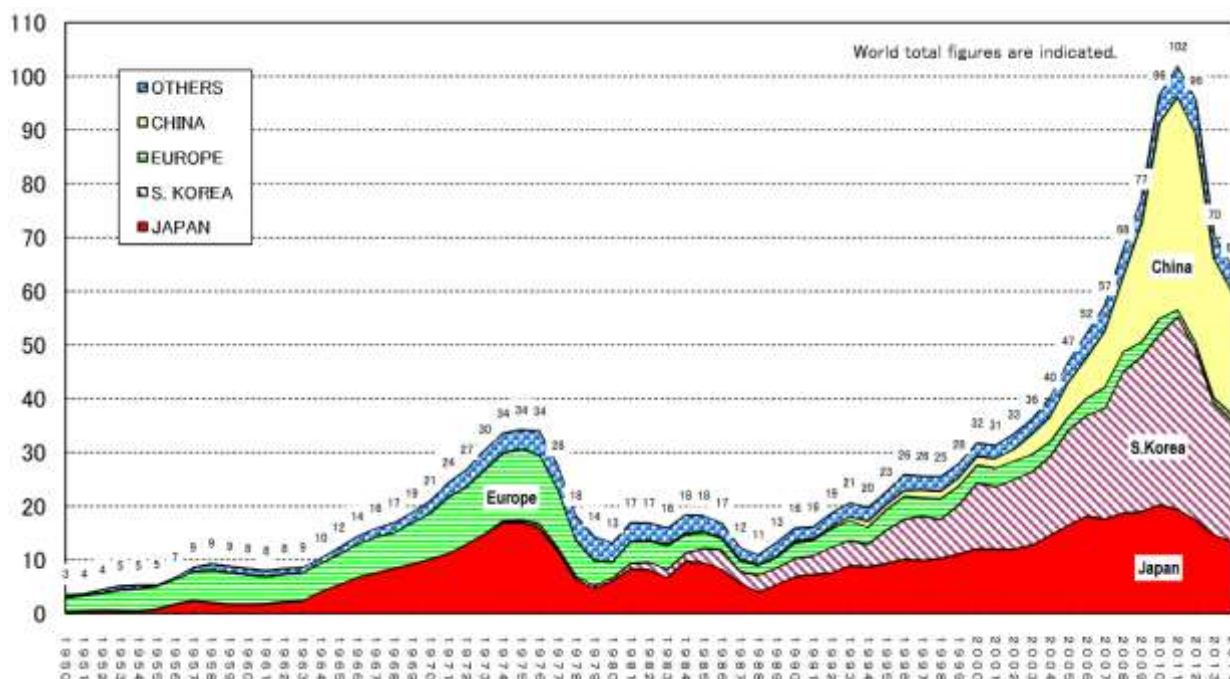
The market for ships has experienced significant long-term growth, with completions rising sharply during the past 10 years, before easing during 2012-14, as a result of a cyclical downturn (Figure 1). The role of Europe in producing vessels has evolved from a dominant one in the 1950s, to a relatively small one in recent years. The position of Germany, the largest EU shipbuilding country in terms of completions in gross tonnes (GT) in 2014, has diminished over time, but it remains an important player. Within Europe, the share of Germany's shipbuilding industry increased from 2006 to 2014, amounting to more than a quarter of total European completions, followed by Romania and Italy (Figure 2). In 2014, with approximately 500 000 GT of production (0.8% of world completions) it ranked sixth, behind China, Korea and Japan, which dominated production, and the Philippines and Chinese Taipei (IHS World Fleet Statistics, 2014).⁴

After peaking in 2008, at 392.9 million GT at year's end, the order book for new ships of 1 000 or more GT worldwide declined in each successive year, to 184.1 million GT in 2012. A turnaround occurred in 2013, when the order book rose to 218.5 million GT, a level that eased to 216.1 million GT, in 2014. The situation with new orders was not as good. After rising sharply in 2013, new orders dipped by 37% in 2014, to 75.8 million GT at year's-end (Clarkson Research Services, 2015*b*). Prices, which slipped by 32% from 2007 to 2012, increased by 5.5% in 2013 and then firmed in 2014, increasing by 3.9% by year's end, from the year earlier level (Clarkson, 2015*b*).

European customers had the highest level of ships on order at the beginning of 2015 (40% of the 5 284 vessels on order), led by Greece, Norway and Germany; Asia was second, at 37%, led by China, Singapore and Japan (Clarkson Research Services, 2015*b*).

On the supply side, Asian shipbuilders dominated order books in terms of compensated gross tons (CGT), GT, the number of vessels ordered and the value of orders at the end of 2014 (Table 1).

Figure 1. World completions of ships over 100 gross tonnes, 1926-2014 by area (in thousands of gross tonnes)



Note: World completions by IHS include tankers (i.e. LNG/LPG, chemicals, crude oil, oil products, others liquids), bulkers (i.e. bulk dry, bulk dry/oil, self-discharging bulk dry, other bulk dry, general cargo), passenger/general cargo, container, refrigerated cargo, Ro-Ro cargo, passenger/ro-ro cargo, passenger (cruise ships), passenger ships, other dry cargo, fish catching and other fishing, offshore supply and other. Note: Ships with less than 1,000 GT (e.g. fishing vessels, tugs) as well as yachts are not included in international shipbuilding statistics like Clarkson. IHS Fairplay takes all ships with 100 GT and more into consideration but yachts are not included. However, these market segments are important for the German shipbuilding industry and consequently included in the VSM statistics.

Note: Statistics prior to 1968 are based on launches.

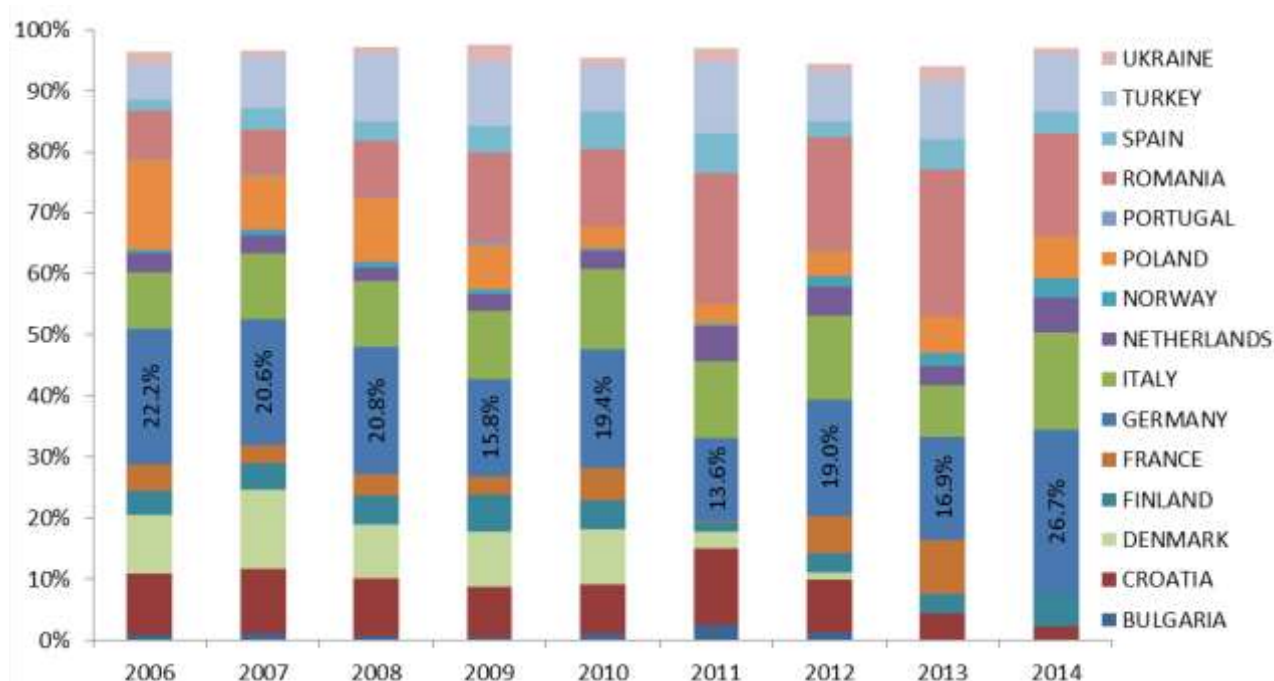
Sources: Shipbuilders' Association of Japan, 2015, based on statistics of IHS (formerly Lloyd's Register).

Table 1. Ships on order, by supplying area, end 2014

Supplier	CGT	GT	Number of vessels	Value (billion USD)
Asia	104.5	201.6	4,642	244.9
China	46.2	92.8	2,443	91.4
Korea	33.7	62.9	879	103.0
Japan	19.7	38.0	987	37.4
Europe	7.5	8.3	369	39.3
Italy	1.5	1.4	20	8.1
Germany	1.4	1.4	19	8.9
Other	4.3	6.2	273	33.4
Total	116.3	216.1	5,284	317.6

Source: Clarkson, 2015b.

**Figure 2. Share of completions in Europe by Country of Build, 2006-2014
(in thousands of gross tonnes)**



Note: European countries covered: Bulgaria, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, Ukraine, United Kingdom. Countries not displayed in graph due to small shares: Sweden, United Kingdom, Estonia, Greece, Slovakia and Slovenia.

Sources: IHS World Fleet Register, 2006 – 2015.

Table 2. Ship deliveries, by supplying area, 2014

Supplier	CGT (millions)	GT (millions)	Number of vessels	Value (billion USD)
Asia	32.4	61.3	1,609	78.3
Korea	12.1	22.1	314	36.7
China	11.6	22.8	690	24.1
Japan	6.8	13.4	382	12.2
Europe	2.0	1.9	143	10.5
Germany	0.5	0.5	11	2.5
Norway	0.4	0.2	37	2.8
Other	0.6	0.5	76	3.0
Total	35.0	63.6	1,828	91.8

Source: Clarkson, 2015a and Clarkson 2015b.

Deliveries of vessels

Annual deliveries of ships, which averaged 43.4 million CGT during 2007-2014, peaked at 53.0 million CGT in 2010, declining in each successive year, to 35.0 million CGT in 2014. On a GT basis, deliveries averaged 79.3 million GT, peaking at 103.2 million GT in 2011, before falling in each successive year, to 63.6 million GT in 2014 (Table 2). Germany accounted for 2.7% of the value total deliveries, but held less than 1% of the gross tonnage.

Cargo ships, tankers and container vessels dominated production of ships of 1 000 or more GT in 2013 (Table 3). The German industry accounted for a small percentage of the production, except in the category of cruise ships, where it accounted for one-third of the total number produced; France and Italy produced the other two-thirds. Significant German production also occurred in the roll-on roll-off (Ro-Ro) ship category.

**Table 3. Completions of ships, by type of ship, world total and in Germany, 2013
(limited to ships of at least 1 000 GT)**

Type of vessel	World			Germany		
	Number of vessels	GT	CGT	Number of vessels	Share of total (%)	
					GT	CGT
Cargo (dry and general)	993	36,017,966	16,514,287	2	0.1	0.1
Tankers	415	14,845,037	7,492,716	1	0.1	0.3
Offshore	311	1,855,671	2,645,431	-	-	-
Container	211	14,746,270	7,462,898	-	-	-
Ro-Ro	81	1,746,999	1,208,663	3	5.1	5.2
Fishing	43	100,853	251,842	-	-	-
Research	14	73,327	118,630	-	-	-
Passenger (cruise)	6	552,567	591,769	2	39.3	38.6
Other	58	201,075	372,269	-	-	-
Total	2,132	70,139,765	36,658,505	8	0.5	0.9

Source: IHS Fairplay, 2014.

The market for large cruise ships is one in which the German industry also has a strong position with respect to orders, for a number of years to come (Table 4). In Germany, these complex vessels can take up to 18 months to plan and design, and an additional 18 months to build (VSM, 2015). Timeframes in other countries could be longer, depending on the experience of the shipbuilder and the complexity of the vessel involved. The per vessel cost may amount to USD 1 billion. This is up to three times more than the list price of an Airbus 380 (Airbus, 2015).

Table 4. Confirmed orders for cruise ships exceeding 40 000 GT, 2015-19

Firm	Number of vessels, by year					Total, 2015-19	
	2015	2016	2017	2018	2019	Number of vessels	Value (million USD)
Meyer Werft (Germany)	2	2	2	2	2	10	8,705
Meyer Turku Oy (Finland)	1	1	1	1	2	6	3,761
STX France (France)	0	1	1	1	1	5	5,114
Fincantieri (Italy)	3	5	5	4	0	17	9,368
Mitsubishi (Japan)	0	2	0	0	0	2	1,300
Total	6	11	9	8	5	40	28,248

Source: AMEM, 2015.

II. STRUCTURE AND FEATURES OF THE GERMAN SHIPBUILDING AND MARINE SUPPLY INDUSTRY

Overview

As a rough quantification, the German shipbuilding and marine supply industry comprises around 2 800 companies,⁵ employing about 80 000 persons, with a total turnover of about EUR 18 billion, of which more than EUR 5 billion in 2013 and 6.4 billion in 2014 are generated by shipyards, with marine equipment suppliers accounting for the rest in 2013 (VSM, 2014; BALance, 2014, Table 14).⁶ Both the shipbuilding and marine equipment industries rely heavily on exports. In the case of shipbuilding, the share of turnover associated with foreign accounts rose to 75% in 2013 and declined slightly to 72% in 2014, while exports of marine equipment represented around 70% of sales in 2013 and 74% in 2014 (VSM, 2014, 2015a; VDMA, 2015). Industry-wide activities are co-ordinated through two principal trade associations, the Verband für Schiffbau und Meerestechnik (VSM) and the German Engineering Federation – Section Marine Equipment and Systems (VDMA) (see Annex I).

Shipbuilding

The shipbuilding industry plays a relatively small but important role in the German economy, accounting, in 2013, for less than 0.5% of value added and total employment, and about 1% of exports (VSM, 2014 and Federal Statistical Office, 2015). Its role is more prominent in the northern part of the country, which is where shipyards building seagoing vessels are concentrated (Figure 3). The supply industry however is spread all over Germany, with strong activity in Länder such as North Rhine-Westphalia, Bavaria and Baden-Württemberg (Figure 3). In Mecklenburg-Western Pomerania, for example, the shipbuilding industry accounts for about 10 000 jobs representing a significant part of local employment. In Lower Saxony, where several ship yards are located, the ship yard Meyer Werft alone with its 3 100 employees generates another 2 400 jobs for suppliers in the region. Being involved in the high innovative character of Meyer Werft's vessels' design, technical standards and assembling process suppliers gain additional know how which improves their technical capability and enhances their competitiveness.

Structure of the industry

The German shipbuilding industry has undergone considerable transformation over the past several decades, first with modernisation and privatisation of the yards in East Germany during the 1990s, where considerable investment was made to enhance the competitiveness of the industry, and then following the 2008 economic/financial crisis which resulted in a number of insolvencies in German yards, and significant consolidation. The industry, which is almost entirely family-owned or privately held, is currently dominated by 8 shipyard groups, which together control some 24 shipyards (Table 5; see also Annex II). These groups, along with three other single yards, account for 85% of shipyard employment. The remaining 13 yards, most of which have fewer than 150 employees, deal mainly with ship repair, maintenance and conversion (BMW, 2015a). The largest shipyard is Meyer Werft, with over 3 000 employees, followed by TKMS Kiel, with 2 300 (IG Metall Küste, 2014). Other yards range in size from less than 50 workers, to several hundred. The size of European yards in general is far smaller than those in Asia; the size of the world's largest shipyard, Hyundai Heavy Industries, has higher GT output than the EU's 20 largest yards combined (PWC, 2011).

Figure 3. Distribution of 1353 namely identified companies in Germany with certificates following postal area codes⁷

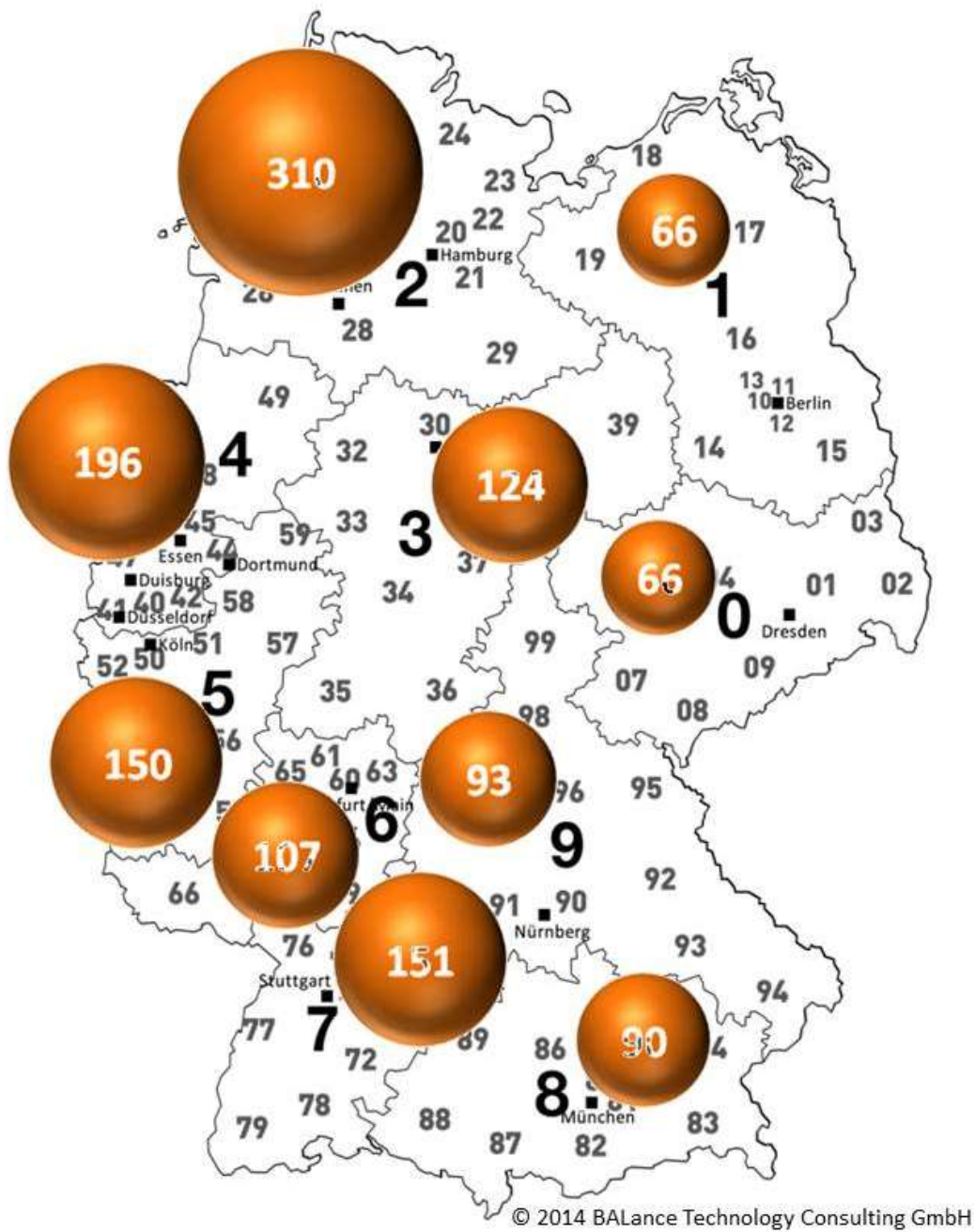


Table 5. German ship groups and other major shipyards, by number of employees, 2014

Group	Facilities	Employment in 2014
Meyer Werft Gruppe	<ul style="list-style-type: none"> • Meyer Werft, Papenburg • Neptun Werft, Rostock 	3 487
ThyssenKrupp Marine Systems (TKMS)	<ul style="list-style-type: none"> • Blohm + Voss Naval, Hamburg • Howaldtswerke-Deutsche Werft, Kiel 	3 448
Lürssen Gruppe	<ul style="list-style-type: none"> • Fr. Lürssen Werft, Bremen • Lürssen-Kröger Werft, Rendsburg • Peene Werft, Wolgast • Neue Jade Werft, Wilhelmshaven • Norderwerft, Hamburg 	1 793
Nordic Yards	<ul style="list-style-type: none"> • Nordic Yards Wismar, Wismar, • Nordic Yards Warnemünde, Warnemünde • Nordic Yards Stralsund, Stralsund 	1 360
Blohm + Voss	<ul style="list-style-type: none"> • Blohm + Voss Shipyards, Hamburg • Blohm + Voss Repair, Hamburg 	1 062
German Naval Yards Holdings	<ul style="list-style-type: none"> • GERMAN NAVAL YARDS Kiel (formerly HDW Gaarden), • NOBISKRUG (Rendsburg) • LINDENAU Werft (Kiel) 	916
Petram Gruppe	<ul style="list-style-type: none"> • Lloyd Werft, Bremerhaven (LWB) • German Dry Docks, Bremerhaven • MWB, Bremerhaven • Genting Group, Hong Kong (purchase of 70% of LWB; option to acquire 50% of Lloyd Investitions-und Verwaltungs (LIV) from Petram) (IHS Maritime 360, 2015; SCMP, 2015) 	580
Rönner Gruppe	<ul style="list-style-type: none"> • Bremerhaven Dock, Bremerhaven • Stahlbau Nord, Bremerhaven • Mützelfeldwerft, Cuxhaven 	174
Other relatively large yards:		
	<ul style="list-style-type: none"> • Flensburger Schiffbau- Gesellschaft, Flensburg 	780
	<ul style="list-style-type: none"> • Fr. Fassmer Werft, Berne 	421
	<ul style="list-style-type: none"> • Abeking & Rasmussen, Lemwerder 	393

Sources: BMWi, 2015a and Ludwig and Wolnik/IG Metall, 2014.

The industry consolidation has been accompanied by significant inward and outward foreign investment. Russian-owned Nordic Yards and Abu Dhabi-controlled German Naval Yards Holding GmbH (formerly Abu Dhabi Mar), for example, each acquired three German yards since 2009,⁸ Russian-based Open JSC Pella acquired J.J. Sietas in 2014, creating a new company called Pella Sietas. Blohm+Voss was acquired by the British-based investment house Star Capital in 2011 who sold its mechanical engineering division to the Swedish SKF in 2013; Norwegian-based SIEM Industries Inc. a marine service provider to the oil and gas industry, acquired Flensburger Schiffbau Gesellschaft in 2014; and the Asian cruise and resort operator Genting Hong Kong entered into an agreement to acquire Lloyd Werft in 2015. With respect to outward investment, Meyer Werft acquired a 70% interest in Finland's Turku shipyard in 2014, with the Finnish government retaining a 30% ownership stake; in April 2015, the company announced that it was exercising an option to purchase the Finnish government stake (Meyer Werft, 2015). Furthermore, at the beginning of 2015 ThyssenKrupp sold Emden Werft and Dockbetriebe GmbH to the investor Seafort Advisors GmbH (VSM).

The restructuring within Germany's shipbuilding industry has had a profound effect on shipbuilding communities, leading to a rise in unemployment rates and shrinkage in the tax base. Responding to these challenges has required active and imaginative policies to revitalise industrial areas. Giovacchini and Sersic (2012) have identified six directions (which are not mutually exclusive) that transformation can take:

- *Industry shift* – out of shipbuilding and into other fields, e.g. alternative energy sources.
- *Industry niche* – capitalising on existing know-how, technology and high innovation capacity; cruise ships, luxury yachts, icebreakers, offshore support vessels and tugs.
- *Remnant* – drawing on location, technology infrastructure – repair, maintenance and dry-docking of ships; welding.
- *Knowledge centre*; science parks, research institutes.
- *Real estate development* – real estate can be highly valuable when obsolete shipyards and port city infrastructure are transformed.
- *Heritage industry* – adapt and reuse historical buildings and sites.

Restructuring in German shipbuilding areas has, to some extent, encompassed five of those six elements, notably industry shift, industry niche, remnant, knowledge center and heritage industry (i.e. historic site). Bremerhaven is a case in point. With the shipbuilding industry in serious decline and high unemployment, the City Council took a number of actions in 2001-2002 to address the situation (Vries, 2009). In addition to revitalising the port, a detailed plan was developed to establish a renewable energy industry, building on the strengths the area had in marine technology and the skills of the workforce in shipbuilding and heavy machinery design and manufacture. By 2009, six wind suppliers and two research and development organisations (i.e. *knowledge centres*) had decided to establish or expand their operations. Currently ships are being built by two yards in the area. Other shipyards have focussed on ship repair and conversion facilities (i.e. *remnants* of the industry). The German Emigration Centre, which opened in 2005, is situated on an *historic site* which served as the point of departure for many of the millions emigrants who passed through Bremerhaven on their way to the New World.⁹

With respect to *industry shift*, federal policies to promote renewable energy have had a significant impact, providing a strong incentive to develop the offshore wind industry. Such an industrial transformation occurred in Emden, when SIAG acquired TKMS's shipbuilding site and transformed it into a wind power plant site, in 2009 (Marine Log, 2009). The company declared insolvency in 2012, and was then acquired by DSD Holding in 2013 (Kostadinova, 2013). The site currently focuses on the manufacture of steel structures, the foundations for wind farms.¹⁰

In Mecklenburg-Western Pomerania (and in the other *Küstenländer*), the shipbuilding industry has largely abandoned the production of cargo ships and tankers, and is focusing on *niche markets* for specialised vessels which are mostly customized products rarely produced in series (Ministerium für Wirtschaft, Bau und Tourismus, 2015). The marine supply industry in Mecklenburg-Western Pomerania is highly competitive. For example, Mecklenburger Metallguss GmbH (MMG) is a major producer of large scale propellers, exporting 95% of its production, with Asia as the largest market (Pospiech, 2015).

With respect to *industry niche* the Papenburg area went from 23 shipyards in the 19th century, at its height, to one currently. The remaining shipyard is primarily focusing on luxury cruise ships, but is also producing research ships, gas tankers and ferries (Giovacchini and Sersic, 2012). The focus on the cruise ship market, it should be noted, was one which evolved and was based on acquiring expertise and experience, over an extended period of time (VSM, 2015).

In total, experts consider the restructuring process having taken place in Germany's shipbuilding industry in the recent period as very successful, still further M&A activities in the industry cannot be excluded. Nowadays, ship yards produce mainly special vessels which are tailor-made ("batch size 1"). German shipyards have thus evolved into successful integrators of complex systems. In order to remain competitive Germany shipyards have increased productivity and efficiency (BMW, 2015a).

Work force

The larger shipbuilding companies (i.e., those which employ more than 50 workers) employed around 18 000 workers in 2014 (Table 6); they are supported by 2 700 equipment suppliers which employ 62 700 workers (as first-tier suppliers, and around additional 30 000 workers as second-tier suppliers).¹¹ The sub-contractors are mainly involved in delivering materials and components. Approximately 69% of shipyard employees are associated with commercial production, with the remaining 31% focussing on military sales.

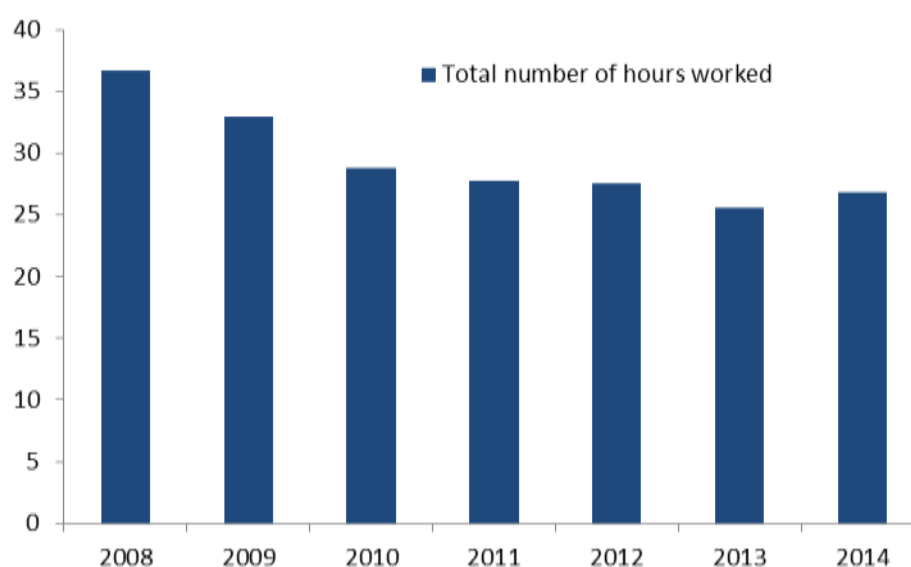
Table 6. Employment in German shipyards

Year	Number of employees
1995	36,748
2000	25,583
2005	22,889
2006	21,008 ¹
2007	21,877 ¹
2008	23,637 ¹
2009	21,975 ¹
2010	19,098 ¹
2011	18,343 ¹
2012	17,928 ¹
2013	16,729 ¹
2014	17,446 ¹

¹ At shipyards employing more than 50 workers.
Sources: VSM, 1998, 2001 and 2014, and BMWi, 2015a.

As Figure 4 shows, the number of hours worked in the German shipbuilding industry dropped from around 36.7 million in 2008 to about 32.9 million in 2009,¹² mostly owing to a reduced economic activity as a result of the financial and economic crisis. Between 2009 and 2011, employees worked relatively the same amount of hours per year. In 2014, the latest available data, the number of hours worked increased to 26.8 million from 25.6 million in 2013.

Figure 4. Number of hours worked in the German shipbuilding industry.

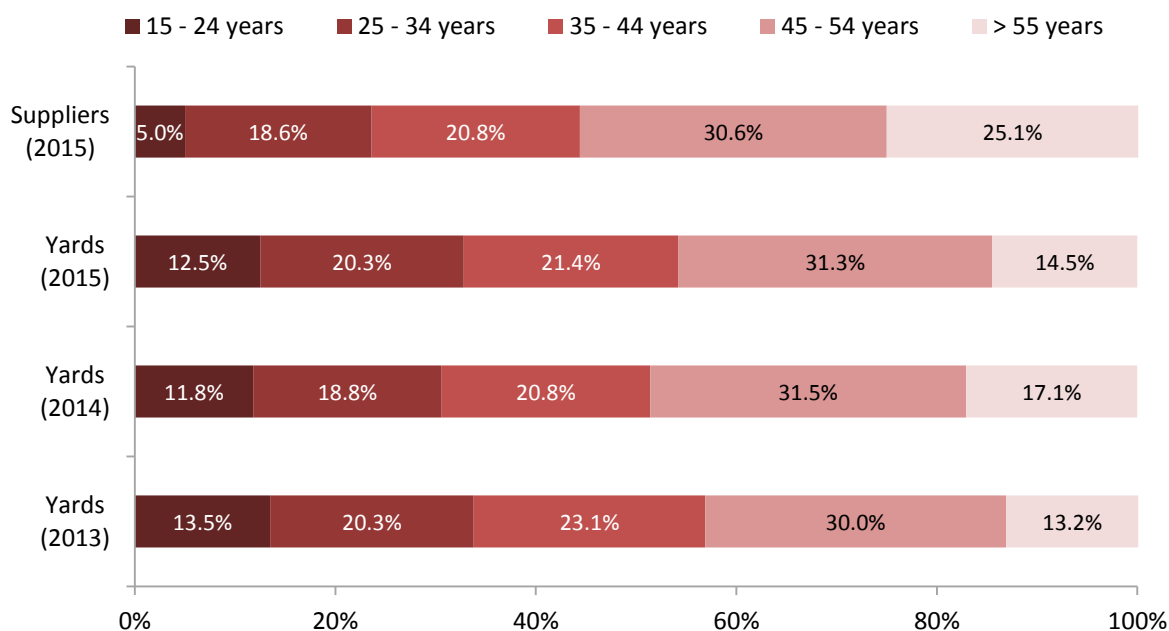


Source: Federal Statistics Office Germany, 2015.

The design and planning for shipbuilding require a high number of engineers and technical staff, as well as large numbers of workers for assembling vessels. The proportion of engineers and technicians has been growing at German shipyards, rising from 16.8% in 2013 to 19.1% in 2014 (Ludwig and Wolnik/IG Metall, 2014). The industry reportedly expects the share to continue to rise, to 22.7% in 2015. This illustrates the effect of the shift from commodity vessels to more complex products.

Employees at shipyards are engaged on a permanent or temporary basis. The proportion of temporary workers has fluctuated between 10.4% and 16.6% in recent years; in 2014, the average was 14.2% (Ludwig and Wolnik/IG Metall, 2014). There was a high level of variability between companies in 2014, with temporary workers accounting for less than 1% at some shipyards, to close to 40% at one. Production workers accounted for about 75% of the temporary workers, followed by engineers and technicians (17%). The work force aged in 2014, compared to 2013, with the share of workers 45 years and older rising from 43.2% to 48.6% (Figure 5). In general, Germany is suffering from an aging population which is also a critical aspect for its industry. However, the companies of the shipbuilding industry have intensified their activities to attract more junior employees, such as with special programmes and trainings.

Figure 5. Age structure of the German shipbuilding industry, January 2013 and January 2014



Source: Ludwig and Wolnik/IG Metall, 2015.

The industry has strong ties with scientific institutions, shipyards and supplier companies, contributing to the development of training curricula (particularly for engineers) and the development and updating of skills (VSM, 2014). There are six universities focusing on maritime disciplines, in Berlin, Bremen, Duisburg, Hamburg, Kiel and Rostock whose programme is topped off with a marine engineering programme at the University of Flensburg. Maritime studies seem to be very popular as shown by the high number of applicants and graduate students. This trend reflects also the increasing importance of energy and propulsion technologies in the shipbuilding sector. The dual-studies programmes, in which students combine on-the-job training as apprentices with their education, are seen as highly beneficial by the industry as they provide students with practical experience that can be readily employed when they graduate. However, companies are concerned with a decline in the number of applicants for the apprenticeships, reducing the opportunities for them to hire highly qualified apprentices. Given the lack of

teachers with a specialization in shipbuilding is it difficult to provide corresponding vocational training in schools. Companies therefore are increasingly using in-house training to provide staff with needed skills (VSM, 2014).

At the European level, the industry is working to find ways to attract qualified employees to the shipbuilding industry, demonstrating its high technology content and new skill requirements, particularly in the area of computer assisted design and technology. SEA Europe,¹³ the European ships and maritime equipment association, is actively engaged in these efforts. Despite efforts, the German industry is finding it difficult to attract a sufficient number of highly skilled engineers and technicians (VSM, 2014 and Ludwig and Wolnik/IG Metall, 2014). In 2014, for example, almost half of the yards indicated that they had problems filling positions with qualified staff.

Technology and innovation

Technology and innovation are crucial for the German industry to maintain and enhance its competitiveness. The importance is evident in the amounts that the industry devotes to research and development (R&D) (Table 7). During 2008-2012, the industry's R&D expenditure intensity increased each year, rising from an estimated 4.4% of the gross value-added by the industry, to 10.2%. This is significantly higher than the 3.0% average within the shipbuilding industry (ISIC C301: building of ships and boats)¹⁴ calculated for 2011 (OECD, 2015). Comparable data are not available for the marine supply industry, which also invests heavily in the development of new and improved products.

Table 7. Research and development expenditures in the German shipbuilding industry, 2008-2012

Year	Million EUR	Percent of gross value-added ¹	Percent of turnover ¹
2008	62.2	4.4	0.9
2009	72.1	6.9	1.5
2010	94.6	8.5	1.4
2011	120.8	9.7	2.1
2012	124.5	10.2	2.4

¹ The data on R&D expenditures is from the OECD; the data on gross value-added and turnover are from Eurostat. As there may be differences between the datasets, the figures presented should be viewed as indicative in nature.

Source: Eurostat, 2015; OECD, 2015.

The German shipbuilding and marine supply industry is focusing technical developmental work in three key "E" areas: notably, controlling *emissions*, enhancing *efficiency* and improving *environmental* performance (VSM, 2014). Scrubbers for gas desulphurisation and of catalysts for nitrous oxides reduction are being employed; opportunities to expand the use of liquefied natural gas (LNG) as a fuel are also being explored. Gas and dual fuel engines are now available for a wide range of vessels. With respect to efficiency, shipyards, equipment and manufacturers, research and testing institutes as well as engineering firms are examining ways to *i*) improve the hydrodynamic shape of ships (with a view towards increasing energy efficiency), *ii*) increase energy recovery and *iii*) increase the use of renewable energy sources.

Development of offshore wind energy in the German waters has prompted the development of special ships, such as SWASH vessels (i.e. small waterplane area single hull), which were introduced in 2013 (Grannemann, 2013). The new vessel is the result of down-sizing existing designs while maintaining superior sea keeping. Special ships for the oil and gas sector, such as seismic vessels, well intervention vessels, ice-breaking ships and pipe layers are also being developed (VSM, 2014).

The government supports maritime R&D&I activities in the shipbuilding and marine supply industry with two programmes that are further discussed in part III of this report, which concerns government policies.

Production

German production of ships has fluctuated significantly over time, declining by almost 50% since 2009, to 61 vessels (Table 8). The decline has been most pronounced in ocean-going vessels, the number of which fell to 20 in 2013, which was one third of the total. However, in the subsequent year the demand increased with completions of ocean going-vessel amounting to 24 and of inland vessels to 65.

Table 8. German ship deliveries/completions of ocean-going and inland vessels, 1990-2014

Year	Number			Percent ocean-going
	Ocean-going vessels	Inland vessels	Total	
1990	118	126	244	48
1991	106	69	175	61
1992	95	53	148	64
1993	93	46	139	67
1994	97	34	131	74
1995	93	27	120	78
1996	89	28	117	76
1997	83	24	107	78
1998	92	27	119	77
1999	67	39	106	63
2000	63	47	110	57
2001	53	55	108	49
2002	68	45	113	60
2003	62	48	110	56
2004	61	51	112	54
2005	69	66	135	51
2006	70	56	126	56
2007	74	63	137	54
2008	84	78	162	52
2009	54	67	121	45
2010	49	49	98	50
2011	31	44	75	41
2012	26	40	66	39
2013	20	41	61	33
2014	24	65	89	27

Sources: VSM, 1998, 2001, 2004, 2007, 2010, 2014 and 2015.

With respect to ocean-going vessels, in light of fierce competition from Asian producers, German producers have withdrawn from the markets for commodity vessels such as cargo and tanker vessels, and, as indicated earlier, are now focusing on niche markets such as large cruise ships and mega-yachts market in which they are highly competitive (Table 9). Some facilities have been used for the production of offshore-wind platforms.

Orders and capacity utilisation

As of 31 December 2014, the industry had orders for 40 vessels (1.7 million CGT); the value of the orders totalled EUR 10.8 billion, up from EUR 9.1 billion at the end of 2013 (BMW, 2015a). Passenger ships and yachts dominated the orders with 27 vessels. In addition, shipyards had orders for the

construction of offshore platforms and systems for the offshore wind industry totalling EUR 721 million, bringing total orders to EUR 11.5 billion.

Table 9. German ship deliveries/completions, by type of ship, 1997, 2000, 2013 and 2014

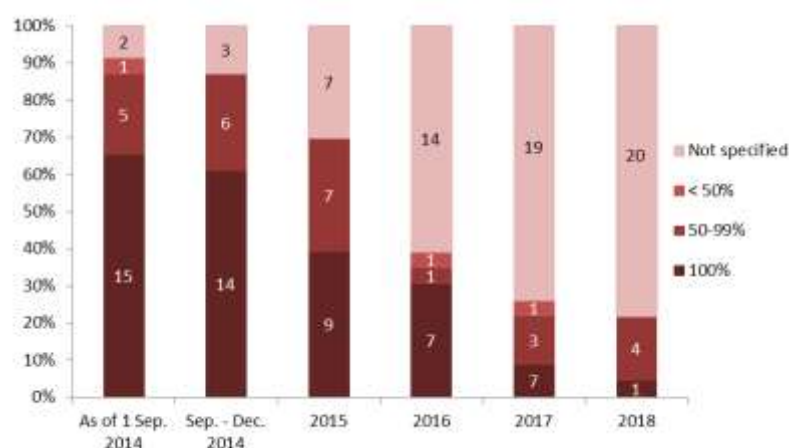
Type of ship	Number				CGT tonnage (in thousands)			
	1997	2000	2013	2014	1997	2000	2013	2014
Ocean-going vessels:								
Oil tanker	1	2	-	-	9	17	-	
Chemical/product tanker	1	2	-	-	10	12	-	
Gas tanker		1	1	-		9	21	
Bulk	1	-	-	-	12	-	-	
Cargo	17	12	-	-	119	112	-	
Container	41	19	-	-	612	389	-	
Ro-Ro	11	9	4	3	247	133	75	59
Ferry		4	-	5		169	-	72
Passenger ship/yacht			8	6			293	335
Other	11	14	7	10	29	135	14	100
Subtotal, ocean-going	83	63	20	24	1,038	976	403	554
Inland vessels:								
General cargo	1	16	5	-	1/	1/	1/	1/
Passenger	11	13	20	31	1/	1/	1/	1/
Harbour tugs and special vessels	12	18	16	34	1/	1/	1/	1/
Subtotal, inland vessels	24	47	41	65	1/	1/	1/	1/
Grand total	107	110	61	89	1/	1/	1/	1/

^{1/} Not available.

Sources: VSM, 1998, 2001 and 2014 and BMWi, 2015a.

An assessment of the capacity utilisation at German yards as of 1 September 2014, indicates that 15 of 21 yards for which information was available were operating at 100%, with 5 operating at 50-99% (Ludwig and Wolnik/IG Metall, 2014) (Figure 6). Orders for 2015 indicated that 9 of 16 yards for which information was available, would continue to operate at 100%. Currently (as of March 2015), the order situation overall was satisfactory to good (BMW, 2015a). There were, however, a few dry dock facilities with spare capacity.

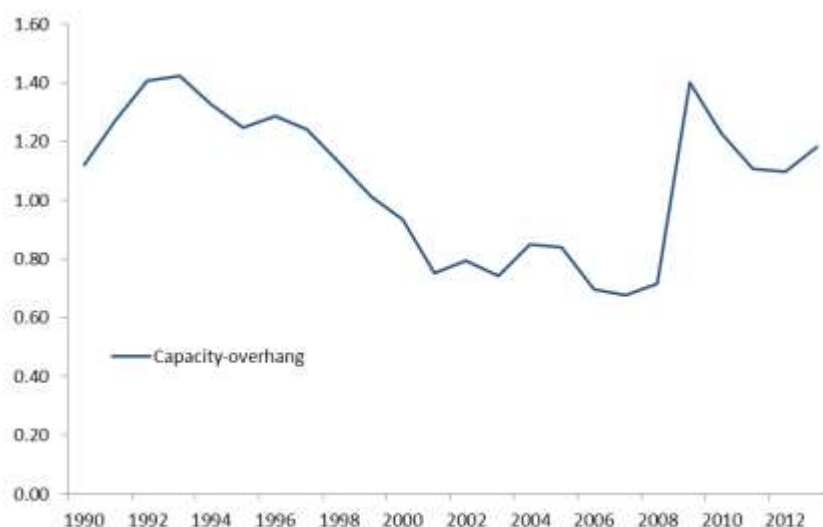
Figure 6. Capacity utilisation at German shipyards, 2014-18



Source: Ludwig and Wolnik/IG Metall, 2014.

A different perspective on the capacity utilization in the German shipbuilding industry is depicted in Figure 7, which assesses the level of capacity overhang in the industry. The overhang reflects the relation of nominalized capacity¹⁵ to nominal sales compared to the moving average of the same ratio. The decline in the capacity overhang¹⁶ during the 1990s may be either related to increasing sales given the same capacity or a decreasing capacity. While the capacity overhang during the early 2000s stayed firmly below a ratio of 1, indicating that the sales increased or capacity declined compared to the moving average, the recession in 2008 resulted in a plunge in sales, increasing the capacity overhang to a level of 1.4. With possible capacity reduction and an increase in sales (which is more likely than capacity adaptations) in recent years, the overhang has slightly fallen to about 1.2.

Figure 7. Capacity overhang in Germany, 1990 – 2014



Note: Capacity overhang defined as “Nominalized capacity to nominal sales, current period ratio relative to moving average of the same ratio lagged one period”.

Source: IHS World Industry Statistics. (Note: Yachts and offshore-wind platforms are not included).

International commercial transactions

As ocean-going vessels are not traded in the same manner as other commodities (i.e. they are not formally exported to, or imported from, countries), traditional trade data are not relevant. Insights into the role of international commerce in these vessels can, however, be gained by reviewing sales that have been made to foreign accounts (which can be related to exports), and purchase from foreign shipbuilders (which can be related to imports). This does not apply to imports and exports of marine equipment, as these are in fact traded like other merchandise.

Sales to foreign accounts

The German shipbuilding industry has become increasingly export-oriented over time. The share of the number of vessels sold to foreign accounts more than doubled between 1997 and 2013, rising from 25% to 56% (Table 10). In terms of value, sales to foreign accounts were far more significant, accounting for 99% of total sales of ocean-going vessels and more than 90% of inland vessels in 2013. The 8 ships exceeding 1 000 GT that were produced in 2013 (Table 11) were produced for owners that were located in the Netherlands (two cargo ships and one tanker), Turkey (two Ro-Ro) Canada (one Ro-Ro), Malaysia (one cruise ship) and the United States (one cruise ship). In 2014, some 24 ocean-going ships valued at

EUR 2.4 billion were delivered; eight of these, valued at EUR 203 million were sold to domestic buyers and sixteen – valued at 2 231 million EUR - to foreign customers (BMW_i, 2015a).

Table 10. German deliveries of ocean-going and inland vessels for national and foreign accounts, 1997, 2000, 2013 and 2014

Type of ship	Number				Value (million EUR)			
	1997	2000	2013	2014	1997	2000	2013	2014
Ocean-going vessels:								
National accounts	58	33	3	8	1,299	675	20	200
Foreign accounts	25	30	17	16	1,234	1,654	2,031	2,200
Subtotal	83	63	20	24	2,533	2,329	2,051	2,400
Percent for foreign accounts	30	48	85	67	49	71	99	92
Inland vessels								
National accounts	21	43	24	<u>46</u>	^{1/}	^{1/}	32	<u>65</u>
Foreign accounts	3	4	17	<u>19</u>	^{1/}	^{1/}	279	<u>424</u>
Subtotal	24	47	41	<u>65</u>	42	65	311	489
Percent for foreign accounts	13	9	41	<u>29</u>	^{1/}	^{1/}	90	<u>87</u>
Total								
National accounts	79	76	27	<u>54</u>	^{1/}	^{1/}	52	<u>265</u>
Foreign accounts	28	34	34	<u>35</u>	^{1/}	^{1/}	2,310	<u>2,624</u>
Total	107	110	61	<u>89</u>	2,533	2,394	2,362	<u>2,889</u>
Percent for foreign accounts	26	31	56	<u>39</u>	^{1/}	^{1/}	98	<u>91</u>

¹ Not available.

Sources: VSM, 1998, 2001, 2014 and 2015, and BMW_i, 2015a.

Table 11. German deliveries of ships to foreign owners, 2013
(limited to ships of at least 1,000 GT; yachts are not included)

Nationality of owner	Type of vessel	Number of vessels	GT	CGT
Canada	Ro-Ro cargo	1	26,786	19,712
Malaysia	Passenger (cruise)	1	145,655	141,132
Netherlands	General cargo	1	14,141	12,237
Netherlands	LNG tanker	1	13,501	20,597
Netherlands	Dry cargo	1	12,824	11,495
Subtotal, Netherlands		3	40,466	44,329
Turkey	Ro-Ro cargo	2	63,080	43,698
United States	Passenger (cruise)	1	71,304	87,455
Grand total		8	347,291	336,326

Source: IHS Fairplay, 2014.

Sales of foreign-built ships to German owners

The number of ships sold to German owners in 2013 was significantly lower in 2013 than in 2000, and the composition in terms of the country of build changed markedly. In 2000, European shipyards accounted for 65% of the number of vessels purchased (42% in terms of CGT) (Table 12). In 2013, this number slipped to less than 5% (less than 1% of CGT) (Table 13). China and Korea dominated the 2013 sales, accounting for 91% of the vessels sold (95% in terms of CGT).

Table 12. Deliveries of ships to German owners, by country of build, 2000

(limited to ships of at least 1,000 GT)

Country of build	Number of vessels	GT	CGT
Korea	35	1,668,421	1,067,548
Poland	20	290,717	265,175
China	17	218,272	173,281
Netherlands	20	79,671	113,468
Romania	18	43,835	74,909
Croatia	3	111,711	72,612
Portugal	4	28,876	38,982
Japan	3	59,556	35,734
Spain	2	14,266	24,729
Slovakia	4	11,812	19,747
Czech	3	6,725	15,469
Turkey	2	11,650	13,080
Bulgaria	3	9,510	12,840
Subtotal, foreign sources	134	2,555,022	1,927,574
Germany	24	280,597	269,284
Total	158	2,835,619	2,196,858

Source: IHS Fairplay, 2000 and IHS Fairplay 2014.

Table 13. Deliveries of ships to German owners, by country of build, 2013

(limited to ships of at least 1,000 GT)

Country of build	Ship type	Number of vessels	GT	CGT
China	Bulk dry	14	395,432	209,377
China	Container	24	1,126,705	672,427
China	General cargo	10	78,680	82,335
Subtotal, China		48	1,600,817	964,139
Korea	Container	12	1,611,948	699,476
Korea	LPG tanker	3	24,027	31,230
Subtotal, Korea		15	1,635,975	730,706
Japan	Crude oil tanker	3	171,243	74,055
Turkey	Chemical	1	4,824	6,036
Romania	General cargo	1	4,102	5,542
Netherlands	LPG tanker	1	2,929	5,867
Total		69	3,419,890	1,786,345

Source: IHS Fairplay, 2014.

Financial performance*Sales*

The sales of the industry have fluctuated, reaching peaks about every 7-8 years notably in 1995, 2002, and 2010 (Table 14). Following the market slump in 2011-2013, sales picked up in 2014, reaching EUR 6.4 billion. Sales to foreign accounts have risen in importance over time, reaching 70-75% of total sales in recent years.

Table 14. Total turnover of German shipyards for national and foreign accounts, 1993-2013

Year	Turnover (million EUR)			Percent for foreign accounts
	National	Foreign	Total	
1993	2,310	2,091	4,400	48
1994	2,423	2,199	4,622	48
1995	2,237	2,919	5,156	57
1996	3,057	1,248	4,305	29
1997	2,200	2,005	4,205	48
1998	2,365	1,618	3,983	41
1999	1,766	1,964	3,730	53
2000	1,763	2,345	4,108	57
2001	1,709	3,032	4,742	64
2002	2,216	3,007	5,223	58
2003	1,767	2,538	4,305	59
2004	2,282	2,241	4,523	50
2005	3,929	2,218	6,147	36
2006 ¹	2,920	2,894	5,814	50
2007 ¹	2,223	2,905	5,128	57
2008 ¹	2,806	4,425	7,230	61
2009 ¹	1,797	3,525	5,322	66
2010 ^{1,2}	2,004	5,526	7,530	73
2011 ^{1,2}	1,583	2,994	4,578	65
2012 ¹	1,410	3,661	5,071	72
2013 ¹	1,276	3,732	5,007	75
2014	1,772	4,651	6,424	72

¹ Restricted to companies with at least 50 employees.

² Turnover of one shipyard in administration has not been reported (about EUR 400 million).

Sources: VSM, 1998, 2001, 2004, 2007, 2010 and 2014, and BMWi, 2015a.

Profitability

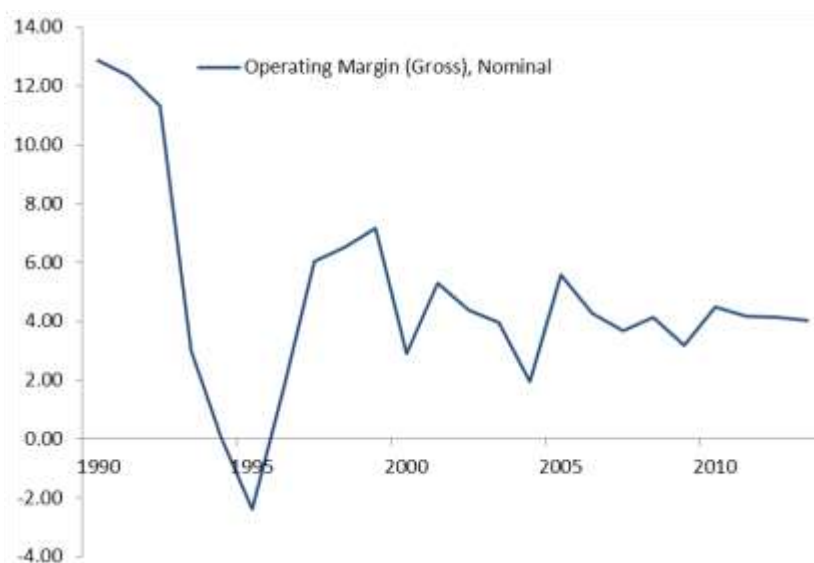
As most of the shipbuilding firms are privately held, there is no publically available information on their profitability. Insights can, however, be gained through an examination of input-output analysis. This data shows that the industry had a sharp decline in profitability (i.e. gross operating surplus/turnover) in 2009, but that the situation experienced a strong turnaround in 2010, which was maintained in 2011 and 2012. The pattern was much the same as the one for the EU as a whole with gross operating surplus on turnover amounting to 6.6% in 2012 according to calculations based on Eurostat data. According to IHS World Industry Service, the operating margin of the German shipbuilding has been hovering at around 4% since 2000 (Figure 8).

Table 15. Selected industry and financial statistics of the German shipbuilding industry, 2008-2013

Item	2008	2009	2010	2011	2012	2013	2014
Number of firms:	73	75	75	73	72	75	77
Turnover (EUR million):	6,412	4,793	7,007	4,357	4,779	4,449	6,280

Note: Figures include ship yards with at least 20 employees. Around 57 repair and conversion companies are not included in the data.

Source: Destatis - Federal Office of Statistics Germany, 2014 WZ 2008 code 30.1 "Building of ships and boats".

Figure 8. Operating margin of the German shipbuilding sector, 1990 – 2013
In percent

Source: IHS World Industry Service, 2015.

The financial difficulties experienced by the industry since 2008 resulted in a number of insolvencies (Table 16). In some instances, the yards concerned had sufficient orders, but could not obtain the financing needed to maintain operations. The high debt leverage of the industry contributed to the situation; in the EU, the ratio of equity to total assets in shipbuilding averaged about 17% several years ago, reflecting high reliance on debt (PwC, 2011). In most instances the insolvent yards were then acquired by other shipyards or outside investors.

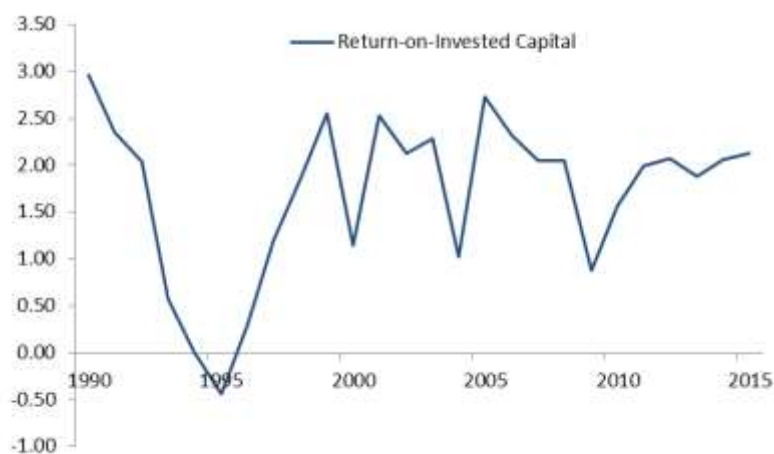
Table 16. Insolvencies in the German shipbuilding industry, Jun 2008-2015

Company	Date	Notes
Cassens Werft	Jun 2008	The firm was acquired by private investors in January 2010 (Baird Maritime, 2010)
Lindenau-Werft	Sep 2008	The firm had orders and no debt, but could not raise short term financing. (MarineLog, 2008) It was taken over by ADM Kiel in January 2013 (SHZ, 2012). Having abandoned the tanker market, the yard now focuses on ship repair (BMW, 2015a).
SMG Werft	Dec 2008	Acquired by Tamsen Yachts in Oct 2009, effective 1 November (SuperYacht Times, 2009; Hamburger Abendblatt, 2009a).
SSW Schichau Seebeck Shipyard	Jan 2009	Insolvency proceedings started early 2009 (taz, 2009) The firm had a full order book but insufficient finance (BMW, 2015). The yard was closed in July 2009 (BMW).
Wadan Yards	Jun 2009	The company, comprising yards in Wismar and Rostock-Warnemünde, was created in January 2008; 30% Aker Yards and Russian FLC West (70%). It was acquired by Nordic Yards in Aug 2009 (Hamburger Abendblatt, 2009b; NDR, 2009).
Nessewerft	Jul 2009	The small ship yard has been founded in Leer in 2006 and was located on a site of the former Jansen Werft (General-Anzeiger, 2015; BMW, 2015a).
Sietas Gruppe	Nov 2011	Rising steel prices and the collapse of the container market were cited as reasons for the insolvency in June 2012: <ul style="list-style-type: none"> • The Sietas yard was acquired by the Dutch firm Veka; it subsequently sold it to Open JSC Pella JSC in Feb 2014; a new company formed under the name Pella Sietas (BMW, 2015a; Pella Sietas GmbH, 2015). • The Norwegian firm TTS Group acquired crane manufacturer Neuenfelder Maschinenfabrik (BMW, 2015a) • The repair yard Norderwerft was acquired by Lürssen Gruppe.
P+S Werften	Aug 2012	The company was formed in 2010 through merger of Peene Werft and Volkswerft Stralsund. It ran into liquidity problems when delays occurred in delivering new ships (Reuters, 2012a). <ul style="list-style-type: none"> • The Peene Werft yard (Wolgast) acquired by Lürssen, effective July 2013 (Reuters, 2012b). • The Volkswerft yard (Stralsund) was acquired by Nordic Yards in Jun 2014 (Motorship, 2014).
Nordseewerke Emden Shipyard	Oct 2012	Thyssen Nordseewerke (1974–2002) TKMS Blohm + Voss Nordseewerke (until 2010) SIAG Nordseewerke (2010–2013) Nordseewerke (since 2013): In 2013, DSD Steel Group in collaboration with the Nord/LB took over Nordseewerke after the approval of the creditors' committee. End of May 2015, the Executive Board filed for insolvency. Since 2014, the company implemented short-term work (i.e. a reduced number of hours worked per week) (Handelsblatt, 2015). Since the 1 st of September 2015, the new owner is Beaufort Capital/ Seaford Advisors Gruppe.
SSB Spezialschiffbau Oortkaten	Dec 2013	Construction financing problems were cited in the insolvency filing (Die Welt, 2013; Hamburger Abendblatt)

Sources: See references within Table 16.

Figure 9 shows the evolution of return on invested capital (ROIC) on average in the German shipbuilding industry from 1990-2014, with forecasts until 2019. In the early 1990s, the industry faced a strong decline in ROIC which fell into negative figures until it started slowly recovering from 1995 onwards. Since 2000, the return has been very volatile, ranging from 1% to 3%.

Figure 9. Return on Invested Capital, 1990 – 2015



Source: IHS World Industry Services.

The net operating margin (Figure 10) in the German shipbuilding industry strongly declined from around 10% in 1990 to about -8% in 1995, subsequently recovering again to positive levels. Since the late 1990s, the profitability in Germany’s shipbuilding industry faced high volatility, ranging from -1% to 3%. Investment

Between 1994 and 2004, the industry experienced a strong decline in capital expenditures from around EUR 350 million to EUR 100 million. The situation improved in subsequent years, before slowing in 2008, reflecting the effects of the recession (Figure 11).

Figure 10. Net operating margin (nominal), 1990 – 2013



Source: IHS World Industry Services.

Figure 11. Capital Expenditures (real term), 1990 – 2034

Note: Capital Expenditure (CapEx) includes investments made by establishments operating in the shipbuilding sector (IHS category D351) during the reference year, net of fixed assets sold. The investments covered are those (whether new or used) with a productive life of one year or more. These assets are intended for the use of the establishments' own labour force. Major additional alterations and improvements to existing assets that extend their normal economic life or raise their productivity are also included.

Source: IHS World Industry Services.

Financing of ships

The financing of ships is an ongoing challenge for ship buyers and shipbuilders, as the amounts of money involved can be high and lead times can be long. In the case of mega cruise ships, for example, it can take three years or more to negotiate the terms of a contract, produce and deliver a ship, and the cost for a single vessel can be on the order of up to USD 1 billion (VSM, 2015). For the shipbuilder, financing the construction can be onerous and costly; for the ship buyer, recovering the up-front investment poses its own challenges. Current practice is for ship buyers to make specified payments at certain milestones, with most of the payment due when the ship is delivered.

To protect the market actors' respective interests, the shipbuilding sector generally requires guarantees for the pre-delivery financing of a project, covering working capital needs; refund guarantees are often needed from the producer's banks to protect buyers from situations in which shipbuilders cannot meet its obligations (PwC, 2011). Access to these types of finance from banks became more difficult during the financial crisis, leading to use of a number of non-commercial schemes dedicated to shipbuilding, including:

- Vertical public schemes, which are based on national legislation and are subject to EC approval;
- Horizontal public schemes, such as export credit agency (ECA) support;
- Vertical private schemes.

Since 2008, the crisis of the worldwide shipping industry led to the situation where a number of banks in Germany reduced or withdrew their commitment in ship financing.

A EUR 707.2 million cruise vessel being made for Hong Kong Genting Limited by Meyer Werft, provides insights into the financing of these types of ships (Genting, 2013). In this case, 5% of the price was due shortly after the effective date of the contract, which was set at 14 January 2014, at the latest. The remaining 95% was due as follows:

- 5% of the contract price to be paid on the date falling 24 calendar months before the delivery date, which was set at 12 October 2016;
- 5% of the contract price to be paid on the date falling 18 calendar months before the delivery date;
- 5% of the contract price to be paid on the date falling 12 calendar months before the delivery date or (if later) the date expressly agreed in writing by the builder and the buyer; and
- The balance of the contract price to be paid, on delivery of the vessel and the related delivery documents to, and to acceptance by, the buyer.

The study carried out by PwC on ship finance in the EU suggests that progress payments are much higher for other types of ships and for smaller yards (Table 17). One development noted since the financial crisis, was an increase in low down-payments, which put more financing pressure on the shipbuilders (PwC, 2011).

Table 17. Progress billings for EU shipyards, in 2009

Category	Progress billings/construction costs (%)
By size of yard:	
Small EU yards	108
Large EU yards	59
By type of vessel:	
Cruise vessel/ferry yards	44
Cargo vessel yards	84
Dredger yards	108
Mega yacht yards	133
Small vessel yards	200

Source: PwC, 2011

Productivity

Figure 12 shows labour productivity levels in the German shipbuilding industry for 1991 to 2007, the latest data available. Between 1995 and 2007, the industry's labour productivity levels increased on average by around 5.2% per year. While the German industry records the strongest increase in labour productivity between 1995 and 1999 with a compound annual growth rate (CAGR) of about 12.6%, the level was fluctuating over the years until 2006 and started to increase slightly in 2007.

Figure 12. Gross value added per hour worked, 1991 – 2007

Note: Labour productivity index is calculated as the ratio of real value-added to total number of hours worked. Shipbuilding data corresponds to the ISIC Rev. 3 category C351: Building and repairing of ships and boats.

Source: EUKLEMS (March 2011 update).

Marine supply industry

The global market for marine supplies is estimated to have been on the order of EUR 150 billion per year during 2006-2010 (BAL, 2014). The EU-28 was the single largest market, exceeding EUR 35 billion, followed by China (exceeding EUR 30 billion) and Korea (exceeding EUR 25 billion). The European Union (plus Norway and Turkey) were important world suppliers, accounting for EUR 62 billion, or 41% of production. Germany is a world leader, both in terms of production and exports; its production of EUR 12.8 billion accounted for 21% of the EU total, while its exports of EUR 7.4 billion accounted for 27% of the EU total.

Within Germany, the marine supply industry plays an important role, providing shipbuilders with equipment that represents about 70% of the value of final production (BMW_i, 2015a). There are approximately 400 mostly medium-sized companies making up this segment of the industry, which employ about 67 000 workers in 2014 (as first-tier suppliers, and there are additional 30 000 workers as second-tier suppliers)¹⁷. Sales in 2014 totalled EUR 11.9 billion, which was more than double the sales of ship yards. In 2014, some 74% of production was exported, with Asia (46%) and other European countries (37%), the principal destinations; Korea and China were the leading importing countries (VDMA, 2015). For 2014, the German marine supply industry registered growth in incoming orders of 4.3%. In the same year, a consolidation with orders for new ships took place leading to a decline of 35%. In the offshore and gas industry, experts expect a further drop in demand owing to the low oil price and investment restraints (VDMA, 2015). The industry is a world leader in a number of areas; German and Finnish companies, for example, are producing all the diesel engines that will power the cruise ships that have been ordered through 2019 (AMEM, 2015). Germany is also a world leader in propulsion (i.e. engines, propellers), ship automation technology or environmental-friendly technologies (BMW_i, 2015a).

As in the shipbuilding segment, the market downturn in 2009 resulted in industry consolidation, through a series of mergers and acquisitions (BMW_i, 2015*a*).

In addition to servicing traditional markets, the industry is expanding activities in emerging offshore markets, which involve wind energy as well as oil and gas (BMW_i, 2015*a*).

Emerging challenges and opportunities

Increasingly stringent environmental standards affecting the operation of ships, and the previously mentioned opportunities provided by the German government's support for renewable energy were flagged in discussions with stakeholders as issues posing challenges and opportunities for the shipbuilding and marine supply industries (BMW_i, 2015*a* and VSM, 2015). Moreover the aforementioned difficulties in financing of ships remain a key challenge.

With respect to environment, a study carried out by ECORYS for the European Commission (ECORYS, 2012), assesses the opportunities that eight environmental developments could provide for the shipbuilding and marine supply industry through the year 2020 (Table 18).

Table 18. Green growth market opportunities for the shipbuilding industry

Trend	Market trends		Regulatory trends				Other trends	
	1	2	3	4	5	6	7	8
	Fuel efficiency	Environmental Awareness and CSR	Nox	Sox	CO2	Ballast Water	Offshore wind	Arctic dimension
Key driver	Fuel price	Image	Regulation	Regulation	Regulation	Regulation	Energy policy	Climate change
Market potential*	Large	Limited	2-3	2-4	3	2.5	2	0.9
<i>Relevant markets:</i>								
Newbuild	✓	✓	✓	✓	✓	✓	✓	✓
Retrofit	✓	✓		✓		✓	Limited	Limited

* Estimated market potential in bn EUR per year for the period until 2020.

Source: ECORYS, 2012.

According to the study, large market opportunities are seen in fuel efficiency improvements, with limited opportunities in the areas of environmental awareness and corporate social responsibility (CSR). These opportunities are considered to be relevant for new-building and retrofit markets. In terms of regulatory trends, the analysis shows that there are likely to be multi-billion euro opportunities in controlling greenhouse gases (GHG) and ballast water treatment. Finally, offshore wind and arctic issues are expected to provide additional openings.

Environmental standards

As from 1 January 2015, EU legislation – based on IMO provisions – has required that the sulphur content of the fuels used to power vessels in Northern Europe be reduced from 1.0% to 0.1% (Unifeeder, undated). Alternatively, the exhaust gas that is generated by using higher sulphur fuels must be cleaned in order to achieve a similar emissions result. The legislation covers a large geographic area extending from the English Channel into the Baltic Sea; this area is termed Sulphur Emission Control Area (SECA).

Ship operators can meet the standard by using distillate fuels (MGO), which sell at a premium of 50% over traditional fuels, equip their vessels with LNG or dual fuel engines or equip their vessels with scrubbers, which would normally be done in ship repair and conversions yards (Unifeeder, undated).

Agreement has been reached that nitrous oxide emissions should be reduced from engines installed on ships that are constructed on or after 1 January 2016 (BMW, 2015a). The reductions are applicable for ships operating in North American and Caribbean waters. When applied to European waters, as above, the stricter regulations will provide opportunities for shipyards and marine engine manufacturers to develop and install more environmentally-friendly equipment.

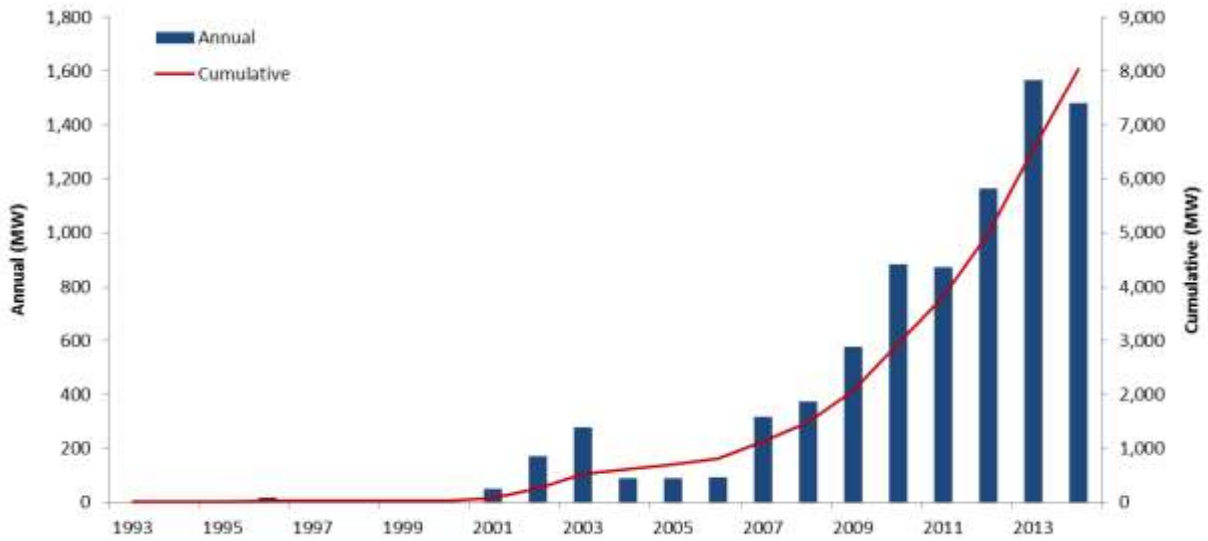
Offshore wind energy and the global oil market

The global offshore wind energy market is developing fast, with Europe leading the way, accounting for 92% of installed capacity (GWEC, 2015). The global total has more than doubled since 2011, rising to 8.8 GW in 2014. In Europe, further growth will occur in the next several years; at the end of 2014, there were 2.9 GW under construction that were expected to be on-stream in the next 12-18 months (EWEA, 2015). Moreover, there were 26.4 GW of consented offshore wind farms and future plans for offshore wind farms totalling more than 98 GW. Germany is one of the top three countries in offshore wind farms, benefiting from government policies aimed at boosting renewable energy to 40-45% of the country's energy mix by 2025, to some 55-60% by 2035 and to up to 80% by 2050 (Montgomery, 2014).

In 2014, Germany more than doubled the number of installed offshore wind turbines, increasing the number to 258 (1 049 MW) (Figure 13) (EWEA, 2015). In 2015 the country is set to install at least another 976 MW. This sharp growth in Germany, and more broadly in Europe and worldwide, could prove to be highly beneficial to German marine equipment suppliers, and may also translate into orders for special ships to service the wind farms or offshore platforms. German-based Siemens, for example, is the leading supplier of offshore wind turbines in Europe, accounting for 86% of the market in 2014 (EWEA, 2015). On the ship building side, German ship companies have established themselves in the market for installer ships (BMW, 2015a). The market for these vessels, however, has eased, as there are 28 in operation worldwide and 5 on order, with no new orders recently. There are however, good prospects for service vessels; orders for these vessels accounted for 14% of the industry backlog at the end of 2013 (BMW, 2015a).

In regards to the offshore oil sector, the sharp decreases of crude oil prices in the second half of 2014 led oil companies to announce reductions of their oil exploration investments. As discussed in OECD (2015c) global offshore vessel deliveries are therefore expected to decrease by at least 10% in 2015, and further decreases are expected in 2016 and 2017.

Figure 13. Offshore wind farms in Europe, 1993-2014



2014												
Country	BE	DE	DK	ES	FI	IE	NL	NO	PT	SE	UK	Total
No. of wind farms	5	16	12	1	2	1	5	1	1	6	24	74
No. of turbines connected	182	258	513	1	9	7	124	1	1	91	1301	2488
Capacity installed (MW)	712	1048.9	1271	5	26	25	247	2	2	212	4494.4	8045.3

Source: EWEA, 2015.

III. GOVERNMENT POLICIES AFFECTING THE SHIPBUILDING INDUSTRY

Policies at Federal and Länder levels

National Maritime Conference

Since 2000, the federal government has convened a National Maritime Conference involving about 800 participants (BMW_i, 2015a). The conference, which now meets every two years, brings together experts from industry, academia, research organisations, trade unions and government to discuss issues and develop proposals for increasing the competitiveness of German maritime industry. The 2015 conference was held on 19-20 October 2015. The development of a Maritime Development Plan grew out of the conference discussions (see below).

Maritime Co-ordinator

A Maritime Co-ordinator, who holds the rank of State Secretary at the Federal Ministry of Economy and Energy (BMW_i), was created in 2000 to facilitate co-operation among the different ministries which address maritime issues, and to help ensure that Germany's general goals in the maritime sector are being kept on track. In addition to the BMW_i, the major ministries involved in maritime issues include transport and environment. The responsibilities of the co-ordinator include the organisation of the National Maritime Conferences. The current Maritime Co-ordinator is Parliamentary State Secretary Uwe Beckmeyer.

In 2013, the powers of the co-ordinator were enhanced to help ensure that the political decision-making processes affecting the maritime sector could be carried out more quickly and in a more targeted manner (Freight Focus, 2013). The co-ordinator's participation in all decision-making processes by federal government departments that are likely to impact on the maritime sector is now mandatory.

National Masterplan Maritime Technologies

As a central instrument for maritime industrial policy, the German government adopted the so called National Masterplan Maritime Technologies (NMMT) in August 2011. The plan is a multi-stakeholder initiative, providing a platform for industry, government, Küstenländer, the scientific community, and maritime associations, including the VSM and VDMA, to come together to address issues under the leadership of the German Ministry for Economic Affairs and Energy. The plan, which had its roots in the 5th and 6th national maritime conferences, is considered to be a strategic tool for targeted, coordinated and coherent policies in Germany's maritime technologies industry in a wider sense. This means it basically addresses maritime technology areas which are listed under Blue Growth initiatives. The main focus is to strengthen industrial competitiveness and improve structural framework conditions with regard to future economic market potentials.

The NMMT outlines actions in 10 areas, six of which have links with shipbuilding:

- Offshore oil & gas (work on the development of vessels and floating platforms for offshore activities).

- Offshore wind energy (work on special ships for offshore maintenance and services; study of the effects that offshore wind energy development will have on harbours and shipbuilding; potential that offshore wind energy developments could have for exports of special ships).
- Hydrography and environmental technologies (work on oil spill recovery systems).
- Maritime traffic & security control technologies (work on traffic control and security).
- Ice & polar technologies (work on new ships and stronger platforms for ships to be used in ice-covered areas).
- Maritime mineral commodities (work on extraction of minerals from maritime beds).

The operational work of the NMMT is strategically focussing on long term developments and improving structural framework conditions by a number of key actions:

- Developing new market opportunities and facilitate market access.
- Improving the policy environment for research, development and innovation.
- Providing political backing and support for exports.
- Enhancing system integration and promoting networking.
- Intensifying public relations (PR) and offering specialist events.
- Endorsing standardisation.
- Supporting training.

The BMWi oversees and co-ordinates the NMMT, which facilitates the process of developing strategies for the maritime sector. The NMMT is not backed with own funds to support strategies developed within its framework (BMW_i, 2014 and BMW_i, 2015*a*). The BMWi has established a co-ordination office for the NMMT and is supporting focussed exercises by means of conferences and studies. For financing of dedicated and actual innovation projects, the NMMT is building on the proven maritime research and innovation instruments as established under the different ministries. At the 9th national maritime conference in 2015 the BMWi announced to reformulate the NMMT with the aim of including the entire maritime industry.

Support Measures

Since the 1970s, the EU has set out the framework for its Member States to provide support to their shipbuilding industries under a series of specific state aid regimes. Over time, the regimes have narrowed, as many of the rules have been aligned with other, horizontal state aid provisions, with a view to eliminating differences between the rules applicable to shipbuilding and to other industrial sectors.

The latest Framework on State Aid to Shipbuilding, which applied from 1 January 2012 to 30 June 2014, contained specific provisions on regional aid, innovation aid and export credits (see Box 1). Other types of support (e.g. for rescue and restructuring of enterprises, or environmental protection) were subject to horizontal rules on state aid in the European Union. With expiration of the framework, there are no special rules governing state aid to shipbuilding.

Box 1. Former support measures in the EU Framework for State Aid to Shipbuilding expired on 30 June 2014

The Framework for State Aid to Shipbuilding permitted three main support measures, which were applicable for shipbuilding, ship repair or ship conversion:

- **Regional aid:** This was limited to support for upgrading or modernizing existing yards, with the objective of improving productivity. For qualifying regions, the maximum aid intensity was 12.5% or 22.5%, depending on the region concerned.
- **Innovation aid:** This was granted for the industrial application of innovative products and processes (i.e. technologically new or substantially improved products and processes which carry a risk of technological or industrial failure. It applied for the first industrial application of the products or processes. The aid was limited to supporting expenditure on investment, design, engineering and testing activities, and an application had to be submitted to the relevant national authority prior to any implementation of the project; otherwise the aid may have been deemed incompatible with EU rules. An independent expert, such as from the university, had to make a positive quantitative and qualitative appraisal of the project and the aid had to be found to result in an increase in innovative activity

The aid was limited to 20% of the cost of the project. If, however, the innovation had the objective of increasing environmental protection and led to compliance with EU standards at least one year before those standards entered into force, or increased the level of environmental protection in the absence of EU standards, or made it possible to go beyond EU standards, the maximum aid could be increased to 30%.

- **Export credits:** This aid had to be compatible with the Arrangement on Officially Supported Export Credits and the complementary Sector Understanding on Export Credits for Ships.

Supports granted under these provisions had to be reported to the Commission on an annual basis.

Source: EU, 2011.

Innovation

The German government implemented an innovation programme, *Innovative Shipbuilding Secures Competitive Jobs*, in 2005 to improve the competitiveness of the shipbuilding industry, in accord with the EU sectoral framework for the shipbuilding industry (BMW_i, 2015a). The programme was revised in 2010, with the elimination of a provision that required repayment of the grant in the event that the innovation succeeded (EC, 2010). In 2012, it was expanded to cover barges and floating structures that support offshore energy projects (i.e. oil, gas and renewable energy, such as wind farms). It has been revised again in 2015. The current programme has been designed to meet the horizontal EU rules governing research and development and innovation after the EU sectoral framework for the shipbuilding industry expired in 2014 (see EU, 2014). Under the new plan, support has been extended to subsidiaries of shipyards, smaller vessels and stationary offshore platforms. Moreover the aid intensity rates have been adjusted according to the size of the company concerned, with higher maximum rates for medium enterprises and even higher aid intensity for small enterprises.

In 2014 and 2015 the programme had an annual budget of EUR 15 million at the Federal level. Projects built by shipyards in Küstenländer are funded by the federal government and the coastal land concerned. Due to a 50% co-funding rate by the Küstenländer, there was an entire annual budget of up to EUR 30 million. In 2015 the German Federal parliament has further increased the annual federal budget to EUR 25 million (from 2016) while reducing the co-financing rate of the Küstenländer to one third. Over the period 2004-2014, some EUR 160.3 million were expended, on 98 projects, involving 18 companies; during 2011-13, annual expenditures were as follows (in millions of euros) (BMW_i, 2015a):

Table 19. Amounts committed for the programme Innovative Shipbuilding Secures Competitive Jobs

Year	Amount
2011	31.4
2012	24.0
2013	23.5
2014	19.7

Source: OECD WP6 Inventory (2015).

The projects in recent years have focused on different areas such as measures to enhance efficiency and environmentally friendly technology, for instance optimization of fuel consumption, propulsion, waste management and security. Other projects funded during the last years concerned innovations that were implemented in ship yards' manufacturing facilities (e.g., laser-guided welding) or improvements in the production processes.

Companies interested in applying for the aid need to submit a proposal to the Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA),¹⁸ an office of the Federal Ministry for Economic Affairs and Energy which has been appointed to administer the scheme (BMW_i, 2015a). The applications have to be accompanied by a confirmation of an independent expert that the project meets the criteria for the innovation aid. The selection of the expert and a description of the tasks to be performed are subject to BAFA's approval (Köhl, 2005). Aid is limited to a maximum of 25% of the eligible innovation costs for big companies, or up to 50% for SMEs.

The programme has recently been revised. Under the new plan, support is extended to subsidiaries of shipyards, smaller vessels and stationary offshore platforms (BMW_i, 2015a). Moreover the aid rates are now adjusted according to the size of the company concerned, with smaller companies eligible for higher levels of support. Overall, the programme has successfully encouraged shipyards to take the risks associated with investments into innovation.

Research and development

The BMW_i oversees a research programme on *Next-Generation Maritime Technologies*, which covers the time period from 2011-2015 (BMW_i, 2011a) and has recently been extended to 2017. The programme is run by Project Management Jülich, which supports the German government and the federal states as well as the European Commission in implementing research policy goals with a focus on project funding. The research programme adopts the successful priority areas of the previous programme "Shipping and Marine technology for the 21st Century" and continues to develop these further.

The programme aims to help German companies develop and use high technology to improve its competitiveness in the global market and to secure jobs. It is divided into four main research areas (BMW_i, undated b):

- ship technology
- production of maritime systems
- shipping
- ocean engineering.

Eligible applicants include commercial companies (i.e. shipyards, suppliers, consultants, service facilities) as well as universities, colleges and non-university research institutions (BMW_i, undated *b*). Funding is provided in the form of non-repayable grants. Table 20 provides information on the funding levels available (BMW_i, 2011*a*). On application by a company, the self-financing is usually at least 50% (BMW_i, 2015*a*).¹⁹

Table 20. Ceilings for research and development grants under the Next-Generation Maritime Technologies programme (Percent of total project cost)

Type of aid	Size of firm		
	Small	Medium	Large
Fundamental research	100%	100%	100%
Industrial research	70	60	50
Industrial research with: <ul style="list-style-type: none"> • Collaboration among companies; for large firms, cross border or with at least one SME • Collaboration among companies and research institutions • Dissemination of results 	80	75	65
Experimental development ¹	45	35	25
Experimental development ¹ with: <ul style="list-style-type: none"> • Collaboration among companies; for large firms: cross border or with at least one SME • Collaboration among companies and research institutions • Dissemination of results 	60	50	40

¹ Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, that is directed to producing new materials, products or devices; to installing new processes, systems and services; or to improving substantially those already produced or installed (OECD, 2002).

Source: BMW_i, 2011*a*.

Some EUR 150 million have been budgeted for the programme for the entire period 2011-2015 (BMW_i, 2015*a*). From 2011 to April 2015, some 188 projects were approved, with supports totalling EUR 97.7 million (Federal Government, undated). The grants have ranged in size from EUR 4.0 million, to less than EUR 50 000. To date, direct aid to shipbuilding firms for 17 projects (about 9% of the total number) has totalled EUR 4.2 million (about 4% of the total) (Table 21). In 2014, the German Government supported 74 collaboration projects with a budget of EUR 29.7 million. The funds were shared between 265 single projects. Ship technology was supported by 38.1%, navigation by 9.1%, production of maritime systems by 12.1% and marine technology by 40.7%. The industry was supported with a funding share of 53.7% and research institutes with 46.3%.

Table 21. Research and development support for shipbuilders, approvals as from November 2011 to April 2015

Firm	Number of projects	Support (1,000 EUR)	Principal areas of the R&D
Flensburger Schiffbau-Gesellschaft mbH & Co. KG	5	1,403	<ol style="list-style-type: none"> 1. Development of approaches to analyse dynamic positioning of vessels during the early stage of the design phase. 2. Integrating 3D-based process chains for the design phase of vessels. 3. Productivity management during production processes 4. Efficient processing of planning data with the aim to optimize prototypes. 5. Development, evaluation and assessment of technical security using methanol to operate Ro-Ro passenger ships.
Fr. Lürssen Werft GmbH & Co. KG	2	536	<ol style="list-style-type: none"> 1. Productivity management. 2. Interior expansion of mega-yachts.
Meyer Werft GmbH & Co. KG	7	1,656	<ol style="list-style-type: none"> 1. Development of a security concept for vessels for navigation purposes. 2. Dynamic positioning of vessels 3. Productivity management for clocked production of unicums 4. Optimizing passenger ships in swell. 5. Navigation system for security, logistics and measurement purposes. 6. Production planning of complex unicums in the construction of passenger ships. 7. Development, evaluation and assessment of technical security using methanol to operate cruise ships.
Neue Triton-Schiffswerft GmbH	1	114	<ol style="list-style-type: none"> 1. Development of production processes to build and retrofit LNG vessels.
ThyssenKrupp Marine Systems GmbH	2	517	<ol style="list-style-type: none"> 1. Development of 3D-typological coordination of the production with the aim to optimize the design of complex vessels. 2. Modelling hybrid propulsion by taking account of hydrodynamic interaction.
Total	17	4,226	

Source: Foerderkatalog of the Federal Government of Germany, undated. See: <http://foerderportal.bund.de/>.

Ship finance and support

Federal support

Export credits

The German government provides insurance for the repayment of loans linked to exports (i.e. HERMES cover), from the time of delivery of a product (i.e. the insurance does not apply to pre-delivery loans). A premium is added to the interest rate by the export credit agency to cover, at least in part, the risk of non-payment. The scheme complies with the terms of the OECD Arrangement on Guidelines for Officially Supported Export Credits (OECD, 2015b). The shipbuilding sector is a large user

of this insurance. In 2014, the share of the shipbuilding sector and marine supply industry in export credit guarantees amounted to EUR 5.5 billion which represents 22.2% of all transactions covered.

Aval/counter guarantees

Aval guarantees complement the export credit guarantees of the German government on a case-by-case basis. These counter-guarantees provide security in favour of the guarantor (i.e. bank or insurance company) by relieving the guarantor largely of the risk of failing to take recourse for compensation to the exporter. The Federal Government will reimburse the guarantor for the guaranteed share (with a maximum of EUR 80 million per exporter with a limitation of 20% per individual export contract) if the guarantee is called. The reimbursement by the government is made on first demand and irrespective of the reason for calling, hence, also in case of a fair calling (AGA, 2015; BMWi, 2015a).

Commercial Interest Reference Rate (CIRR)

The CIRR ship financing scheme in Germany provides ship buyers with the possibility to obtain loans at a fixed interest rate, the minimum levels of which are established by international agreement, through the OECD.²⁰ Those loans mostly cover those sums due at the time of delivery. The programme is administered by the KfW. The interest rate risk of the loan is borne by the federal government (BMWi, 2013 and 2007 guidelines). The maximum liability of the federal government from CIRR interest equalisation guarantees granted in this connection was approximately EUR 5.8 billion at the end of 2014.

Since the introduction of this CIRR ship financing scheme in 2008, guarantees for 118 ships with a contract value of EUR 17.0 billion were approved, through December 2014 (BMWi, 2015a).

Loan guarantees to facilitate restructuring

In 2009-2010, the federal government established a EUR 75 billion loan programme to assist firms that had been adversely affected by the financial crisis (OECD, 2013). The programme was administered in co-operation with the Länder governments or the government-owned KfW bank (Kreditanstalt für Wiederaufbau). The bank forwarded loans to the borrowing company's bank and assumed up to 90% of the risk. Risk premiums were paid to cover the guarantees (Box 2). Part of the stimulus program was also an increase in the maximum share to be covered by Federal states guarantee schemes from 80% to 90% while the federal government assumed 50% (60% in the Neue Bundesländer) of the total risk.

Box 2. Risk premiums

In the EU, the premiums paid for government loan guarantees should cover all the costs associated with them. The PwC study indicates that most premiums paid in the period covered by the study were in the range of 0.8 to 1.5%. Some yards, however, reported premiums as high as 3 to 3.5%.

In the case of Germany, PwC reports that there is an upfront payment of EUR 2 500 to EUR 25 500 for processing an application, and that an annual premium of 0.8 to 1.5% is added to the interest rate.

Source: PwC, 2011.

Loans from the programme were limited to EUR 300 million. Exceptions had to be approved by the government via the Special Funds Steering Committee. To receive a loan, companies must not have been experiencing economic difficulties prior to mid-2008 but must have had at best limited access to capital markets. In addition, it had to be assured that the company would be able to function effectively without government assistance after the end of the crisis, and that all other possibilities for financing had been

exhausted. The loans were granted on the basis of the EU Commission’s “temporary framework” and were therefore deemed to be in line with European competition law (BMW_i, 2015a).

According to the BMW_i (2015a), one loan has been granted within the context of a debtor-in-possession financing which has been entirely repaid. The loan was given to a yard for completing the construction of two ships and was completely repaid.

Expert group on finance

The transition from construction of container ships to specialty vessels raised a number of financial challenges to shipbuilders, as the latter were more costly, required more time to build and have higher technical risks. Furthermore, international competition increased as well as banks restricted financial lending, among others, due to stricter liquidity requirements within Basel III. As the German shipbuilding industry was considered to be a strategic sector, the German government and Länder provided various financing instruments to support its industry. To examine ways to address the financial challenges more effectively the BMW_i established a group of experts (BMW_i, 2015a; Expertenbericht, 2012). The group concluded that the current financial support schemes – which are listed in this section – were adequate, and that they should be maintained. Apart from that, the group suggested the German government to take actions in several areas including green shipping and public financing schemes. The suggestions of the expert group have not been binding for the German government. The Federal government welcomes and actively supports the dialogue on financing measures. Thus, the Federal government and the Länder place a high value on the use of the existing measures in a flexible manner in line with national and international regulations (such as the OECD consensus, national and EU competition law, etc.).

Länder support

Guarantee schemes (pure cover) for shipyards approved by the EU-Commission can be provided by Küstenländer for pre-delivery and by some states for post-delivery financing. These schemes accept default guarantees of generally up to 80% to secure bank loans or finance from other lenders (PwC, undated). Most states have assigned private companies to administer the programmes. Between 2011 and 2014, commitments were only made for pre-delivery finance and monies actually committed for this measure were as follows (in millions of Euros) (OECD, 2015b):

Table 22. Monies committed for guaranty schemes

Year	Amount
2011	92
2012	113.5
2013	113
2014	180

Note: in EUR millions.

Source: OECD Inventory on subsidies and other support measures.

Furthermore, Mecklenburg-Western Pomerania forwarded loans, in line with the European Competition Law, to shipyards at market based interest rates during 2012 and 2013, as depicted in the following table (OECD, 2015b).

Table 23. Loans provided by Mecklenburg-Western Pomerania

Year	Amount
2012	70
2013	30

Note: in EUR millions.

Source: OECD Inventory on subsidies and other support measures.

One programme in Mecklenburg-Western Pomerania supports the suppliers of ships/shipyards to enhance the diversification of their product portfolio by hiring high educated engineers to make the enterprises less vulnerable against all odds of the maritime industry (BMW_i, 2015a).

Other

Trade promotion

The federal government supports the development of export markets for the shipbuilding and marine equipment industries, through the organisation and support of foreign trade fairs, business meetings and conferences (BMW_i, 2015a), such as in Offshore Technology Conference (OTC) Houston (German Missions in the United States, 2015a), Cruise Shipping in Miami and Brazil (German Missions in the United States, 2015b and 2015c).

IV. OUTLOOK

In the government's view, the situation in the industry has stabilised, with the industry abandoning the production of standard ships such as tankers, container vessels and cargo ships, and moving toward the production of more customised vessels, hence, in a niche market of the shipbuilding industry. The strongest product areas are ocean-going and river cruise ships, ro-ro and ro-pax vessels, military and patrol vessels, offshore wind products and mega yachts. The majority of yards in Germany are relatively small and family-owned. Further consolidation in the industry is, however, likely, with smaller yards merging with others. Rising demand for environmentally-friendly shipping (i.e. "green shipping") is expected to benefit the industry, particularly in the marine equipment area.

The Federal government as well as the Länder have been taking actions to support the industry, which turned out to be particularly important for regions where the industry is the backbone of the economy. These efforts have and will continue to focus on measures to boost innovation and research and development. Efforts to support the financing of ships through export credits are viewed as important and will continue.

A closer look in the future suggests that growth in the cruise ship market is likely to continue and hence Germany's shipbuilding industry could greatly benefit. However, the offshore market faces economic difficulties owing to the decrease in global crude oil prices and the weakening of the global economy as well as overcapacity concerns (OECD, 2015 c). In this regard, equally shipbuilding industry producing vessels for offshore oil and gas will face economic challenges that require the German shipbuilding industry to react.

NOTES

¹ The Secretariat would like to thank Peter Avery for his large contribution to this report.

² This share refers only to ship yards and does not include the supply industry.

³ See www.oecd.org/tad/xcred/rates.htm.

⁴ Different measures are used in the shipping industry to characterise the size of vessels. Compensated gross tonnage (CGT) is an indicator of the amount of work that is necessary to build a given ship and is calculated by multiplying the gross tonnage of a ship by a coefficient, which is determined according to type and size of a particular ship (see OECD 2007). Gross tonnage (GT) is a function of the volume of all of a ship's enclosed spaces, measured to the outside of the hull framing. Deadweight tonnage (DWT) is a measure of how much weight a ship is carrying or can safely carry. It is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, passengers and crew.

⁵ These 2 800 companies are operating in the maritime sector, whereof around 1 500 companies employ less than 10 workers and 1 300 firms more than 10 workers (BALance, 2014).

⁶ Please note, these figures include naval vessels. According to VSM there are no figures solely related to commercial shipbuilding, since there is hardly any company that entirely relies on naval shipbuilding.

⁷ For Figure 3, the BALance study identified namely and by location a total of 1 353 firms in Germany, which classify with at least one certificate for maritime-related operations or products.

⁸ Nordic Yards acquired Volkswerft, Wadan Yards and P+S Werften; German Naval Yards Holding GmbH encompasses German Naval Yards in Kiel (formerly HDW Gaarden), Nobiskrug in Rendsburg and Lindenau in Kiel.

⁹ <http://dah-bremerhaven.de/ENG/english.php>.

¹⁰ <http://nordseewerke.com/unternehmen/die-geschichte/>.

¹¹ Ludwig and Wolnik/IG Metall (2014, 2015) count around 16 000 employees in the shipbuilding industry and 68 000 employees in the marine supply industry (first-tier suppliers) in 2013, or 68 000 and 15 000 in 2014. VDMA (2014, 2015) counts around 68 000 employees in the marine supply industry (first-tier suppliers) in 2013 and 67 000 in 2014. For 2013, BALance (2014) counts around 63 000 employees within the 1st tier marine supplier category which includes all suppliers directly dealing with final producers (i.e. shipyards, boatyards etc.). These figures include only direct employees at yard facilities, and neither include temporary nor contract workers, which represent in total around 8 500 to 10 000 people in 2013 and 2014 (Ludwig and Wolnik/IG Metall, 2014, 2015). Overall, the number of employees in total in the German shipbuilding and marine supply industry (first-tier suppliers) ranges according to estimates between 80 000 and 84 000. The 2 700 companies include suppliers of systems, components, materials as well as subcontractors. Subcontractors' work includes the provision of systems, components and materials (i.e. hardware) as well as the work on site of the customer/shipyard (e.g. assembly) or directly for the shipyard (e.g. engineering, classification etc.). There is a tendency in outfitting that shipyards purchase more subcontractor services in manufacturing and assembly rather than buying components and materials and assemble those with shipyard personnel.

12 Figure refers to ship and boat building incl. repairs and conversions, in yards with 50 employees and more.
13 See www.seaeurope.eu.

14 27 OECD countries and 2 non-member economies (Singapore and Chinese Taipei) covered in the OECD
R&D database are included in the sample (OECD, 2015).

15 The term ‘nominalized capacity’ is used just to emphasize that the capital stock, the capacity, was
calculated using nominal values of gross capital expenditure.

16 Thus capacity overhang is measured as a ratio of capital stock to sales (nominal) relative to a moving
average of the same ratio of capital stock to sales.

17 The reader is referred to Footnote 13 about the description of the composition of employment in
Germany’s shipbuilding and equipment supply industry.

18 See www.bafa.de/bafa/en/index.html.

19 The interested reader is referred to other OECD publications, such as “The Innovation Imperative” (OECD,
2015d) or the “Science, Technology and Innovation Scoreboard” (OECD, 2015e), that analyse across
countries different R&D support schemes through direct support (i.e. grants, loans, procurement contracts)
and indirect funding (i.e. tax incentives), as well as the design of R&D support policies that differentiate
between firm size and profitability.

20 See www.oecd.org/tad/xcred/rates.htm.

21 Based on information provided by the German Federal Ministry for Economic Affairs and Energy (BMWi,
2015).

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ANNEX I: INDUSTRY ASSOCIATIONS²¹

Verband für Schiffbau und Meerestechnik (VSM)

The German shipbuilding and ocean industries association (VSM) represents the shipbuilding and marine equipment industries. In addition to these industries its 140 members include classification societies, research organisations, offshore exploration companies, engineering firms, universities and research institutions. The organisation addresses issues in key areas, including ocean-going vessels, inland vessels and engineering. Committees have been established to deal with matters pertaining to finance and tax matters, purchasing and logistics. Working groups deal with matters pertaining to regulations, application of standards and training. The work of the committees includes the development of industry positions, which are shared with the government and other stakeholders.

The VSM also provides its members with support and expertise in economic, technical and legal matters, and develops and shares industry and market data. The VSM is itself a member of a number of other organisations, including:

- SEA EUROPE, the umbrella organisation of the European shipbuilding and marine equipment industry.
- STG (Schiffbautechnischen Gesellschaft e.V.), the shipbuilding engineering society.
- AUMA (Ausstellungs- und Messeausschuss der Deutschen Wirtschaft e.V.), the exhibition and trade fair committee of German businesses.
- NSMT (Normenstelle Schiffs- und Meerestechnik im DIN), the shipbuilding and marine standards committee.
- CMT (Center of Maritime Technologies e.V.), the centre of marine technologies.
- AVI (Arbeitsgemeinschaft der Eisen und Metall verarbeitenden Industrie), the association of iron and metal processing societies.
- VBW (Verein für europäische Binnenschifffahrt und Wasserstraßen e.V.), the association for European inland navigation and waterways.
- Stiftung Offshore Windenergie, the offshore wind energy foundation.

Within Europe, the VSM represents the interests of the German maritime industry. It participates in the annual industry meeting of decision makers for leading shipbuilding companies in China, Europe, Korea and the United States (the JECKU meeting).

The VSM also participates in the Committee for Expertise of Shipbuilding (CESS), which is a committee formed under the JECKU to address issues of common concern, particularly in the regulatory area.

Finally, VSM supports the Community of European Shipyards Association (CESA) in its role as observer in the International Maritime Organization.

Verband Deutscher Maschinen und Anlagenbau (VDMA) – Section Marine Equipment and Systems

VDMA (Verband Deutscher Maschinen- und Anlagenbau, German Engineering Federation) represents over 3,100 mostly medium-sized companies in the capital goods industry, making it the largest industry association in Europe. The association represents the shared financial, technical and scientific interests of the mechanical engineering industry, especially with respect to national and international authorities and business groups. VDMA's membership covers the entire process chain from components to plants, from system suppliers and system integrators through to service providers. The association reflects the diverse customer-supplier relationships along the whole value chain and promotes sector-specific and overarching cooperation.

VDMA is divided into 15 cross-sector departments, branch offices in Berlin and Brussels, liaison offices in Brazil, China, India, Japan and Russia. The organisation comprises 39 divisions and working groups, including a sector association on Marine Equipment and Systems.

VDMA - Marine Equipment and Systems represents the interests of its about 240 member firms, with three principal objectives:

- Facilitate access to emerging shipbuilding and offshore markets.
- Establish and maintain open markets and fair competition in world markets.
- Promote greater understanding of the technical and economic importance of the industry to the public.

**ANNEX II:
GERMAN SHIPBUILDING AND REPAIR COMPANIES**

Company	Location	Ownership	Yachts	Naval ships/ public sector	Cruise and passenger ships	Research vessels	Ferries, barges and the like	Repair and conversion	Notes
Abeking & Rasmussen	Lemwerder	Privately held	✓	✓					<ul style="list-style-type: none"> • Since Jun 2009, an unlisted public company
Schiffswerft Hermann Barthel GmbH; Schiffswerft Bolle GmbH	Derben	Privately held					✓	✓	
Blohm + Voss Shipyards GmbH; Blohm + Voss Repair GmbH	Hamburg	Privately held; owned by Star Capital, an independent investment fund manager	✓	✓				✓	<ul style="list-style-type: none"> • Acquired by Star Capital (UK) in Jan 2012, from TKMS
Schiffswerft Hans Boost Maschinen- und Stahlbau GmbH & Co. KG	Trier	Privately held					✓	✓	
BREDO – Bremerhavener Dock GmbH	Bremerhaven	-						✓	
Heinrich Buschmann & Söhne GmbH Schiffswerft	Hamburg	Private, family-owned						✓	
Theodor Buschmann GmbH & Co. KG Schiffswerft – Stahl und Metallbau	Hamburg	-					✓	✓	
Cassens Werft GmbH	Emden				✓		✓	✓	<ul style="list-style-type: none"> • Declared insolvency in Jun 2008; had orders but finance was not available • Purchased by private investors in Dec 2009/Jan 2010.

Company	Location	Ownership	Yachts	Naval ships/ public sector	Cruise and passenger ships	Research vessels	Ferries, barges and the like	Repair and conversion	Notes
Schiffswerft von Cölln GmbH & Co	Hamburg							✓	
Deutsche Industrie-Werke GmbH	Berlin	Part of Hegemann Group					✓	✓	• Sold yacht builder Rolandwerft to Lürssen in Jun 2010
Schiffswerft Diedrich GmbH & Co. KG	Moormerland-Oldersum						✓	✓	
EW Elsflether Werft AG	Elsfleth							✓	
Ender Werft und Dockbetriebe GmbH	Emden	Seafort Advisors, private equity group						✓	• Formerly called North Sea Works • Sold to Seafort Advisors in Dec 2014, subject to regulatory approval; part of strategic repositioning.
Ferus Smit	Leer	Family-owned (NL)		✓			✓		
Fr. Fassmer GmbH & Co. KG	Berne, Bardenbleth	Private, family-owned	✓	✓		✓	✓		
Flensburger Schiffbau-Gesellschaft mbH & Co. KG	Flensburg	SIEM, a publicly traded diversified industrial holding company (NO)		✓		✓	✓		• Acquired by SIEM Industries in Oct 2014. Designed to establish a stronger position on the offshore-market.
Schiffswerft M. A. Flint GmbH	Hamburg							✓	
Gebr. Friedrich GmbH & Co. KG Schiffswerft	Kiel	Family-owned						✓	
German Dry Docks GmbH & Co. KG	Bremerhaven							✓	Formed on 1 January 2013 with merger of Rickmers Lloyd Dockbetrieb and MWB Schiffstechnik. Part of Petram Gruppe.
German Naval Yards Kiel GmbH	Kiel-Gaarden, Kiel-Friedrichsort, Rendsburg	Privately held; owned by Abu Dhabi Mar holding group	✓	✓			✓	✓	• Acquired Nobiskrug in Jul 2009 • Acquired Howaldtswerke-Deutsche Werft (HDW) in 2011 from TKMS Acquired Lindendau in Jan, 2013; had declared insolvency in Sep 2008

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Company	Location	Ownership	Yachts	Naval ships/ public sector	Cruise and passenger ships	Research vessels	Ferries, barges and the like	Repair and conversion	Notes
Julius Grube KG Schiffswerft GmbH & Co.	Hamburg							✓	
Hitzler Werft GmbH	Lauenburg	Family-owned		✓			✓	✓	
HDR - Husumer Dock und Reparatur GmbH & Co. KG	Husum							✓	
Kölner Schiffswerft Deutz GmbH & Co. KG								✓	
Kötter-Werft GmbH	Haren						✓	✓	
Lloyd Werft Bremerhaven AG	Bremerhaven							✓	Part of Petram Gruppe Genting Group, Hong Kong (purchase of 70% of LWB; option to acquire 50% of Lloyd Investitions-und Verwaltungs (LIV) from Petram) (IHS Maritime 360, 2015; SCMP, 2015)
Lürssen-Kröger Werft GmbH & Co.; Fr. Lürssen Werft GmbH & Co. KG	Bremen; Rendsburg, Wolgast, Wilhelmshaven, Hamburg		✓	✓				✓	<ul style="list-style-type: none"> • Lürssen purchased the Neue Jadewerft shipyard in 2006. • The shipbuilding and steel construction company Berne GmbH & Co. KG acquired the former construction facilities and staff of Detlef Hegemann Rolandwerft GmbH & Co. KG and became part of Lürssen in 2010. • The Norderwerft shipyard in Hamburg becomes part of the Lürssen Group in October 2012. • In Dec 2012, Lürssen purchased the Peene Werft shipyard in Wolgast, Germany, effective in Jul 2013. Had been part of P+S.
Lux-Werft und Schifffahrt GmbH	Niederkassel						✓	✓	
Meidericher Schiffswerft GmbH & Co. KG	Duisburg							✓	

Company	Location	Ownership	Yachts	Naval ships/ public sector	Cruise and passenger ships	Research vessels	Ferries, barges and the like	Repair and conversion	Notes
MEYER WERFT GmbH	Papenburg, Rostock, Turku (Finland)	Family-owned			✓	✓	✓		<ul style="list-style-type: none"> • 2014: Acquired 70% share of Finnish Turku works; Meyer noted the technical competence of the Finnish yard and the benefits to co-operate in R&D. • Mid-2015: Meyer Werft became 100% owner of Turku shipyard. (Meyer Werft, 2015).
MWB Motorenwerke Bremerhaven GmbH & Co. KG	Bremerhaven							✓	Part of Petram Gruppe.
MWB Motorenwerke Wilhelmshaven GmbH & Co. KG	Wilhelmshaven							✓	
NEPTUN WERFT GmbH	Rostock				✓		✓		<ul style="list-style-type: none"> • Since 1997, part of Meyer Werft
Neue Jadewerft GmbH	Wilhelmshaven						✓	✓	<ul style="list-style-type: none"> • Since 2006, part of Lürssen group
Neue Oderwerft GmbH	Eisenhüttenstadt						✓	✓	
Nobiskrug GmbH	Rendsburg, Kiel		✓	✓					<ul style="list-style-type: none"> • In ADM group, see German Naval Yards Kiel
Nordic Yards Warnemünde GmbH; Nordic Yards Wismar GmbH; Nordic Yards Stralsund GmbH (Russian)	Rostock-Warnemünde; Wismar; Stralsund	Private, Russian			✓		✓	✓	<ul style="list-style-type: none"> • Acquired bankrupt P+S's Volkswerft in Stralsund in Jun 2014. Greater synergy by third site involve substantial competitive advantages for Nordic Yards; expansion of the portfolio in the area of offshore oil and gas ships and fishing vessels, especially for the Russian market. • Acquired Wadan yards in 2009
Pella Sietas GmbH Hamburg	Hamburg	Private, Russian					✓		<ul style="list-style-type: none"> • Created in Mar 2014, through the acquisition of bankrupt JJ Sietas by Russian firm Open JSC Pella. The buyer has undertaken to operating Sietas Shipyard as shipyard for at least eight years.
Peters Werft GmbH	Wewelsfleth		✓					✓	

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Company	Location	Ownership	Yachts	Naval ships/ public sector	Cruise and passenger ships	Research vessels	Ferries, barges and the like	Repair and conversion	Notes
Heinrich Rönner Firmengruppe	Bremen; Tangermünde; Bremerhaven, Cuxhaven	Family run					✓	✓	Includes the following yards: <ul style="list-style-type: none"> • BVT-Brenn und Verformtechnik Bremen GmbH • Schiffbau-u Entwicklungsgesellschaft Tangermünde mbH; • Stahlbau Nord GmbH; • USM Nord-Unterweser Schiff-und Maschinenbau GmbH; • Mützelfeldwerft GmbH & Co. KG
Stahlbau Müller	Spessart							✓	
TAMSEN MARITIM GmbH	Rostock		✓	✓				✓	
ThyssenKrupp Marine Systems GmbH	Kiel; Hamburg; Emden			✓				✓	<ul style="list-style-type: none"> • HDW sold to ADM Kiel in 2011 • Sells Nordseewerke equipment to SIAG in March 2010, which will use for offshore wind power plants. • Blohm + Voss sold to Star Capital in 2012.
Turbo-Technik Reparatur-Werft GmbH & Co. KG	Wilhelmshaven							✓	

Source: Companies' websites.