

# PEER REVIEW OF THE PORTUGUESE SHIPBUILDING AND REPAIR INDUSTRY



## 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 28 November 2013. No substantive comments were received and delegates agreed to declassify the report. The report will be made available on the WP6 website: [www.oecd.org/sti/shipbuilding](http://www.oecd.org/sti/shipbuilding).

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**PEER REVIEW OF PORTUGUESE GOVERNMENT SUPPORT MEASURES TO THE SHIPBUILDING AND MAINTENANCE / REPAIR INDUSTRY**

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## 1. Introduction to the study

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.

Portugal is the second country to undertake a WP6 peer review, following the review of Japan<sup>1</sup> in 2012. The WP6 aims to alternate between "large" and "small" shipbuilding economies for the reviews, based on historical output data, and Portugal accepted the invitation for a "small builder" review in 2013.

As a WP6 economy with a low level of annual shipbuilding output, Portugal's peer review differs in some important respects from that of the Japanese review. First, although the WP6's focus is on shipbuilding, the weight of ship repair and maintenance activity in Portugal's shipbuilding industry has now become dominant. As such, this report attempts to describe trends and issues in both building and maintenance / repair. Second, data from public sources are scarcer than for Japan, since Portugal does not fall within the group of larger builders whose orders and outputs are reported in more detail in statistical publications (repair activity is even less well captured). This means that the report draws on more anecdotal and qualitative information for some issues.

The Portuguese peer review also took place against a backdrop of severe domestic economic pressures, thus putting emphasis on issues of industry competitiveness, employment and growth. The financial and economic crisis continues to be felt in Europe and globally, with consequences for trade and the maritime industries. Furthermore, Portugal itself is subject to a European Union (EU) – International Monetary Fund (IMF) financial assistance programme that is imposing rigorous fiscal adjustment and structural reform on the Portuguese economy. Nevertheless, the Portuguese government considered that the situation offers an opportunity to reshape the shipbuilding and repair industry and regain competitiveness.

The report is structured as follows:

- Section 2 provides an introduction to Portugal's shipbuilding and maintenance / repair industry;
- Section 3 explores the structure and features of the industry;
- Section 4 describes policies that impact on the Portuguese shipbuilding and maintenance / repair industry, including those at European level;
- Section 5 looks at the performance of the Portuguese industry, highlighting where possible the trends affecting specific sub-sectors;
- Section 6 summarises and describes the main challenges faced by the industry;
- Section 7 concludes with questions for discussion.

The information in the report is drawn from public information sources, statistical series available to the Secretariat, and Portugal's response to the generic peer review questionnaire, prepared by the Portuguese government in co-operation with the Portuguese Association for Maritime Industries (AIN). The Secretariat also undertook a mission to Portugal to visit a shipbuilding yard (Estaleiros Navais de Peniche – ENP) and a ship repair and maintenance facility (Lisnave Estaleiros Navais), and benefited from in-depth discussions with management at these firms. The Secretariat expresses its gratitude to the government and industry stakeholders who participated in the review.

## **2. An introduction to Portugal's shipbuilding and maintenance / repair industry**

According to information from the Portuguese government, there are more than 200 shipbuilding and repair companies in Portugal, most of them small- to medium-sized firms engaging mainly in ship repair and maintenance. Some are very small facilities, with minimal activity, focused on local clients, predominantly in repair work. The Portuguese government considered that the shipbuilding industry in Portugal is limited to around five yards with the infrastructure and conditions to compete on the global market in commercial construction.

Consistent with this focus on repair work, IHS Fairplay data (which provide statistics on shipbuilding activity for all self-propelled seagoing merchant ships of 100 GT or above) indicate that the world share of the Portuguese shipbuilding industry was only 0.002% in 2012 in terms of completion (measured in GT). The main companies capable of constructing new ships above 100 GT are listed in Table 1, along with the largest repair and maintenance facilities in Portugal. The biggest shipbuilding company engaging in newbuilding is Estaleiros Navais de Viana do Castelo, S.A. (ENVC), which is currently owned by Empresa Portuguesa de Defesa SGPS S.A. (EMPORDEF), a public holding, held 100% by the Portuguese government.<sup>2</sup> The other companies also construct small ships (below 100 GT) such as passenger ships and fishing vessels, and some also work in the sector of manufacturing offshore equipment. Lisnave is dedicated exclusively to ship maintenance / repair and reportedly has one of the largest and modern ship repair yards in Europe.

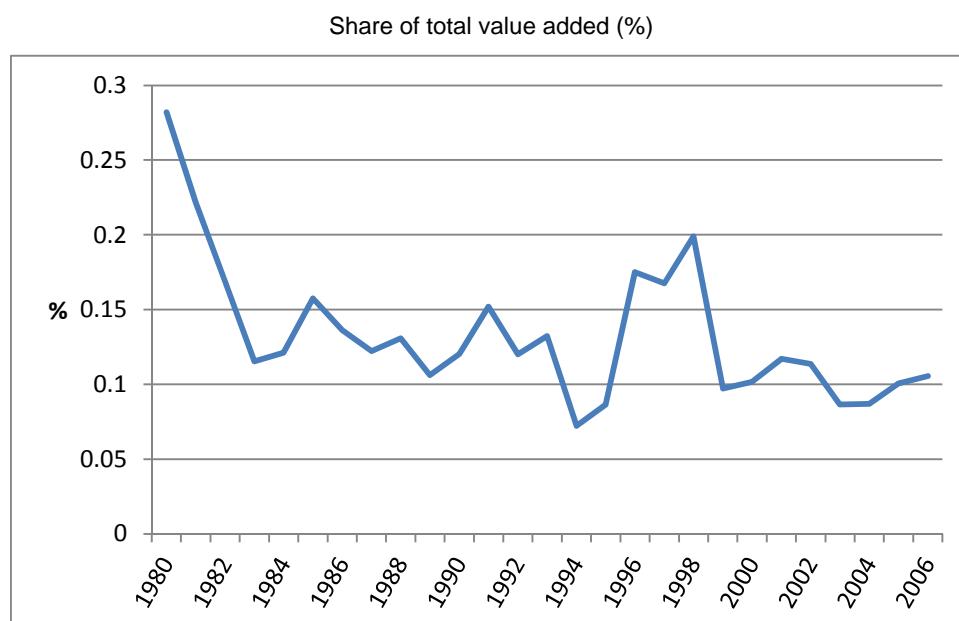
**Table 1. Portugal's largest shipbuilding and repair companies**

Shipbuilding and repair companies	Business	Notes
Estaleiros Navais de Viana do Castelo, S.A. (ENVC)	Newbuilding, conversion and repair (container ships, passenger ships, chemical tankers, cement carriers, etc.)	Owned by EMPORDEF, a public holding held 100% by the Government of Portugal.
Estaleiros Navais de Peniche S.A. (ENP)	Newbuilding and repair (fishing vessels, passenger boats, pleasure boats, wooden boats and composite material boats, etc.)  Manufacturing of offshore equipment (renewable energy)	A private limited company.
Estaleiros Navais do Mondego, S.A.	Newbuilding and repair (fishing vessels, passenger ships, etc.)	Was closed for several years due to insolvency and reopened recently.
NAVALRIA Drydocks	Newbuilding and repair  Manufacturing of offshore equipment	A group company of Martifer, a multinational industrial group, mainly engaging in metallic construction and solar energy.
NAUTIBER Estaleiros Navais do Guadiana, Lda.	Newbuilding and repair (specialised in composite materials; passenger ships, etc.)	
Lisnave, Estaleiros Navais S.A.	Maintenance / repair (all commercial ship types)  Manufacturing of offshore equipment (renewable energy)	Thyssenkrupp Marine Systems AG (Germany) owns 20% of equity.
NAVALROCHA, S.A.	Ship repair, focused on high-value and personalised maintenance / repair services for medium-sized boats	Medium-sized firm, owned by ETE Group and Lisnave (55%) and EMPORDEF (45%).

Source: Compiled by the Secretariat based on information provided by the Portuguese government and company websites.

The Portuguese shipbuilding and maintenance / repair industry's share in the country's gross domestic product (GDP) has been very low over the past 30 years. Data from the OECD's Database for Structural Analysis (STAN) show that the share dropped sharply in the early 1980s, slightly increased in the late 1990s, and then decreased again to around 0.1% in 2006 (Figure 1). Because data after 2006 were not available, the effect of the shipbuilding boom in the 2000s cannot be observed from this data series.<sup>3</sup> However, data provided by the Portuguese government, which cover the period 2004-2011, show the industry's share of GDP rising to a peak of 0.32% in 2008, then dropping to 0.13% by 2011 (Figure 2). The data in Figure 2 also show the breakdown for shipbuilding and ship repair and show that the share of ship repair in GDP is now larger than that of shipbuilding in Portugal. In contrast to the shipbuilding segment, ship repair and maintenance has held its contribution to GDP relatively constant since 2004.

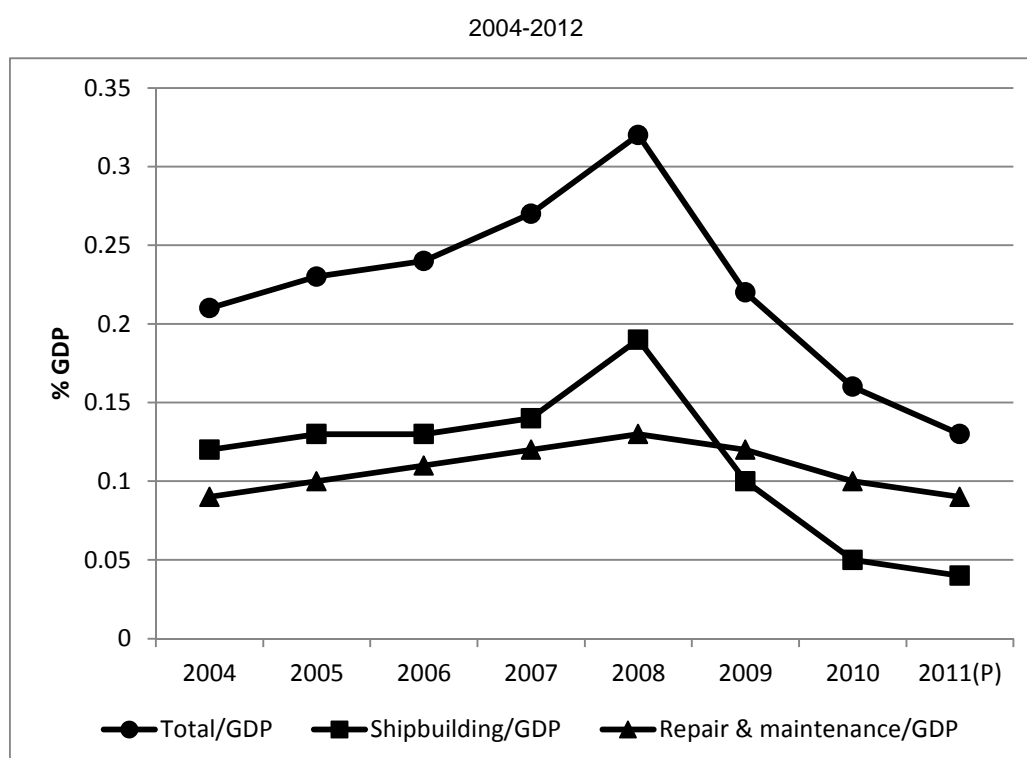
**Figure 1. Shipbuilding and maintenance / repair in the Portuguese economy**



Note: Data refer to the share of ISIC category 351: Building and repairing ships and boats.

Source: OECD, 2010a.

**Figure 2. Shipbuilding and maintenance / repair as a share of Portuguese GDP**

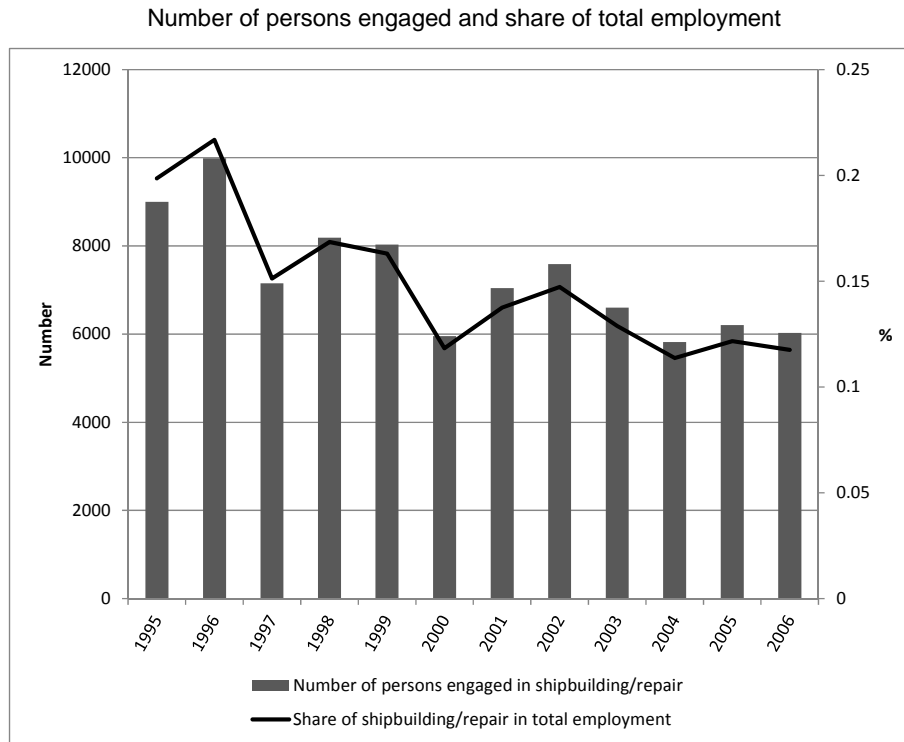


Source: Data provided by the Portuguese government, from INE – Sistema de contas integradas das empresas (Integrated Business Accounts System).



Employment in the shipbuilding and maintenance / repair industry as a whole has also been decreasing. In the late 1990s, employment in the shipbuilding and maintenance / repair industry was about 10 000 persons; since then the number has decreased, to about 6 000 persons in 2006, which was approximately 0.12 % of total employment in Portugal (Figure 3).

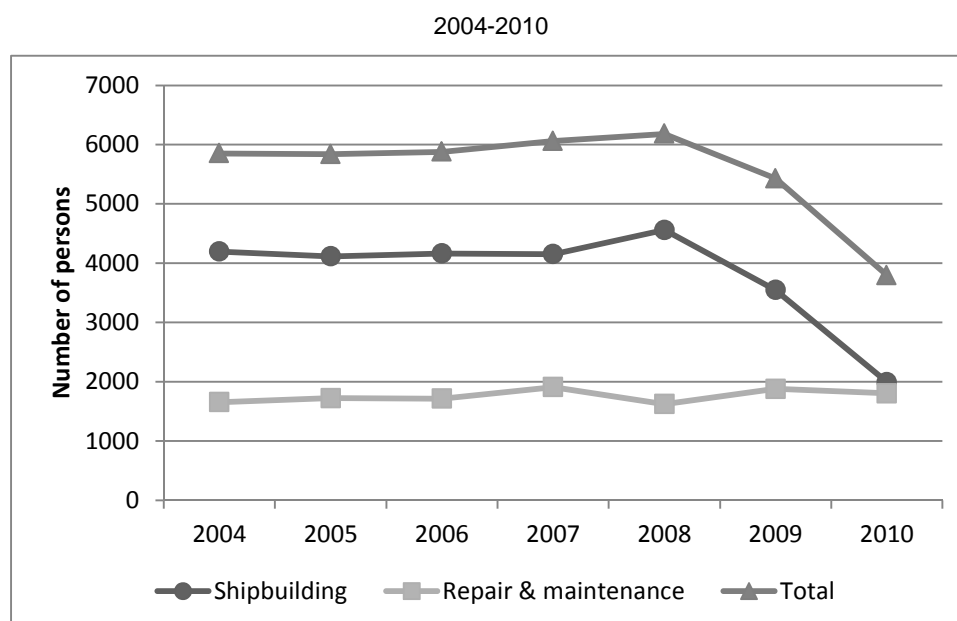
**Figure 3. Employment in shipbuilding and maintenance / repair in Portugal**



*Note:* Total employment in shipbuilding and repair refers to estimated number of persons engaged in ISIC category 351: Building and repairing ships and boats.

*Source:* OECD, 2010a.

More recent data provided by the Portuguese government reveals that employment in the Portuguese shipbuilding and repair industry started decreasing significantly after 2008, when the effects of the financial crisis began to flow through to the shipbuilding industry (Figure 4). Until 2008, the number of persons engaged in the industry remained at approximately 6 000. However, the number dropped to about 3 800 in 2012, equivalent to a 39% reduction from 2008. This job loss was reportedly caused largely by shrinking employment in the metal shipbuilding sub-sector, where more than 1 500 jobs were lost in just three years. This was due to the closure of Estaleiros Navais do Mondego as well as reductions in capacity at other yards, including ENVC. In contrast, reflecting the more continuous requirements for ship repair and maintenance, the ship repair and maintenance sector has had relatively steady employment levels despite the economic downturn. In 2010, the repair and maintenance sector accounted for 48% of total industry employment, compared to 26% in 2008.

**Figure 4. Employment in the shipbuilding and maintenance / repair industry**

Source: Data provided by the Portuguese government, from INE - Sistema de contas integradas das empresas (Integrated Business Accounts System).

Regarding the wider maritime sector in Portugal, the Portuguese government noted that the shipbuilding industry's linkages with the shipping, marine equipment and steel industries are very weak. The National Statistics Office does not collect data on the shipbuilding equipment sector, so no information is available for this activity. However, industry participants commented that the local equipment industry was practically non-existent and that almost all inputs must come from abroad, which can negatively affect their competitiveness. In practice, the impact on their competitiveness would depend on the cost and quality of the imported items and, especially for repair works, the speed of delivery. It is possible that, as small players in the market, Portuguese shipbuilders and repairers have less buying power, which could affect the price they pay for imported equipment.

Portugal has a classification society, Registro Internacional Naval, SA (RINAVE), established in 1973.<sup>4</sup> RINAVE is authorised to conduct surveys and issue certificates in order to verify a vessel's compliance with relevant international conventions, codes, etc. Portugal is also home to the European Maritime Safety Agency (EMSA), which provides technical assistance and support to the European Commission and member states in developing and implementing European Union legislation on maritime safety, ship pollution and maritime security.<sup>5</sup>

### 3. Structure and features of the industry in Portugal

The weight of the ship repair and maintenance sub-sector, compared to the shipbuilding sub-sector, is an important feature of Portugal's industry that sets it apart from the previous WP6 peer review country, Japan. This section describes this and some of the other major characteristics of the Portuguese shipbuilding and repair industry.

### ***Two distinct sub-sectors***

During the WP6 visit to Portugal, the government and industry representatives stressed that the shipbuilding and ship repair/maintenance sectors of activity are quite distinct in Portugal, although some yards perform both repair and building in the same facility. Certainly, the trajectory of the two sub-sectors is diverging; Figure 2 earlier showed how the repair and maintenance sub-sector overtook shipbuilding as a share of GDP in 2009, while by 2010 employment in each sub-sector was roughly the same. But in addition, shipbuilding was regarded as a more traditional industry, transforming and assembling raw materials into “goods”, while ship repair was regarded as a service industry. Box 1 provides a general discussion of the similarities and differences between building and repair work.

#### **Box 1. Building and maintenance / repair - similarities and differences**

##### ***Facilities and equipment***

The facilities and equipment necessary for shipbuilding and repair are similar to some extent. Both activities need docks, berths and cranes, and the equipment for steel cutting, welding, painting, and so on. However, while there are some specific/predetermined flows of work in shipbuilding, going from metal cutting to block construction to assembly, work flows can be less standardised in ship repair, according to the specific demands and conditions of individual vessels.

##### ***Labour skills***

The required labour skills for both shipbuilding and maintenance / repair are also similar, such as processing steel (e.g. cutting, welding, heat bending, etc.), painting, outfitting, and so on. However, some shipbuilding firms may also require staff with competencies in design, both for in-house development and for interacting with third-party providers of vessel designs and specifications.

##### ***Determinants of demand***

In shipbuilding, demand for vessels is mainly determined by the demand for shipping, which is influenced by the demand for seaborne transport, which is in turn influenced by world economic conditions. In addition, there tend to be speculative investments in ships, in particular when the shipping industry is booming. In contrast, the demand for ship repair is generally driven by the need for periodical surveys, which are required by relevant international regulations to renew certificates. In a sense, this demand is more predictable (based on the volume of the world fleet) and more stable than newbuilding.

##### ***Orderbooks***

The level of orders that shipyards would like to have on their books depends to some extent on each company and its business strategy. Generally speaking, shipbuilding companies tend to target orderbooks of more than two years. In contrast, since the time spent on one ship repair or maintenance job is generally much shorter than new construction of a ship, and the schedule of docking for a survey is subject to various conditions such as the market situation and navigation schedule, ship maintenance / repair companies' views of their future activity is less “concrete” than shipbuilding companies.

##### ***Location of shipyards***

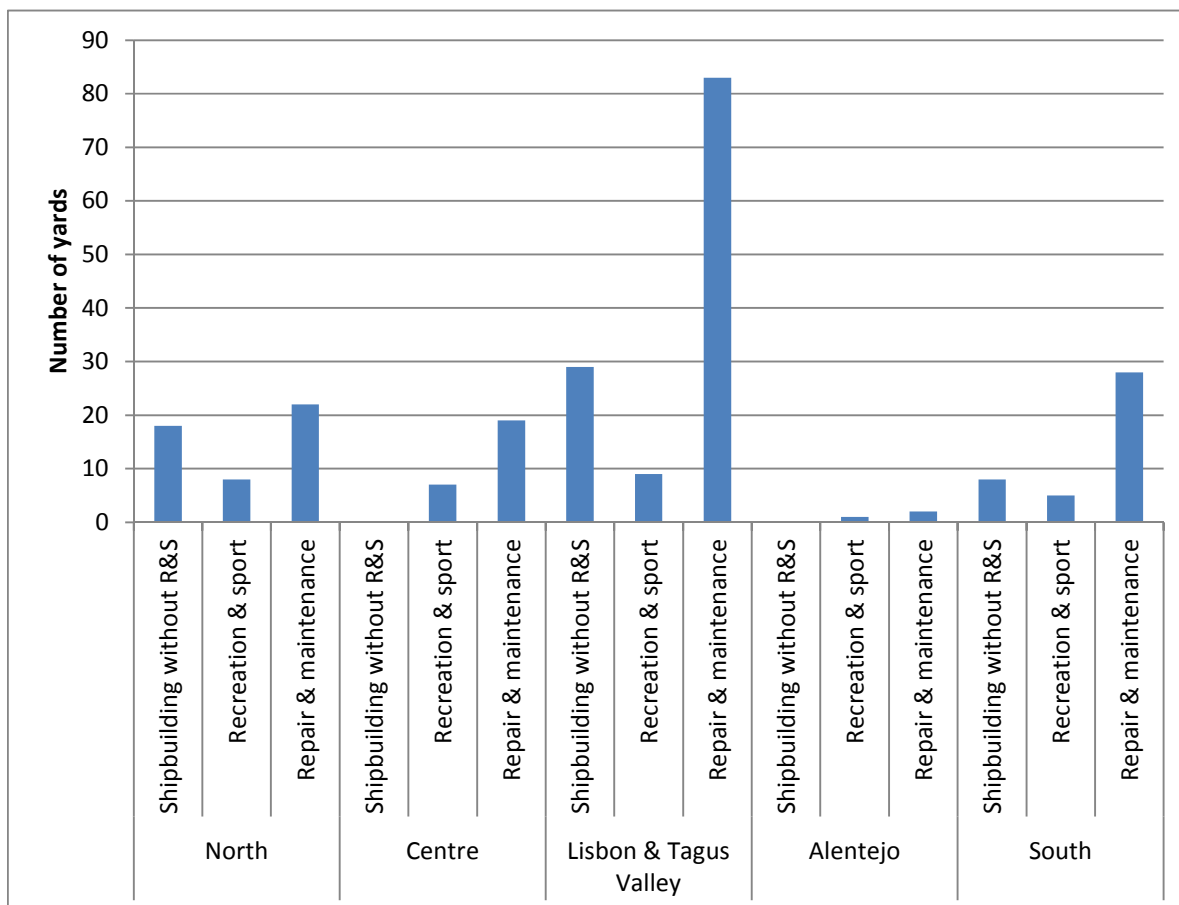
In the case of newbuilding, the geographic locations of shipyards are not a crucial element for yards' competitiveness. Vessels can be built practically anywhere and sailed to their first destination. But since ship repair is conducted during operation, and cargoes should be unloaded during ship repair, locations of shipyards are an important factor for this sub-sector. Generally, ship repair yards have competitive advantages if they are located close to major trade routes, since ships can drop by ports on these routes for loading/unloading and avoid detours for repair purposes. Time spent *en route* to the shipyard can even be used for maintenance / repair preparation, such as in the case of tankers, which need 7-10 days for tank cleaning before entering yards.

*Source:* Prepared by the Secretariat.

**Facilities**

Shipbuilding and ship repair yards are distributed across Portugal, along its coastal waterways and rivers. The ENVC yard, for instance, is located in the far north of the country, while the largest repair yard – Lisnave – is located on the Setúbal Peninsula, south of Lisbon. Figure 5 below shows the geographic distribution of construction and repair facilities in Portugal. It can be seen that the majority of facilities are in the Lisbon region, both in terms of building and repair.

**Figure 5. Geographic distribution of construction/repair yards**



Source: Information provided by the Portuguese government.

Table 2 below presents some details on the capacity of various yards in Portugal. Lisnave, which engages only in repair and maintenance, has the largest facilities in Portugal. ENVC is the largest Portuguese shipbuilder, having resumed activity with the building of two asphalt carriers worth EUR 128 million for the Venezuelan oil company PDVSA. Estaleiros Navais de Peniche (ENP) has smaller facilities, specialised in small vessels of high added-value. NAVALRIA has emerged since 2010 as a builder of hotel river vessels, having already completed seven vessels amounting to 2 960 GT and sales of around EUR 40 million, and has two further vessels on its orderbook.

**Table 2. Yard capacity - dock statistics**

Company	Docks	Berths	Longest dock length (m)	Widest dock beam (m)	Maximum DWT	Workers
Lisnave	6	9	450	75	700 000	299 <sup>a</sup>
ENVC	2	2	203	30	30 000	620
ENP	2	2	140	20		113
NAVALRIA	2	1	110	18		120
NAVALROCHA	2	1	174	22.1		28
EN Mondego	2 <sup>b</sup>	1	100	18		40
Nautiber	1 <sup>b</sup>	-	35	3		31

a: Permanent employees

b: Slipway

Source: Information provided by the Portuguese government.

In the past decade, there has been no expansion of shipbuilding capacity in Portugal, according to the Portuguese government. Estaleiros Navais de São Jacinto, in Ria de Aveiro, was closed in the 1990s, while FOZNAVE, on the estuary of the Mondego river near Figueira da Foz, closed on the turn of the century. Several other facilities focused on fishing vessels also closed in the last few decades. Nevertheless, the Estaleiros Navais do Mondego shipyard has recently been reactivated, having been closed for a few years due to insolvency.<sup>6</sup>

### ***Ownership and internationalisation***

The Portuguese government noted that most of the shipbuilding and ship maintenance / repair yards in Portugal are privately owned by domestic persons or entities. Lisnave is the only yard which has received foreign investment; Germany's Thyssenkrupp Marine Systems AG holds 20% of Lisnave's equity. The government commented that further foreign investment from Europe for Portuguese shipbuilding and maintenance / repair firms seemed unlikely at this point, given the economic situation and the state of the shipbuilding industry. Nevertheless, some interest from outside the European Union was expressed during the early stages of the (now abandoned) privatisation of ENVC, suggesting that the Portuguese industry may be an attractive investment for firms wishing to establish a European presence.

Regarding outward foreign investment, the Portuguese government identified one case, that of Lisnave International in Senegal. Lisnave International, which is in the market for investment opportunities and belongs to the Navissel Group, owns Chantiers Naval de Dakar, DAKARNAVE, in Senegal, Africa. Aside from this case, the Portuguese government considered it unlikely that Portuguese shipbuilders have the capacity to commit to either domestic or foreign investment, given the current economic conditions in Portugal. Finance from commercial banks is limited, as they seek to reinforce their balance sheets, while many shipbuilding firms do not have sufficient equity or capacity to invest.

While direct foreign investment may be rare, certain Portuguese shipbuilders and repairers have a strong international focus. The yard visits undertaken by the WP6 Secretariat provide two explicit examples. Lisnave's repair and maintenance customers are all international – there are no Portuguese owners as clients. To grant contracts around the clock, Lisnave has agents in 17 maritime centres around the world, marketing Lisnave's services. ENP's clients are mainly in Africa – they have built craft for customers in countries including Algeria, Angola, Mozambique, and Senegal, as well as Cape Verde. On occasion, ENP staff also travel to clients' countries to assemble vessels that have been constructed in pieces at ENP's yard and shipped to their final destination in containers. The export orientation of the industry is discussed later in the report.

## *Workforce*

There is little formal statistical information available about Portugal's shipbuilding and maintenance / repair workforce. As noted earlier, overall employment in the industry has fallen substantially in recent years, driven by changes in shipbuilding employment. Between 2008 and 2010, there was a large fall in employment in metal shipbuilding, due to the closure of Estaleiros Navais do Mondego and reductions in capacity at several shipbuilding yards, including the largest (Viana do Castelo). In contrast, ship repair employment remained fairly steady over the period 2004-2010 (although it was noted at Lisnave that its employment composition shifted from majority permanent to majority sub-contractors). In total, around half of the industry's employment is in maintenance / repair work, with the other half in shipbuilding.

Despite Portugal's high level of unemployment, attracting appropriately skilled and reliable staff to shipbuilding and repair enterprises may be a challenge. Industry representatives mentioned fitters and welders, and engineers, as particular groups that are difficult to attract and retain, particularly with higher salaries on offer in countries such as the Netherlands, Norway and Poland. They also suggested there is a general image problem, with ship maintenance / repair in particular being viewed as a "dirty" industry that is less attractive than other more service-oriented sectors.

In response to shortages, some firms are designing and providing training for staff. Industry representatives gave examples of a one-year programme for staff working with GRP (fibreglass), and a multi-million euro programme to train maintenance / repair workers. The latter programme is currently being re-run but is targeting workers in a slightly older age bracket (25-35 years of age) than previously. The view was expressed that young workers are not always sufficiently responsible or reliable – an important consideration for an industry whose activities cannot accept high rates of absenteeism.

Firm-level training may in fact be the most practical option for enterprises seeking to upskill their staff, especially those enterprises located outside the Lisbon area. Lisbon Technical University (Universidade Técnica de Lisboa), for instance, offers undergraduate and masters degrees in engineering and naval architecture,<sup>7</sup> but local universities or polytechnics in smaller population centres may have no shipbuilding/maintenance/repair-specific courses. Given the geographic dispersion of yards in Portugal, this means on-site learning may be the only option for some firms.

Firm-level training is also a valuable complement to employees' formal education, given that Portugal has relatively low levels of educational attainment. In 2010, only 52% of 25-34 year-olds had completed upper secondary school (compared to an OECD average of 82%), and less than 20% of older workers, aged 55-64 years-old, had reached this level (OECD, 2012a). The situation is improving over time as enrolment increases, but in the immediate future, the stock of workers available to the industry is perhaps less well educated, on average, than in other OECD shipbuilding economies. The regional dimension appears here too, with Portugal having a relatively high level of disparity between regions in terms of educational attainment (OECD, 2011a). Shipbuilding and maintenance / repair firms in some regions may thus have particular difficulties in sourcing staff with basic school qualifications.

At an institutional level, changes to labour market regulations appear to have benefitted some firms in the shipbuilding and repair industry. Portugal has begun to reform certain areas of its labour market policies, to address weaknesses in employment and competitiveness. Industry representatives noted that reductions in the cost of extra time have been valuable, particularly in lowering the cost of staff working in weekends and on public holidays. For some activities (such as bringing a vessel into a dry dock), tides are very important, and it is not possible to stay within a "Monday-Friday, 9am-5pm" schedule. Other valuable reforms are an increase in functional flexibility (i.e. job delineation) and work time flexibility. The latter will mean greater ease in coping with fluctuating activity levels, as workers' hours can be spread unevenly

throughout the year. However, it is noted that work time flexibility depends on the support of unions, while implementation of labour laws needs CGTP (General Confederation of Portuguese Workers) agreement.

Over time, reforms to the labour market may generate additional flexibility for firms. For instance, in 2011, the government agreed to freeze the minimum wage as well as “administrative extension”,<sup>8</sup> and changes have also been made to dismissal procedures (OECD, 2012b). Nevertheless, for some firms, changes to minimum wages and working time arrangements are considered to have little practical impact on their operations, while others called for additional progress on issues such as worker representation and the power of unions.

### ***Technology and innovation***

Technology and innovation appear to have different implications for the shipbuilding and repair/maintenance sub-sectors of the industry. For shipbuilding firms, it offers the possibility of new materials, new designs and new types of vessels to be constructed. For maintenance/repair firms, it mainly offers a way to reduce worker effort and increase productivity, and to speed up procedures to provide a quicker service for clients.

The WP6 Secretariat’s visit to ENP gave a good example of the possibilities offered by incorporating technology and innovation into shipbuilding activities. ENP considered that it had consolidated its technical knowledge over a period of time and had diversified its product offering. It uses GRP (fibreglass) as a key material, due to its superior strength, and its weight, anticorrosion, and acoustic and thermal insulation properties, and combines this with other materials in vessel construction. ENP has internal design capabilities, but also works with internationally-recognised designers, sometimes identifying promising tenders and then teaming with the designer to bid for the project. It also undertakes R&D through its participation in a number of EU FP7 projects, as a partner in international consortia, and attempts to leverage this for its shipbuilding activities (Box 2 describes an example).

#### **Box 2. Wave power - R&D in Portuguese shipbuilding**

ENP is currently involved in a project to tap wave energy. Together with a small Finnish company – AW-Energy Oy – it is working on a “wave roller” structure that is submerged onto the sea floor, with wings that move with the current. The structure is capable of producing 300 KW of power, and the aim is to create fields of roller that produce 5 MW of power.

The efforts are part of an EU project called SURGE – Simple Underwater production of Renewable Energy. The project started in October 2009, but ENP worked with its Finnish partner prior to this as a testing ground, with tests of the roller being carried out at its site in Peniche in 2007 and 2008. A consortium was set up in 2009, aiming to connect the wave roller to the Portuguese power grid. A 3-roller field was deployed in 2012, and ENP is currently testing the device, to fine-tune its settings.

Source: Information from industry representatives. See also <http://aw-energy.com/concept.html>.

The visit underlined the importance of the FP7 stream of funding, and the potential need for a more strategic approach to participation in FP7 projects. ENP noted it was currently involved in five projects, but that its original involvement came through an invitation from a German firm to join it in an EU-funded research activity. It is possible that other Portuguese shipbuilding firms could have the capability and interest to participate in these types of R&D projects, but that they are not aware of the opportunities. Maintenance / repair firms may also have an interest – the Portuguese government noted that LISNAVE was involved in a project called WINDFLOAT, where it undertook assembly work to complete an offshore

floating structure for exploitation of wind energy. This is discussed further in the section later on industry challenges.

While perhaps less obvious, innovation is equally important for the repair sub-sector – partly for improving processes, and partly to ensure effective repair and maintenance of new technologies installed in ships. Lisnave noted that ship repair is labour intensive and time sensitive – thus, any innovation that reduces worker effort or the time vessels must spend in the repair dock is valuable. Lisnave also noted that it follows technological developments in the industry, such as ballast water and exhaust systems, so as to be able to efficiently service such systems.

#### **4. Policies affecting the Portuguese shipbuilding and maintenance / repair industry**

The Directorate General for Economic Activities (Direção-Geral das Atividades Económicas – DGAE) in the Portuguese Ministry of Economy has responsibility for policies related to the shipbuilding and repair industry in Portugal.

The Portuguese government offers no specific direct or indirect support measures to the shipbuilding and maintenance / repair industry. However, as businesses operating within Portugal, eligible firms in the industry have accessed three general support measures, as reported for the most recent WP6 Inventory of Subsidies and Other Support Measures (OECD, 2013). These are discussed below, followed by a description of some other relevant policy measures and future possibilities.

##### ***Support measures***

Three support measures available to the shipbuilding and repair industry were described in the WP6 Inventory (OECD, 2013):

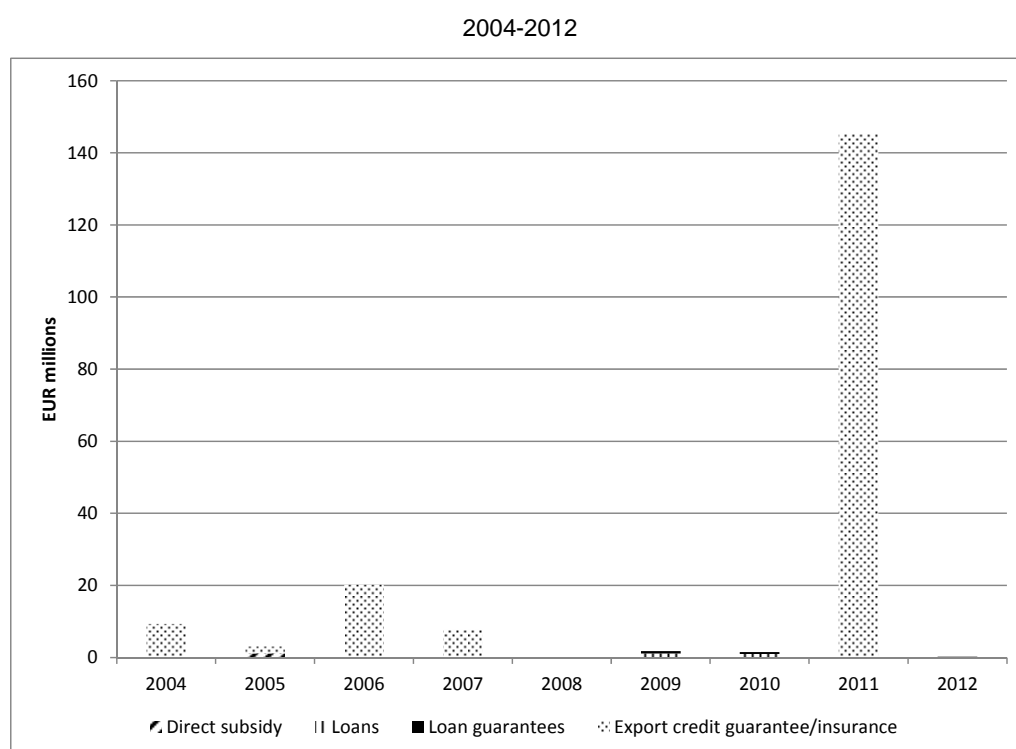
- **Export credit guarantees/insurance:** Portugal's Companhia de Seguro de Créditos, S.A. (COSEC) offers export credit guarantees and insurance (pure cover) to the shipbuilding and repair industry in accordance with the OECD's Sector Understanding on Export Credits for Ships (SSU).<sup>9</sup> COSEC is owned 50% by Euler Hermes, a trade-related credit insurance company, and 50% by BPI, a Portuguese bank.
- **Loans:** Shipbuilding and maintenance / repair firms may access loans on terms and conditions more favourable than those commercially available from the Institute for the Support of Small and Medium-sized Enterprises (IAPMEI), a Portuguese government agency for SMEs and innovation. IAPMEI provides technical and financial support to SMEs operating in Portugal; it is not specific to any one industry. The programme – SME Invest – was conceived to facilitate access to finance for SMEs through more favourable credit rates. However, the amount of credit available (maximum EUR 1 million) is not sufficient for shipbuilding activity.
- **Loan guarantees:** Associated with the provision of loans, the IAPMEI also reduces risk for SMEs by providing a mutual guarantee scheme. The scheme – SME Crescimento – grants financial guarantees that facilitate access to loans, and technical guarantees that provide terms suitable for investments and activity cycles. The main objective is to stimulate investment, development, modernisation and internationalisation of SMEs by sharing risks and thus facilitating access to loans. Box 3 describes the scheme in more detail.

Support to the shipbuilding and maintenance / repair industry via these three measures has been intermittent, reflecting the relatively small scale of the industry and the limited number of orders for large vessels. Export credit guarantees in recent years were offered under the general terms of the Arrangement



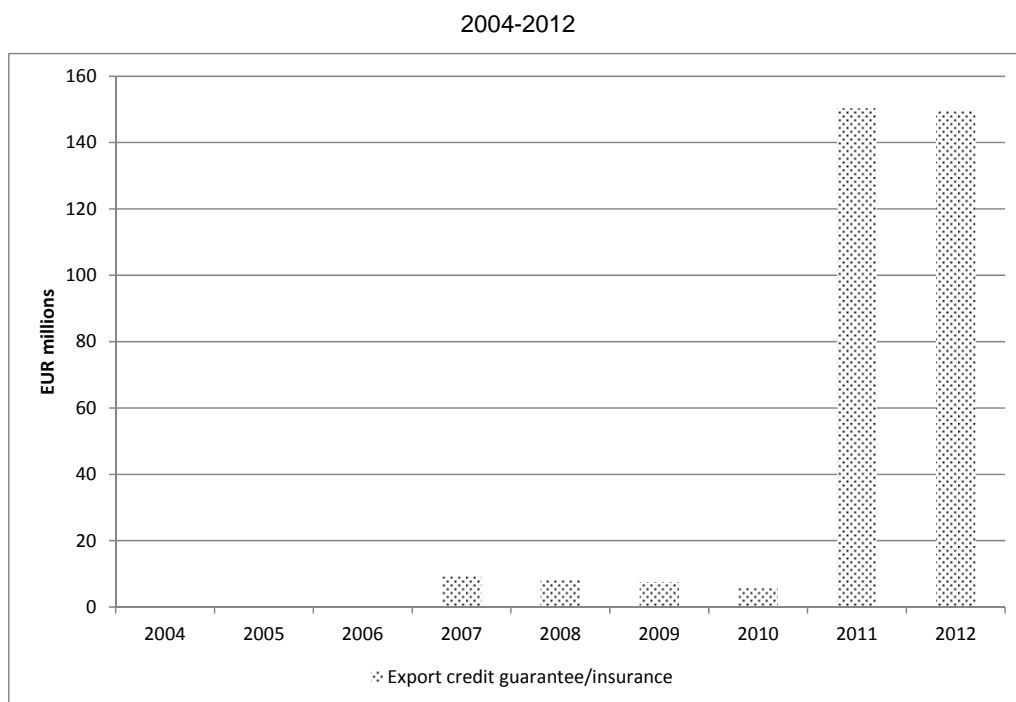
on Officially Supported Export Credits rather than on SSU terms. Export credit guarantees account for the largest amount of monies committed and financial exposure – the sums for loans and loan guarantees are much smaller. Figures 6 and 7 below show the measures used by the shipbuilding and maintenance/repair industry over the period 2004 to 2012, as reported for WP6 inventories. Direct subsidies were reported in the 2007 and 2008 inventories, relating to a sum dispersed in 2005.

**Figure 6. Monies committed each year**



Source: OECD (2007, 2008, 2009, 2010b, 2011b, 2012c, 2013).

**Figure 7. Maximum financial exposure at year-end**



Source: OECD (2007, 2008, 2009, 2010b, 2011b, 2012c, 2013).

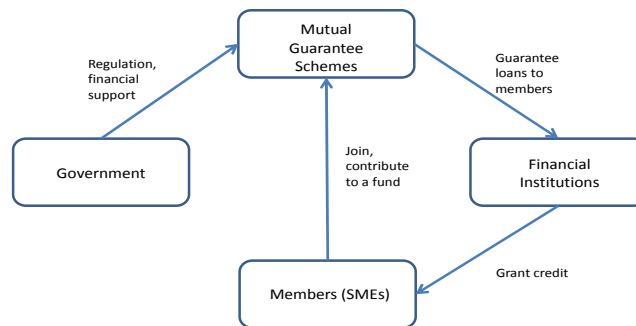
For the period 2010-2012, the loans/credit lines provided to the shipbuilding and maintenance / repair industry amounted to EUR 2.22 million. These had associated guarantees of EUR 1.2 million, and involved 10 companies. There were no export credit guarantee commitments in 2012, but two policies were issued in 2011 relating to the construction of two asphalt carriers by Estaleiros Navais de Viana do Castelo (ENVC).

### Box 3. The mutual guarantee scheme

The IAPMEI mutual guarantee scheme aims to help micro-, small- and medium-sized enterprises obtain credit under conditions appropriate for their investment and business activity cycles. The scheme has three pillars:

- Mutual guarantee societies, which provide guarantees to SMEs to enable completion of their projects. Beneficiaries of a guarantee must be shareholders of the mutual guarantee society. There are currently four societies in Portugal (Norgarante, Lisgarante, Garval and Agrogarante);
- A national reinsurance fund (the Mutual Counter-guarantee Fund – FCGM), which covers part of the risk of the societies. The FCGM is publicly funded by IAPMEI;
- A co-ordinator (Sociedade de Investimento S.A. – SPGM), which manages the FCGM and stimulates the creation and development of mutual guarantee societies.

As a general illustration, the basic structure of a mutual guarantee scheme is usually as depicted in the diagram below:



Source: Information from [www.iapmei.pt](http://www.iapmei.pt) (Garantia Mútua) and [www.spgm.pt](http://www.spgm.pt).

### *Other relevant policies*

Within the wider Portuguese and European policy frameworks there are some additional measures of relevance to the shipbuilding and repair industry. In particular, the Portuguese National Strategic Reference Framework for 2007-2013 (Quadro de Referência Estratégica Nacional – QREN) and its COMPETE programme, and the EU Framework on State Aid to Shipbuilding, allow certain measures to be undertaken in support of shipbuilding and maintenance / repair activity, although their provisions have not been utilised to date. Portugal also has a system of R&D tax incentives that is open to all sectors of the economy. These are described further, below.

Aside from these policy frameworks and the aforementioned export credit and loan/loan guarantee measures, the Portuguese government did not indicate any other laws, regulations or practices, or any other government involvement in the industry. Notably, there appears to be a strong perception within the Portuguese shipbuilding and maintenance / repair industry that state support is more readily available in other European countries, and that this makes it more difficult for them to compete in the international market for building and repair work.

### *QREN and COMPETE*<sup>10</sup>

The QREN is Portugal's framework for implementing EU economic and social cohesion policy within the country. It has the strategic aim of upgrading skills and promoting economic development, and is carried out via three broad thematic Operational Agendas (on human potential, competitiveness, and territorial enhancement).

COMPETE is an Operational Programme under the QREN's Operational Agenda for Competitiveness Factors. It implements measures that aim at innovation, technological development, entrepreneurship and the business environment, and is co-financed by the European Regional Development Fund. While shipbuilding and maintenance / repair is not eligible for industry-specific aid under COMPETE, firms in the industry may access two horizontal measures that aim to improve the general competitiveness of the Portuguese economy.<sup>11</sup>

- The first measure is incentive schemes for technological research and development (SI I&DT). These schemes provide grants with the aim of intensifying corporate R&D efforts and linking companies with organisations in the science and technology system to speed up dissemination, transfer and use of technology and knowledge.
- The second measure is an incentive scheme for "qualification" and internationalisation of SMEs (SI Qualificação de PME). This measure also provides grants and aims to increase Portuguese companies' orientation to international markets and reposition them in more competitive differentiated segments. It also aims to promote productivity through increasing competitiveness.

However, shipbuilding and maintenance / repair companies have not received any grants under these schemes to date. Grants are provided to companies on a project basis and are allocated through a competitive process. One shipbuilding firm applied for funding under the R&D scheme but was not approved; no shipbuilding firms had applied for funding under the internationalisation scheme as of end-2012.

### *EU Framework on State Aid to Shipbuilding*<sup>12</sup>

Since the 1970s, the EU has enabled 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 current Framework on State Aid to Shipbuilding, covering the period 1 January 2012 to 31 December 2013, contains specific provisions in respect of regional aid, innovation aid and export credits (see Box 4). Other types of support (e.g. for rescue and restructuring of enterprises, or environmental protection) must accord with horizontal rules on state aid in the EU. The European Commission noted that it has a policy to abolish sector-specific rules wherever possible.

#### **Box 4. Support measures in the EU Framework for State Aid to Shipbuilding**

The current Framework for State Aid to Shipbuilding (see EU, 2011) allows for three main support measures, which are considered compatible with EU rules under certain conditions:

- **Regional aid:** This is limited to investments for upgrading or modernising existing yards, with the objective of improving productivity. The maximum aid intensity\* (ceiling) is lower than in other industry sectors and aid can only be granted to facilities in eligible regions.
- **Innovation aid:** This is granted for the first industrial application of technologically new or substantially improved products or processes when compared to the state of the art that exists in the shipbuilding industry with the EU, which carry a risk of technological or industrial failure. The aid is limited to supporting expenditure on investment, design, engineering and testing activities, and an application must be submitted to the relevant national authority prior to any implementation of the project, otherwise the aid may be deemed incompatible with EU rules. An independent expert must make a positive quantitative and qualitative appraisal of the project and the aid must result in an increase in innovative activity.
- **Export credits:** This aid must be compatible with the Arrangement on Officially Supported Export Credits and the SSU.

\* Aid intensities are expressed in gross grant equivalents – essentially, the value of the aid as a percentage of the eligible costs of the investment project. This ensures the beneficiary makes a financial contribution to the investment.

The Portuguese government does not provide any support under the EU Framework for State Aid on Shipbuilding, as it would require a national budget line (i.e. funding) to be established and this is not compatible with the current economic climate and budgetary adjustment.

#### *R&D tax incentives<sup>13</sup>*

Portugal offers a R&D tax incentive scheme to eligible firms in all sectors, aimed at encouraging R&D activities. The scheme – SIFIDE II (Sistema de Incentivos Fiscais em Investigação e Desenvolvimento Empresarial) – allows for a tax deduction on business revenue tax. Eligible expenditures include investment in R&D equipment, salaries of researchers and the costs of patent application and management, amongst others. The level of support via the scheme was reduced somewhat for larger firms in the 2012 budget, due to fiscal constraints, but most conditions were maintained for SMEs.

As a general scheme, SIFIDE II would be open to shipbuilding and maintenance / repair firms if they incurred eligible expenditures on R&D-related work. At present, information suggests that no firms used this scheme of fiscal incentives related to fiscal years after 2010.

#### *Possible future policy developments*

Looking ahead, there are several areas of policy development that may hold relevance for the Portuguese shipbuilding and maintenance / repair industry.

#### *A new QREN*

The first area relates to the preparation of Portugal's QREN framework for the next period of EU economic and social cohesion funding,<sup>14</sup> which runs from 2014 to 2020 and has a strong growth and jobs focus. The new QREN framework could possibly include support to shipbuilding, although any measures would be subject to the restrictions in the EU's shipbuilding-specific framework on state aid beyond 2013.

*Stimulus efforts*

The second area relates to Portugal's stimulus efforts, notably measures to support business growth and development in general. In late April 2013, the Portuguese Government announced a programme incorporating cuts to the corporate tax rate and financing for small- and medium-sized enterprises on attractive terms. The first measure has been approved (Law n° 49/2013, 16 July) and establishes a fiscal incentive benefit associated with investment expenditures made by firms in the second semester of 2013. The second measure is a financing policy involving the creation of a EUR 500 million financing line for export-oriented SMEs, to increase liquidity. This last measure is available for one year, renewable for a further year if the line is not exhausted. The period of use for SME's is 6 months from the contract date (with a possible extension to 12 months). Given that most of Portugal's shipbuilding and maintenance / repair firms are relatively small, this policy may be of benefit to those firms that have promising investment plans and markets but that are suffering from liquidity constraints. Another aspect of the programme that may benefit ship maintenance / repairers in particular is the proposal to cut port fees to make ports more competitive (Público, 2013). Given that ship maintenance and repairs are typically undertaken close to ports where vessels unload cargos, any increase in traffic through Portuguese ports has the potential to increase the customer base for the Portuguese industry. During discussions, Lisnave noted that the biggest closest port to its facilities is Rotterdam and that up to 85% of its business is gleaned from passing bulk transporters (solids, liquids, gas) that have discharged their cargo at North Atlantic ports.

*Privatisation*

The third area of policy is privatisation of state-owned enterprises (SOEs), being carried out under Portugal's Memorandum of Understanding on Specific Economic Policy Conditionality (MOU). This document, issued on 17 May 2011, sets out the economic policy conditions required for disbursement of European financial assistance for Portugal.<sup>15</sup> SOEs in several sectors have been identified for privatisation, including in energy and communications. The expectation is that privatisation of SOEs will modernise and restructure SOEs, reduce the State's role in the economy and reduce public debt.

The Portuguese government advised that three shipbuilding and maintenance / repair firms are subject to some level of state-ownership. These are:

- Arsenal do Alfeite SA, which provides repair and maintenance to the Portuguese Navy and has the capacity to design, project and build small craft. Arsenal is 100% held by the state through EMPORDEF SGPS, a Portuguese defence industries holding company;
- NAVALROCHA, a medium-sized ship repair firm focused in high-value and personalised repair services for medium-sized boats. The Portuguese government, through EMPORDEF SGPS, holds 45% of NAVALROCHA;
- Estaleiros Navais de Viana do Castelo SA (ENVC), a medium-sized builder with design, construction, conversion and repair capabilities. ENVC is 100% held by the Portuguese government through EMPORDEF SGPS.

Of these three firms, ENVC had been earmarked for privatisation and the process had commenced under Portugal's Privatisation Law (Lei Quadro das Privatizações). However, the privatisation process was recently abandoned,<sup>16</sup> following the opening of a state aid investigation by the EU. Box 5 describes the events to date.

It is not yet clear what ENVC's future will be – recent reports suggest that an alternative model, perhaps involving sublease of the shipyard's land, will be investigated (Silva, 2013). The Portuguese

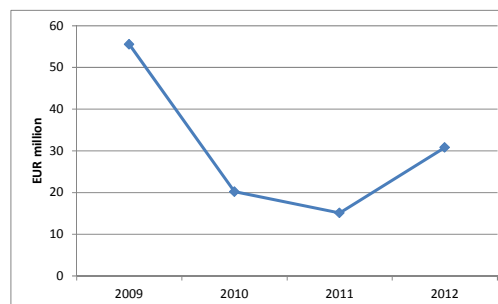
government noted that ENVC, as a public company, faces serious constraints in competing with private companies, as it must comply with the public contract code.<sup>17</sup> One particular issue is that the code requires international public tenders for the acquisition of raw materials, equipment and services, which means that ENVC cannot guarantee that the brandname of equipment (e.g. the engine) specified by the client will be the successful tenderer. As a consequence, there are risks that equipment will be purchased that will not be accepted by the client. Another issue is the long period of time required for the tender process, which can entrain delay penalties or even contract cancellation. Private companies do not have to comply with these procedures.

#### Box 5. ENVC - privatisation and future plans

ENVC is a medium-size shipyard that has been active since 1944. It is situated in the north of Portugal, not far from the city of Porto, and employs approximately 620 people. Owned by EMPORDEF, it is part of the group's naval cluster, along with NAVALROCHA and Arsenal do Alfeite. ENVC has a capacity to construct various types of ships, from tankers to container ships up to 37 000 DWT. Up to the present, ENVC has delivered more than 200 vessels including barges, tugboats, ferry boats, fishing vessels, general cargo and bulk carriers, container ships, oil and chemical tankers, LPG carriers, cement carriers and war vessels.

ENVC's annual sales have fluctuated considerably recently (see chart below). In 2009, total sales were more than EUR 50 million, but they dropped significantly in 2011 following a decrease in new orders. In 2012, sales increased again, to EUR 30.8 million. In 2009, 86% of its output was for export, but this was expected to be only 9% in 2012. ENVC has an order for two 27 000 DWT asphalt carriers for Venezuela, whose construction has recently commenced.

**Sales volume of ENVC, 2009-2012**



Source: Data from the Portuguese government.

ENVC has been loss-making since at least 2004 and has had a constant decrease in turnover and negative equity since 2008-09 (EU, 2013). The Portuguese government has been considering privatising ENVC (or more correctly, re-privatising, since the company was initially private then nationalised) for several years. The Portuguese government noted that as a public company, ENVC is bound by the public contract code, which causes significant constraints for shipbuilding operations.

A privatisation process was approved by Decree Law 186/2012, 13 August 2012, which proposed directly selling up to 95% of shares to an investor and publically offering the remaining 5% to ENVC's employees. Over 70 potential investors were identified by EMPORDEF, of which six submitted non-binding offers. Four investors were selected to participate in Phase II, of which two entered eligible binding bids.

However, the process was suspended and then abandoned (see note 16), following the opening of an in-depth investigation by the European Commission into possible support measures granted by the Portuguese government in favour of ENVC. The EC is investigating whether past measures constitute state aid in the meaning of EU rules (EU, 2013). It also expressed concerns that measures planned within the context of the privatisation process might constitute state aid and requested Portugal to notify any such measures before implementation.

The Portuguese government then looked at alternative approaches to the re-organisation of ENVC. Recently, it approved Decree Law n° 98/2013, 24 July, authorising ENVC to open an international public tender, aiming at the

sub-concession of a certain area where defined activities can be implemented. Following the approval of the Program of Procedures and Specifications, and the publication of the respective advertisement, an Evaluation Panel was nominated jointly by the Minister of State and Finances (Ministra de Estado e das Finanças – MEF) and the Minister of National Defence (Ministro da Defesa Nacional – MDN) (Order nº 11029/2013, Diário da República, 27 August).

In the course of the call for tender, two binding bids were submitted but only one was admitted. The Panel presented its final report to the Board of ENVC SA on 11 October. On that same day, the Board of ENVC SA took the decision to grant the sub-concession to Navalria / Martifer Energy. Currently, all the items necessary to the contract's formal elaboration and signature are undergoing preparation.

*Source:* Information provided by the Portuguese government, supplemented by Secretariat desk research.

### *LeaderSHIP 2020*

Finally, at the European-level is the new shipbuilding strategy – LeaderSHIP 2020 – that was announced in February (EC, 2013). This strategy builds on a previous EU-level initiative (LeaderSHIP 2015<sup>18</sup>) and aims to increase the competitiveness of European maritime technology. The strategy proposes action on employment and skills, improving market access and conditions, access to finance, and R&D and innovation. It proposes harnessing existing EU programme tools and funding opportunities, but it also advocates broadening the lending activities of the European Investment Bank (e.g. for offshore renewable energy) and creating new private-public partnerships for finance and research.

It is not yet clear how the LeaderSHIP 2020 strategy will translate into concrete policies or initiatives. However, it is possible there may be opportunities in the future for Portuguese shipbuilding and maintenance / repair firms to, for example, tap support for activities such as staff training or research, or to participate in projects related to environmental technologies. AIN (the Portuguese Association for Maritime Industries) was part of the LeaderSHIP Coordination Group and participated in all the preparatory meetings. AIN is also responsible for follow-up, through SeaEurope (the European association) with which AIN works closely.

## **5. The performance of the Portuguese industry**

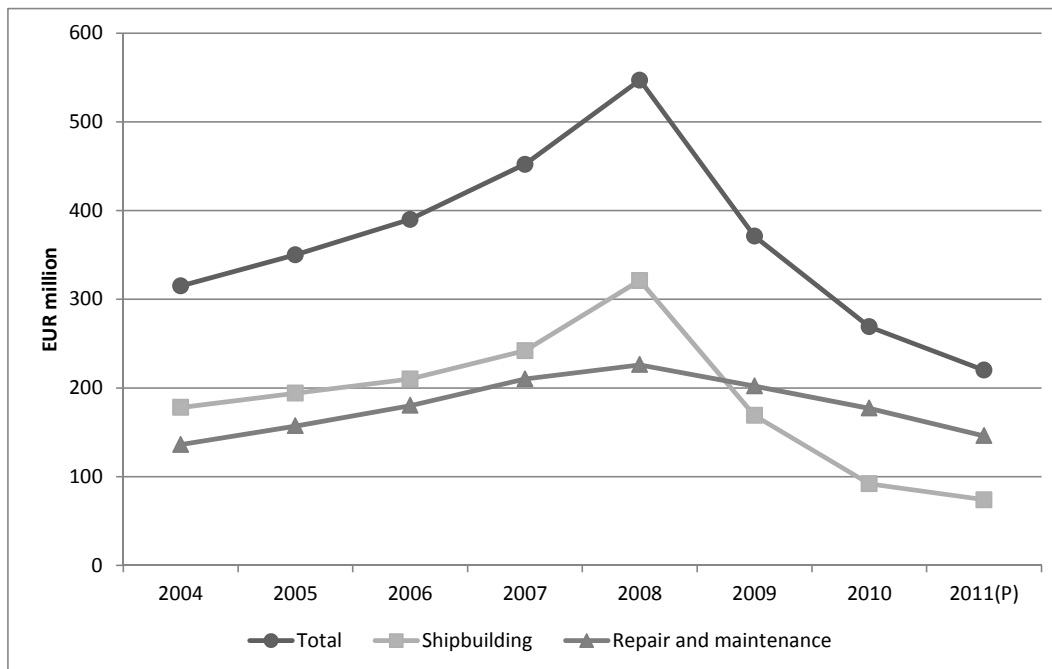
This section of the report presents some indicators of the performance of the Portuguese shipbuilding and maintenance / repair industry. It also provides some comparative data on countries with a shipbuilding and maintenance / repair industry of a similar size to Portugal's, to aid in identifying industry challenges.

Due to the distinct characteristics of the industry's sub-segments, the analysis below attempts to distinguish between building and repair/maintenance, although data on the latter are limited. Figure 2 earlier showed how the maintenance / repair sub-sector has maintained its share of GDP in recent years, in broad terms, while the shipbuilding sub-sector has declined. Additional data from the Portuguese government confirm this diverging performance, showing that since 2009, ship repair and maintenance has generated more turnover<sup>19</sup> than shipbuilding in Portugal (Figure 8). The impact of the global financial and economic crisis on trade and the maritime industry flowed through to Portuguese shipbuilding and maintenance / repair activity from 2008, but while both segments of the industry have been in decline since then, shipbuilding has suffered more. By 2011 shipbuilding accounted for only one-third of total industry turnover, down from over half in 2004. In 2011, provisional data showed a total turnover of EUR 220 million – EUR 146 million from repair and maintenance and EUR 74 million from shipbuilding.



**Figure 8. Turnover in shipbuilding and maintenance / repair**

2004-2011



Source: Data provided by the Portuguese government, INE - Sistema de contas integradas das empresas (Integrated Business Accounts System).

Data on financial autonomy similarly reveal a diverging performance within the industry. Information from Portugal's Ministry of Justice<sup>20</sup> shows that the extent to which total assets are financed by shareholder/owner capital (i.e. equity to total net assets) differs widely between the metal shipbuilding, non-metal shipbuilding, recreation and sport construction, and repair and maintenance parts of the industry. From 2006 to 2009, the financial autonomy of firms in ship repair and maintenance increased, from 25.5% to 50%. At the same time, that of firms in metal shipbuilding turned negative, to register -1.3% in 2009. Financial autonomy of firms in non-metal shipbuilding remained positive over the period, although generally less than 10%, while that of firms involved in recreation and sport construction generally hovered around 30%.

The indebtedness of the industry sub-segments followed a similar pattern to that of financial autonomy. The Portuguese government advised that the debt to equity ratio of the maintenance / repair segment decreased from 74.4% in 2006 to 50% in 2009. In contrast, metal shipbuilding firms increased their indebtedness, from 94.9% to 101.3%, revealing complete dependence on creditors.

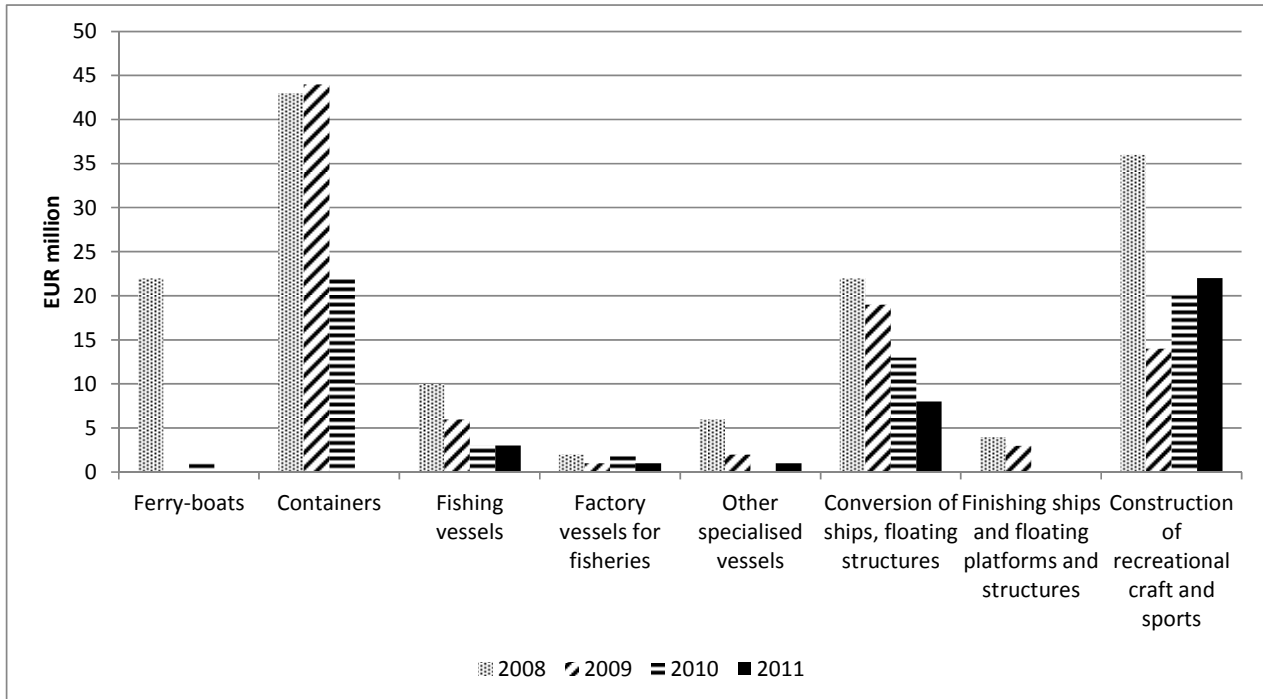
### **Shipbuilding**

#### *Output*

The number of ships larger than 100 GT completed in Portuguese shipyards has been low for some years, and there is a general declining trend in output. Since 2010, only one or two vessels have been constructed each year, of which total gross tonnage was less than 10 000 GT. On this basis, the Portuguese share of world output has decreased from 0.55% in 1996 to 0.06% in 2012, by number of vessels, and from 0.21% to 0.009% over the same period as measured by CGT.



**Figure 10. Vessels produced in Portuguese shipyards**



Source: Data provided by the Portuguese government, from INE - Inquérito anual à produção (Annual enquiry on production).

**Table 3. Types of ships constructed in Portugal**

Vessels over 100 GT, 2002-2012

Year	Types and number of ships constructed	Number of ships built
2002	Chemical (1), general cargo (1), fishing (1)	3
2003	Fishing (2), chemical (1), general cargo (1), refrigerated cargo (1)	5
2004	Chemical (1), fishing (1)	2
2005	Chemical (2)	2
2006	Fishing (3), general cargo (2)	5
2007	General cargo (3)	3
2008	General cargo (2)	2
2009	Offshore supply (3), general cargo (2)	5
2010	General cargo (1)	1
2011	Ro-ro cargo (1)	1
2012	Product (1), fishing (1)	2

Source: Compiled by the Secretariat, based on completions data from IHS Fairplay *World Shipbuilding Statistics*, various editions.

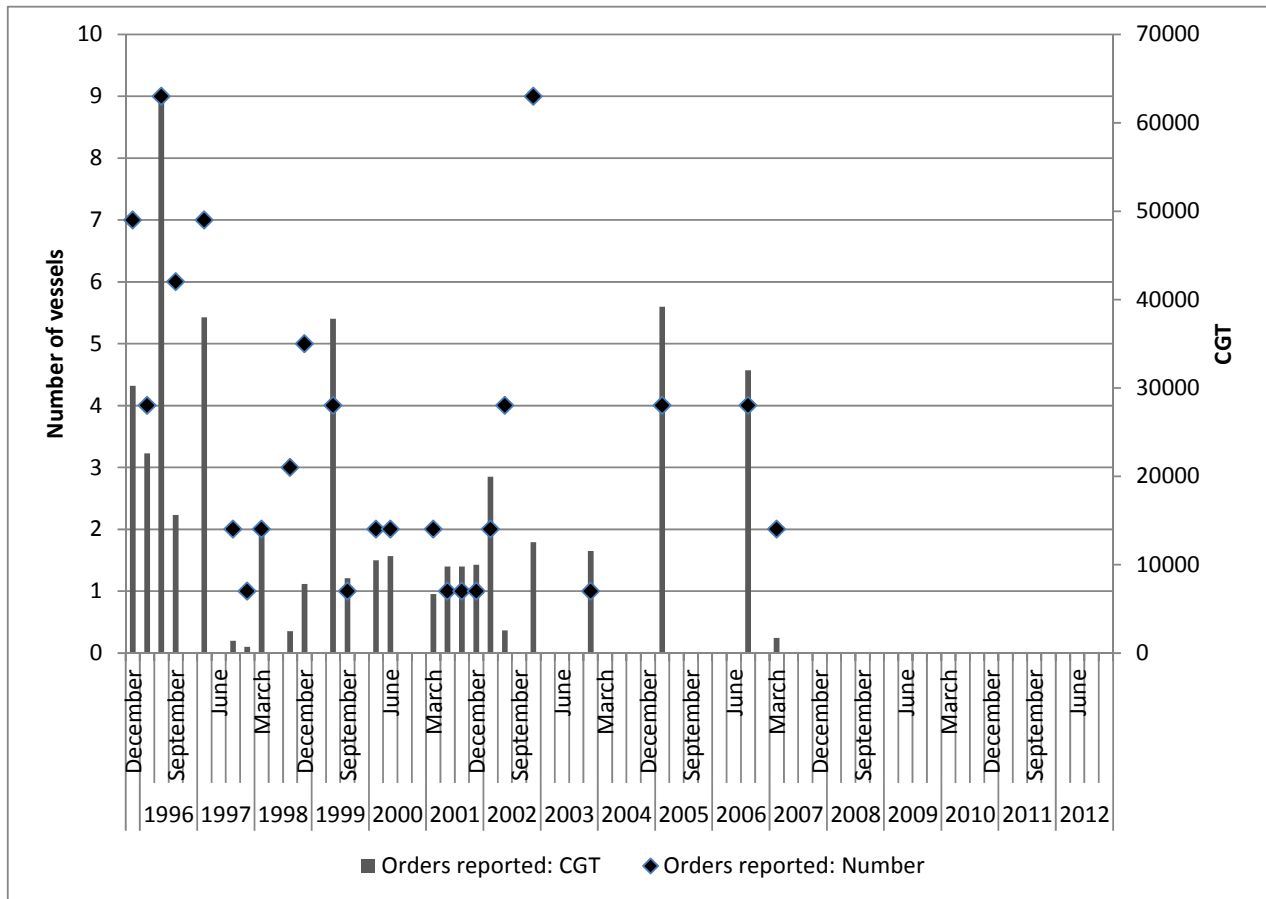
*Orders and the orderbook*

Data from IHS Fairplay suggest that Portuguese shipyards have received no new orders for vessels over 100 GT since 2007 (Figure 11). As such, while the Portuguese share of world orders reported was 1.25% in 1996 by number of vessels and 0.67% by CGT, it was zero in 2012. However, the Portuguese government noted that these data do not include orders placed by the ship owner Douro Azul at the NAVALRIA yard, in 2009, 2010 and 2011, of two ferries (each of 450 GT / 1 530 CGT) and four passenger vessels (hotel river ships) each of 650 GT / 3 757 CGT. The data also do not incorporate the 2010 contract of the Venezuelan oil company PDVSA for two asphalt carriers at the ENVC yard. These

vessels (of 188 metres each) are designed to carry asphalt at high temperatures, and the contract was worth EUR 128 million in 2010. While building was stopped due to financial and public hiring difficulties at the yard, the work restarted in 2013 and the order has remained in the orderbook. These data omissions also affect Figures 12 and 13 below.

**Figure 11. Evolution of orders reported by Portuguese yards**

Number and CGT, quarterly data



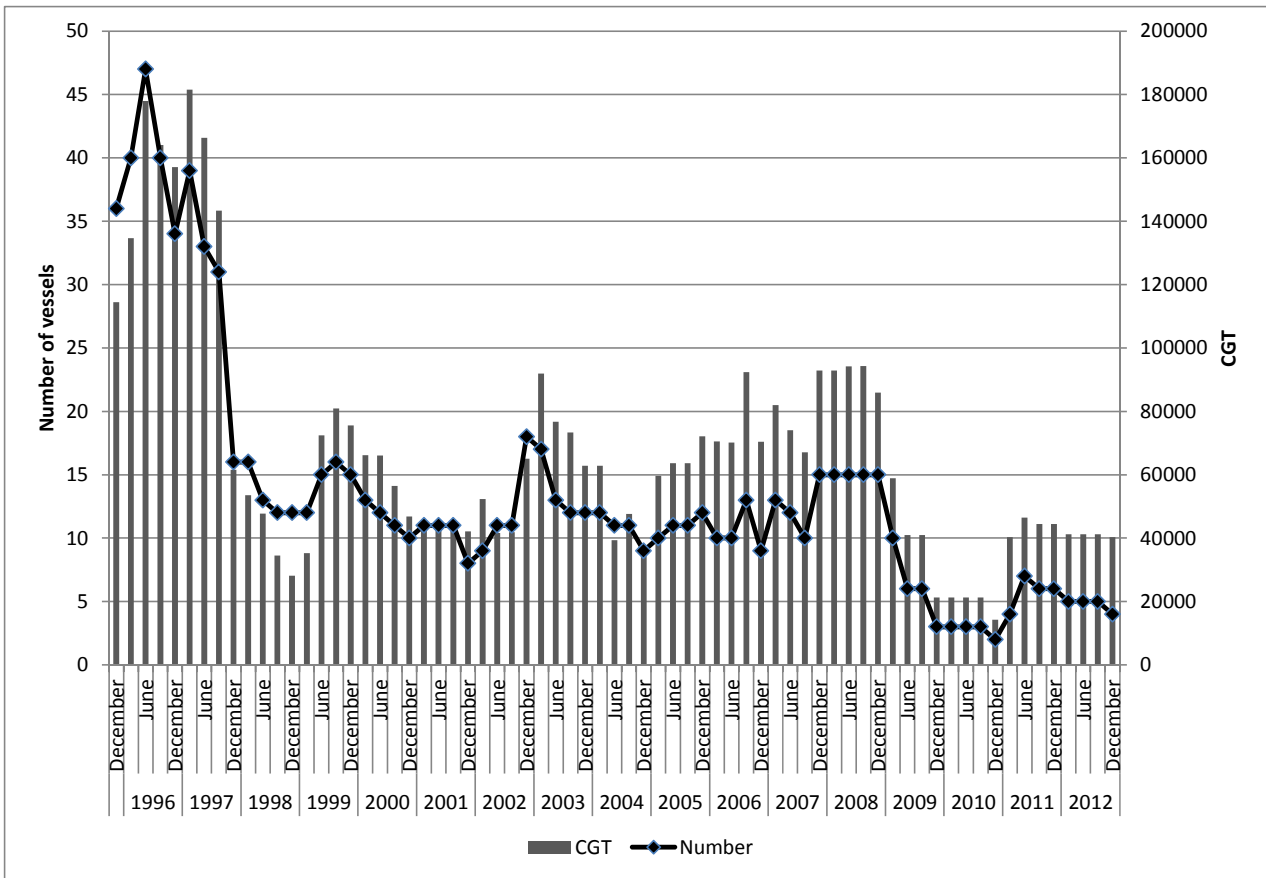
Note: Data for vessels over 100 GT.

Source: Compiled by the Secretariat, based on data from IHS Fairplay *World Shipbuilding Statistics*, various editions.

With the drop-off in new orders, the orderbook as measured by IHS data has also declined (Figure 12). From late 1997, there was a sharp drop in the orderbook, followed by another step-drop in late 2008/early 2009. This translated into a decline in Portugal’s share of the world orderbook – in 1996, its share by CGT was around 0.46% (1.6% by number of vessels), and by 2012 this had fallen to 0.04% (0.08%). In other words, Portugal’s share of the 2012 world orderbook by CGT was less than a tenth of what it was in 1996, and its share by vessels was one-twentieth of its previous level. Data provided by the Portuguese government are slightly different, but show a similar steep decline in the orderbook in the 2008-09 period and indicate zero orders from 2009 (Figure 13).

**Figure 12. Evolution of the Portuguese orderbook**

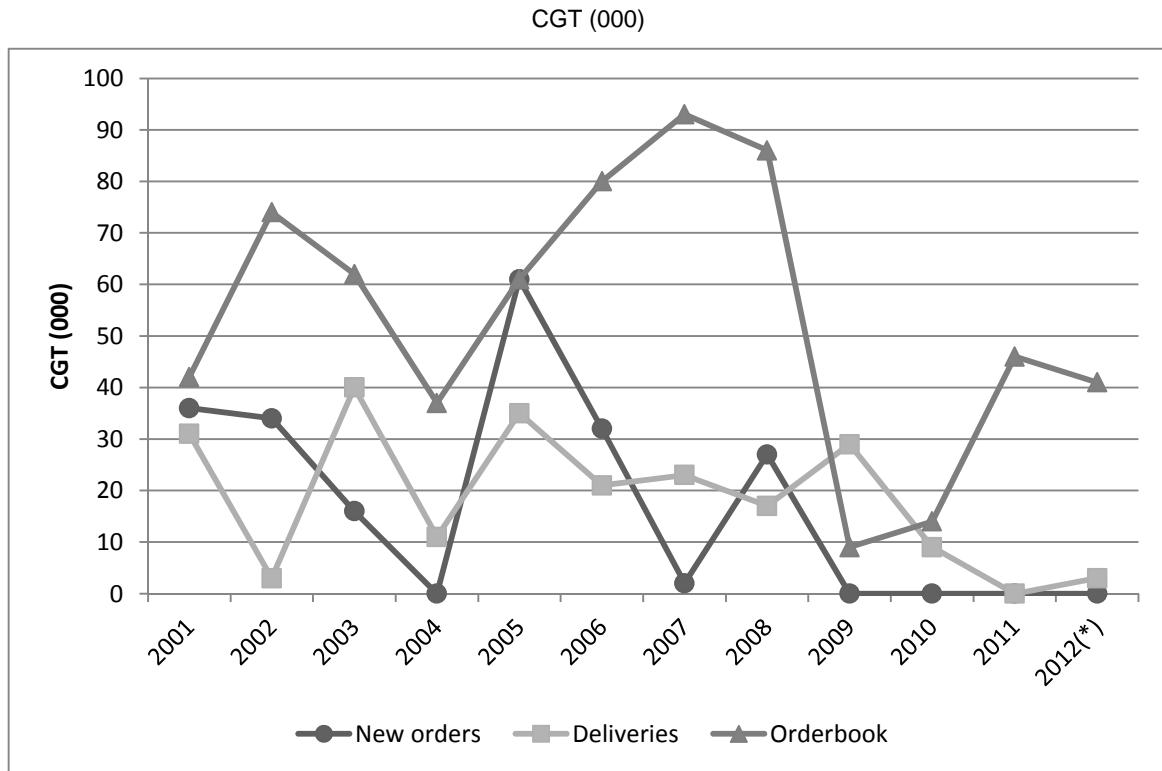
Number of vessels and CGT on order



Note: Data on vessels over 100 GT.

Source: Compiled by the Secretariat, based on data from IHS Fairplay *World Shipbuilding Statistics*, various editions.

**Figure 13. Portuguese shipbuilding - orders and deliveries**



\* First six months.

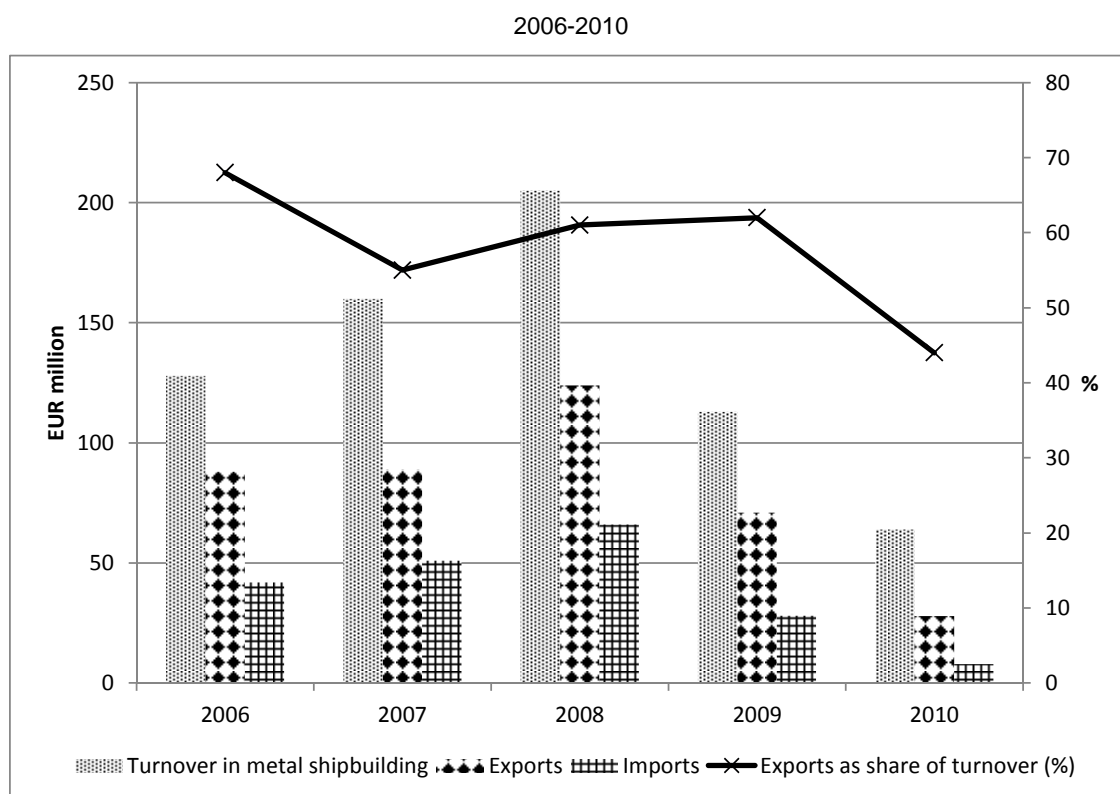
Source: Data provided by the Portuguese government, based on CESA, Lloyd's Register and Fairplay.

According to Clarkson data, the orderbook at April 2013 comprised two passenger/car ferries, for a total of 8 360 GT (Clarkson 2013, p. 29). These vessels are contracted to be built at the ENVC yard. While small, a notable feature of the orderbook is that these types of vessel are new for Portuguese shipyards, perhaps indicating a potential to diversify the industry’s product offering into higher value vessels.

*Internationalisation*

The metal shipbuilding industry in Portugal has a significant export component, with 44% of its turnover in 2010 going for export (Figure 14). Nevertheless, this represented a decline on previous years, where the share of exports was as high as 68%. Data for the ENVC yard showed that exports represented 86% of sales in 2009, although this dropped to around 50% in 2010-11.

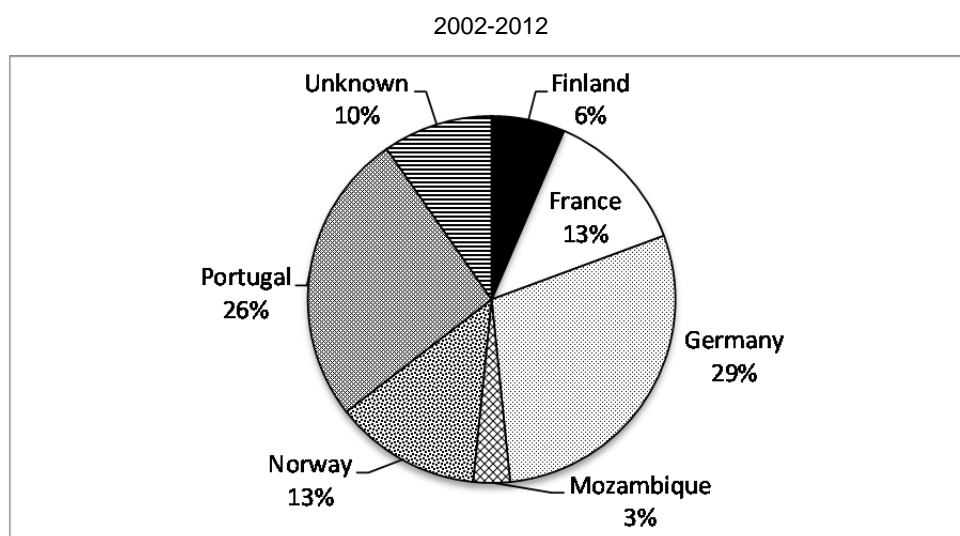
**Figure 14. Exports in turnover in metal shipbuilding**



Source: Data provided by the Portuguese government, from IES - Informação empresarial simplificada (Simplified Business Information - Ministry of Justice).

Approximately 90% of customers (i.e. shipowners) for Portuguese-constructed vessels are European. Between 2002 and 2012, Germany was the biggest customer in terms of the number of vessels built (29%), followed by Portugal itself (26%) (Figure 15).

**Figure 15. Origin of shipowners**



Note: Based on economy's share of number of vessels completed, above 100 GT.  
 Source: IHS Fairplay World Shipbuilding Statistics, various editions.

*Portugal's shipbuilding competitors*

The challenge faced by the Portuguese shipbuilding industry is highlighted by studying its competitors in a typical market segment. In the past few years, general cargo ships between 7 000 and 12 000 DWT were the main products of Portuguese shipyards. In this market segment, China is the biggest player internationally, by volume, followed by Japan and the Netherlands (Table 4).

**Table 4. Completion of general cargo ships**

No. of vessels (7000-12000 DWT), 2008-2012

Rank	2008	2009	2010	2011	2012
1	China (53)	China (49)	China (52)	China (73)	China (58)
2	Japan (14)	Japan (8)	Netherlands (7)	Netherlands (9)	Japan (9)
3	Netherlands (7)	Netherlands (4)	Japan (5)	Japan (9)	Netherlands (7)
4	South Korea (4)	Vietnam (3)	Vietnam (5)	Ukraine (4)	Turkey (2)
5	Indonesia (2)	Ukraine (3)	Chinese Taipei (4)	Chinese Taipei (3)	Vietnam (2)
<i>c.f. Portugal</i>	2	2	1	0	0

Source: IHS Fairplay *World Shipbuilding Statistics*, various editions.

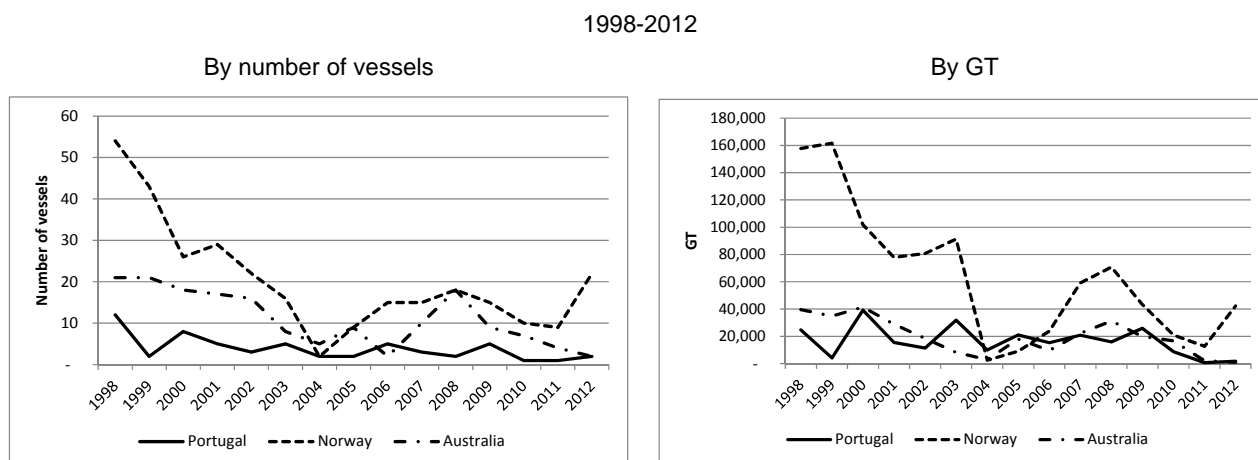
China clearly has scale on its side and likely lower costs, while Japan and the Netherlands supply many of these vessels to local clients (60% and 80%, respectively, by number of vessels in the 2008-2012 period) and are therefore less reliant on the international market. In contrast, Portugal is a small-scale producer relying more heavily on foreign customers.

To maintain and expand activity, it would seem Portuguese shipbuilders need to find niches where they can offer a differentiated product and to cultivate a loyal international customer base. While some builders may hope for growing domestic demand, perhaps from the Navy or from offshore project opportunities, it is likely that economic circumstances will constrain such domestic possibilities for the near future and that an international focus would hold stronger potential.

Are there any insights to be gained from the approach of other WP6 shipbuilders of a similar size to Portugal? By share of world orderbooks, Australia and Norway are Portugal's closest comparators – Australia slightly smaller, Norway larger, but both with a share of 0.1% or less.<sup>21</sup> There is also a general similarity among these countries, particularly from 2004 onwards, in vessel completions (Figure 16).



**Figure 16. Completion in Australia, Norway and Portugal**

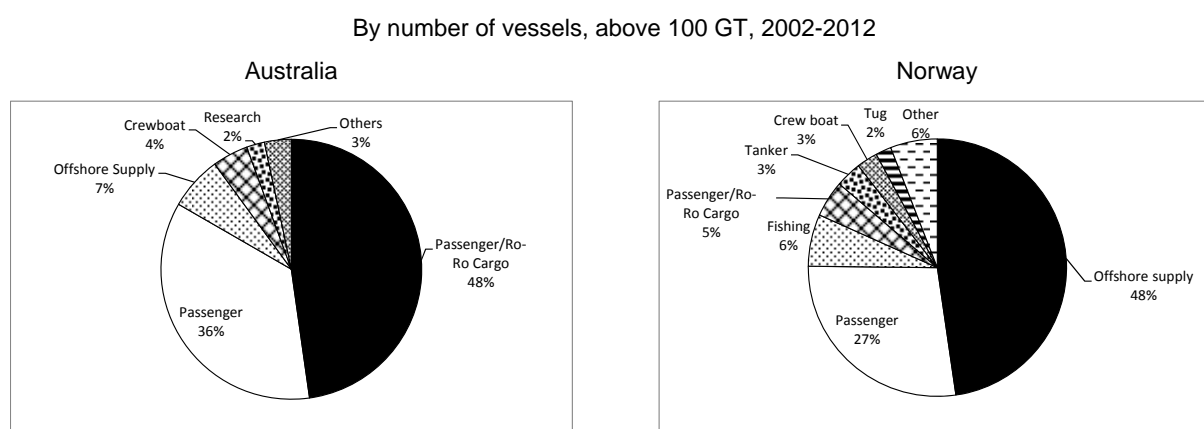


Source: IHS Fairplay World Shipbuilding Statistics, various editions.

A comparison of ship-types reveals that Australia and Norway have specialised in some market segments (Figure 17), while as shown earlier, Portuguese shipbuilders have built a variety of vessel types. While this might indicate technological adaptability and flexibility on the part of Portuguese shipbuilders, it may also be a reflection of yards taking what orders are available and being unable to strategically position themselves in a competitive niche. Industry stakeholders commented that while it is more efficient to run a production line for a series of vessels, it has been increasingly necessary to build a diverse range of vessels. They noted it is harder to survive producing unique vessels or short runs.

For its part, Australian shipbuilding has mainly focused on passenger ships and passenger/ro-ro cargo ships, which in total accounted for 84% of its total production from 2002 to 2012. Australian shipbuilders also make extensive use of aluminium as a construction material. Australia’s competitive strength can be seen in its share of world output of small passenger ships, for instance – it was the largest producer of these vessels, by number, over the decade 2002-2012 (Figure 18). Norway’s main focal segments are offshore and passenger ships, although it also produces other types of vessels such as tankers and fishing vessels (Figure 17).

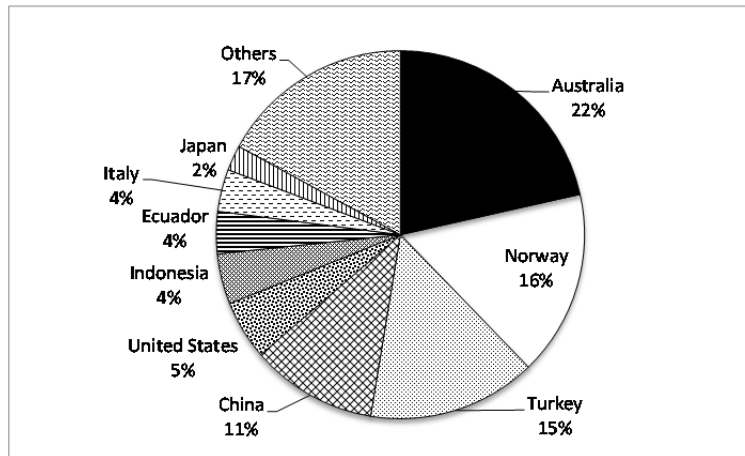
**Figure 17. Types of vessels built - comparator economies**



Source: IHS Fairplay World Shipbuilding Statistics, various editions.

**Figure 18. World completion of passenger ships, by economy**

By number of vessels below 1 000 GT, 2002-2012

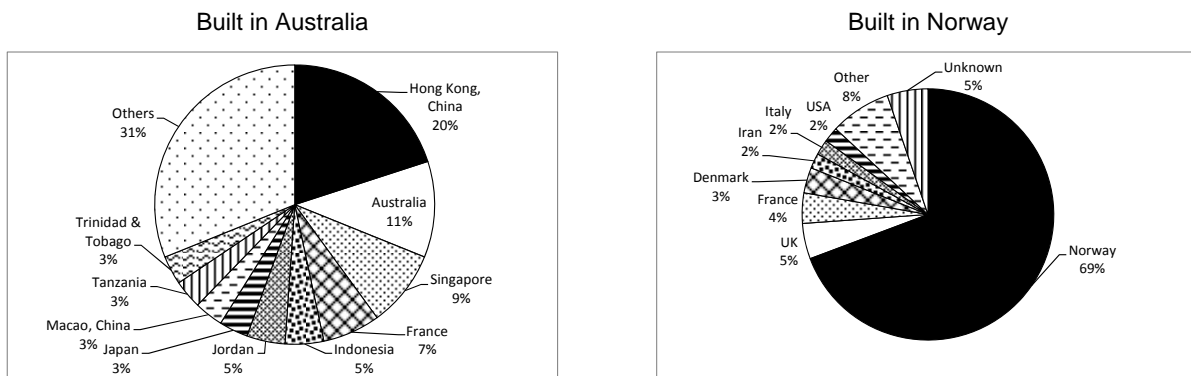


Source: IHS Fairplay World Shipbuilding Statistics, various editions.

Australia and Norway have different customer profiles, however. Australian shipbuilders have a diverse customer base, including Asia, the Middle East and Europe (Figure 19). Norway, in contrast, has a strong domestic demand base, related to its energy and fishing industries, and almost 70% of the vessels built in the decade 2002-2012 were for Norwegian shipowners. In this case, Portugal may have more to learn from Australia, with respect to the industry’s marketing approach and international strategies.

**Figure 19. Origin of shipowners - comparator economies**

By number of vessels above 100GT, 2002-2012



Source: IHS Fairplay World Shipbuilding Statistics, various editions.

Both Australia and Norway appear to be recovering from the shipbuilding recession of the past few years; Norway in particular has obtained a number of orders (Table 5). Portugal, however, does not yet have any orders scheduled for delivery beyond 2014, according to IHS statistics.

**Table 5. Delivery schedules of orderbooks - Australia, Norway and Portugal**

As of December 2012

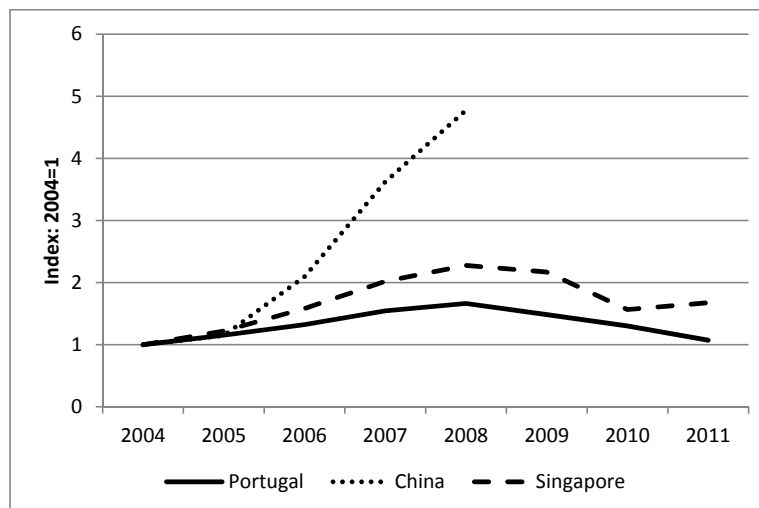
	2013			2014			2015		
	No.	GT	CGT	No.	GT	CGT	No.	GT	CGT
Australia	5	22 693	35 423	2	1 468	5 502	4	2 936	11 004
Norway	23	42 447	89 968	21	57 703	107 580	19	105 568	165 926
Portugal	3	26 960	27 238	1	18 600	13 028	0	0	0

Source: IHS Fairplay *World Shipbuilding Statistics*, December 2012, Table 2A.

### *Ship repair and maintenance*

As shown in Figure 8 earlier, turnover in the ship maintenance / repair sub-sector in Portugal increased steadily from 2004 to 2008 – a 66% increase in five years – in association with the shipbuilding boom and the expansion of the world fleet. However, since the financial crisis, turnover has been decreasing gradually (a 33% decrease from 2008 to 2011). The general trend of turnover in both shipbuilding and ship repair is similar, but the fluctuations in turnover are less in ship repair than in shipbuilding. Also, reflecting the sharp drop in turnover in shipbuilding, turnover in ship repair overtook that of shipbuilding in 2009.

Figure 20 shows the trend of turnover in ship repair in China, Portugal and Singapore. It can be observed that turnover in ship repair in China increased very rapidly, becoming more than four times larger from 2004 to 2008. Turnover in Portugal and Singapore showed a similar trend, although the growth to 2008 was larger in Singapore than in Portugal, and a small recovery can be seen in Singapore in 2011.

**Figure 20. Turnover of ship repair in China, Portugal and Singapore**

Source: Data for Portugal provided by the Portuguese government. Other data sourced from Chinese ship repair market analysis (Japan Ship Technology Research Association – [www.jstra.jp](http://www.jstra.jp) and the Association of Singapore Marine Industries – [www.asmi.com](http://www.asmi.com)).

### *Industry productivity*

Labour productivity in the Portuguese shipbuilding and repair industry appeared to increase in the mid-2000s, but unfortunately analysis over a longer period is limited by data availability and reliability. Figure 21 below shows an index of real value added per employee in the industry over the period 1995 to 2006. It displays a strong rise in productivity from 1995 to 1998; this was partly due to a large drop in

employment in the industry,<sup>22</sup> but also to wider economic events that affected the data rather than underlying shipbuilding and repair activity.<sup>23</sup> From 2000, productivity dipped slightly, then grew strongly from 2003, as the industry shed labour and output picked up from 2004 onwards.

It is important to note that the data measure the combined performance of the shipbuilding and maintenance / repair sub-sectors; individual analysis of these sub-sectors was not possible due to data availability. The Portuguese government commented that the shipbuilding industry's evolution over the past few years is suggestive of a weak competitive position; however, it considered that the productivity and competitiveness of its main ship maintenance / repair company, Lisnave, was world-class. The combined data mask such differences and must be interpreted cautiously.

**Figure 21. Productivity in Portuguese shipbuilding and maintenance / repair**



*Note:* Calculations made using nominal value added and number of persons engaged in the STAN data category C351: Building and repairing of ships and boats. As no deflator was available for this category, the value-added deflator for the aggregate category C34T35 Transport Equipment was used.

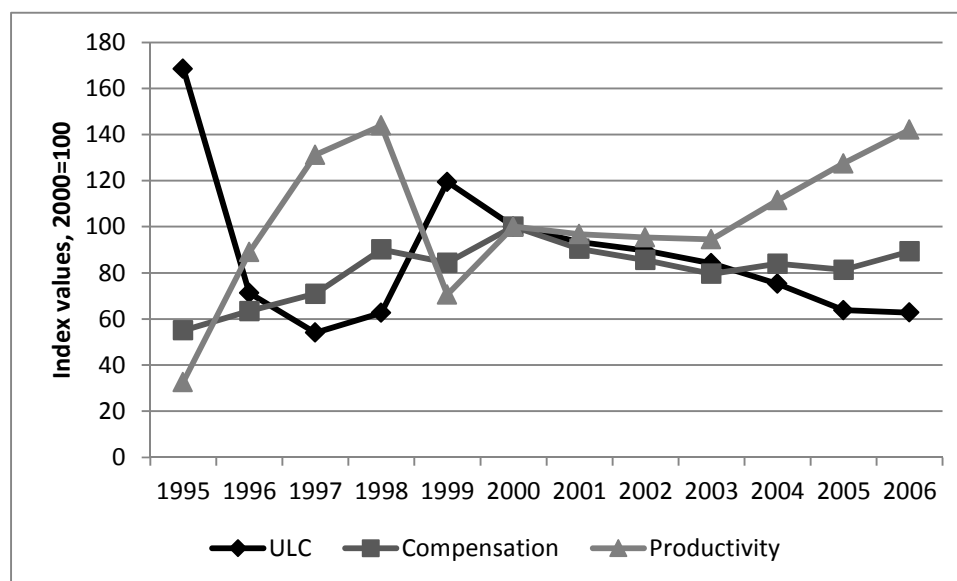
*Source:* Secretariat calculations, based on data from OECD 2010a.

The average annual growth in labour productivity for the shipbuilding and maintenance / repair industry from 2000-2006 was over 6%, mainly due to double-digit growth rates from 2004-2006. This was higher than the labour productivity growth seen in Portuguese manufacturing as a whole over the 2000-2006 period, which grew steadily at an average annual rate of just over 2%, mainly reflecting a continuous reduction in the number of employees.

Unit labour costs in Portugal's shipbuilding and maintenance / repair industry have been falling since 2000, as employee compensation dropped then held relatively steady, and productivity took off from 2003. Figure 22 below shows the changes in these three measures, in index values. Trends in unit labour cost data can give an indication of changes in the average cost of labour per unit of output. If labour costs rise without a commensurate increase in productivity, then unit labour costs rise – this can be an indicator of possible pressure on output prices and/or the profit margins of the industry (although other factors such as capital costs are also important). However, this was not the case in Portugal, at least up to 2006.

**Figure 22. Change in unit labour costs in Portuguese shipbuilding and maintenance / repair**

The contribution of changes in employee compensation and productivity

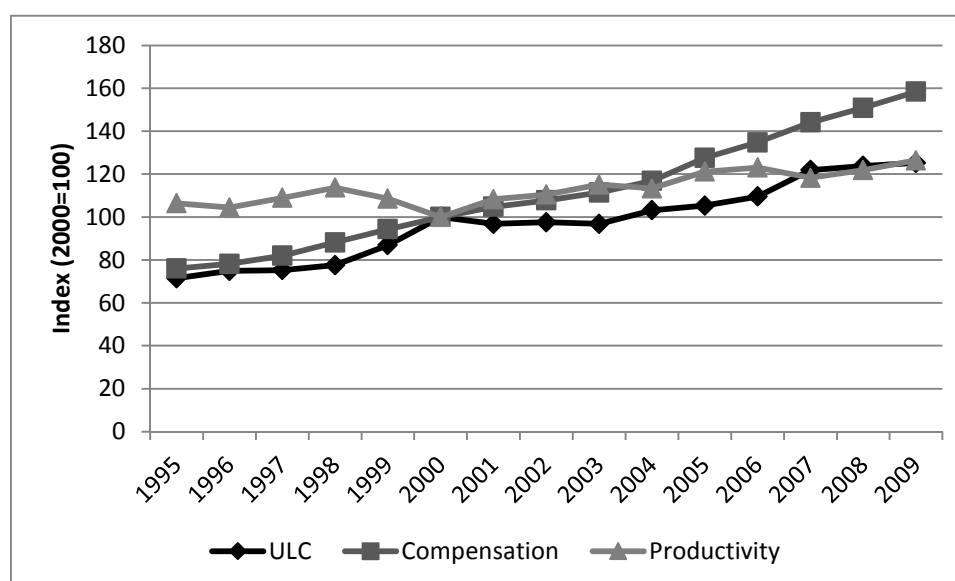


Source: Secretariat calculations, using data from OECD 2010a.

Continuing with the comparison with other small WP6 shipbuilders, similar calculations for Norway's shipbuilding and maintenance / repair industry show its labour productivity growth was lower than Portugal's over the period 2000-2006, at an average annual 3.6%. However, this growth was also less volatile, with only one year of falling productivity, compared to three in Portugal. Figure 23 below presents Norway's unit labour costs, employee compensation and productivity to 2009 – it shows compensation clearly outstripping productivity in the last five years of the data series and a steadily rising unit labour cost, in contrast to the situation in Portugal. Unfortunately data on Australian productivity were not available for comparison with the Portuguese data.

**Figure 23. Change in unit labour costs in Norwegian shipbuilding and repair**

The contribution of changes in employee compensation and productivity



Source: Secretariat calculations, using data from OECD 2010a.

## 6. Summary and challenges

This peer review of the Portuguese shipbuilding and maintenance / repair industry is the first WP6 review of a “small” shipbuilding economy. By presenting details of the industry in Portugal and its policy environment, the report aims to boost transparency and support discussion of policies, practices and measures in the WP6. Although the WP6’s focus is construction of ocean-going vessels, the repair and maintenance sub-sector forms an important share of the Portuguese industry; as such, this review has attempted to describe trends and issues related to both shipbuilding and maintenance / repair, within the availability of data and information.

### *Main points*

Portugal has more than 200 shipbuilding and maintenance / repair firms, but the vast majority are small, and only around five yards are considered to have the infrastructure and conditions to compete on a global scale. Yards are geographically dispersed and typically domestically-owned, although the ship repairer Lisnave is part-owned by Germany’s Thyssenkrupp Marine Systems. The industry has experienced several yard closures in the last few decades and the wider maritime cluster (e.g. shipping firms, marine equipment) is weak. Because of the small domestic market, the shipbuilding and maintenance / repair industry has a strong international focus. Europe and Africa, are key markets.

The industry’s share of global shipbuilding output is tiny and has fallen over time, and the share of the building and maintenance / repair industry in Portuguese GDP and employment has similarly decreased. However, the sub-sectors of the industry have some different features, and have diverged further in the wake of the global economic downturn:

- Shipbuilding is regarded as a traditional transformation and assembly industry, and its demand is driven by international trade and economic conditions. Since 2010, only one or two vessels have been constructed per year and published statistics suggest that no new orders for vessels over 100 GT have been received since at least 2009 (although the Portuguese government highlighted that orders were received in 2009, 2010 and 2011 by two shipyards, for asphalt carriers, ferries and hotel river ships). Portuguese yards do not appear to have a strong specialisation in vessels types, having constructed a variety of vessels in the past, and the current orderbook comprises two passenger/car ferries as well as two asphalt carriers.
- Repair and maintenance is regarded as a service industry, driven significantly by regulatory requirements and with high sensitivity to yard location and speed of work. The repair and maintenance sub-sector experienced a decline in its share of Portuguese GDP following the downturn, but of a much lower magnitude than the building sub-sector, and maintained its employment levels relatively constant, at least until 2010. As such, it now forms a bigger part of the industry than shipbuilding. It also has higher equity levels and lower indebtedness than the building sub-sector.

Workforce and technology are important for both sub-sectors of the industry. Attracting sufficient skilled workers is apparently a challenge, and firm-level training has been undertaken by some industry players to fill the gap. Labour-market reforms have brought some benefits to the industry, for instance in allowing greater flexibility in working hours, to fit with tides and activity fluctuations. Technology and innovation allow builders to explore new materials and designs, while those involved in maintenance and repair mainly look to increase productivity and speed up repair time. EU-level research projects have offered one avenue for such activity, but participation appears more “by chance” than “by design”.

A comparison of Portugal’s industry with that of Australia and Norway, which have similar sized industries, shows that Portugal is less specialised by ship-type and has a less diverse customer base, particularly compared to Australia. It has experienced faster labour productivity growth than Norway (comparison with Australia was not possible) but this was due mainly to labour shedding.

The Portuguese government offers no specific direct or indirect support measures to the shipbuilding and maintenance / repair industry, although firms have access to general programmes of export credit guarantees and insurance, plus loans and loan guarantees to small- and medium-sized enterprises. Export credit guarantees account for the largest sum of monies committed and financial exposure to the shipbuilding and repair industry. Domestic schemes for R&D support have not been utilised by the industry, and no support has been provided under the EU’s Framework for State Aid to Shipbuilding due to lack of national funding availability. Some general measures taken to support business growth and development as part of Portugal’s economic stimulus efforts, may be of benefit to the industry, but any specific future measures would need to be consistent with the EU’s shipbuilding-specific and general regulations on industry support. The extent to which the EU-level LeaderSHIP 2020 strategy will impact on Portugal’s industry is unclear.

### ***The challenges ahead***

As mentioned in the introduction to this report, the Portuguese government considers that the economic crisis may offer an opportunity for its shipbuilding and maintenance / repair industries to reshape themselves and regain competitiveness. The two sub-sectors each have some distinct challenges but also some common difficulties, which will influence the future directions chosen by industry stakeholders.

One factor that weighs on both industry sub-segments is the small size of the domestic maritime cluster. Most of the building and maintenance / repair firms are small or very small, there are no large

shipping companies, there are few marine equipment manufacturers, and there appear to be few universities or research institutions conducting maritime technology research. This has a number of implications:

- Given the global trend in orders towards larger vessels (especially tankers, containers, and bulk carriers – see OECD 2012d), smaller shipbuilders with limited physical capacity (docks, cranes, etc) may find themselves in a slower growing (or even shrinking) market niche. The trend may place similar pressures on small and medium-sized maintenance / repair yards, whose facilities may be unable to handle large vessels. The trend towards larger vessels seems likely to continue, as owners seek cost savings through economies of scale and fuel efficiencies, spurred both by economic pressures and environmental regulations in the industry.
- The lack of a large domestic shipping company removes a potential source of domestic demand that is enjoyed by other shipbuilding economies, and underscores the reliance of Portuguese firms on foreign clients. The reportedly tiny domestic marine equipment sector further orients Portuguese shipbuilding and maintenance / repair firms towards international markets, which can have important impacts on their competitiveness, depending on currency movements and supply chain factors.
- The ability to adapt and adopt product and process innovations, as well as develop ideas in-house, may be hampered by the lack of a domestic network of experts who can disseminate knowledge and help firms keep up with relevant technologies. While individual firms have made efforts to connect with R&D projects, for instance via EU Framework projects, the chance for wider learning and spillover benefits is lessened in the absence of a domestic research base. A lack of a domestic R&D base may also make it more difficult for shipbuilders to keep up with international conventions on safety and environmental protection, if these require investment in new technologies.

A second factor that appears common to both building and maintenance / repair is the difficulty in attracting appropriate staff. Work in the industry is typically viewed as hard, dirty and dangerous, and skilled workers who do choose to work in the industry can secure higher pay in other countries. The long-term decline in the shipbuilding sub-segment may further deter younger people from considering a career in the industry in Portugal. Some individual firms have taken action to introduce in-house training to boost their workforces but there appears to be no systematic approach to this.

A third factor is the challenge to raise productivity. Combined industry data suggest that Portugal's improved productivity performance in shipbuilding and maintenance / repair has been mainly driven by shedding labour (although, unfortunately, a breakdown by sub-sector is not available). As a long-term strategy, this is not sufficient, and the industry must search for additional sources of productivity improvement.

Looking ahead, larger shipbuilding and ship maintenance / repair firms will continue to rely on international clients and need to focus on building their customer base and offering distinctive products and services. The internal Portuguese market is limited and cannot be the base of industry growth, as it might for some other WP6 members. Both industry sub-sectors also need to look for productivity-enhancing measures, such as incorporating innovative production/process techniques or introducing innovative products and services, improving management practices, seeking economies of scale, and upskilling the workforce.

For the shipbuilding sub-sector in particular, it seems crucial that firms seek niches where they are not competing head-on with Chinese shipbuilders. While it may be efficient to produce vessels in series,



another viable approach may be to seek orders for more specialised or individualised vessels that require a higher degree of design, technology and client interaction and that yield a higher potential profit margin. One path that has been followed, at least by the firm visited by the Secretariat, was to tap EU innovation funding and join international consortia on R&D projects. This has led to construction of new kinds of units, and there is the potential to use the knowledge gained in other parts of the business. Another path that might be considered is greater use of partnerships within the industry, to gain scale and expertise in pursuing a particular vessel niche. As an additional benefit, this might also help address financial weaknesses in the industry, where currently liquidity is considered a major challenge.

For the maintenance and repair sub-sector, strategic positioning of the Portuguese industry seems to be of particular importance. A recent projection by BIMCO suggested the world fleet would be almost 20% larger seven years from now, bringing with it a need for fleet repair and other activity (BIMCO/HSN, 2013). In discussions with the Secretariat, Lisnave also considered that demand for ship maintenance / repair and maintenance would continue and commented that it would be a strategic industry for Europe, given the continent's on-going role in world trade. Environmental concerns, and increasing awareness of safety, also heighten the importance of repair and maintenance activities. Marketing Portugal as a North Atlantic centre for repair and maintenance, and being forward-thinking about IMO-related opportunities and retrofitting, could help the Portuguese ship maintenance / repair industry strengthen its activity.

The role of government policy in these future orientations is an important question. The government is currently relatively "hands-off" towards the industry, although there are schemes to which firms in the industry could apply. From the industry's point of view, some firms believed that shipbuilding exists in a "hostile" environment in Portugal, when compared to other countries, especially with regard to finance. They suggested that the government should work to stop other countries supporting their domestic yards, or alternatively help Portuguese yards to compete with yards that have special relationships with the state (e.g. those doing work on Navy vessels). They also suggested the Portuguese government, through its representative at the IMO, should defend the importance of a high level of vessel maintenance as a way of protecting the ocean environment, people and transported goods, and should seek close contact with the industry as well as operators.

## **7. Suggested questions for discussion**

The discussion in the report suggests some possible avenues for consideration for government policy in Portugal. First, what can be done to improve knowledge and information about EU R&D funding opportunities, both for innovation and for regional development? Second, what can be done, perhaps with the co-operation of the industry association, to support a more systematic approach to improving workers' skills? Third, are there opportunities to reduce or remove regulations that hinder uptake of technology and innovation in the industry, or slow the through-put of repair work through yards? Fourth, is there a role for government in marketing Portugal as a ship repair destination?

Other questions that might be interesting to discuss include:

- How can shipbuilding policy in a small economy best contribute to a coherent maritime cluster? What can governments do to support clusters that may naturally straddle national borders?
- To what extent is domestic R&D necessary versus "buying in" from abroad? Is potential government support best directed at finance or human resources for R&D?

## NOTES

<sup>1</sup> The review of Japan can be found at: [http://www.oecd.org/sti/ind/C-WP6\(2012\)26-FINAL-ENG.pdf](http://www.oecd.org/sti/ind/C-WP6(2012)26-FINAL-ENG.pdf).

<sup>2</sup> ENVC was until recently in the process of privatisation and its shipbuilding activity was paused (see Box 5 for further detail).

<sup>3</sup> OECD STAN data for Portugal are available only up to 2006. However, the data are shown to allow a consistent comparison with other peer review economies.

<sup>4</sup> RINAVE is a recognised organisation (RO) with respect to the European Commission's Regulation (EC) n° 391/2009, of 23 April 2009, on common rules and standards for ship inspection and survey organisations. RINAVE is not a member of the International Association of Classification Societies (IACS). RINAVE has an agreement with the Portuguese Administration governing the delegation of specific tasks and functions related to statutory certification services of ships entitled to fly the Portuguese flag.

<sup>5</sup> See <http://emsa.europa.eu/about.html>.

<sup>6</sup> The shipyard Estaleiros Navais do Mondego (ENM) was created in 1944. Since then it has been working in building and repair. The main shareholder of ENM until 2007 was the Fundação Bissaya Barreto (Foundation Bissaya Barreto). In 2007, the Spanish yard Astilleros COTNSA, S.A., located in Vigo, took over the equity of ENM, becoming the unique holder.

In April 2011, due to the poor market and consequent poor turnover results, the Board decided and presented to the courts the yard's insolvency. However, this was ruled out. After the process was terminated by the courts, the Portuguese Government, through the Administração do Porto da Figueira da Foz (Figueira da Foz Port Authority), launched a public tender in May 2012 for granting the use of the yard facilities for ship repair and connected activities. In September 2012, a private company – Atlanticeagle Shipbuilding – decided to explore the facilities and as a result signed a commercial contract with the Authority.

<sup>7</sup> See [www.utl.pt](http://www.utl.pt). Naval architecture degrees are offered by the Instituto Superior Técnico, one of the seven schools at the Lisbon Technical University.

<sup>8</sup> Administrative extension is the situation where collective agreements formed by negotiations between trade unions and employers' associations are rolled out automatically to whole industries. This effectively inhibits labour agreements being negotiated and agreed at the individual firm-level.

<sup>9</sup> The legislation on export credit guarantees comprises Decree-Law n°183/88 (24 May 1988) as amended by Decree-Law n°31/2007 (14 February 2007). These decrees regulate the legal framework of the official support of export credits in terms of cover, premium and procedures, in which shipbuilding is included.

<sup>10</sup> Information provided by the Portuguese government, supplemented by Secretariat desk research (see [www.qren.pt](http://www.qren.pt)).

<sup>11</sup> A third measure – an incentive scheme for innovation (SI Inovação) – is not open to the shipbuilding industry.

<sup>12</sup> This section draws on OECD (2013) and European Union (2011).

- 13 See [http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country\\_pages/pt/highlights/highlight\\_0004](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/pt/highlights/highlight_0004) (accessed 24 April 2013).
- 14 Referred to in Portuguese as the QEC – Quadro Estratégica Comum.
- 15 The MOU can be consulted at [http://ec.europa.eu/economy\\_finance/eu\\_borrower/mou/2011-05-18-mou-portugal\\_en.pdf](http://ec.europa.eu/economy_finance/eu_borrower/mou/2011-05-18-mou-portugal_en.pdf).
- 16 This decision was published in the Resolution of the Portuguese Council of Ministers (Resolução de Conselho de Ministros) No. 27/2013 – “Diário da República no. 80”, 24 April 2013 (in Portuguese only).
- 17 The Public Contract Code was published by Decree-Law No. 18/2008 – “Diário da República no. 20”, 29 January 2008 (in Portuguese only).
- 18 See EC (2003) and EC (2007).
- 19 Defined as the net amount of sales and services including compensatory payments related to ordinary activities. The Portuguese government noted that turnover values may differ depending on the data source. Two sources were used and are marked as appropriate in the chart references: the INE “Integrated Business Account System” (Ministry of Economy) and the IES “Simplified Business Information” (Ministry of Justice).
- 20 From the IES – Informação empresarial simplificada or “simplified business information”.
- 21 Based on data from IHS Fairplay *World Shipbuilding Statistics*, December 2012. Calculations show Norway’s share of the world orderbook (by GT) was 0.1%, Portugal’s 0.028% and Australia’s 0.017%.
- 22 Note that it has not been confirmed whether the Portuguese employment statistics provided for the OECD STAN database include contract (i.e. temporary) labour. If temporary workers are not included, then the employment figures would be under-stated, leading to an overstatement of the productivity performance.
- 23 In particular, in the period leading up to adoption of the Euro currency in 1999, Portugal was actively pursuing lower inflation. This, coupled with a recession in 1994 and a Social Pact on wage restraint, led to a period of deflation and recorded data on value added leapt from 1995 to 1996.

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