The economic contribution of the UK Marine industry

A report for Maritime UK

September 2017

Cebr

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Executive Summary

- The Centre for Economics and Business Research (Cebr) has been commissioned by Maritime UK to quantify the economic contribution of the Marine industry. This report forms one of seven reports which also assess the contribution of the Maritime sector as a whole, at industry-level, in Scotland, and in the Solent LEP region.
- **The Marine industry consists of a variety of activities, grouped within this report as either Leisure Marine or Marine Engineering, with the latter consisting of Shipbuilding; Marine Renewable Energy; Marine Oil and Gas support; and Marine Scientific and Technical activities.** This report draws upon a combination of sources, including the ONS, British Marine, the Society of Maritime Industries (SMI) and the FAME database in order to quantify the aggregate economic contribution of the Marine industry, both at UK and regional level.
- The Marine industry makes a substantive macroeconomic contribution to the UK through business turnover, Gross Value Added (GVA), employment and through the compensation of employees. **It is estimated that the industry directly supported around £17.9 billion in business turnover, £6.45 billion in GVA and 99,500 jobs in 2015.** This respectively equates to 44.7% of turnover, 44.6% of GVA and 53.6% of the employment estimated to be directly supported by the wider UK Maritime sector in 2015.
- **Marine Oil and Gas Support and Shipbuilding are the largest constituent activities within the industry in terms of economic activity**, **directly contributing £2.6 billion and £1.6 billion in GVA, and directly supporting around 22,400 jobs and 26,300 jobs respectively in 2015.** Combined, this contribution equates to 63.7% of GVA and 49% of employment for the Marine industry as a whole.
- **The average job in the Marine industry generated just under £65,000 in GVA in 2015;** this lies below the average productivity of the UK Maritime sector of £77,900 but above the UK-wide level of £50,800. However, this overall industry productivity level masks the performance of some constituent activities, which are found to be very productive. For example, GVA per job in Marine Oil and Gas support activities and Marine Renewable Energy was around £113,800 and £72,200 respectively in 2015.
- By extension of its significant direct contributions to GVA and employment, the Marine industry also helps to raise millions of pounds each year to the UK Exchequer. **The industry contributed an estimated total of £3.1 billion in tax revenues in 2015, spread across VAT, Corporation Tax, Income Tax, National Insurance Contributions (NICs) and Business Rates.** Marine Oil and Gas Support was the largest contributor, with £700 million in 2015.
- After quantifying the aggregate economic impacts through the industry supply chains and induced effects on expenditures, **it is estimated that the Marine industry helped to support a total of £14.7 billion of GVA in 2015.** This implies that, for every £1 in GVA directly contributed by the industry in 2015, a total of £2.29 in GVA was generated across the wider UK economy.
- These aggregate economic impacts associated with the Marine industry also extend to business turnover, employment and the compensation of employees. **It is estimated that the Marine industry helped to support a total of £38.5 billion in turnover, 277,100 jobs and £12.7 billion through the compensation of employees in 2015.**
- **The economic activity directly contributed and more widely supported by the Marine industry is spread across all regions of the UK.** In 2015, the UK regions with the largest direct contribution in terms of GVA were Scotland (£2.9 billion), the South West (£1.1 billion) and the South East (£0.7 billion). Scotland's relatively high economic contribution can be attributed to the high share of employment in Marine Oil and Gas Support and Shipbuilding activities in all years considered.

1 Introduction

Cebr is pleased to present this report to Maritime UK and British Marine on the economic impact of the Marine industry on the UK economy. This report forms one of seven reports on the economic contribution of the Maritime sector, which is defined as comprising the individual Shipping, Ports, Marine and Maritime Business Services industries, each comprising a wide range of component activities. The other reports focus on the economic contribution of each of the other three industries at UK level, the contribution of the sector in Scotland, the Solent LEP, and the contribution of the Maritime sector at UK-level. It is therefore important to consider this report as part of the wider framework set out in the six reports, which set out the impact of the Maritime sector both at a national and regional level.

In this context, the Marine industry is defined as encompassing a wide range of constituent activities, categorised under either Leisure Marine or Marine Engineering; the latter composed of Shipbuilding, Marine Renewable Energy, Marine Oil and Gas Support and Marine Scientific and Technical activities. Each activity represents a diverse range of sub-activities; for example, Leisure Marine represents a range of manufacturing, distribution and service operations, encompassing (but not limited to) boatbuilding, boat chartering and distribution, the provision of marinas and moorings, and the operating of training schools. In contrast, Shipbuilding and Marine Scientific and Technical activities are dominated by large manufacturers such as BAE Systems and QinetiQ.

Our examination spans the period from 2010 to 2015 (inclusive), with the latter being the latest year for which full data are available, and endeavours to capture the full economic 'footprint' of the Marine industry. As such, our report is not confined to direct ongoing contributions to GDP and employment through the Marine industry's operations and activities in the UK, but also provides assessments of the associated indirect and induced multiplier impacts.

1.1 About Maritime UK

Maritime UK is the promotional body for the UK's maritime sector, representing companies and partner organisations in the shipping, ports, marine and maritime business services industries. It acts to promote the sector, influence government and drive growth.

1.2 Purpose of this report

This study seeks to equip Maritime UK and British Marine with statistics and figures on the value of the Marine industry to the UK economy, within the context of the value of the wider Maritime sector. As such, Cebr has focused on the following key economic indicators: employment, Gross Value Added (GVA), the compensation of employees and the Exchequer contribution (through tax revenues raised). The study also seeks to identify the contribution of the Marine industry at regional level.

1.3 Overview of the study and methodology

Purpose of the study

This report provides a thorough and comprehensive examination of the role of the Marine industry in the UK and its constituent sub-regional economies. It presents a range of analyses demonstrating different aspects of the value contributed by the industry, including direct contributions to GDP and employment, indirect and induced multiplier impacts and the Marine industry's contribution to the UK Exchequer through tax revenues raised.

An important task has been to develop an in-depth understanding of the Marine industry. To produce a robust study, it is necessary to interrogate the available data to ensure that it captures the full range of activities that should be included in establishing the aggregate economic 'footprint' of the industry. Following the collation of the necessary data capturing these activities, the values of key economic

indicators were established to demonstrate the impact of the industry. The key macroeconomic indicators include:

- GVA[1] contributions to UK and regional GDP generated by the Marine industry, directly and through indirect and induced multiplier impacts.
- Jobs supported by the industry, including direct, indirect and induced jobs through multiplier impacts.
- The value of the turnover of Marine industry and, again, the turnover supported in the UK and regional economies through multiplier impacts.
- The value of employee compensation[2] generated by the Marine industry, representing the total remuneration of employees operating in the industry.
- The contribution of the Marine industry through revenues raised for the Exchequer.

Mapping the UK Marine industry

In order to identify and quantify these economic impacts, Cebr has adhered to the following definition of the Marine industry as comprising the major activity groupings listed below:

- **Leisure Marine** (include leisure boatbuilding, recreational marine activities, as well as a variety of marine customer and business activities);
- **Marine Engineering**
    - Shipbuilding and Marine Engineering;
    - Marine Renewable Energy;
    - Marine Oil and Gas Support;
    - Marine Scientific and Technical.

The first stage of the study has involved mapping the activities of the Marine industry against the National Accounts framework, in order to establish clarity on the precise definition of the industry as it maps against the Standard Industrial Classification (SIC) framework.[3] In essence therefore, this involves taking each of the Marine industry's activities, and mapping these to the most relevant Standard Industrial Classification (SIC) code in order to identify the activity's economic data.

There is a disparate list of individual activities which comprise the Marine industry, a large number of which lie under the Leisure Marine category. A full and comprehensive list of Leisure Marine activities considered as part of this report can be found in the Annex.

[1] GVA, or gross value added, is a measure of the value from production in the national accounts and can be thought of as the value of industrial output less intermediate consumption. That is, the value of what is produced less the value of the intermediate goods and services used as inputs to produce it. GVA is also commonly known as income from production and is distributed in three directions – to employees, to shareholders and to government. GVA is linked as a measurement to GDP – both being a measure of economic output. That relationship is (GVA + Taxes on products - Subsidies on products = GDP). Because taxes and subsidies on individual product categories are only available at the whole economy level (rather than at the sectoral or regional level), GVA tends to be used for measuring things like gross regional domestic product and other measures of economic output of entities that are smaller than the whole economy.

[2] Compensation of employees is the total remuneration, in cash or in kind, payable by an employer to an employee in return for employers' social contributions, mainly consisting of employers' actual social contributions (excluding apprentices), employers' imputed social contributions (excluding apprentices) and employers' social contributions for apprentices.

[3] The United Kingdom Standard Industrial Classification of Economic Activities (SIC) is used to classify business establishments and other standard units by the type of economic activity in which they are engaged.

However, it is clear that some of the activities of the Marine industry do not map neatly onto the SIC framework. For instance, while broader financial services and activities can be identified through SIC code 64, there is no separate distinction within the national accounts framework for Marine financial activities specifically.

As a result, this precludes the use of publicly-available data sources such as the Annual Business Survey to gather data for some constituent activities of the Marine industry. Cebr has therefore exclusively drawn upon a combination of publicly-available data, desk research and industry-level data to quantify the contributions made through Marine industry activities.

Quantifying the direct economic impacts of the Marine Industry and data sources

In order to quantify the direct economic impacts of the Marine industry, three different approaches have been taken which reflect the degree of alignment (or otherwise) for each Marine activity against the National Accounts framework. They are as follows:

- Where Marine industry activities can be assigned to a particular SIC code, Cebr have drawn upon business demography data taken from Bureau van Dijk's Financial Accounts Made Easy (FAME) database.[4] Examples of activities where this approach was viable include Shipbuilding and Marine Offshore Oil and Gas Support activities.
- For those activities which cannot be separately identified through the use of SIC codes, Cebr have drawn upon existing analysis from Marine industry bodies including British Marine and the SMI. Examples of activities where this approach was taken include the majority of Leisure Marine activities and Marine Scientific and Technical activities. However, for the estimation of some macroeconomic indicators (such as GVA for Marine Scientific and Technical activities), these sources have been combined with FAME data in order to generate estimates.
- For Marine Renewable Energy activities, Cebr have drawn upon the 2015 Department for Business, Innovation and Skills (the former BIS; now the Department for Business, Energy and Industrial Strategy) report, "The Size and Performance of the Low Carbon Economy"[5] which covers the economic contribution of marine renewable energy activities over the years 2010 to 2013.

A more detailed description of sources used for each Marine industry activity can be found in the next section of this report.

Quantifying the aggregate economic impacts of the Marine Industry

After collation and interrogation, the direct economic impacts for the Marine industry have then been embedded within Cebr's economic impacts models of the UK economy. For each of the five activity groups, the direct impacts are then combined with the bespoke economic multipliers to generate indirect, induced and so aggregate impacts.

These multipliers were calculated by Cebr using our input-output modelling approaches, as these activities are not 'standard' sectors reported in the ONS' input-output tables. Cebr's models establish the relationships between industries through supply chain linkages, as well as industries' linkages with government, capital investors and the rest of the world (through trade).

The models produce three types of impact for four indicators – business turnover, GVA, the compensation of employees, and employment. The three types of impact are:

[4] FAME is a company financials database which provides detailed information on UK and Irish companies as taken from annual reports and other sources up to the latest available year. FAME has been used to establish the aggregated contribution of businesses in the Marine industry to the UK economy in terms of turnover, employee numbers and GVA.

[5] BIS, 2015. "The Size and Performance of the Low Carbon Economy, Report for 2010 to 2013."

- Direct impact: this is the value generated and jobs supported directly by the economic activities of the UK Marine industry.
- Indirect impact: this is the value generated and jobs supported in industries that supply inputs to the UK Marine industry.
- Induced impact: this is the value generated and jobs supported in the wider economy when the direct and indirect employees of the Marine industry spend wages and salaries on final goods and services.

These three impacts are then combined to convey the aggregate impact associated with each activity within the Marine industry in terms of GVA, employment, business turnover, and the compensation of employees.

1.4 Structure of the report

The remainder of the report is structured as follows:

- Section 2 provides an overview of how the Maritime sector has been defined, and how the Marine industry fits within this definition. Further information is also provided on how the key macroeconomic indicators have been captured or estimated;
- Section 3 outlines the direct economic impacts of the Marine industry. We consider the direct impacts through GVA, employment, the compensation of employees, and contribution to the UK Exchequer through tax revenues contributed by the industry.
- Section 4 considers the multiplier impacts of the Marine industry through the activities it stimulates in the local supply chain and in the wider economy when employees directly and indirectly employed by the Solent-based industry spend their wages and salaries in the local and wider economy.
- Section 5 examines the direct and multiplier impacts of the Marine industry at regional level, as disaggregated by the 12 former Government Office Regions (GORS).[6]

[6] These are: Scotland, Wales, Northern Ireland, the East of England, the East Midlands, London, the North East, the North West, the South East, the South West, the West Midlands, and Yorkshire and the Humber.

2 The Maritime Sector and the Marine industry

Here we set out how the wider Maritime sector has been defined for the purposes of the study. On a holistic level, the wider sector can be disaggregated into the Shipping, Ports, Marine and Maritime Business Services industries, which in themselves are formed of numerous individual and distinct activities, of which the Marine industry is the focus of this report.

2.1 The definition of the Maritime sector and its constituent industries

Maritime UK have provided a list of activities which fall under the auspices of the Maritime sector; Cebr has subsequently undertaken a mapping exercise using this list to identify how each of these four industries aligns with the national accounts. For most Maritime sector activities, a corresponding Standard Industrial Classification (SIC) code exists which enables the identification and quantification of the direct economic impacts using publicly-available data sources. A minority of activities do not map neatly against the SIC framework, necessitating the use of industry or local-level data for quantification purposes.

- **Shipping industry**
  - International transport of passengers;
  - Transport of passengers on inland waterways;
  - International transport of freight;
  - Transport of freight on inland waterways.
- **Ports industry**
  - Warehousing and storage;
  - Port activities and management;
  - Stevedores, cargo and passenger handling;
  - Border agency, HMRC and public sector employees operating in ports.
- **Marine industry (Leisure marine and Marine Engineering)**

  Leisure Marine:
  - Boatbuilding (marine leisure vessels);
  - Recreational marine activities, marine finance and legal activities and general marine services.

  Marine Engineering:
  - Shipbuilding;
  - Marine renewable energy;
  - Marine support activities for offshore oil and gas, engineering and mining;
  - Marine science and academic activities, including government vessels and technical consulting;
- **Maritime Business Services industry**
  - Shipbroking and other miscellaneous transport services;
  - Maritime insurance, finance and legal services; [7]
  - Ship surveying and classification;
  - Maritime Education (including university courses and cadet training);
  - Maritime Consultancy;
  - Maritime Accountancy.

[7] These activities are distinct from those Insurance, Financial and Legal activities taking place within the Marine industry, and the contribution of these activities are treated and quantified separately as a result.

In this report we focus solely on the Marine industry. The remainder of this section focuses on how the direct economic impacts of the constituent activities have been measured, in light of difficulties in establishing how aspects of the industry map against the National Accounts framework.

2.2 Quantifying the direct economic impacts of the Marine industry

Here we set out in detail the approach taken to quantify the direct economic impact of the Marine industry through its constituent activities. With the exception of ship classification and surveying activities, this has involved combining existing PwC analysis with that of publicly-available data sources. For ship classification and surveying activities, this has involved direct evidence-gathering from ship classification organisations.

Quantifying the direct economic impacts for the Marine industry

Table 1 below shows how activities for the Marine industry have been identified, and the data sources used to capture and quantify the associated economic activity. A full and comprehensive list of Leisure Marine activities can be found in the Annex of this report.

Table 1: Mapping the activities of the Marine industry

INDUSTRY	ACTIVITY		MAPPING	SOURCE(S)
MARINE	**Leisure Marine**		Leisure boatbuilding has been identified through SIC code 3012 ("Building of pleasure and sporting boats") as well as through the British Marine "Key Performance Indicators for the Leisure, Superyacht and Small Commercial Marine Industry". Other Leisure Marine activities include Recreational marine activities, marine finance and legal activities and general customer and business marine services. These activities do not map neatly across the SIC framework, as they are typically bundled together with others within the leisure industries; this precludes the effective use of FAME to gather economic impact data. Cebr have therefore drawn upon the British Marine "Key Performance Indicators for the Leisure, Superyacht and Small Commercial Marine Industry" to derive employment, turnover and GVA estimates.	ABS, BRES, British Marine, Cebr analysis
	Marine Engineering	Shipbuilding and Marine Engineering	Identified in the National Accounts framework through SIC code 3011 ("Building of ships and floating structures") and 3315 (“Repair and maintenance of ships and boats”)	ABS, BRES, FAME, Cebr analysis
		Marine renewable energy	Marine renewable energy activities do not map neatly across the SIC framework. Cebr have therefore drawn upon the BIS report, “The size and performance of the UK-low carbon economy” BIS report (2013) to derive employment, turnover and GVA estimates.	BIS, Cebr analysis
		Marine support activities for offshore oil and gas, engineering and mining	Identified in the National Accounts framework through SIC code 91, "Support activities for petroleum and natural gas extraction".	FAME, Cebr analysis
		Marine Scientific and Technical	Marine Scientific and Technical activities do not map neatly across the SIC framework, as they are typically bundled together with other activities within the Manufacturing and "Other Scientific and Professional" sectors. Cebr have therefore drawn upon the Society of Maritime Industries (SMI) "Annual Review of UK Marine Scientific Industries" reports to gather data.	SMI, Cebr analysis

Source: Maritime UK, Cebr analysis

A key source of information used by Cebr to capture marine leisure activities are the Key Performance Indicators (KPI) analysis produced by British Marine. The KPI analysis is produced each year, drawing upon information supplied to British Marine by its membership, such as company turnover and statistics declarations. KPI analysis covering the years 2010 to 2015 (inclusive) has therefore been used as a major source of information for capturing and quantifying leisure boat manufacturing as well as business and customer marine activities.

2.3 Quantifying the direct economic impacts of the industry at regional level

In this final subsection we set out the approach taken to disaggregate the direct and aggregate economic impacts at regional level. For some activities, the approach taken to disaggregate the direct economic impacts of the Marine industry has involved combining the direct economic impacts at UK-level with publicly-available statistics which can be disaggregated at regional level. However, for some activities this approach is precluded as they cannot be separately identified within the National Accounts framework.

Leisure Marine

The majority of Leisure Marine activities do not map neatly across the National Accounts framework, and Cebr have therefore drawn upon KPI analysis from British Marine to quantify the economic contribution at regional-level. British Marine have supplied Cebr with information on the regional breakdown of revenue (turnover), employment, exports and the number of enterprises for the years 2010 to 2015, which has then been applied to the UK-level estimates. Leisure Marine GVA in each region has been estimated using employment-to-GVA ratio as determined at UK-level, before being adjusted for regional differences in productivity (see further information provided at the end of this section).

Shipbuilding

As Shipbuilding activities are explicitly identified within the National Accounts framework (under SIC code 3011, as described in Table 1 above), macroeconomic data for Shipbuilding activities as sourced from the FAME database have then been combined with publicly-available data sources capturing Shipbuilding activity at regional-level.

Alongside FAME, the major source of employment was the Business Register and Employment Survey (BRES)[8], as accessed through NOMIS. BRES employment data associated with the 3012 SIC code were gathered and an implied regional breakdown estimated after interpolating for some missing information. Shipbuilding employment in Northern Ireland has been estimated using a combination of BRES and the Annual Business Survey, the latter providing the proportion of employment in Northern Ireland across the broader industrial sector categories. Table 2 below shows the implied regional breakdown of employment in Shipbuilding activities from 2010 to 2015 using the approach described above.

Table 2: The regional breakdown of UK employment in Shipbuilding activities

Share of Aggregate employment	2010	2011	2012	2013	2014	2015
England	68.8%	68.8%	67.6%	67.5%	64.7%	69.4%
Scotland	26.4%	26.0%	28.0%	27.4%	30.4%	25.1%
Wales	1.5%	1.7%	1.2%	1.4%	0.7%	1.3%
Northern Ireland	3.2%	3.5%	3.2%	3.7%	4.2%	4.2%
East of England	3.1%	1.3%	1.0%	2.1%	1.3%	1.9%

[8] The Business Register and Employment Survey (BRES), produced by the ONS on an annual basis, is the official source of employee and employment estimates by detailed geography and industry within Great Britain.

East Midlands	0.4%	0.7%	0.9%	0.7%	0.9%	0.2%
London	0.1%	0.1%	0.8%	0.0%	0.3%	0.2%
North East	4.4%	3.0%	2.3%	1.4%	1.0%	0.8%
North West	26.4%	26.0%	28.0%	27.4%	30.4%	37.7%
South East	11.0%	8.7%	10.5%	8.0%	3.9%	2.9%
South West	22.0%	26.0%	23.3%	27.4%	26.1%	25.1%
West Midlands	0.7%	0.4%	0.5%	0.2%	0.2%	0.2%
Yorkshire and the Humber	0.7%	2.6%	0.2%	0.2%	0.7%	0.4%

Source: ONS, Cebr analysis

Marine Renewable Energy

Marine renewable energy activities do not map neatly across the National Accounts framework, thereby preventing the use of publicly-available data sources such as BRES or ABS to generate regional-level estimates. Cebr have therefore drawn upon regional breakdown estimates published as part of the 2013 report, "The size and performance of the UK-low carbon economy". Table 3 below shows the implied regional breakdown of employment in Offshore Wind and Marine in 2013 (including the supply chain); it is assumed that the direct employment contribution in each region follows the Aggregate employment breakdown.

Table 3: The regional breakdown of UK employment in Marine renewable energy in 2013 as implied by BIS analysis

Share of Aggregate employment	Offshore wind	Marine	Total
England	79.0%	64.5%	76.3%
Scotland	15.2%	32.3%	18.3%
Wales	2.9%	3.2%	3.0%
Northern Ireland	2.9%	0.0%	2.4%
East of England	16.5%	9.7%	15.3%
East Midlands	1.4%	3.2%	1.8%
London	16.5%	3.2%	14.1%
North East	12.2%	3.2%	10.6%
North West	7.2%	9.7%	7.6%
South East	5.7%	22.6%	8.8%
South West	8.6%	6.5%	8.2%
West Midlands	7.2%	3.2%	6.5%
Yorkshire and the Humber	3.6%	3.2%	3.5%

Note: Figures subject to rounding. Source: BIS, Cebr analysis

Marine Oil and Gas Support activities

Marine renewable energy activities can be separately identified within the National Accounts framework through SIC code 91, "Support activities for petroleum and natural gas extraction". Regional estimates for GVA, employment and the other key macroeconomic indicators have therefore been generated using a combination of the UK-level sources described in Table 1 and publicly-available data sources BRES and ABS. Table 4 below shows the implied regional breakdown of employment in Marine Oil and Gas Support activities using this approach; perhaps unsurprisingly, the vast majority of activity took place in Scotland in all years considered.

Table 4: The regional breakdown of UK employment in Marine Oil and Gas Support activities, 2010 to 2015

Share of Aggregate employment	2010	2011	2012	2013	2014	2015
England	8.1%	12.0%	16.2%	13.7%	11.1%	7.4%
Scotland	91.4%	87.5%	83.4%	85.8%	88.5%	91.9%

Wales	0.5%	0.5%	0.4%	0.5%	0.4%	0.7%
Northern Ireland	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
East of England	1.9%	2.2%	2.6%	2.1%	1.6%	2.0%
East Midlands	1.4%	1.5%	1.8%	1.2%	1.0%	1.5%
London	1.0%	1.5%	2.6%	1.4%	0.7%	1.0%
North East	1.4%	1.7%	0.7%	0.2%	0.2%	0.1%
North West	0.5%	0.2%	0.1%	0.0%	0.3%	0.2%
South East	0.4%	2.4%	5.5%	6.0%	3.6%	0.5%
South West	0.5%	1.0%	1.8%	0.8%	0.8%	0.7%
West Midlands	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%
Yorkshire and the Humber	1.0%	1.5%	1.1%	1.9%	2.8%	1.3%

Source: ONS, Cebr analysis

Marine Scientific and Technical activities

Unfortunately the SMI Annual Review of UK Marine Scientific Industries reports do not provide a regional disaggregation of economic activity; in drawing upon company annual reports published at UK-level, using the FAME database would not be appropriate to disaggregate activity at regional level either. Cebr have therefore estimated the regional breakdown of turnover, GVA, employment and the compensation of employees based on regional employment data for the "Other professional, scientific and technical activities" industry grouping (SIC 74909).

The main source of data for regional employment was BRES. BRES employment data associated with the 74909 SIC code were gathered and an implied regional breakdown estimated after interpolating for some missing information. Once again, employment in Northern Ireland has been estimated using a combination of BRES and the Annual Business Survey, the latter providing the proportion of employment in Northern Ireland across the broader industrial sector categories.

Other adjustments for regional economic activity

Other adjustments have been made to the regional disaggregation of the key macroeconomic indicators which represent the direct economic impacts of the Maritime Business Services industry, in order to reflect differences in economic performance across the regions. These are as follows:

- To account for regional differences in productivity (GVA per employee), the breakdown of GVA has been adjusted using the ONS GVA per employee by region statistics.[9] For example, the average employee in London in 2015 was 46% more productive than the average UK employee, while the average employee in the North East was 10% less productive.
- To account for regional differences in wages and salaries, estimated wages and salaries paid to employees in the Marine industry have been adjusted using differentials taken from ASHE.[10] For example, the average wage for an employee in the South East was 4% higher than the national average in 2015.
- To account for regional variation in the ratio of compensation of employees to GVA in different sectors, the compensation of employees for the industry have been adjusted using regional differentials implied by the closest industry, as sourced from the Annual Business Survey.

[9] ONS, 2017. Subregional Productivity: Labour Productivity (GVA per hour worked and GVA per filled job) indices by UK NUTS2, NUTS3 subregions and City regions.
[10] Ibid.

The results of this analysis are shown in the final section of this report. The next sections in this report set out the direct and aggregate economic impacts of the Marine industry in the UK.

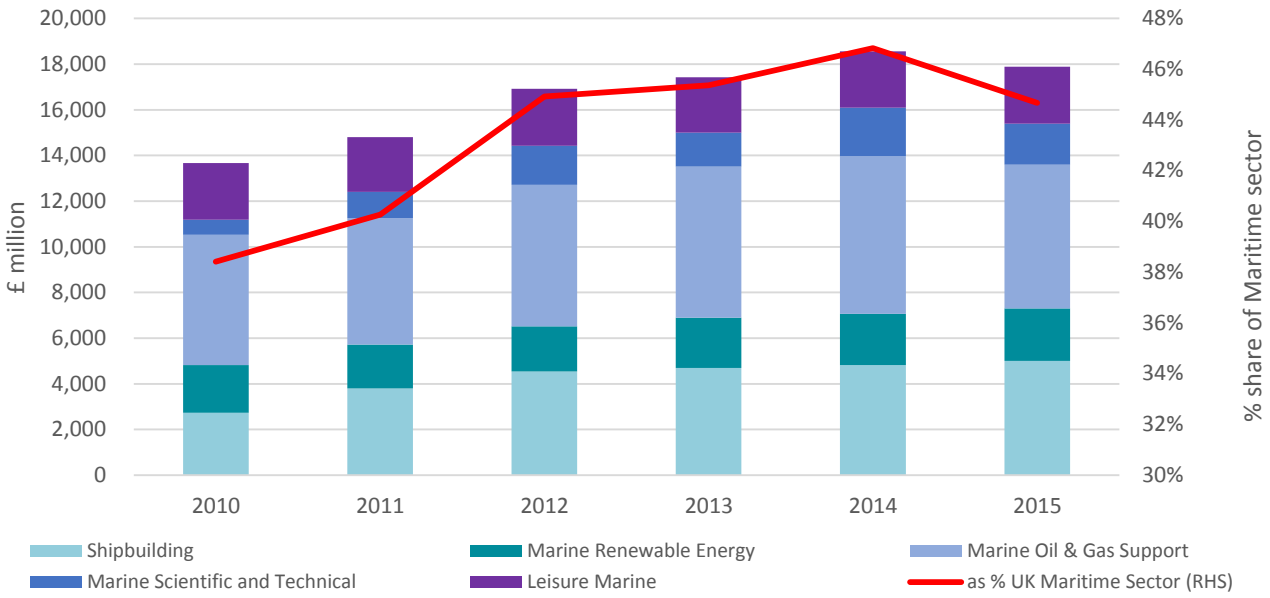
3 The direct economic impact of the Marine industry in the UK

In this section we set out estimates for the direct contribution of the Marine industry to the following key macroeconomic indicators: Business turnover, GVA, employment, the compensation of employees, and the Exchequer contribution through tax revenues raised. After quantifying the direct contributions made through the first three of these activities, the contribution that the Marine industry makes to the wider UK Maritime sector is then examined.

3.1 The direct economic impact through turnover

Figure 1 below shows the breakdown of business turnover generated by the Marine industry and its constituent activities between 2010 and 2015. Overall, the industry is estimated to have contributed £17.9 billion in business turnover in 2015, a fall of 3.6 % from the 2014 level but above the 2010 level of £13.6 billion. The overall increase since 2010 can be attributed to persistent turnover growth experienced among Shipbuilding and Marine Oil and Gas Support activities.

Figure 1: The estimated turnover of the Marine industry, and expressed as a share of the Maritime sector's total turnover, £ million



Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Marine Oil and Gas Support activities generated the largest share of business turnover across all the years considered, with £6.3 billion (35%) of turnover in 2015; Shipbuilding and Leisure Marine activities were the next largest contributors with £5.0 billion and £2.5 billion respectively.[11] This finding is consistent with the other macroeconomic indicators of the industry (discussed further below). Overall, turnover from the collective Marine industry represented 44.7% of the Maritime sector total in 2015; this share has increased slightly in recent years, rising from 38.4% in 2010 and peaking at 46.8% in 2014.

Despite increases in in business turnover directly generated by the Marine industry, profitability (as measured using the ratio of gross profits to turnover) in the Marine industry is estimated to have remained

[11] As discussed in detail in the Annex of this report, not all activities included in the KPI have been included in Leisure Marine. Were they included the Leisure Marine direct turnover would be approximately £ 3 billion.

broadly stable since 2010. Table 5 shows trends in profitability across each industry activity. The overall profitability of the industry remains just below the Maritime sector average; for every £1 in turnover generated by the Marine industry in 2015, an estimated 17 pence was generated in gross profit. This compares to 23 pence across the entire Maritime sector in the same year.

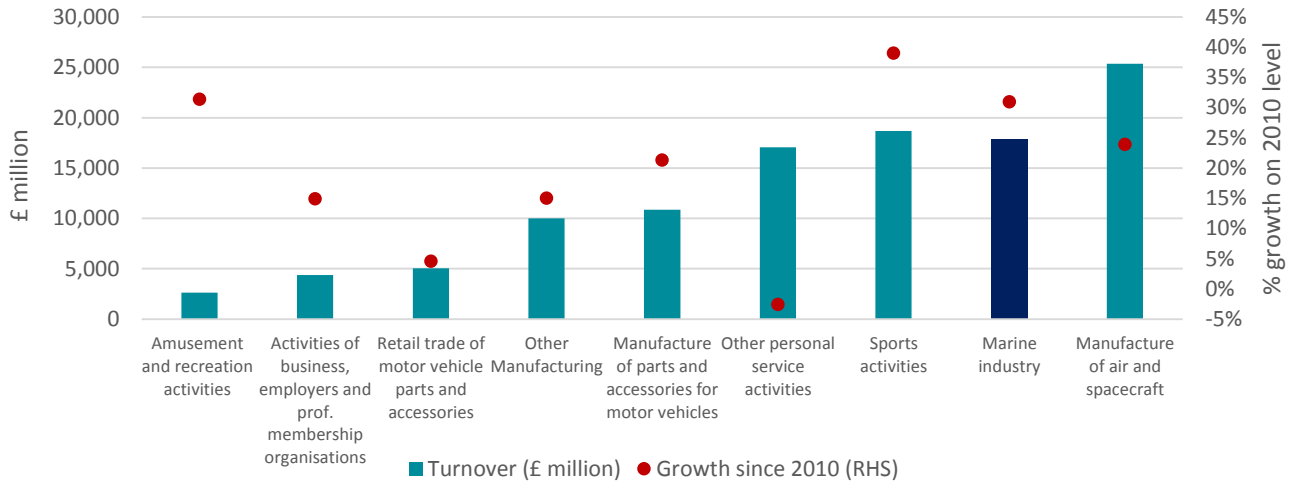
Table 5: Estimated profitability (gross profit ratio) of the Marine Industry and its constituent activities

Profitability	2010	2011	2012	2013	2014	2015
UK Maritime sector	**18.4%**	**19.7%**	**21.4%**	**21.4%**	**23.0%**	**22.9%**
UK Marine industry	**18.2%**	**19.4%**	**20.1%**	**19.0%**	**19.0%**	**16.7%**
Leisure Marine	26.5%	24.2%	24.4%	24.8%	23.5%	22.9%
Shipbuilding	9.0%	8.2%	6.9%	6.9%	7.4%	6.1%
Marine Renewable Energy	5.1%	4.6%	12.3%	13.5%	13.7%	13.7%
Marine Oil and Gas Support	19.5%	17.1%	18.0%	20.3%	20.4%	15.6%
Marine Scientific and Technical	31.0%	31.0%	32.0%	31.9%	29.3%	26.5%

Source: British Marine, SMI, FAME, ONS, Cebr analysis

To place this direct contribution in context, Figure 2 below compares the turnover of the Marine industry against that of comparable industries and activities; nominal turnover growth against the 2010 level is also shown for each industry activity. Turnover data for the comparable industries has been sourced from the Annual Business Survey (ABS).

Figure 2: The estimated turnover of the Marine industry against comparable industries in 2015, and growth against the 2010 level



Source: British Marine, SMI, FAME, ONS, Cebr analysis

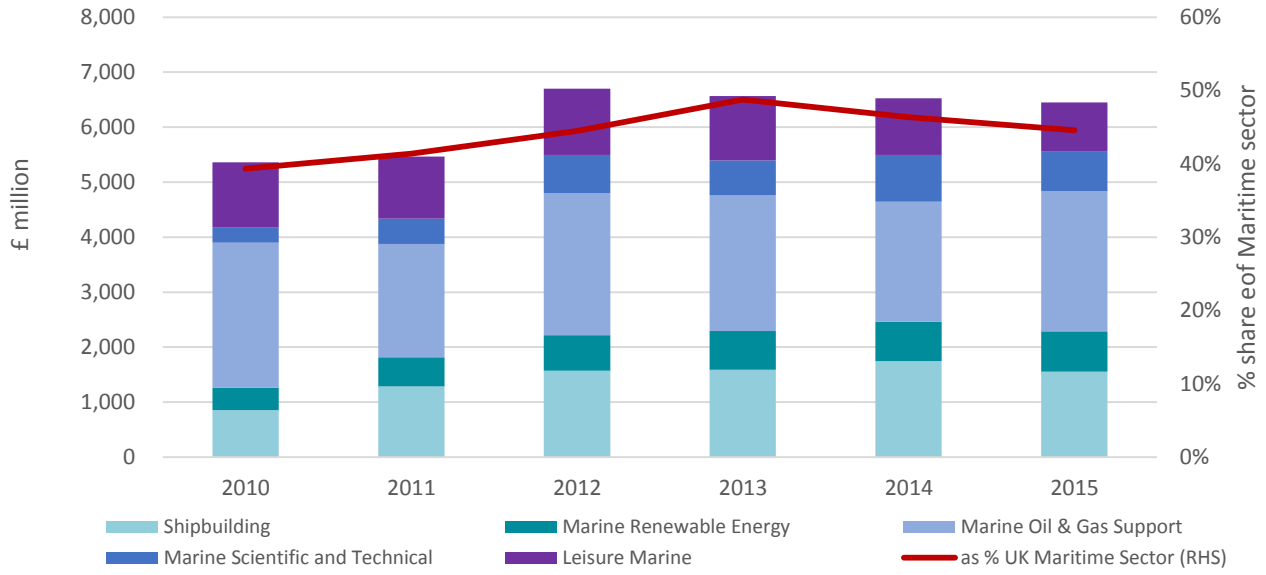
In 2015, turnover from the Marine industry stood higher than the Manufacture of parts and accessories for motor vehicles (£10.9 billion) and Other personal service activities (£17.1 billion), and was comparable with Sports activities (£18.7 billion). However, it lay behind turnover from the Manufacture of air and spacecraft (£25.4 billion). The observed nominal growth in turnover between 2010 and 2015 from the Marine industry also compares favourably to several of the other industries and other activities shown above.

The 30% growth in turnover achieved by the Marine industry lies ahead that of Other personal service activities (-3%), the Manufacture of parts and accessories for motor vehicles (21%) and Other Manufacturing (15%).

3.2 The direct economic impact through GVA

This subsection illustrates the contributions in terms of the GVA from the Marine industry to UK GDP. Figure 3 below shows this direct impact, disaggregated by industry activities in the years 2010 to 2015, as well as the Marine industry's share of GVA directly generated by the Maritime sector.

Figure 3: The direct contribution of the Marine industry through GVA, and the industry's share of the Maritime sector's total direct contribution through GVA, £ million



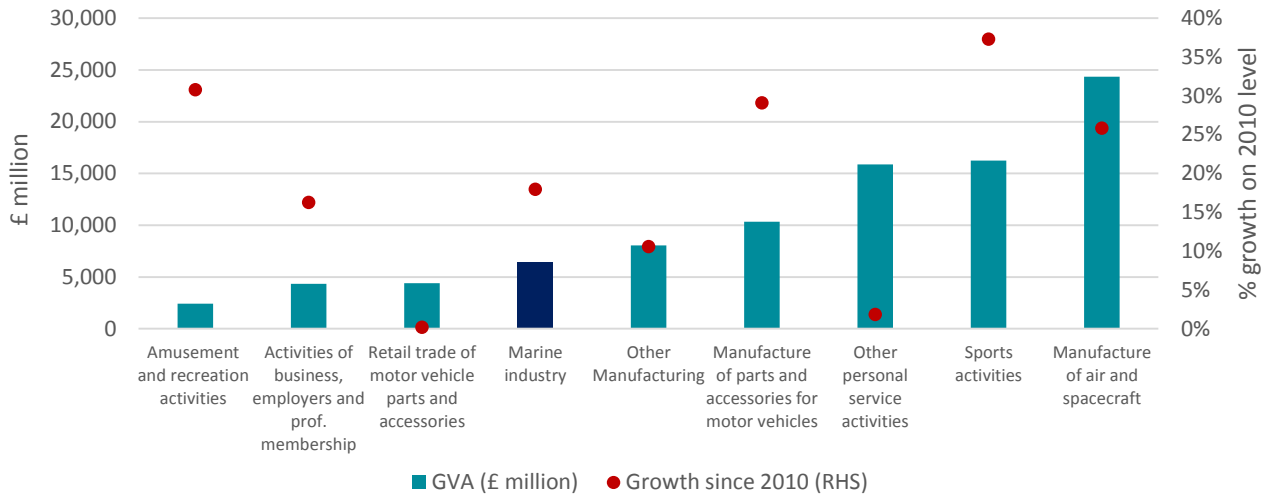
Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

It is estimated that the Marine industry directly contributed a total of just under £6.5 billion in GVA in 2015, rising from £5.3 billion in 2010. As with business turnover, it is an industry dominated by Marine Oil and Gas support, Leisure Marine and Shipbuilding activities; these activities contributed an average of 81% of the direct GVA contribution of the entire Marine industry in the period considered, although this has fallen from 87% in 2010 to 77% in 2015, as GVA from Marine Scientific and Technical activities has grown more rapidly (albeit from a low base). The Marine industry was been responsible for 45% of the total GVA directly contributed by the UK Maritime sector in 2015. This is an increase for the 2010 percentage share of 39.3% in 2010.

Following Figure 2, Figure 4 below compares GVA trends in the Marine industry against those of comparable activities. In terms of the direct GVA contribution in 2015, the Marine industry was larger than the retail trade of motor vehicle parts and accessories, with £6.4 billion against £4.4 billion. Nominal GVA growth between 2010 and 2015 for the Marine industry was 20%; this compares to only 2% for Other personal service activities, and 26% for the Manufacture of air and spacecraft.

Figure 4: The estimated GVA of the Marine industry against comparable industries in 2015, and growth against the 2010 level

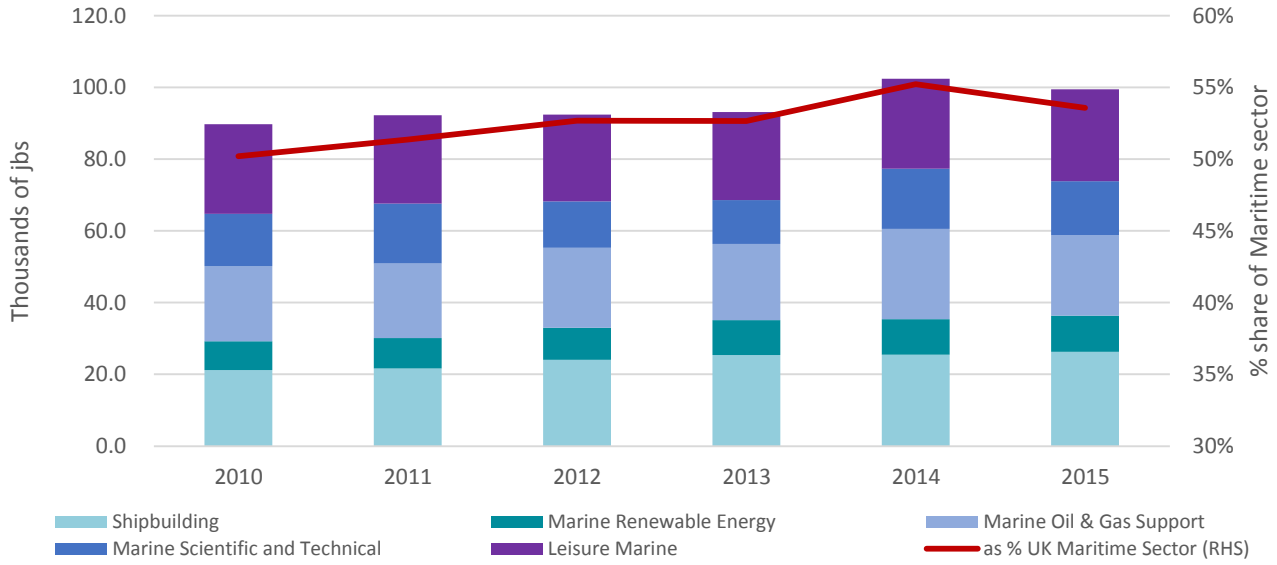


Source: British Marine, SMI, FAME, ONS, Cebr analysis

3.3 The direct economic impact through employment

In addition to its contribution through GVA, the Marine industry also directly supports a significant number of jobs. Figure 5 below highlights the direct contribution of the Marine industry to UK employment, again disaggregated by industry activity.

Figure 5: The direct contribution of UK Marine through employment, and the industry's share of the Maritime sector's direct contribution through employment



Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

It is estimated that the Marine industry directly supported 99,500 jobs in 2015, an increase from 89,700 jobs in 2010. The Marine industry's share of Aggregate employment directly supported by the Maritime sector remained broadly constant over this period, on average around 53% of total Maritime sector employment. Shipbuilding activities made the largest direct contribution through employment within the industry – 26,300 jobs, or 26% of employment in 2015. After this, Leisure Marine and Marine Oil and Gas support activities directly contributed 25,600 and 22,400 jobs respectively in 2015.

Table 6 below shows the estimated productivity of each Marine industry activity across the years 2010 to 2015, and compared against the average productivity level of the Maritime sector and the UK as a whole. Productivity here is defined as GVA per job; we observe that productivity across the Marine industry is considerably in excess of than the UK average but below that of the wider Maritime sector in all years.

Table 6: Productivity (GVA per job) in the Marine industry and constituent activities, the Maritime sector and UK economy

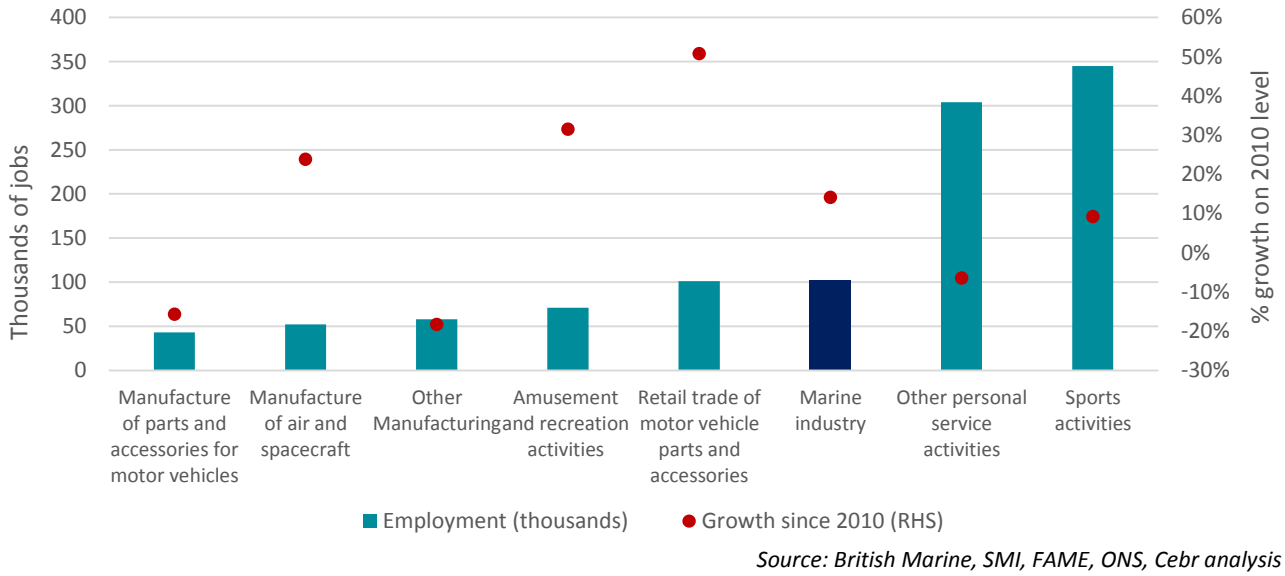
GVA per employee	2010	2011	2012	2013	2014	2015
UK economy	**£45,734**	**£46,652**	**£47,735**	**£49,009**	**£50,205**	**£50,830**
UK Maritime sector	**£76,273**	**£73,557**	**£85,822**	**£76,130**	**£75,917**	**£77,897**
UK Marine industry	**£59,750**	**£59,283**	**£72,477**	**£70,509**	**£63,714**	**£64,805**
Leisure Marine	£47,551	£46,016	£49,736	£47,799	£41,105	£34,550
Shipbuilding	£40,300	£59,417	£65,257	£62,596	£68,520	£59,243
Marine Renewable Energy	£51,075	£62,433	£73,097	£72,165	£72,165	£72,165
Marine Oil & Gas Support	£125,500	£99,111	£115,830	£116,598	£86,907	£113,828
Marine Scientific and Technical	£18,845	£27,409	£53,366	£51,392	£50,545	£48,117

Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Figure 6 below compares the direct contribution that the Marine industry made through UK employment in 2015 against comparable industries and activities.

Figure 6: The estimated employment of the Marine industry against comparable industries in 2015, and growth against 2010 level



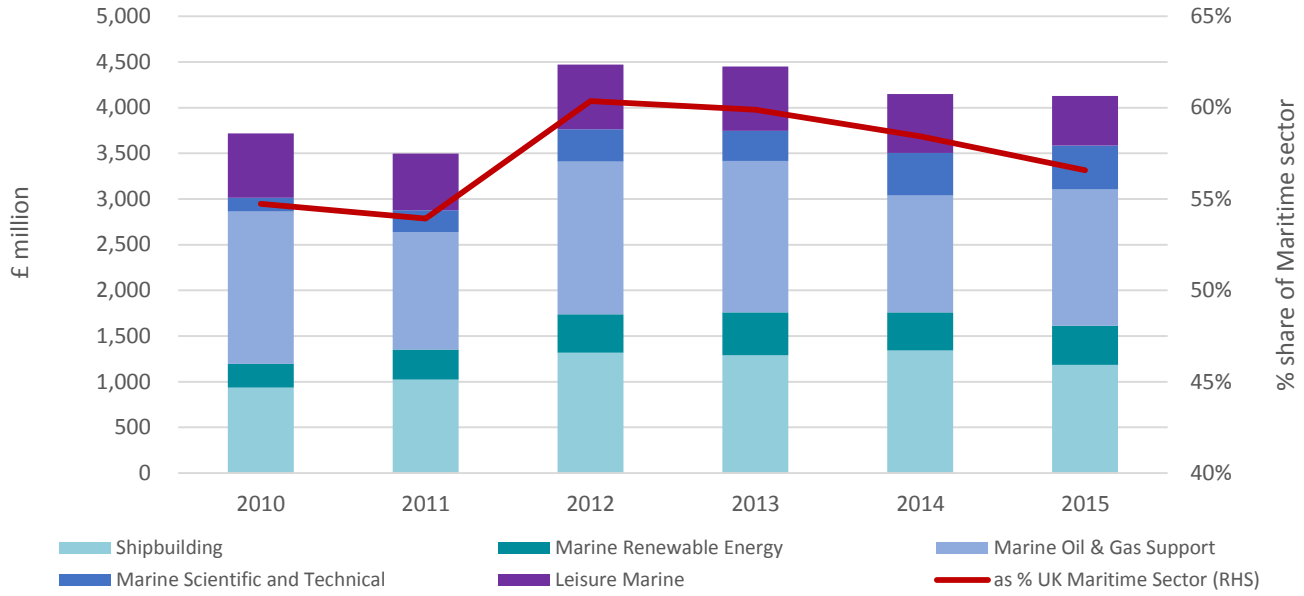
Source: British Marine, SMI, FAME, ONS, Cebr analysis

Employment in the Marine industry in 2015 was 14% higher than in 2010; in contrast, employment in Other personal service activities, considerably in excess of the Marine industry with 304,000 jobs, fell by 6% over the same period.

3.4 The direct economic impact through the compensation of employees

Figure 7 below illustrates the compensation of employees which is directly supported by the Marine industry, disaggregated by activity. It also illustrates the proportion of all direct employee compensation in the Maritime sector which is directly supported by the industry.

Figure 7: The direct contribution of the Marine industry through the compensation of employees, 2010 to 2015, £ million



Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

It is estimated that the Marine industry directly contributed just over £4.1 billion through the compensation of employees in 2015; this total has increased by around £400 million since 2010. Once again, Marine Oil and Gas support and Shipbuilding activities were the largest contributors to the employee compensation directly impact. Overall, the total value of compensation of employees directly supported across the Maritime sector from the Marine industry is estimated to have risen marginally from 54.7% in 2010 to 56.6% in 2015 (but fallen since the peak of 60.4% in 2012).

3.5 The direct contribution to the UK Exchequer

This section discusses the contribution of the Marine industry to the UK Exchequer. For each activity within this industry, Cebr have calculated the contributions in terms of:

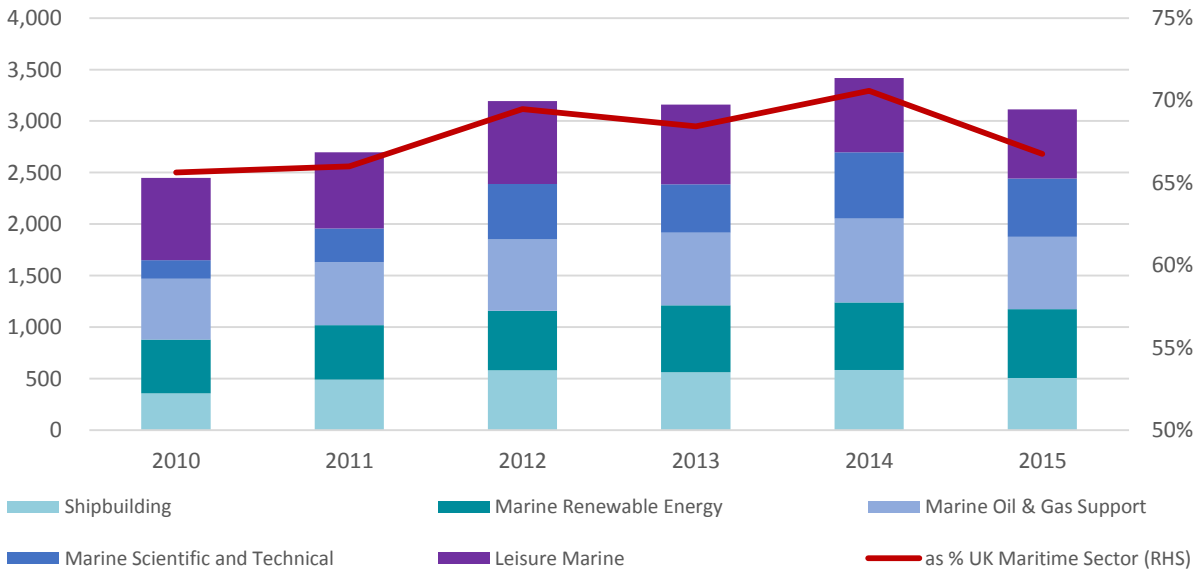
- Income Tax;
- National Insurance Contributions (NICs) – from both employees and employers;
- VAT;
- Corporation Tax;
- National Non-Domestic Rates (Business Rates).

For the personal taxes listed above, Income Tax and NICs revenues have been calculated by applying tax rates to the estimated wages and salaries paid to employees operating in each industry activity; rates and thresholds have been sourced from HMRC for the years 2010 to 2015. Wages and salaries for employees have been sourced from the Annual Survey for Hours and Earnings (ASHE)[12]. For the business taxes listed above, Corporation Tax revenues have been estimated by applying HMRC estimates for Average Effective Tax Rates (AETRs) to the estimated Gross Profit of each industry activity. Business Rates have been estimated using the average level of Business Rates paid as a proportion of GVA, drawing upon the ONS Annual Business Survey (ABS).

[12] The Annual Survey of Hours and Earnings (ASHE) provides data on the levels, distribution and make-up of earnings and hours worked for UK employees by sex and full-time or part-time status in all industries and occupations.

Figure 8 below depicts the direct contribution of the Marine industry to the UK Exchequer across 2010-2015, both in absolute levels (left side) and as a percentage of the overall Maritime sector.

Figure 8: The direct contribution of the Marine industry to the UK Exchequer, 2010 to 2015, £ million



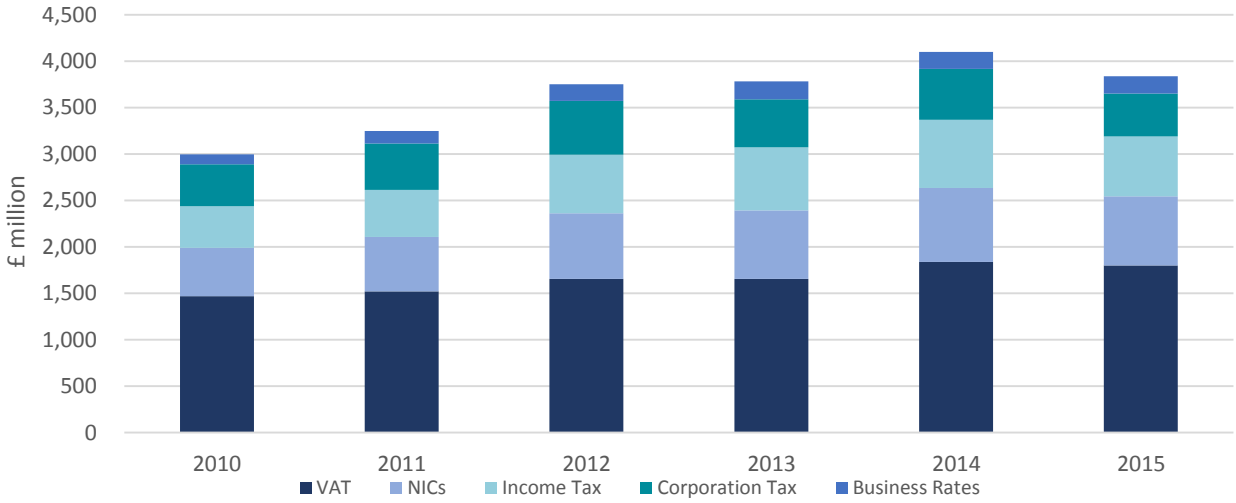
Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, HMRC, SMI, FAME, ONS, Cebr analysis

The Marine industry directly contributed £3.1 billion in tax revenues in 2015; this corresponds to approximately 67% of the total Maritime sector tax contribution. In aggregate, the Marine industry's direct Exchequer contribution grew by 27%, from £2.5 billion in 2010 to £3.1 billion in 2015. Marine Oil and Gas Support contributed the most to this direct impact, generating £700 million in tax revenues (22% of the direct contribution). The share of Leisure Marine's tax contribution fell over the period, from 32.7% in 2010 to 21.6% in 2015; with steady above-inflation increases in the Personal Allowance since 2010, the average employee paid less Income Tax and National Insurance.

Figure 9 overleaf disaggregates the Exchequer contribution of the Marine industry by tax head. VAT forms the largest component of Exchequer contributions from the Marine industry, averaging 40% of total tax receipts from the industry from 2010 to 2015; this is despite the assumed zero contribution from those businesses undertaking Shipbuilding activities (among others). After VAT, the industry is estimated to have contributed £1.2billion in Income Tax and National Insurance Contributions in 2015.

Figure 9: The direct contribution of the Marine Industry to the UK Exchequer, 2010 to 2015, by tax head



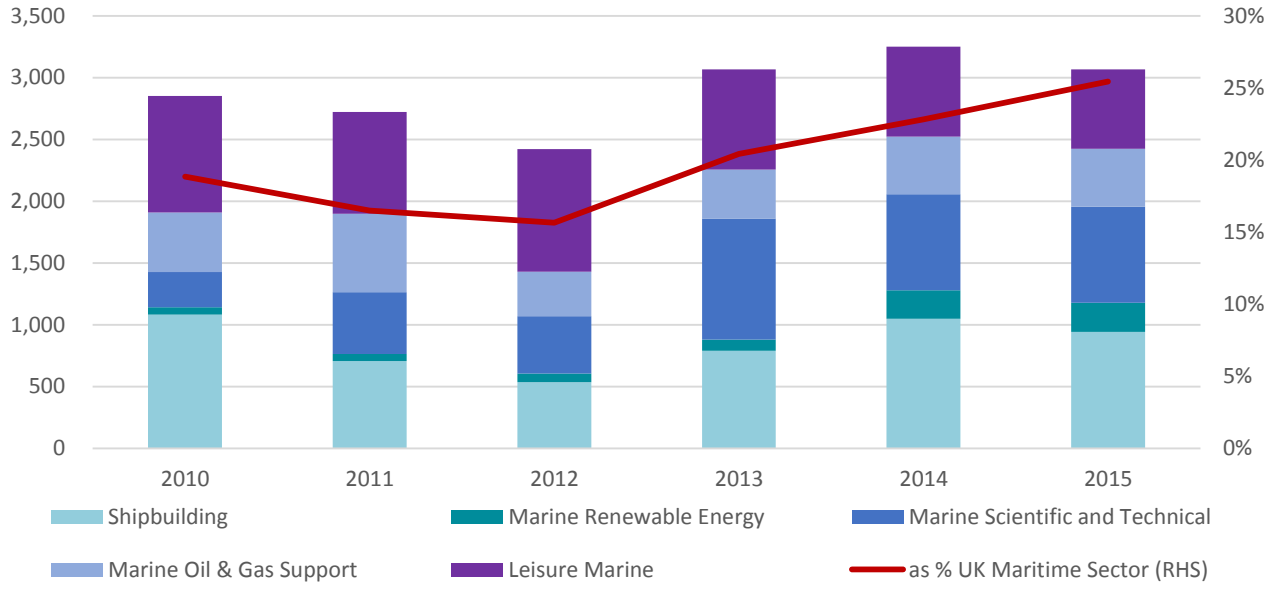
Source: British Marine, HMRC, SMI, FAME, ONS, Cebr analysis

3.6 The direct contribution to the UK's export of goods and services

In this final subsection we consider the contribution that the Marine industry makes to goods and services exported from the UK. For Leisure Marine, the value of exports has been determined using statistics taken from the British Marine Key Performance Indicators. Exports for the other activities of the Marine industry have been estimated by assuming that the level of exports for an industry activity is the same as that of the wider sector within which it sits. For example, exports from Marine Renewable Energy expressed as a proportion of turnover from this activity is assumed to be the same as that of the wider Energy sector. Specifically, exports of goods and services across each industry activity have been estimated using the ratio of goods and services exports to wider industry turnover as sourced from the ONS Supply Use Tables.

Figure 10 below shows trends in exports of goods and services from the Marine industry between 2010 and 2015, and exports expressed as a share of total Maritime sector exports across the same period.

Figure 10: Exports of goods and services from the Marine industry



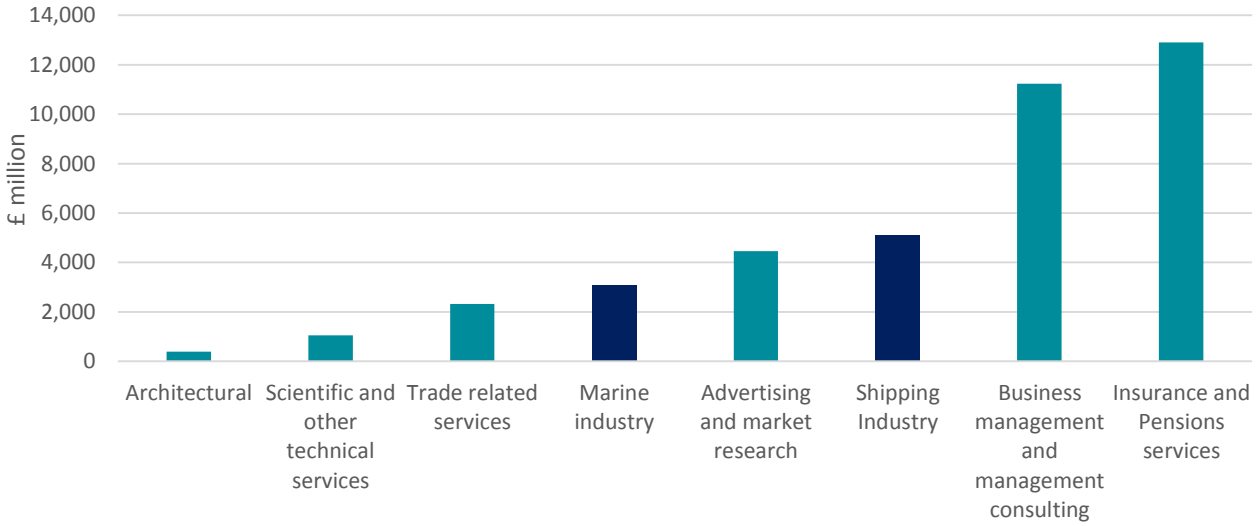
Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

The Marine industry exported goods and services valued at £3.1 billion in 2015; exports have grown very slightly over the period considered, with slight falls in Shipbuilding exports offset by increases from Marine Scientific and Technical activities, and Marine Renewable Energy. However, as a consequence of exports falling across the wider Maritime sector (discussed in more detail in Cebr's separate report on the economic contribution of the Maritime sector), the proportion of sector exports supported by the Marine industry has risen from 18.8% in 2010 to just over 25.4% in 2015.

Figure 11 below compares exports from the Marine industry against exports of goods and services from other comparable activities in 2015, as taken from the Pink Book. The Marine industry is estimated to have exported £3.1 billion of goods and services in 2015; this compares to £5.1 billion from the Shipping industry and £4.5 billion from the entire Advertising and market research industry. Marine industry exports exceeded that of Trade-related services (£2.3 billion), Scientific and other technical services (£1.1 billion) and Architectural services (£400 million).

Figure 11: Exports of goods and services from the Marine industry in 2015 against those from comparable activities, £ million



Source: ONS, Cebr analysis

In the next section we examine how the direct contribution that the Marine industry makes through business turnover, GVA, employment and the compensation of employees translates into aggregate economic impacts through indirect and induced effects.

4 The aggregate economic impact of the Marine industry in the UK

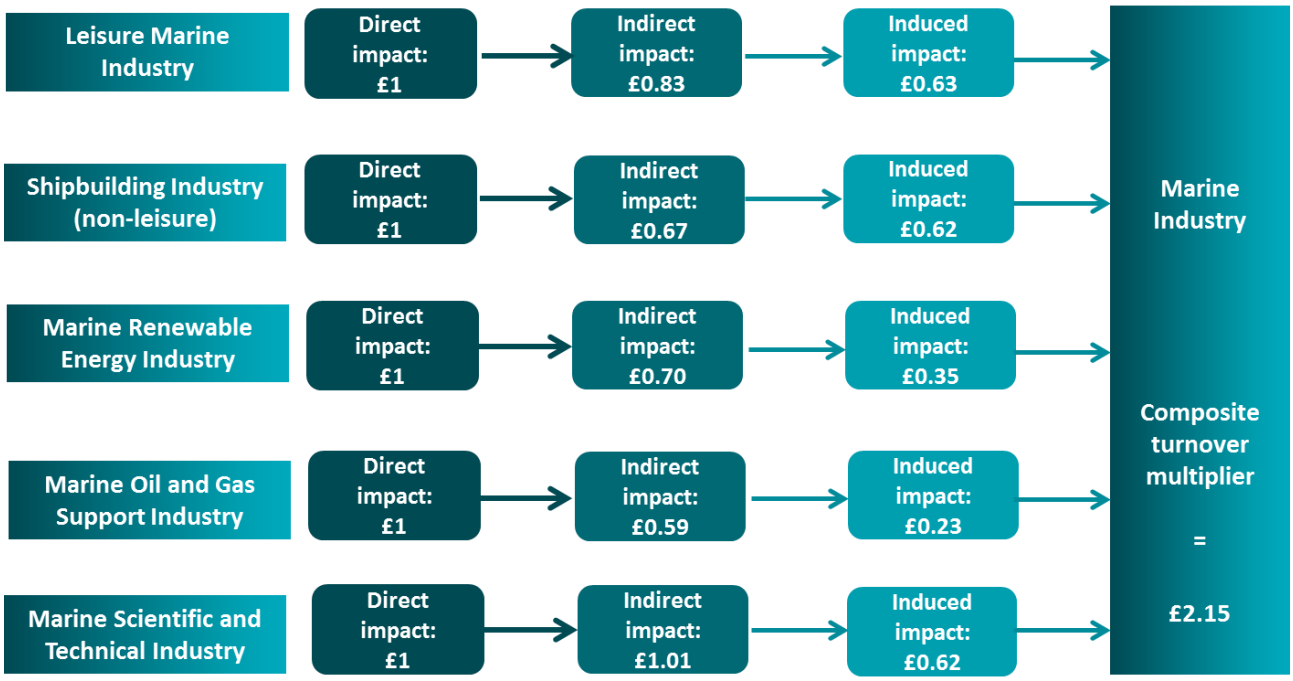
This section sets out the aggregate economic impacts of the Marine industry, by taking into account the indirect (or supply chain) and induced (employee spending) impacts that arise from the activities of firms within this industry. The four macroeconomic indicators for which the aggregate economic impact have been calculated are as follows: turnover; GVA; employment; and the compensation of employees. Multipliers have been generated from Cebr's economic impact model for the UK.

4.1 The aggregate economic impacts through turnover

Figure 12 below illustrates the turnover multipliers for the Marine industry within the UK, disaggregated by industry activity. The interpretation is that for example, for every £1 of direct turnover generated by the Leisure Marine activities of the industry, £0.83 worth of GVA is stimulated in the supply chains and £0.63 worth of turnover in the wider economy when direct and indirect (supply chain) employees spend their earnings.

Therefore, after combining each industry activity, for every £1 of turnover initially generated by the Marine industry, the UK economy as a whole experiences an increase in turnover of £2.15.

Figure 12: Turnover multiplier impacts of the UK Marine industry in 2015



Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 7 overleaf shows the estimated aggregate turnover impacts from the individual industry activities when taken in isolation. The Marine industry directly contributed £17.9 billion in turnover in 2015 (see previous section); once the indirect and induced economic channels are taken into consideration the industries contributed £38.5 billion in turnover.

Table 7: Domestic turnover impact of the Marine industry in 2015, £ million

Turnover in 2015	Direct Impact	Indirect Impact	Induced Impact	Total Impact
TOTAL	**17,885**	**12,573**	**8,052**	**38,510**
Leisure Marine	2,489	2,072	1,568	6,129
Shipbuilding	5,012	3,378	3,128	11,518
Marine Renewable Energy	2,294	1,606	805	4,704
Marine Oil & Gas Support	6,290	3,699	1,442	11,431
Marine Scientific	1,800	1,819	1,110	4,729

Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 8 below presents in each year the direct contribution to turnover from the Marine industry, alongside our estimate of the composite turnover multiplier that applies to the entire industry. We observe that both the turnover multiplier and direct impact are higher than in 2010, and thus so too is the total turnover impact.

Table 8: Direct and total turnover impact of the Marine industry, 2010 to 2015, £ million

	Direct Impact	Composite Turnover multiplier	Total turnover impacts
2010	13,661	2.11	28,788
2011	14,809	2.14	31,686
2012	16,919	2.15	36,415
2013	17,421	2.14	37,200
2014	18,555	2.15	39,869
2015	17,885	2.15	38,510

Source: British Marine, SMI, FAME, ONS, Cebr analysis

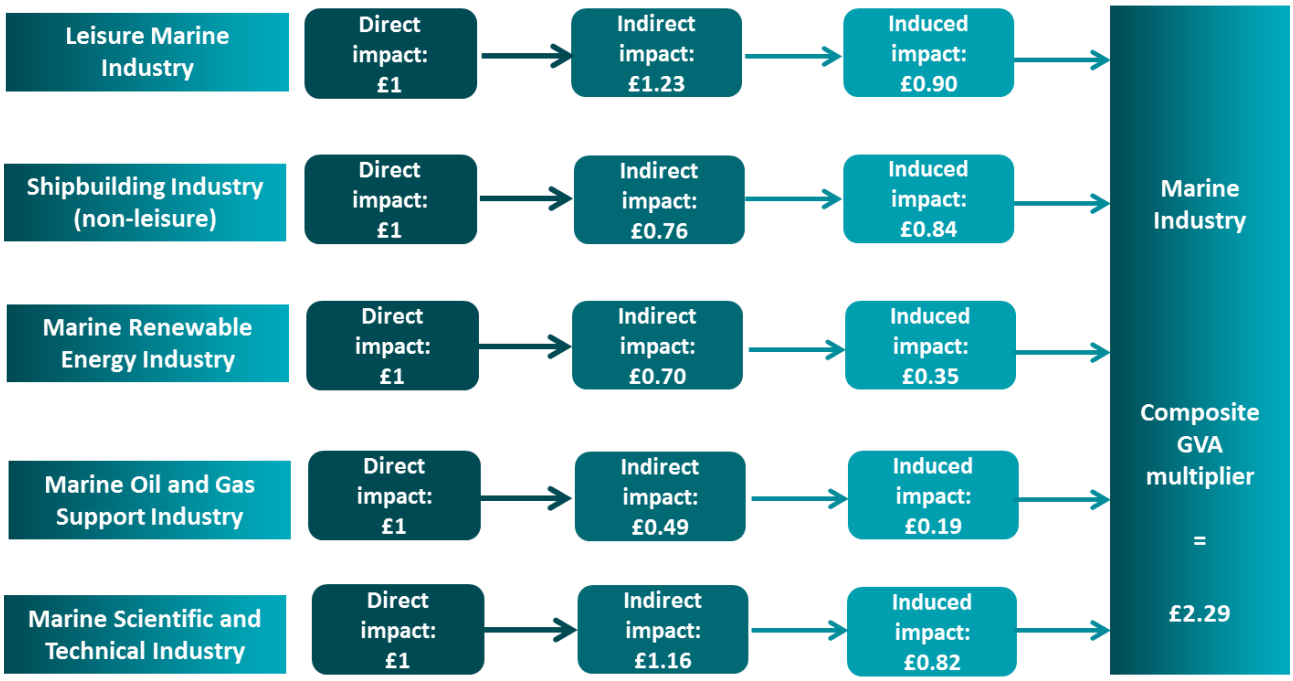
4.2 The aggregate economic impacts through GVA

Figure 13 below illustrates the GVA multipliers for the Marine industry within the UK, disaggregated by industry activity. The interpretation here is that, for example, for every £1 of direct GVA generated by the Shipbuilding activities of the Marine industry, £0.76 worth of GVA is stimulated in the supply chains and £0.84 worth of GVA in the wider economy when direct and indirect (supply chain) employees spend their earnings.

Therefore, after combining each industry activity, for every additional £1 of GVA initially contributed by the Marine industry, the UK economy as a whole sees an increase in GVA of £2.29.

The Marine industry directly contributed to just under £6.5 billion towards UK GDP in 2015; once the indirect and induced economic channels are taken into consideration the Marine industry contributed £14.8 billion in GVA.

Figure 13: GVA multiplier impacts of the UK Marine industry in 2015



Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 9 below shows the estimated aggregate GVA impacts from Marine industry activities when taken in isolation. Marine Oil and Gas Support had the largest aggregate GVA impact at £4.3 billion in 2015, followed by Shipbuilding (£4.1 billion) and Leisure Marine (£2.7 billion). With direct impacts relatively small in comparison, the aggregate GVA impact from the other remaining industry activities was just under £3.7 billion in 2015. Despite making a relatively small contribution to the level of GVA directly generated by the Marine industry – a total of only £730 million in 2015 – Marine Scientific and Technical activities actually have the largest GVA multiplier, with a total of £2.98 in GVA for each £1 initially generated. This lies in contrast with Marine Oil and Gas support, with a GVA multiplier of only £1.69.

Table 9: GVA impact of the Marine industry disaggregated by activity in 2015, £ million

GVA in 2015	Direct Impact	Indirect Impact	Induced Impact	Total Impact
TOTAL	**6,446**	**4,892**	**3,454**	**14,792**
Leisure Marine	885	1,091	795	2,771
Shipbuilding	1,556	1,185	1,310	4,052
Marine Renewable Energy	730	511	256	1,497
Marine Oil & Gas Support	2,550	1,260	496	4,307
Marine Scientific	726	844	596	2,167

Notes: Marine engineering = Shipbuilding + Marine Renewable Energy + Marine Oil & Gas Support + Marine Scientific and Technical

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 10 below presents the direct contribution to GVA alongside our estimate of the composite GVA multiplier that applies to the entire industry, an estimated 2.29 in 2015. The aggregate GVA impact from the Marine industry increased from £12.4 billion in 2010 to £14.8 billion in 2015.

Table 10: Direct and aggregate GVA impact of the Marine industry, 2010 to 2015, £ million

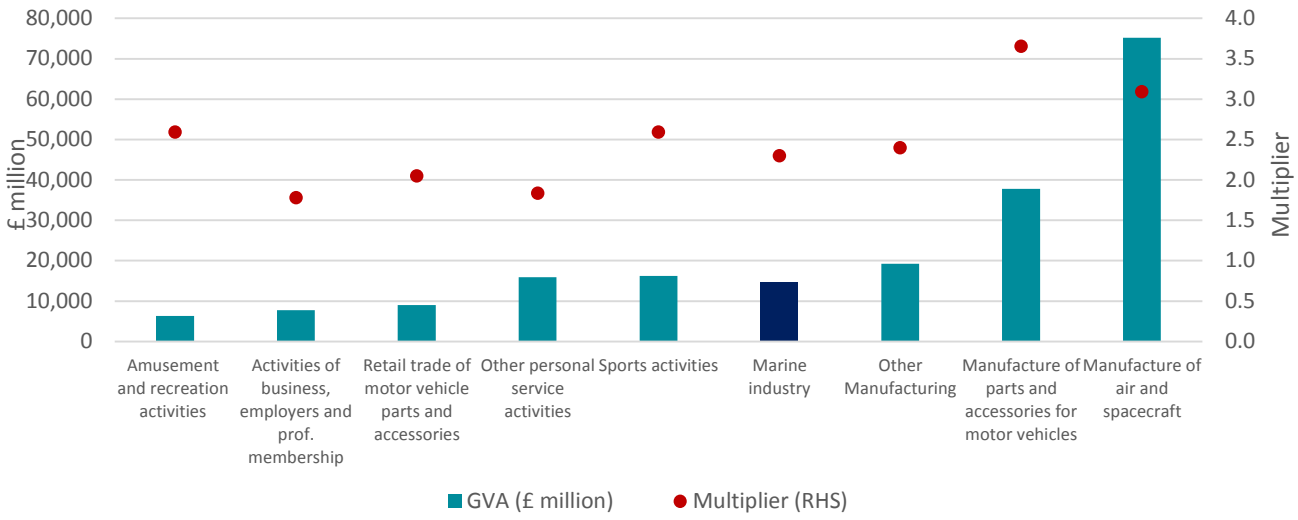
	Direct Impact	Composite GVA multiplier	Total GVA impacts
2010	5,361	2.31	12,369
2011	5,467	2.40	13,105
2012	6,699	2.37	15,898
2013	6,567	2.36	15,511
2014	6,524	2.39	15,573
2015	6,446	2.29	14,792

Source: British Marine, SMI, FAME, ONS, Cebr analysis

To place these results in context, Figure 14 compares the aggregate GVA impact of the Marine industry in 2015 against the comparable activities identified in the previous section. In addition, the GVA multipliers associated with each activity are also presented.

The Marine industry's aggregate GVA impact of £14.8 billion in 2015 compares favourably to the Retail trade of motor vehicle parts and accessories (£8.9 billion) and the Activities of business, employers and prof. membership (£7.2 billion), but lies considerably below that of the Manufacture of air and spacecraft (£75.2 billion).

Figure 14: The aggregate GVA impact and GVA multiplier of the Marine industry against comparable industries in 2015



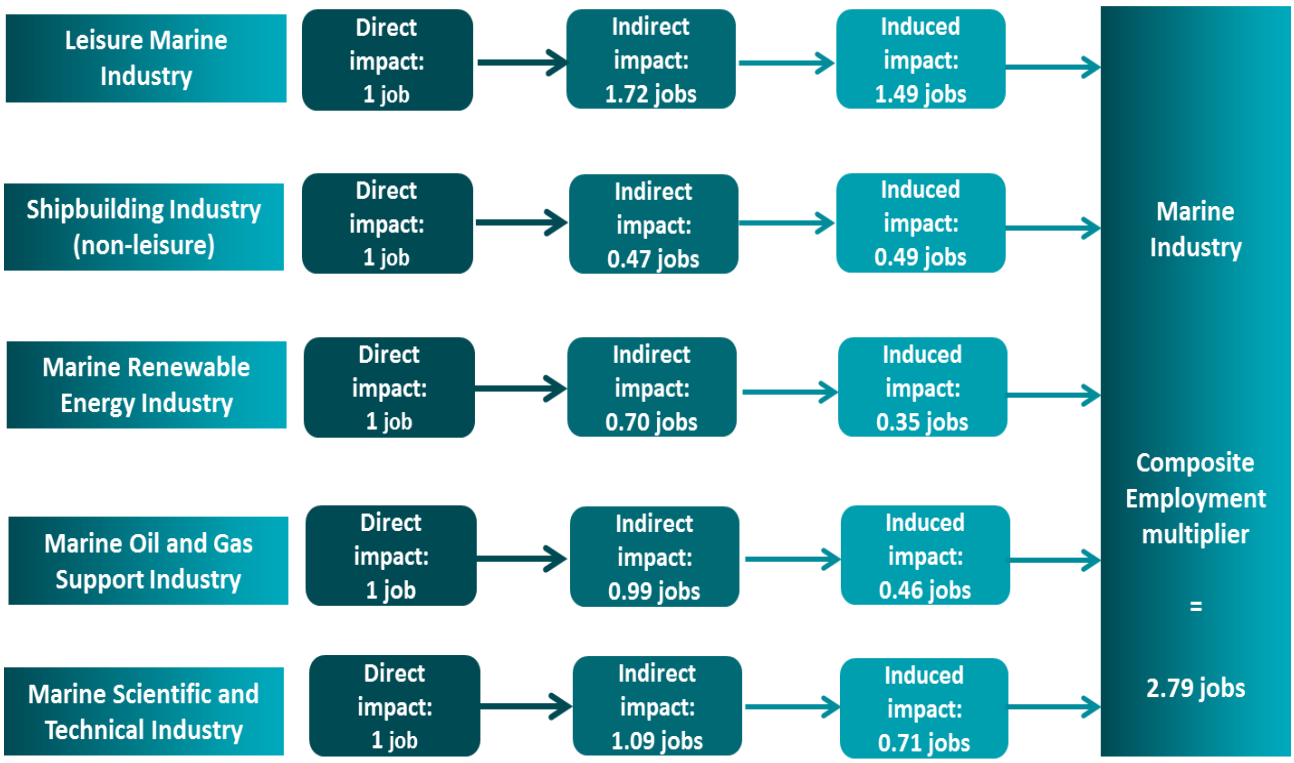
Source: British Marine, SMI, FAME, ONS, Cebr analysis

4.3 The aggregate economic impacts through employment

Here we examine the aggregate economic impact of the Marine industry through employment. Figure 15 below illustrates the employment multipliers for the Marine industry within the UK, disaggregated by industry activity. The interpretation here is that, for every job supported by the Marine industry, 1.03 jobs are stimulated in the industry's supply chains and a further 0.76 jobs supported in the wider economy when direct and indirect (supply chain) employees spend their earnings.

In other words, for every additional job initially supported by the Marine industry, the UK economy experiences an increase of 2.79 jobs.

Figure 15: Employment multiplier impacts of the UK Marine industry, 2015



Source: British Marine, SMI, FAME, ONS, Cebr analysis

The combined number of jobs directly supported by the Marine industry in 2015 was 99,500, whilst 277,100 were supported once the indirect and induced impacts of the industry are taken into account. Table 9 below shows the estimated aggregate employment impacts from Marine industry activities when taken in isolation.

As with GVA, the highest employment multiplier is associated with Marine Scientific and Technical activities; from a direct impact of 15,100 jobs in 2015, the aggregate jobs impact was 42,300 jobs with an employment multiplier of 2.80. In contrast, the Shipbuilding industry directly supported 27,300 jobs in the UK in 2015; the aggregate economic impact was 51,500 jobs, with an employment multiplier of 1.96.

Table 11: Employment impact of the Marine industry in 2015, in thousands of jobs

Employment in 2015	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	**99.5**	**102.2**	**75.4**	**277.1**
Leisure Marine	25.6	43.9	38.2	107.7
Shipbuilding	26.3	12.5	12.8	51.5
Marine Renewable Energy	10.1	7.1	3.5	20.7
Marine Oil and Gas Support	22.4	22.2	10.3	54.9
Marine Scientific and Technical	15.1	16.5	10.7	42.3

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 12 shows the direct and aggregate employment impacts of the Marine industry between 2010 and 2015. In line with an increasing direct contribution to UK employment between 2010 and 2015, the aggregate employment impact has also increased, from 245,000 jobs in 2010 to nearly 277,000 jobs in 2015. The composite multiplier for the industry has also increased slightly following faster employment growth in Marine industry activities with higher multipliers (chiefly Marine Scientific and Technical activities).

Table 12: Direct and Aggregate employment impact of the Marine industry, 2010 to 2015, in thousands of jobs

	Direct Impact	Composite industry multiplier	Aggregate employment

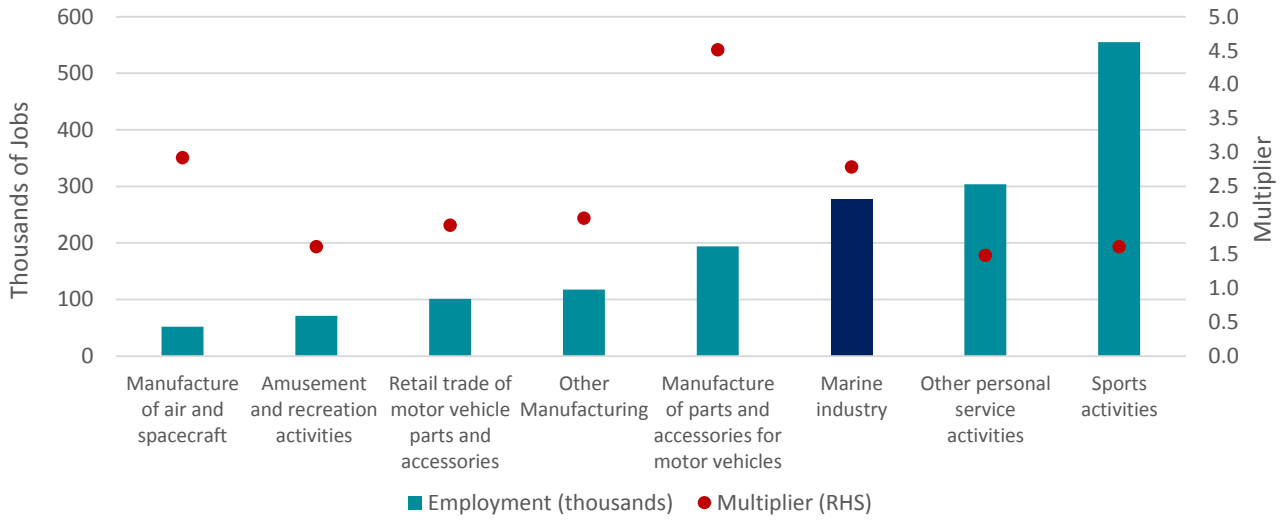
			impact
2010	89.7	2.73	245.0
2011	92.2	2.74	252.6
2012	92.4	2.76	254.9
2013	93.1	2.74	254.9
2014	102.4	2.75	281.6
2015	99.5	2.79	277.1

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Once again, the Marine industry compares favourably against other comparable activities in terms of its aggregate employment impact, shown overleaf in Figure 16. The Marine industry had an aggregate employment impact of 277,100 jobs in 2015, in comparison to 194,000 for the Manufacture of parts and accessories for motor vehicles and 71,000 for Amusement and recreation activities.

The Marine industry also has a notably higher employment multiplier, driven by the Leisure Marine and Marine Scientific and Technical activities within the wider industry (as identified in Figure 15 above).

Figure 16: The aggregate employment impact and employment multiplier of the Marine industry against comparable industries in 2015



Source: British Marine, SMI, FAME, ONS, Cebr analysis

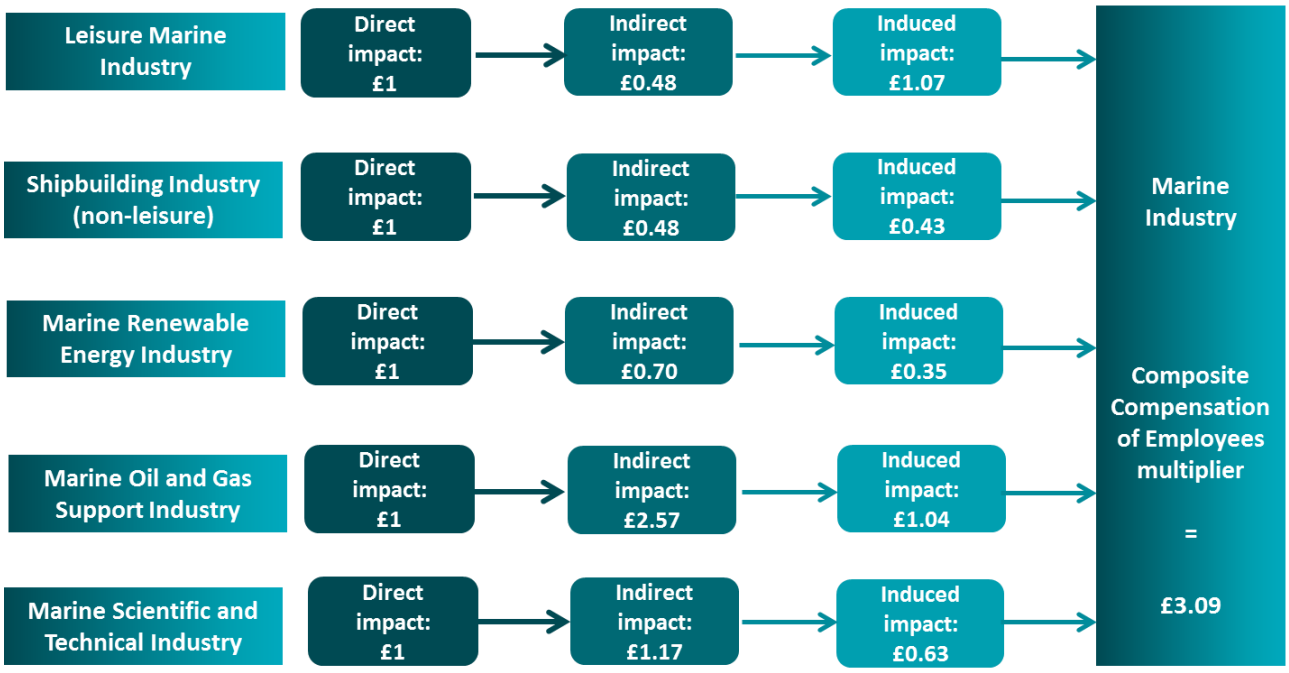
4.4 The aggregate economic impacts through the compensation of employees

In this final subsection we consider the aggregate economic impact of the Marine industry through the compensation of employees. Figure 16 below illustrates the direct, indirect and induced compensation of employee impacts associated with the industry, disaggregated by industry activity.

Here the interpretation is that, for every £1 of employee compensation directly supported by the Marine industry, '£X' of wages and salaries and other employee remuneration is supported in total throughout the economy through supply chain (indirect) and employee spending (induced) channels. For example, for each £1 of employee compensation in Maritime Scientific and Technical activities in 2015, £1.17 is supported through the supply chain and an additional £0.63 is supported through employee expenditures – yielding an aggregate impact of £2.81.

Therefore, for the Marine industry as a whole, for every £1 directly raised in the compensation of employees in 2015, a total of £3.09 in employee compensation was supported in the UK economy.

Figure 16: Aggregate contribution of the Marine industry through the compensation of employees



Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 13 below shows the estimated aggregate impacts through the compensation of employees from Marine industry activities, when taken in isolation. A total of just under £12.8 billion through the compensation of employees was supported by the Marine industry in 2015, the majority of this contribution sourced from Marine Oil and Gas support, and Shipbuilding activities.

Table 13: Impact through the compensation of employees in the Marine industry in 2015, £ million

Compensation of Employees in 2015	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	**4,127**	**5,526**	**3,101**	**12,754**
Leisure Marine	542	260	582	1,384
Shipbuilding	1,184	572	512	2,269
Marine Renewable Energy	427	299	150	876
Marine Oil & Gas Support	1,493	3,832	1,553	6,878
Marine Scientific	480	562	304	1,347

Source: British Marine, SMI, FAME, ONS, Cebr analysis

Table 14 presents the direct contribution to GVA alongside our estimate of the composite compensation of employees (COE) multiplier that applies to the entire industry, an estimated 3.09 in 2015. The composite multiplier for the Marine industry has fallen slightly since 2010; this can be partly attributed to an observed fall in the direct contribution from Marine Oil and Gas support activities, which has a relatively high multiplier for the compensation of employees.

However, due to growth in the Marine Industry's other activities, the aggregate impact through the compensation of employees has risen from £12.2 billion in 2010 to £12.7 billion in 2015.

Table 14: Direct and aggregate impacts through the compensation of employees from the Marine industry, 2010 to 2015, £ million

	Direct Impact	Composite industry multiplier	Aggregate impact
2010	3,719	3.29	12,228
2011	3,497	3.09	10,813
2012	4,470	3.11	13,883
2013	4,449	3.10	13,785
2014	4,148	2.96	12,266
2015	4,127	3.09	12,754

Source: British Marine, SMI, FAME, ONS, Cebr analysis

In the final section of this report, we examine the direct and aggregate economic impact of the Marine industry at regional level throughout the years 2010 to 2015.

5 The regional economic impact of the Marine industry

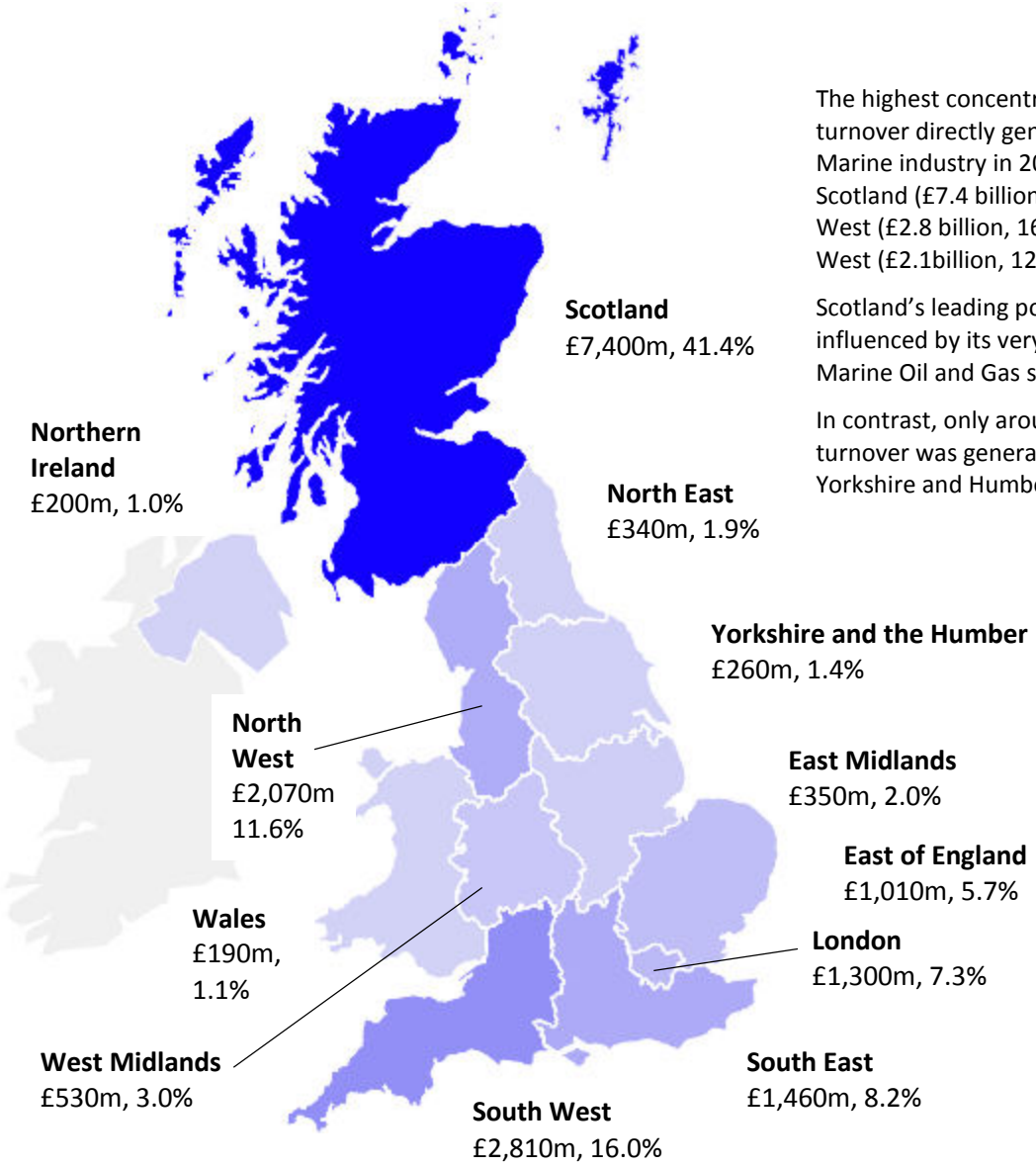
In this final section we examine the economic contribution of the Marine industry across the different UK regions. In this context, these regions are defined as the former Government Office Regions (GORS).

5.1 The direct economic impact of the Marine industry by UK region

Business turnover and GVA

Figures 17 and 18 below show the estimated regional breakdown of business turnover and GVA directly supported by the Marine industry in 2015.

Figure 17: Regional breakdown of turnover directly contributed by the Marine industry in 2015, £ million



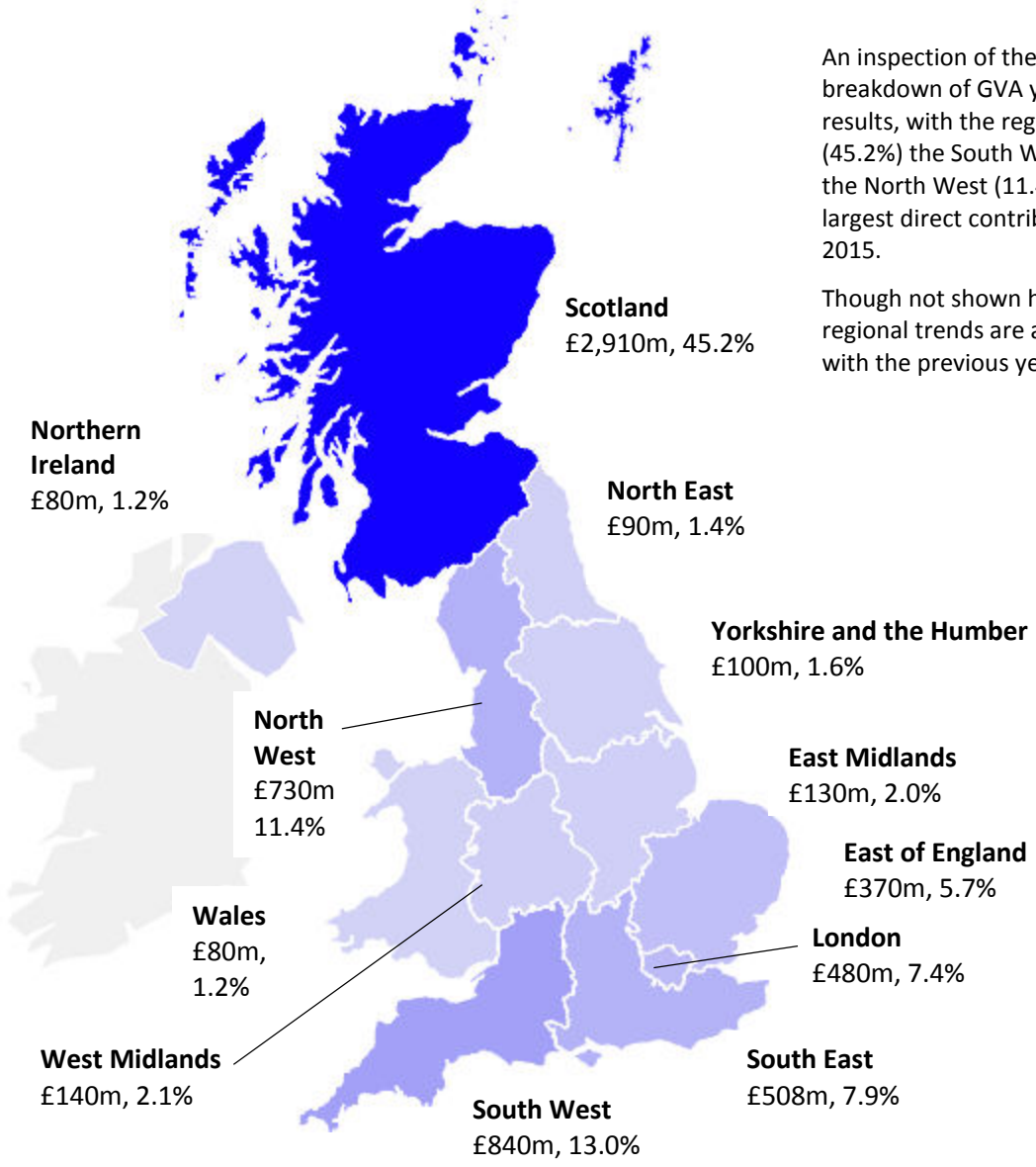
The highest concentrations of business turnover directly generated by the Marine industry in 2015 were in Scotland (£7.4 billion, 41%), the South West (£2.8 billion, 16%) and the North West (£2.1billion, 12%).

Scotland's leading position is heavily influenced by its very high share of Marine Oil and Gas support activities.

In contrast, only around £260 million of turnover was generated directly in the Yorkshire and Humber region.

Note: Figures subject to rounding to nearest £10 million. Source: British Marine, SMI, FAME, ONS, Cebr analysis

Figure 18: Regional breakdown of GVA directly contributed by the Marine industry in 2015



An inspection of the regional breakdown of GVA yields similar results, with the regions of Scotland (45.2%) the South West (13.0%) and the North West (11.4%) making the largest direct contributions to GVA in 2015.

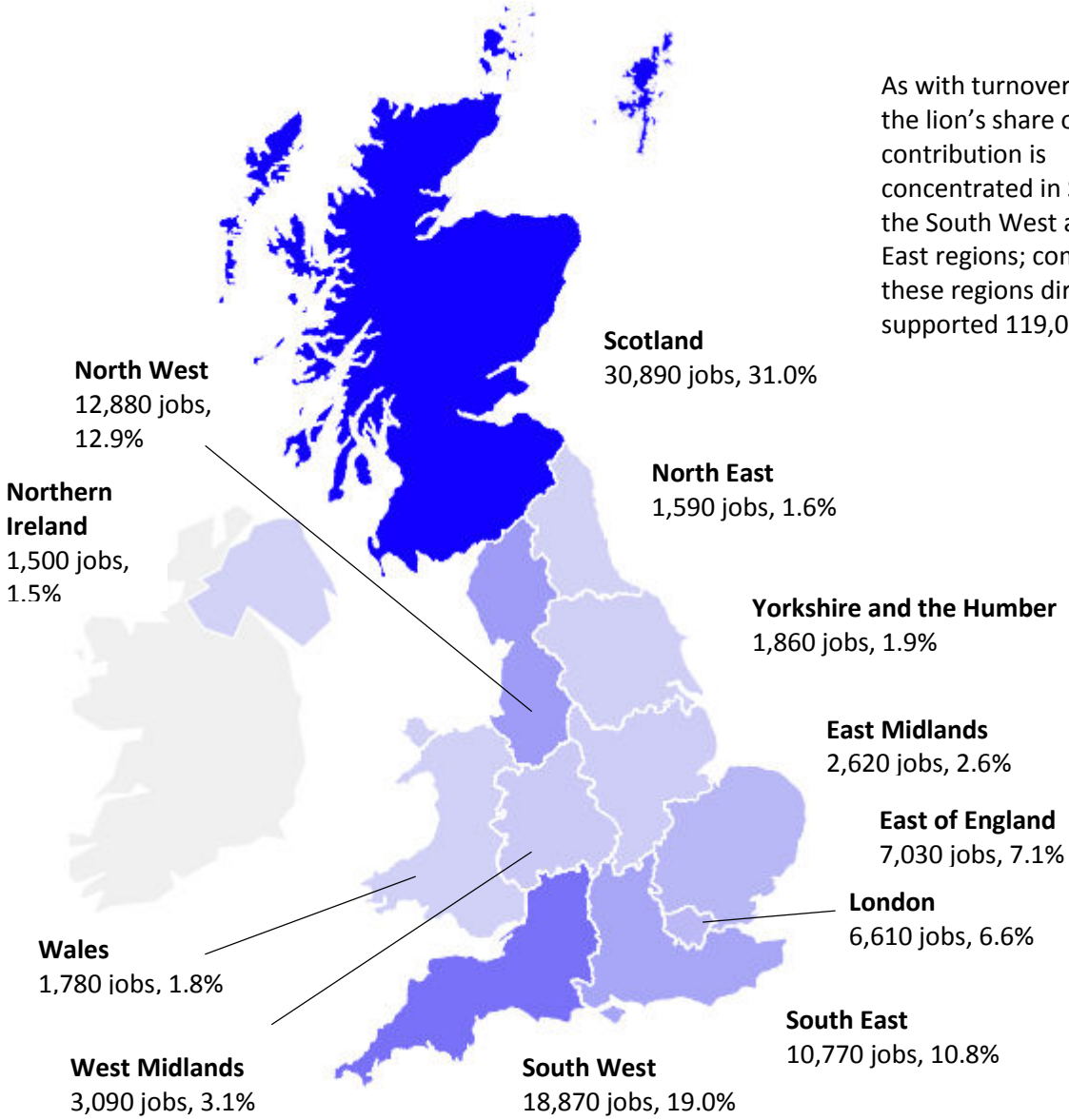
Though not shown here, these regional trends are also consistent with the previous years back to 2010.

Note: Figures subject to rounding to nearest £10 million. Source: British Marine, SMI, FAME, ONS, Cebr analysis

Employment and the Compensation of Employees

Figures 19 and 20 below shows the estimated regional breakdown of employment and the compensation of employees directly supported by the Marine industry in 2015.

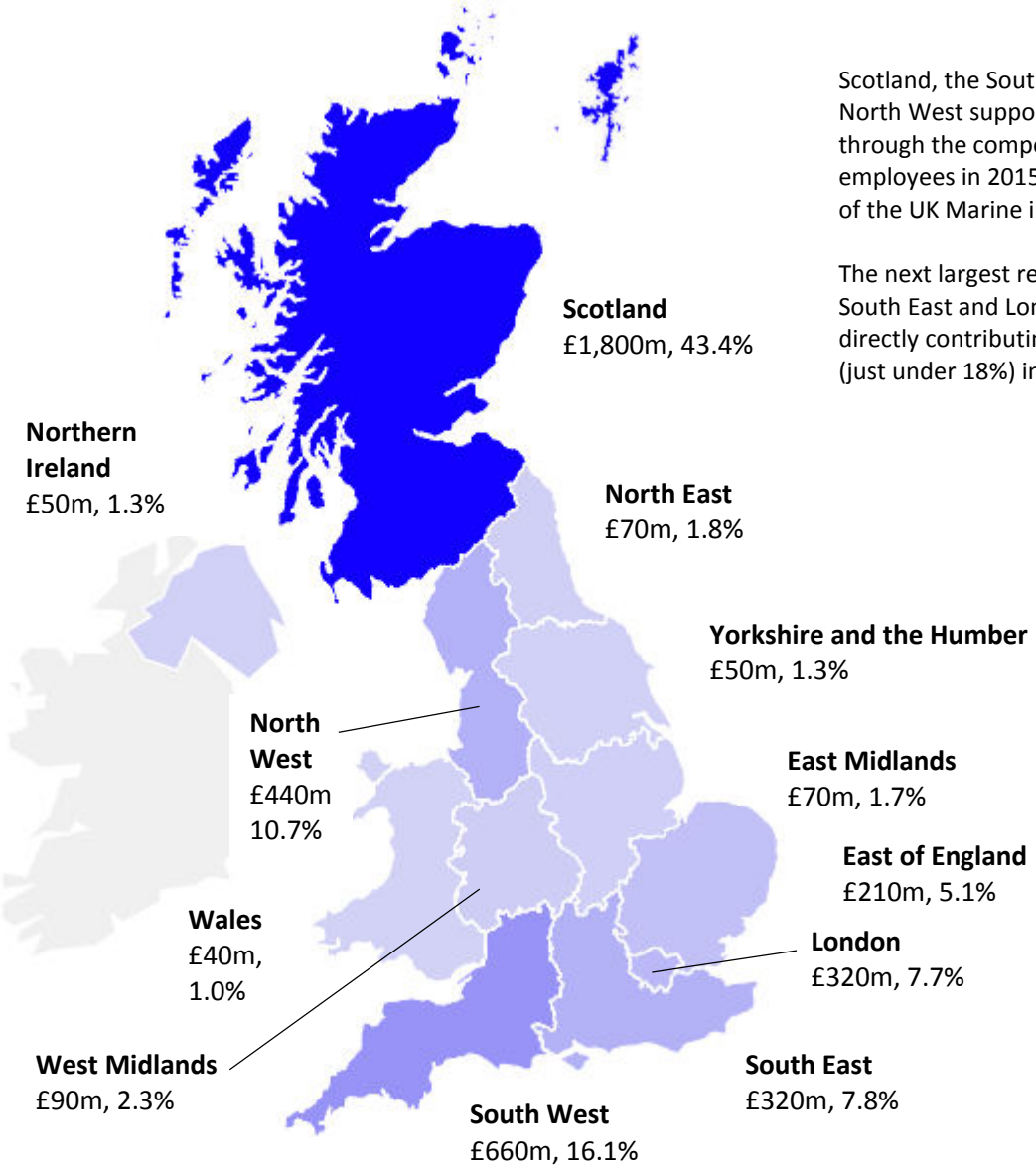
Figure 19: Regional breakdown of employment directly contributed by the Marine industry in 2015



As with turnover and GVA, the lion's share of the direct contribution is concentrated in Scotland, the South West and South East regions; combined, these regions directly supported 119,000 in jobs.

Note: Figures subject to rounding to nearest ten jobs. Source: British Marine, SMI, FAME, ONS, Cebr analysis

Figure 19: Regional breakdown through the compensation of employees directly contributed by the Marine industry in 2015



Scotland, the South West and the North West supported £2.9 billion through the compensation of employees in 2015, or around 70% of the UK Marine industry total.

The next largest regions were the South East and London, with both directly contributing £320 million (just under 18%) in 2015.

Note: Figures subject to rounding to nearest £10 million. Source: British Marine, SMI, FAME, ONS, Cebr analysis

5.2 The aggregate economic impact of the industry by UK region

This final subsection examines the aggregate economic impact of the Marine industry across each region for the four macroeconomic indicators covered in the previous subsection. In order to estimate the aggregate economic impact of the industry at regional level, the direct economic impacts as already estimated were combined with Cebr's suite of regional economic impact models, within which the activities of the Marine industry were separately identified and isolated.

It is important to note that the economic impact multipliers as estimated for each region are necessarily lower than the equivalent multiplier for the Marine industry as a whole, reflecting the leakage of impacts when the activity of the industry in a particular region imports inputs from elsewhere in the UK outside that region.

The aggregate economic impacts for business turnover and GVA by region

Table 15 shows the breakdown of direct and aggregate economic impacts for business turnover and GVA in 2015, alongside the composite industry multiplier for each region. It is estimated that from a total of £17.9 billion in turnover and £6.4 billion in GVA directly contributed by the Marine industry in 2015, a total of £38.5 billion and £14.8 billion respectively was sustained in total across the UK regions. For GVA, the highest multiplier impacts are associated with the South East, East of England and the South West.

Table 15: Regional breakdown of the aggregate economic impact through turnover and GVA contributed by the Marine industry in 2015

	Turnover (£ million)			GVA (£ million)		
Region	Direct Impact	Industry Multiplier	Aggregate impact	Direct Impact	Industry Multiplier	Aggregate impact
Scotland	7,364	1.72	12,701	2,913	1.70	4,962
Wales	190	1.94	370	78	2.31	180
Northern Ireland	196	1.92	376	75	2.20	165
East of England	1,014	2.12	2,144	367	2.74	1,008
East Midlands	350	2.16	757	129	2.50	321
London	1,308	1.88	2,457	479	2.35	1,122
North East	337	1.74	585	92	1.94	180
North West	2,067	2.04	4,211	733	2.29	1,681
South East	1,458	2.40	3,503	508	3.23	1,640
South West	2,812	2.18	6,132	835	2.81	2,348
West Midlands	531	2.22	1,180	136	2.64	359
Yorkshire and the Humber	258	2.02	520	100	2.26	227

Source: British Marine, SMI, FAME, ONS, Cebr analysis

The aggregate economic impacts for employment and the compensation of employees by region

Finally, Table 16 below shows the breakdown of direct and aggregate economic impacts for employment and the compensation of employees in 2015, alongside the composite industry multiplier for each region. The region with the largest aggregate impacts through employment and the compensation of employees was Scotland, with an aggregate impact of 59,300 and £5.9 billion, respectively.

Table 16: Regional breakdown of the aggregate economic impact through employment and the compensation of employees contributed by the Marine industry in 2015 (employment in thousands of jobs; compensation of employees in £ million)

	Employment			Compensation of Employees		
Region	Direct Impact	Industry Multiplier	Total impact	Direct Impact	Industry Multiplier	Total impact
Scotland	30.9	1.92	59.3	1,789.6	3.30	5,897.8
Wales	1.8	2.50	4.4	42.8	2.35	100.8
Northern Ireland	1.5	1.88	2.8	52.2	1.52	79.4
East of England	7.0	3.04	21.4	212.5	2.31	491.6
East Midlands	2.6	2.78	7.3	69.4	2.61	181.4
London	6.6	2.46	16.3	317.2	2.53	804.1
North East	1.6	2.00	3.2	72.4	1.60	115.5
North West	12.9	1.95	25.1	440.3	1.57	691.0
South East	10.8	3.27	35.2	321.3	2.28	732.2
South West	18.9	2.79	52.6	662.9	1.77	1,171.6
West Midlands	3.1	2.74	8.5	93.1	2.31	214.9
Yorkshire and the Humber	1.9	2.52	4.7	53.7	2.66	142.7

Source: British Marine, SMI, FAME, ONS, Cebr analysis

6 Annex – full list of Leisure Marine activities

Table A.1 below shows the full list of activities which fall under the Leisure Marine category considered as part of the study; this list of activities has been sourced from the British Marine Key Performance Indicators (KPI) for 2010 to 2015.

Not all activities listed in the KPI have been considered as part of the study; some are instead considered to be activities associated with either the Shipping industry (the economic contribution of which is covered in a separate Cebr report) or Shipbuilding activities of the Marine industry, and have therefore been excluded to avoid double-counting. The list of excluded activities consists of: Inland Boat Hire; Coastal/Sea Charter; Passenger Boats; Boatyard Services / Repairs; Facilities / Maintenance; and Technical/Boatbuilding Services.

Table A.1: Full list of activities which fall under Leisure Marine and considered as part of this study.

Manufacturing	Distribution	Business Services	Customer Services
Superyachts (over 24m)	Superyachts (over 24m)	B2B Boat Transport	Sailing Schools tuition
Sailboats/Kellboats/Dinghies	Sailboats/Kellboats/Dinghies	Services/Consultants	Brokerages
Motoryachts/Cruisers	Motoryachts/Cruisers	Marine business training	Dealerships of new boats
Narrowboat/Barge	Narrowboat/Barge	Financial	Chandleries
Personal Watercraft	Personal Watercraft	Insurance	Marinas and Moorings (Inland)
RIBS/Inflatables	RIBS/Inflatables	Legal	Marinas and Moorings (Coastal)
Canoes/Kayaks	Canoes/Kayaks	Marina Services	Fuelling Stations
Commercial Boats	Commercial Boats	Other Business Services	Finance
Boats (Other)	Boats (Other)		Insurance
Engine Installation Equipment	Engine Installation Equipment		Legal
Inboard Engines	Inboard Engines		Surveyors
Outboard Engines	Outboard Engines		Other Consumer Services
Sterngear and Propellers	Sterngear and Propellers		
Transmissions	Transmissions		
Engines (other)	Engines (other)		
Boatbuilding equipment	Boatbuilding equipment		
Boat care and maintenance	Boat care and maintenance		
Electrical	Electrical		
Electronics	Electronics		
Hardware/Rigging	Hardware/Rigging		
Marina, Boatyard Equipment	Marina, Boatyard Equipment		
General Utilities	General Utilities		
Personal Gear & Equipment	Personal Gear & Equipment		
Safety Equipment	Safety Equipment		
Equipment (other)	Equipment (other)		

Source: British Marine, Cebr analysis