

# **Non paper on the size, nature and dynamics of the blue economy**

15 September 2015

## **ABSTRACT**

*The blue economy is the part of the market economy that benefits from the resources of the sea. Currently the main benefits provided are food, energy, transport and leisure. The industries that deliver these benefits – fishing, aquaculture, petroleum extraction, offshore wind, shipping, shipbuilding and coastal tourism currently employ about 5 million people in the EU with about half of these in the coastal tourism sector. This assumes all oil and gas exploration and exploitation is offshore, takes into account fish processing, transport to and from tourism destinations and sectors such as insurance that provide goods and services to the main sectors. But it does not include tourism trips without an overnight stay, construction or trading of second homes, wholesaling and retailing of fish and shellfish or non-market activities such as marine research, coastal protection or defence. Neither does it include niche or emerging sectors such as the laying of communication cables which, although strategic to the EU, are smaller in size than uncertainties in the size of the main industries.*

*The analysis provides an overview of the blue economy for each Member State, as well as the EU as a whole. It largely uses numbers provided by EU Member States and a number of neighbouring states to the EU's statistical office, Eurostat, through structural business statistics, the Labour Force Survey and tourism surveys. Additional information comes from the Data Collection Framework for fisheries and the European Wind Energy Association.*

*Since 2008, employment in the coastal tourism sector has grown slightly and that in shipbuilding fallen. But by far the fastest growth has come from offshore wind which has grown from almost nothing in 2008 to an industry that now employs 75,000 people, about half as many as fishing.*

*The focus so far has been on employment because the primary objective of the EU's blue growth policy is to find new opportunities for Europe's unemployed and underemployed. However, work is also ongoing to determine the contribution of this sector to the EU's Gross Domestic Product. Initial estimates suggest about 3% or €400 billion in total, largely from the shipping, petroleum and coastal tourism sectors.*

*It marks the first stage in a process to obtain a more detailed picture of the current state and future prospects of the blue economy. It is not the final word, but, because it uses data that are harmonised at an EU level and that are reported annually or quarterly, the analysis is reproducible. The method can be codified, updated and built on. On 29 September, 2015, statisticians and economists from EU Member States will critically examine the analysis, compare it with their own efforts and discuss a way forward.*



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## 1. OBJECTIVE

DG MARE has begun a process to estimate the size, nature and dynamics of the blue economy in EU Member States. This should allow comparison on a similar basis between different activities, different countries and, where possible, different sea basins in order to inform policies aiming to promote growth and jobs. The process will involve specialists from Member States and the relevant industries.

## 2. METHOD

### 2.1. Definition of blue economy

The EU's blue economy covers market activity taking place on European territory that is intrinsically linked to the sea. It includes:

- (1) primary sectors – transport (shipbuilding, shipping), energy (oil, gas, renewable energy), food (fisheries, aquaculture) and coastal tourism.
- (2) secondary sectors such as insurance that provide goods and services to these primary sectors.
- (3) smaller sectors such as marine aggregate extraction or communication cable laying. They also contribute to the blue economy but are not covered in this analysis because they are not considered separately in official statistics. Nevertheless, whilst some of these are economically significant, they are much smaller in size than uncertainties in the size of the primary sectors. Neglecting them for now has negligible impact on our estimates of the overall size.

### 2.2. Direct Employment

Statistics such as turnover, average wages, added value and employment are taken directly from structural business statistics (SBS) which cover industry, construction, trade and services. Presented according to the NACE<sup>1</sup> activity classification, they describe the structure, conduct and performance of businesses across the European Union (EU). Data are available for the EU as a whole and for each Member State. They also cover neighbouring countries such as Norway and Turkey so it is possible to compare their blue economies using the same method.

The exceptions are:

- (1) fisheries and aquaculture – where data are obtained from the Data Collection Framework because these are not covered by structural business statistics;
- (2) offshore wind energy where data are obtained from the European Wind Energy Association.

Our initial estimates assume that all oil and gas activity is offshore. The International Association of Oil and Gas Producers suggest that 80% of production is offshore and that a given production offshore creates more jobs than onshore. They are currently looking at information provided by their members to determine whether they can provide a country-by-country analysis

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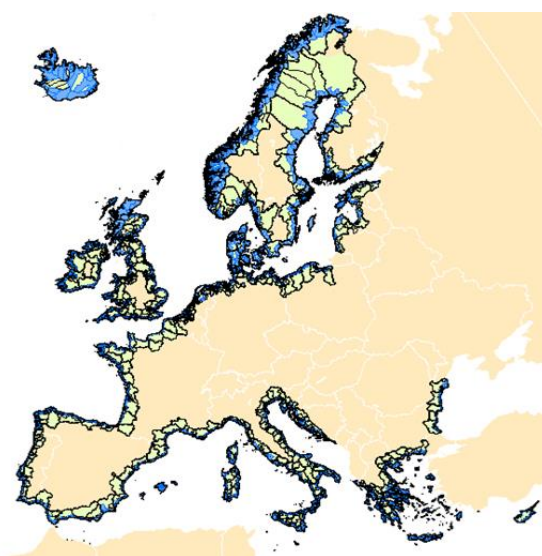
<sup>1</sup> Nomenclature statistique des activités économiques

of the split between offshore and onshore. The Commission has also launched a study to clarify this<sup>2</sup>.

Structural business statistics do not distinguish between activity generated by coastal tourists, for instance in restaurants, from that generated by residents or from that generated by tourism in non- coastal areas. Estimates of the activity also requires information provided by Member States under Regulation 692/2011 which includes data from surveys made of tourists and tourism establishments. The method is summarised in section 2.3

### 2.3. Coastal Tourism

Coastal tourism is defined as tourism where at least one night is spent in a municipality with a coastline or with 50% of its territory within 10km of the sea. At present there is insufficient data to estimate activity for day trips. Coastal tourism is the largest activity in the blue economy in terms of jobs.



*Figure 1 Coastal municipalities are the blue areas in the map. The larger green areas are the NUTS3 coastal areas analysed for other socio-economic indicators (see section 7)*

The size of the activity is based on analyses of tourist spending on:

- (1) accommodation
  - The number of nights spent in coastal regions are determined from surveys of tourism destinations. The turnover and employment are calculated assuming that averages for similar types of accommodation (hotels, campsites etc) are the same for coastal as for non-coastal accommodation in a given country
- (2) transport, food and beverage services and "other"
  - turnover is estimated from surveys of tourist spending and employment from turnover to employed ratios. The turnover to employment ratio for retail activities is used to estimate employment generated by spending on "other"

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<sup>2</sup> Bids for MARE/2014/45 are still being evaluated. The study should start in the first quarter of 2016 and report in 2017

Separate analyses are made for residents (tourists who reside in the same country) and non-residents (those who come from another EU country). Travel for business is excluded for now although normally tourism statistics do include it.

The transport statistics assume turnover to employment ratios of the destination country. Employment is attributed to the destination country.

Work is ongoing, together with Eurostat, to improve these numbers through:

- (1) better estimates of nights spent in non-paid accommodation. This is particularly significant for residents, currently this is estimated by comparing the difference in income of accommodation establishments and the declared average spending per night of tourists. Better information can be deduced from surveys.
- (2) Better estimates of spending by non-residents. Currently EU-averages are used but numbers are available to attribute the spending to tourists from a particular country;
- (3) Attribution of spending on transport between departure and arrival country.
- (4) In the longer term, when data availability improves, estimates of spending by same-day visitors could be added to the analysis (preliminary data from tourism satellite accounts show that same-day visits account for half of domestic tourism expenditure and one tenth of inbound tourism expenditure).

Numbers will be presented both including and not including business travel.

#### 2.4. Indirect employment

Data are available on the amount that each primary activity spends on goods and services. Supply and use tables indicate what particular goods and services are bought. Ratios of turnover to persons employed for these activities then allow the indirect jobs to be estimated using the following formula.

$$J_i = \sum_{j=1}^{j=n} \frac{p_i \alpha_i^j}{t^j}$$

$$i \in P, j \in S, j \notin P$$

where:

- $J_i$  is the number of secondary jobs generated by primary activity  $i$
- $p_i$  is the sum of purchases of primary activity  $i$  from Eurostat structural business statistics
- $t^j$  is the turnover per person employed of secondary activity  $j$  from Eurostat structural business statistics
- $\alpha_i^j$  is the proportion of total supplies to primary activity  $i$  provided by secondary activity  $j$  (from supply and use tables)
- $P$  is the set of primary activities
- $S$  is the set of secondary activities. To avoid double counting, purchases from primary sectors are excluded.
- $n$  is the number of secondary activities

The current estimate assumes that the indirect activity takes place in the same country as the primary activity. Provided that the turnover to persons employed ratios are similar, and provided that most indirect activity is within the EU, this will not have a large impact at an EU level. However, this can distort the distribution of activity between countries. Improving these estimates will be one of the objectives of the proposed process for estimating the size of the blue economy.

The supply and use tables were taken partly from Eurostat and partly from the UK statistical office. Other national tables allowing a greater level of detail than those of Eurostat are available and will be examined in a following step.

## **2.5. Contribution to Gross Domestic Product**

The Gross Domestic Product of a country measures the monetary value of all the finished goods and services produced within its borders in a specific time period.

There are different approaches to measuring the contribution from the blue economy. The bottom-up approach used in the past<sup>3</sup> has been to sum up the value added of all contributing sectors using Eurostat's structural business statistics. This included both the primary sectors and a number of sectors that included a maritime component. In the past the identification of the proportion that was maritime was rather arbitrary. In principle, using supply and use tables, the indirect added-value could be determined in the same way as for the indirect employment (section 2.4) but this has not been attempted here.

Rather the approach has been to take a top down approach. The Gross Domestic Product can also be determined by the expenditure approach

$$GDP = C + G + I + NX$$

Where *C* is equal to all private consumption, or consumer spending, in a nation's economy, *G* is the sum of government spending in final goods or services, *I* is the sum of all the country's businesses spending on capital and *NX* is the nation's total net exports, calculated as total exports minus total imports (*NX* = Exports - Imports.)

## **3. EMPLOYMENT**

### **3.1. Number of persons employed**

Table 1 gives a breakdown of employment in the blue economy. The annex to this paper provides more detail, including references to sources used. This suggests that:

- (1) the blue economy provides about 5 million jobs in the EU
- (2) about half of these are in coastal tourism.
- (3) enterprises providing services and good to the primary sectors make up a significant proportion. This is particularly the case for the oil and gas

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<sup>3</sup> e.g. "Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts" ("Blue Growth" study MARE/2010/01)



industry. For instance about half of civil helicopters worldwide service the offshore industry<sup>4</sup>.

*Table 1 Breakdown of number of persons employed in blue economy using data from structural business statistics and Data Collection Framework for fisheries.*

oil and gas <sup>5</sup>	590000	extraction	77,000
		support activities	49,000
		indirect	460,000
wind	77000	total	77,000
food	380000	processing	110,000
		aquaculture	40,000
		fishing	140,000
		indirect	93,000
shipbuilding	433000	shipbuilding	190,000
		repair	85,000
		indirect	160,000
shipping	1100000	construction of water projects	99,000
		cargo handling <sup>6</sup>	260,000
		service activities	110,000
		water transport	210,000
		indirect	390,000
coastal tourism	2,400,000	residents	680,000
		non-residents	1,300,000
		indirect	410,000
<b>TOTAL</b>	<b>5,000,000</b>		

### 3.2. Cross-check - Labour Force Survey

Data for employment from the Data Collection Framework and structural business statistics have been compared with data from the Labour Force Survey.(Figure 2). This quarterly survey covers about one and a half million households in the EU and provides data up to and including 2014 whereas the latest data from structural business statistics and the Data Collection Framework finish in 2013.

<sup>4</sup> "Rotor slayed". The Economist, 25 July, 2015

<sup>5</sup> Assumes all extraction activity is offshore

<sup>6</sup> Includes cargo handling air transport

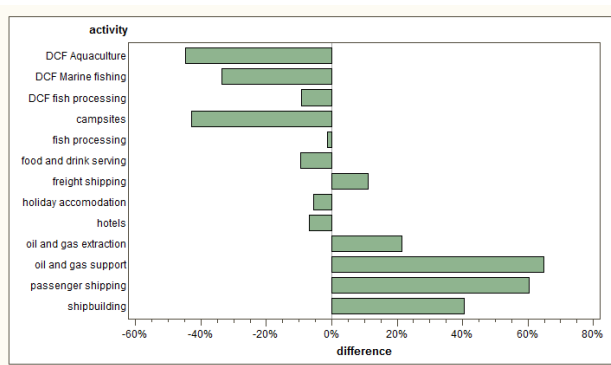


Figure 2 Percentage difference between data on employment from Labour Force Survey and those from structural business statistics and Data Protection Regulation. Numbers are positive when Labour Force Survey numbers are higher

Further analysis is required but respondents to the Labour Force Survey from employment agencies working in a particular sector may identify themselves as belonging to a sector whereas the structural business statistics would include them under "employment agency"<sup>7</sup>. The Data Collection Framework may underestimate employment at an EU level because of the difficulty of imputing values to non-reporting countries.

The structural business statistics are exhaustive but the Labour Force Survey data are sampled from household surveys.

#### 4. CONTRIBUTION TO GROSS DOMESTIC PRODUCT

Some indications of the size of the blue economy can be deduced from Table 2. For most activities we use turnover as an indicator because this includes the added value of all the secondary or indirect sectors. The analysis is still ongoing and these results are indicative.

The figures show that there are three main components – petroleum, shipping and tourism. Shipbuilding has not been included for now because the output is largely covered by the spending of the shipping, fishing and oil and gas industries.

Work is ongoing to determine the imports to each of these activities that need to be deducted from the turnover when we estimate the contribution to the EU's GDP. We also need to subtract the onshore component of the petroleum industry. However, adding day trips to the coastal tourism total would add to the total. So a figure of between €400 and €450 billion does not seem unreasonable.

The EU's nominal Gross Domestic Product is about €14.3 trillion and at purchasing power parity about €12.7 trillion. The blue economy therefore contributes in the region of 3% of this.

However, about 48% of the EU's GDP is made up of government spending, most of which is on non-market activities such as health or education so the blue economy's share of the market economy would be higher.

<sup>7</sup> They would be counted as "indirect employment" in our analysis

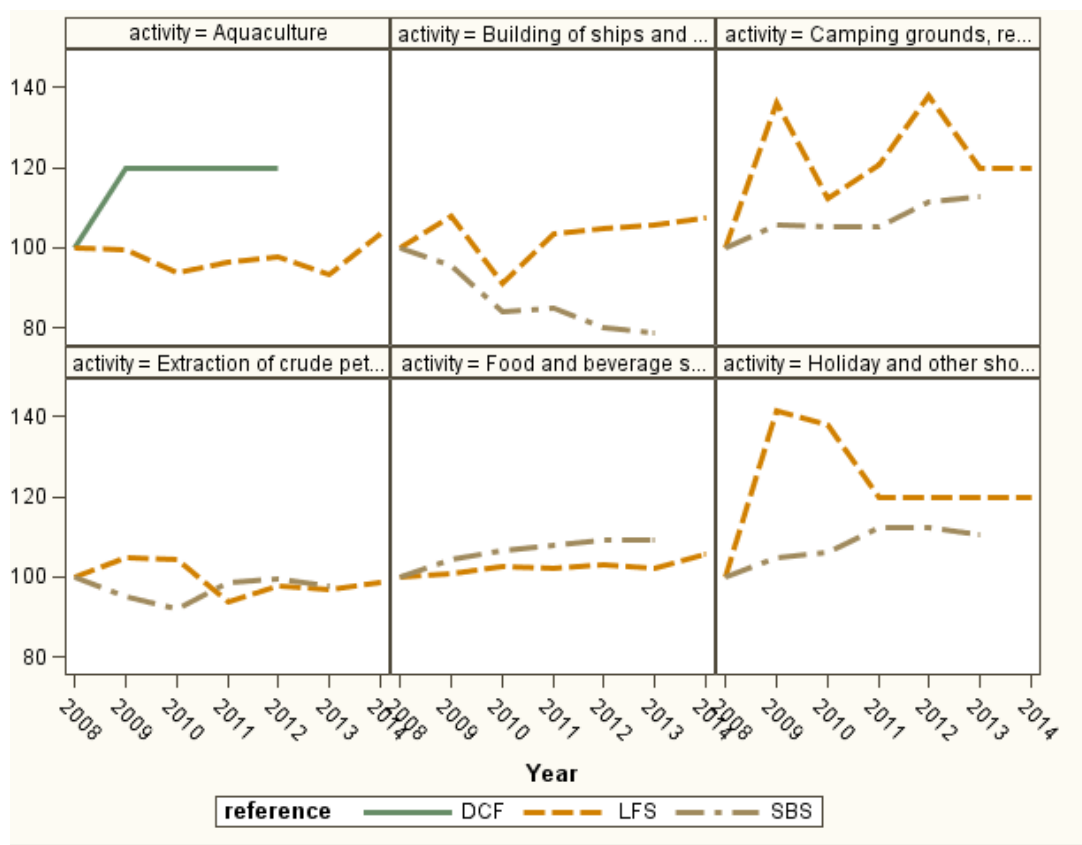
Table 2 indicators for the size of the blue economy in monetary terms

activity	indicator	Value (€ billions)
crude petroleum and gas extraction	turnover	160
offshore wind	investment	4
fishing	revenue	7
aquaculture	turnover	2
fish processing	gross value added	7
shipbuilding		0 <sup>8</sup>
shipping	turnover	110
tourism (residents)	turnover	51
tourism (non-residents)	turnover	130
<b>total</b>		<b>≈450</b>

5. GROWTH RATE

5.1. Employment

Growth rate in employment since 2008<sup>9</sup> has been estimated using the three data sources – structural business statistics, Labour Force Survey and the Data Collection Framework (Figure 3)



<sup>8</sup> Turnover (€35 billion for building and €8billion for repair) already largely included in accounts of shipping, oil and gas and fishing industries

<sup>9</sup> The NACE codes were revised in 2008 which could result in a discontinuity in the time series.



Figure 3 Growth rate in number of persons employed as obtained from structural business statistics (SBS), Labour Force Survey (LFS) and Data Collection Framework (DCF)

A cursory look at these figures indicates significant differences between the three data sources. A closer examination indicates:

- agreement that employment in tourism activities (hotels, food and beverage services) has increased slightly over the period.
- agreement about a drop in employment in 2010 in shipbuilding and shipping.
- disagreement about the dynamics of employment in shipping and shipbuilding from 2011. The structural business statistics indicate a decrease whereas the Labour Force Survey shows an increase.

## 5.2. Turnover

Turnover may be a better indicator of growth in a particular industry than employment because it takes into account those not directly employed by the provider of the final service or product (Figure 4).

These figure are more consistent with employment figures from the structural business statistics than from the Labour Force Survey – a slight increase in activity in tourism-related industries and a fall in passenger shipping and shipbuilding. The time series for freight shipping was too short to draw conclusions.

Turnover in the oil and gas industry is more volatile, reflecting the volatility in prices.

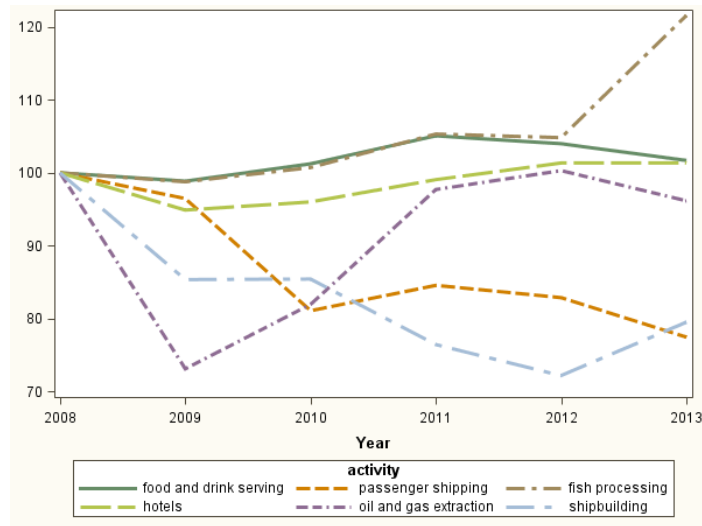


Figure 4 dynamics of turnover in blue industries in volume terms. The monetary values have been adjusted to take into account inflation which was determined by comparing GDP at current prices with that at previous year's prices.

**6. IMPORTANCE OF EMPLOYMENT IN MARITIME INDUSTRIES IN EU MEMBER STATES**

The size of the maritime industries in EU Member States as a proportion of total employment can be seen in appendix 3

**7. OTHER INDICATORS**

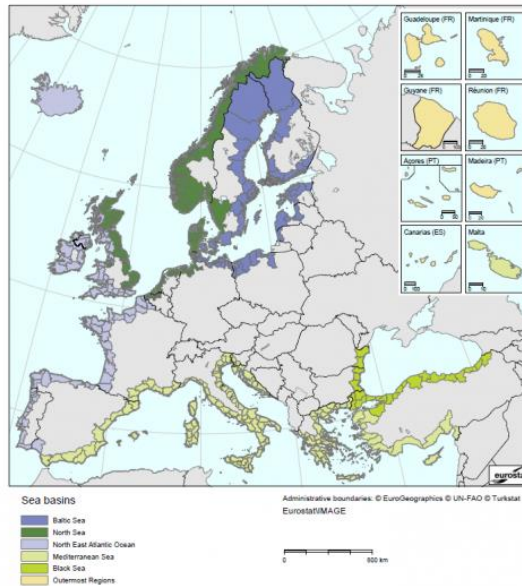


Figure 5 Coastal regions of the EU defined at a NUTS3 level

The EU's statistical office, Eurostat, has updated its 2013 "Statistics in Focus" publication on "economic ebb and flow in maritime sectors"<sup>10</sup> with a new analysis<sup>11</sup>. It includes comparisons between coastal and non-coastal regions based on the EU's

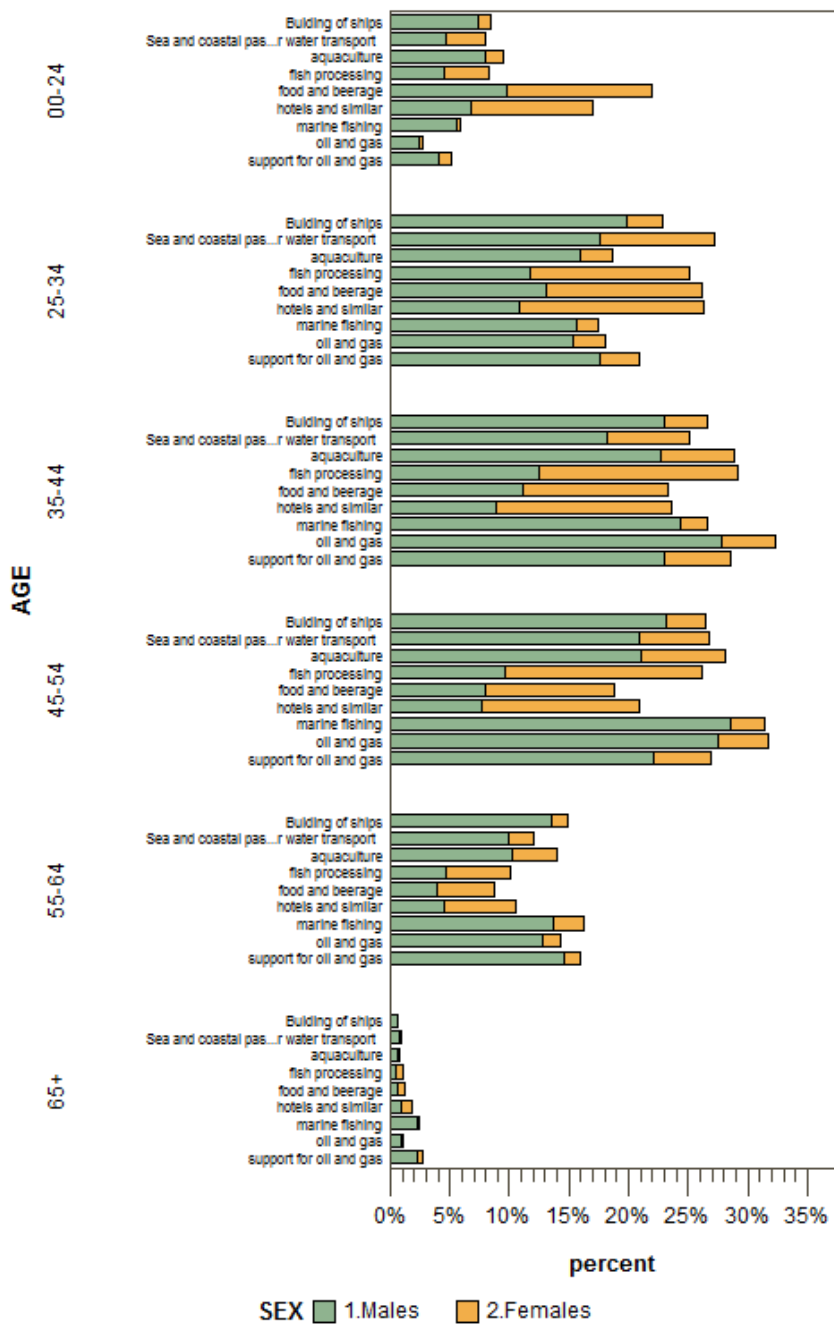
<sup>10</sup> <http://ec.europa.eu/eurostat/documents/3433488/5585712/KS-SF-13-005-EN.PDF/c1327a39-9222-4157-b4f5-248bc20d9b7c?version=1.0>

<sup>11</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/Maritime\\_economy\\_statistics\\_-\\_coastal\\_regions\\_and\\_sectoral\\_perspective](http://ec.europa.eu/eurostat/statistics-explained/index.php/Maritime_economy_statistics_-_coastal_regions_and_sectoral_perspective)

geographical statistical unit, NUTS3 (Figure 5). Their coastal regions contain much territory that is a long way from the sea but this is the smallest level at which meaningful economic and demographic data are available<sup>12</sup>. The analysis also covers freight and passenger shipping traffic.

### 8. CHARACTERISTICS OF WORKFORCE

The age and sex distribution of those employed in the blue economy can be seen from Eurostat's Labour Force Survey. This also includes information on parameters such as educational attainment. In this section the data for tourism does not distinguish between coastal and non-coastal.



<sup>12</sup> Except for tourism

These show a high proportion of female and younger workers in the service industries associated with tourism and in fish processing.

The Labour Force Survey also provides information on staff mobility and employment of non-EU citizens (Figure 6)

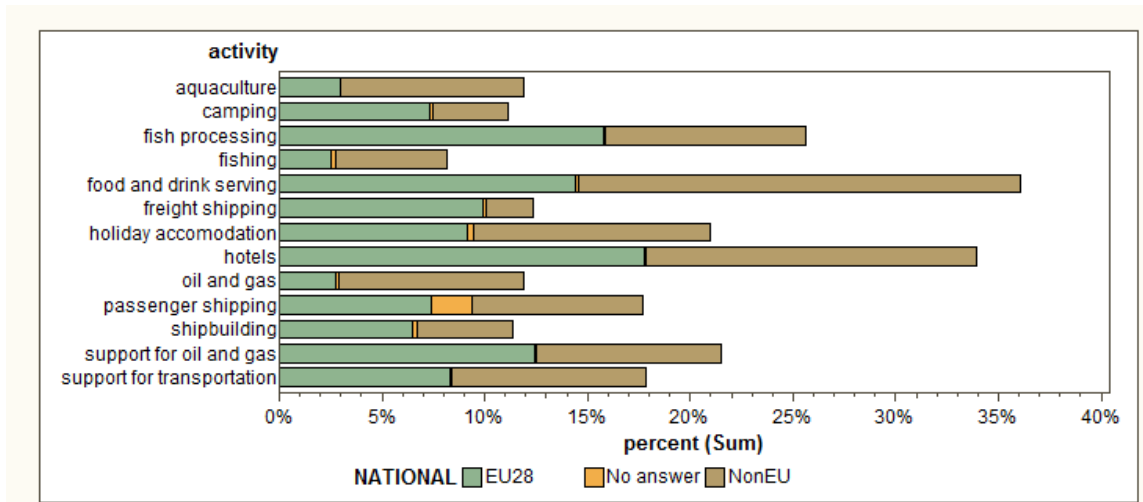


Figure 6 The proportion of workforce employed outside their country of origin ("EU28" for those from other EU countries and "nonEU" for those from outside the EU).

The survey confirms that the workforce of the blue economy remains international in nature. Nearly all industries employ significant proportions from outside their own country with about half coming from other EU countries and another half from outside the EU. The proportions are particularly high in the tourism industries and fish processing

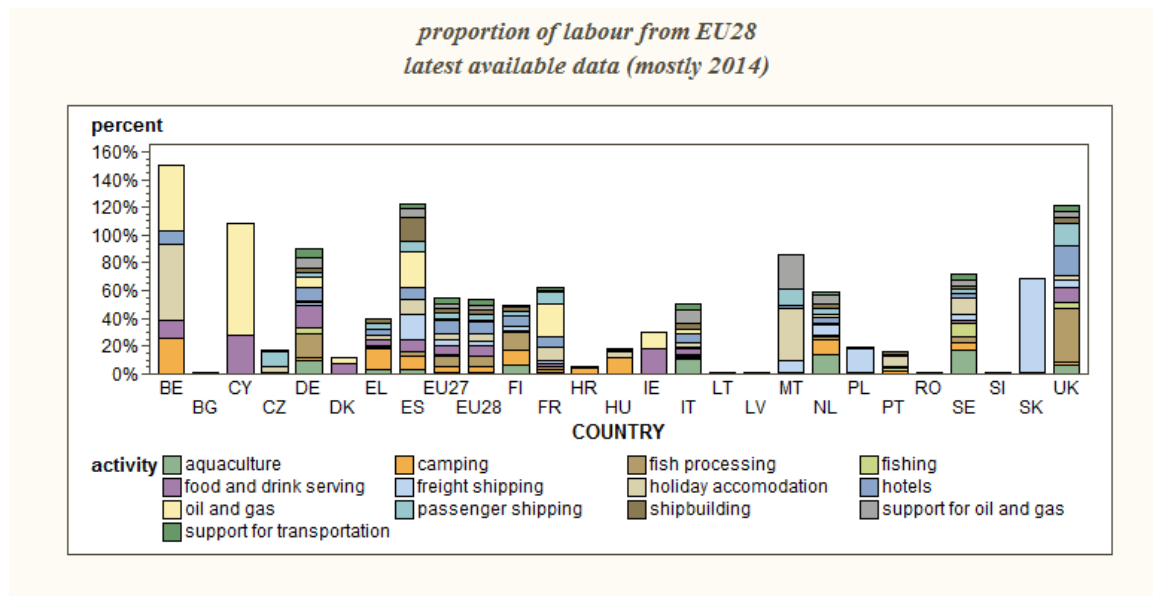
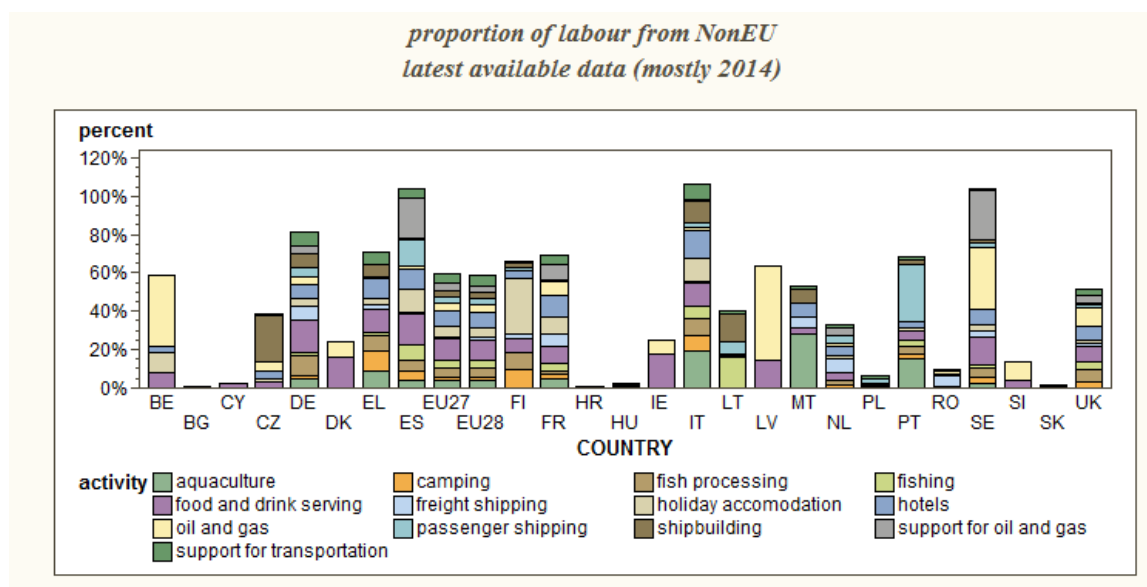


Figure 7 Proportion of workforce from other EU countries in blue activities. The proportions are expressed as percentage of total in each sector i.e. the figures for fish processing are the percentage from other EU countries working in fish processing. Thus the totals here can be more than 100%



*Figure 8 Proportion of workforce from outside EU. The proportions are expressed as percentage of total in each sector i.e. the figures for fish processing are the percentage from other EU countries working in fish processing. Thus the totals here can be more than 100%*

## 9. NEXT STEPS

This analysis is a first step and the figures should not be taken as definitive. Economists and statisticians have been invited to a meeting on 29 September 2015 and are invited to comment on:

- (1) the definition of the blue economy (section 2.1);
- (2) the main sectors identified (has any important contribution been forgotten?);
- (3) the assumptions made (focus on market economy, neglecting business travel or day trips, etc);
- (4) the estimate of number of people employed (in EU and Member States);
- (5) the conclusions regarding growth rate;
- (6) the most appropriate approach for estimating the contribution to GDP.

They are also invited to present their own analyses which will be published on the Commission's maritime forum<sup>13</sup>.

A follow-up meeting will be held in the first quarter of 2016.

<sup>13</sup> <https://webgate.ec.europa.eu/maritimeforum/en/frontpage/225>



## APPENDIX 1: INITIAL ESTIMATE OF SIZE OF BLUE ECONOMY FOR EUROPEAN UNION

The numbers below are averages from 2009 till the latest date where data are available (2012 in most cases) together with the average growth rate since 2008. The exception is the renewable energy sector where the rate of growth is so high that presenting past averages would be misleading. Here data from 2014 was used.

Note that, to avoid double counting, indirect jobs from primary sectors are not counted. Thus, for instance, the contribution of shipbuilding to the fishing sector is not included. This will mean an underestimate of the indirect jobs for individual sectors.

			Number persons employed		Turnover (€millions)		Average wages	
crude petroleum and gas extraction	Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E) [sbs_na_ind_r2] updated 8 May 2015 extracted 14 May 2015	Extraction of crude petroleum and natural gas	77,000	-0.4%	160,000	0.3%	55,000	6.4%
		Support activities for petroleum and natural gas extraction	49,000	5.8%	15,000	4.7%	51,000	3.5%
		Indirect	460,000					
	supply and use tables		<b>580,000</b>					
fishing and aquaculture	Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E) [sbs_na_ind_r2] updated 8 May 2015 extracted 14 May 2015 Data Collection Framework: data from JRC	Processing and preserving of fish, crustaceans and molluscs	110,000	-0.1%	26,000	9.1%	19,000	8.2%
		Freshwater aquaculture	6,600		540		17,000	
		Marine aquaculture (finfish)	3,700		710		25,000	
		Marine aquaculture (shellfish)	30,000		870		6,000	
		Marine fishing	140,000		6,800		13,000	
		Indirect	93,000					
	supply and use tables		<b>380,000</b>					
other	Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E) [sbs_na_ind_r2] updated 8 May 2015 extracted 14 May 2015	Extraction of salt	<b>9,200</b>	0.5%	1,800	2.6%	30,000	1.5%
renewables	European Wind Energy Association	wind - total	<b>77,000</b>	31.1%	.	.	.	.
shipbuilding	Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E) [sbs_na_ind_r2] updated 8 May 2015 extracted 14 May 2015	Building of ships and boats	190,000	-5.7%	35,000	-3.5%	29,000	6.7%
		Dismantling of wrecks	15,000	-8.9%	4,300	-	18,000	-
		Repair and maintenance of ships and boats	85,000	-6.6%	8,100	13.9%	20,000	3.6%
		Indirect	130,000			-8.8%		0.9%
	supply and use tables	Indirect shipbuilding	28,000					
		Indirect repair						
			<b>440,000</b>					

			Number persons employed		Turnover (€millions)		Average wages		
shipping	Annual detailed enterprise statistics for construction (NACE Rev. 2, F) [sbs_na_con_r2] updated 5 May 2015 extracted 14 May 2015  Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95) [sbs_na_1a_se_r2] updated 12 May 2015 extracted 14 May 2015  supply and use tables	Construction of water projects	99,000	.	14,000	-6.0%	.	.	
		Cargo handling	260,000	-3.9%	26,000	0.5%	25,000	1.6%	
		Service activities incidental to water transportation	110,000	-1.5%	19,000	1.9%	37,000	1.9%	
		Water transport	210,000	-2.4%	110,000	-1.6%	36,000	2.2%	
		indirect	390,000						
			<b>1,100,000</b>						
tourism	Eurostat tourism survey and abs residents	Camping grounds, recreational vehicle parks and trailer parks	44,000	2.3%	4,600	2.3%	.	.	
		Holiday and other short-stay accommodation	69,000	1.7%	4,000	1.3%	.	.	
		Hotels and similar accommodation	330,000	0.2%	23,000	1.3%	.	.	
		Passenger air transport	1,900	-3.2%	610	-0.9%	.	.	
		Passenger rail transport, interurban	9,500	-3.8%	1,100	2.0%	.	.	
		Restaurants and mobile food service activities	180,000	3.2%	8,000	3.2%	.	.	
		Retail sale of automotive fuel in specialised stores	11,000	-1.5%	4,800	0.3%	.	.	
		Retail trade, except of motor vehicles and motorcycles	37,000	-0.1%	5,100	1.0%	.	.	
		Eurostat tourism survey and sbs non-residents	Camping grounds, recreational vehicle parks and trailer parks	11,000	2.3%	1,100	2.3%	.	.
			Holiday and other short-stay accommodation	54,000	1.7%	2,800	1.3%	.	.
	Hotels and similar accommodation		360,000	0.2%	23,000	1.3%	.	.	
	Passenger air transport		140,000	-3.2%	44,000	-0.9%	.	.	
	Passenger rail transport, interurban		22,000	-3.8%	2,300	2.0%	.	.	
	Restaurants and mobile food service activities		420,000	3.2%	15,000	3.2%	.	.	
	Retail sale of automotive fuel in specialised stores		27,000	-1.5%	11,000	0.3%	.	.	
	Retail trade, except of motor vehicles and motorcycles		240,000	-0.1%	29,000	1.0%	.	.	
	supply and use tables		Indirect	410,000					

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Number persons employed	Turnover (€millions)	Average wages
2,400,000		

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## APPENDIX 2: INDIRECT EMPLOYMENT

		Extraction Of Crude Petroleum And Natural Gas	Fishing and aquaculture	Processing and preserving of fish, crustaceans, molluscs, fruit and vegetables	Building of ships and boats	Repair and maintenance of ships and boats	Water transport
All	1,538,082	456,601	34,846	93,126	126,016	27,544	393,002
Products of agriculture, hunting and related services	.	.	.	.	.	.	.
Products of forestry, logging and related services	.	.	.	.	.	.	.
Fish and other fishing products; aquaculture products; support services to fishing	.	.	.	.	.	.	.
Mining and quarrying	610	.	559	.	.	.	51
Coal and lignite	18	0	0	18	0	0	0
Crude Petroleum And Natural Gas & Metal Ores	.	.	.	.	.	.	.
Other mining and quarrying products	418	0	0	0	0	0	0
Mining support services	83,431	83,431	0	0	0	0	0
Food, beverages and tobacco products	8,357	.	2,933	.	.	.	5,424
Processed and preserved fish, crustaceans, molluscs, fruit and vegetables	37,438	319	30	14,412	95	0	66
Vegetable and animal oils and fats	991	19	0	627	0	0	7
Dairy products	3,050	168	0	467	60	0	11
Grain mill products, starches and starch products	1,678	0	4	781	0	0	0
Bakery and farinaceous products	27,303	523	0	53	0	0	57
Other food products	13,027	526	19	4,248	0	0	53
Prepared animal feeds	383	0	250	0	0	0	0
Alcoholic beverages	65,710	0	0	0	0	0	1
Soft drinks	1,815	0	0	0	0	0	3
Tobacco products	0	0	0	0	0	0	0
Textiles, wearing apparel, leather and related products	7,751	0	3,673	0	0	0	2,429
Wearing apparel	1,945	1,173	14	0	0	0	0
Leather and related products	1,897	0	3	0	0	0	0
Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	12,355	652	911	0	7,972	1,293	310
Paper and paper products	8,861	0	323	5,496	191	82	1,105
Printing and recording services	1,130	0	129	39	207	0	455
Coke and refined petroleum products	6,026	522	780	104	98	38	3,415
Chemicals and chemical products	1,577	.	888	.	.	.	689
Petrochemicals - 20.14/16/17/60	2,243	805	5	33	422	199	2
Dyestuffs, agro-chemicals - 20.12/20	92	0	0	63	0	0	0
Paints, varnishes and similar coatings, printing ink and mastics	2,743	0	0	0	1,689	760	0
Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	1,889	0	0	149	0	0	6

	Extraction Of Crude Petroleum And Natural Gas	Fishing and aquaculture	Processing and preserving of fish, crustaceans, molluscs, fruit and vegetables	Building of ships and boats	Repair and maintenance of ships and boats	Water transport	
Other chemical products	205	0	0	155	0	0	
Basic pharmaceutical products and pharmaceutical preparations	527	0	144	12	0	12	
Rubber and plastic products	21,146	70	651	6,755	9,670	1,198	2,250
Other non-metallic mineral products	716	.	245	.	.	.	471
Glass, refractory, clay, other porcelain and ceramic, stone and abrasive products - 23.1-4/7-9	5,064	90	0	1,422	2,218	619	7
Manufacture of cement, lime, plaster and articles of concrete, cement and plaster	210	210	0	0	0	0	0
Basic metals	5,530	2,243	96	12	2,697	443	38
Other basic metals and casting	2,453	451	0	404	991	597	10
Fabricated metal products, except machinery and equipment	60,933	29,518	1,844	3,218	19,536	2,321	4,232
Weapons and ammunition	178	178	0	0	0	0	0
Computer, electronic and optical products	10,428	471	362	63	6,248	1,001	932
Electrical equipment	9,165	2,869	312	20	4,157	788	987
Machinery and equipment n.e.c.	27,128	4,781	1,011	510	17,083	1,791	1,700
Motor vehicles, trailers and semi- trailers	1,245	0	64	74	228	181	314
Other transport equipment	5,258	0	645	0	0	0	4,580
Ships and boats	.	.	.	.	.	.	.
Air and spacecraft and related machinery	935	906	0	0	0	0	0
Furniture and other manufactured goods	3,287	0	370	45	227	201	1,468
Other manufactured goods	13,007	536	76	565	7,417	1,868	73
Repair and installation services of machinery and equipment	50,973	12,996	3,770	951	12,364	3,510	16,994
Repair and maintenance of ships and boats	.	.	.	.	.	.	.
Repair and maintenance of aircraft and spacecraft	4,339	4,339	0	0	0	0	0
Electricity, gas, steam and air conditioning	379	.	239	.	.	.	140
Electricity, transmission and distribution	4,132	585	82	484	1,697	249	28
Gas; distribution of gaseous fuels through mains; steam and air conditioning supply	1,287	519	2	266	301	86	0
Natural water; water treatment and supply services	1,623	196	169	643	272	142	54
Sewerage services; sewage sludge; waste collection, treatment and disposal services; materials recovery services; remediation services and other waste management services	2,536	323	200	190	160	0	1,091
Waste collection, treatment and disposal services; materials recovery services	3,440	608	70	504	334	0	84

	Extraction Of Crude Petroleum And Natural Gas	Fishing and aquaculture	Processing and preserving of fish, crustaceans, molluscs, fruit and vegetables	Building of ships and boats	Repair and maintenance of ships and boats	Water transport	
Remediation services and other waste management services	0	0	0	0	0	0	
Constructions and construction works	76,706	47,618	1,517	0	4,328	1,135	4,788
Wholesale and retail trade and repair services of motor vehicles and motorcycles	4,717	1,374	190	121	0	79	540
Wholesale trade services, except of motor vehicles and motorcycles	2,390	0	34	0	0	0	2,357
Retail trade services, except of motor vehicles and motorcycles	.	.	.	.	.	.	.
Land transport services and transport services via pipelines	30,586	926	1,164	8,571	603	196	8,300
Rail transport services	7,653	7,139	69	0	170	141	10
Water transport services	.	.	.	.	.	.	.
Air transport services	4,552	2,842	38	12	72	52	520
Warehousing and support services for transportation	191,621	784	2,140	212	495	112	186,063
Postal and courier services	51,198	18,388	492	1,839	972	0	4,085
Accommodation and food services	.	.	.	.	.	.	.
Accommodation services	.	.	.	.	.	.	.
Food and beverage serving services	.	.	.	.	.	.	.
Publishing services	1,841	0	55	151	78	71	995
Motion picture, video and television programme production services, sound recording and music publishing; programming and broadcasting services	2,309	0	41	0	0	0	460
Telecommunications services	5,809	406	184	105	87	25	1,627
Computer programming, consultancy and related services; Information services	59,118	16,111	137	1,054	3,705	1,158	8,117
Information services	5,385	0	0	204	560	190	136
Financial services, except insurance and pension funding	.	.	.	.	.	.	.
Insurance, reinsurance and pension funding services, except compulsory social security	.	.	.	.	.	.	.
Services auxiliary to financial services and insurance services	.	.	.	.	.	.	.
Real estate services, excluding on a fee or contract basis and imputed rent	6,272	681	0	120	297	131	835
Real estate activities on a fee or contract basis	0	0	0	0	0	0	0
Imputed rents of owner-occupied dwellings	.	.	.	.	.	.	.
Real estate services excluding imputed rents	.	.	.	.	.	.	.
Legal and accounting services; services of head offices; management consultancy services	25,464	.	2,702	.	.	.	22,762
Legal services	87,899	76,325	31	0	625	272	1,459

		Extraction Of Crude Petroleum And Natural Gas	Fishing and aquaculture	Processing and preserving of fish, crustaceans, molluscs, fruit and vegetables	Building of ships and boats	Repair and maintenance of ships and boats	Water transport
Accounting, bookkeeping and auditing services; tax consulting services	29,987	13,877	50	554	1,597	322	603
Services of head offices; management consulting services	8,588	146	0	227	339	145	409
Architectural and engineering services; technical testing and analysis services	47,487	21,948	362	6,495	1,981	1,398	4,576
Scientific research and development services	13,043	7,022	2	4,047	911	224	224
Advertising and market research services	21,850	4,668	100	3,286	929	255	1,755
Other professional, scientific and technical services and veterinary services	15,635	2,995	362	853	756	540	3,652
Veterinary services	119	0	0	0	0	0	0
Rental and leasing services	27,252	8,582	311	567	1,614	657	14,962
Employment services	185,936	72,165	1,109	18,600	7,522	1,918	42,301
Travel agency, tour operator and other reservation services and related services	10,944	0	26	91	0	0	4,216
Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services	31,910	0	2,073	0	0	0	26,128
Services to buildings and landscape	26,390	0	78	0	772	636	576
Office administrative, office support and other business support services	23,806	2,084	62	3,236	1,269	522	179
Public administration and defence services; compulsory social security services	.	.	.	.	.	.	.
Public administration and defence services; compulsory social security services	.	.	.	.	.	.	.
Education services	.	.	.	.	.	.	.
Education services	.	.	.	.	.	.	.
Human health services	.	.	.	.	.	.	.
Residential care services; social work services without accommodation	.	.	.	.	.	.	.
Creative, arts, entertainment, library, archive, museum, other cultural services; gambling and betting services	.	.	.	.	.	.	.
Libraries, archives, museums and other cultural services	.	.	.	.	.	.	.
Gambling and betting services	.	.	.	.	.	.	.
Sporting services and amusement and recreation services	.	.	.	.	.	.	.
Services furnished by membership organisations	.	.	.	.	.	.	.
Repair services of computers and personal and household goods	2,751	493	648	0	0	0	814
Other personal services	.	.	.	.	.	.	.



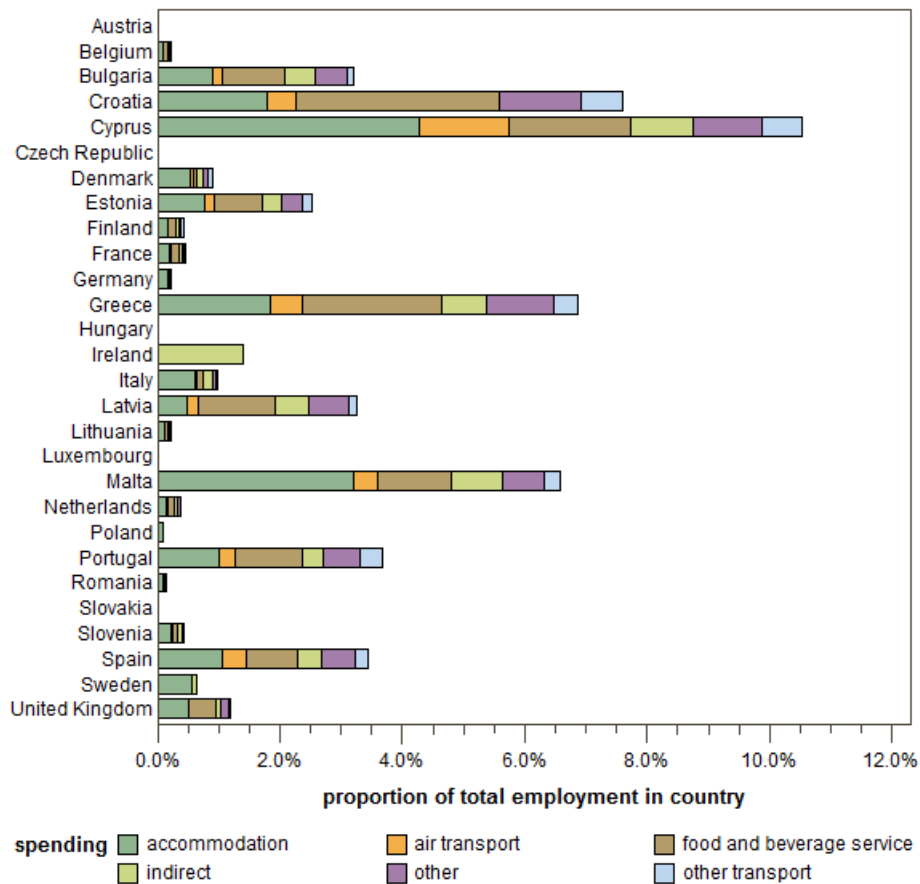
	<b>Extraction Of Crude Petroleum And Natural Gas</b>	<b>Fishing and aquaculture</b>	<b>Processing and preserving of fish, crustaceans, molluscs, fruit and vegetables</b>	<b>Building of ships and boats</b>	<b>Repair and maintenance of ships and boats</b>	<b>Water transport</b>
Services of households as employers; undifferentiated goods and services produced by households for own use	.	.	.	.	.	.
Services of households as employers of domestic personnel	.	.	.	.	.	.
Services provided by extraterritorial organisations and bodies	.	.	.	.	.	.



### APPENDIX 3 IMPORTANCE OF EMPLOYMENT IN BLUE ECONOMY IN EU MEMBER STATES

Whilst accommodation is the single largest spending item, it is less than half of the total. 58% of residents in a country and 33% of visitors stay in non-rented accommodation. A tendency towards many short breaks rather than fewer long ones means that spending on transport is significant. Europe's air industry is highly dependent on coastal tourism.

#### Coastal tourism

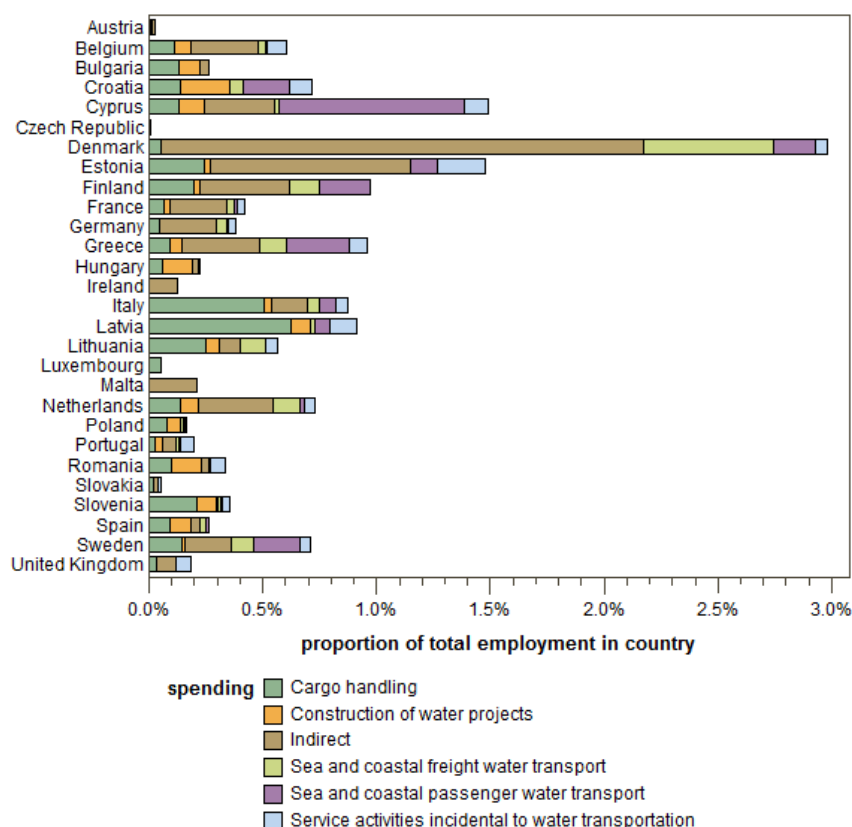


Employment in coastal tourism is a significant factor for employment in all EU countries but its importance to southern countries is highest. Nearly 20% of the workforce are under the age of 25 which is double the proportion of other blue industries. More than half are women.

#### Shipping

The one million employees working in the EU's shipping industry are responsible for the transport of 75% of the EU's external trade by volume and 37% of internal trade measured by tonne-kilometre. Most of the employment is indirect; the largest indirect category being "warehousing and support activities for transportation" which employs 45% of those in indirect employment. Legal, accounting and other professional services account for another 9%.

<sup>14</sup> Jobs in travel are allocated to the destination country although they may be elsewhere in the EU.



There has been a steady decline in the numbers working in the primary activities. Employment in freight transport in 2013 was 86% of its 2008 level. Decline in passenger transport has been marginally less than for freight transport; 92% of its 2008 level. The category includes the operation of excursion, cruise or sightseeing boats, ferries and water taxis. 27% of employees in this sector are in the crucial 25-24 age bracket, a higher number than the average for the blue economy and 28% of the total number of employees are women.

### Shipbuilding

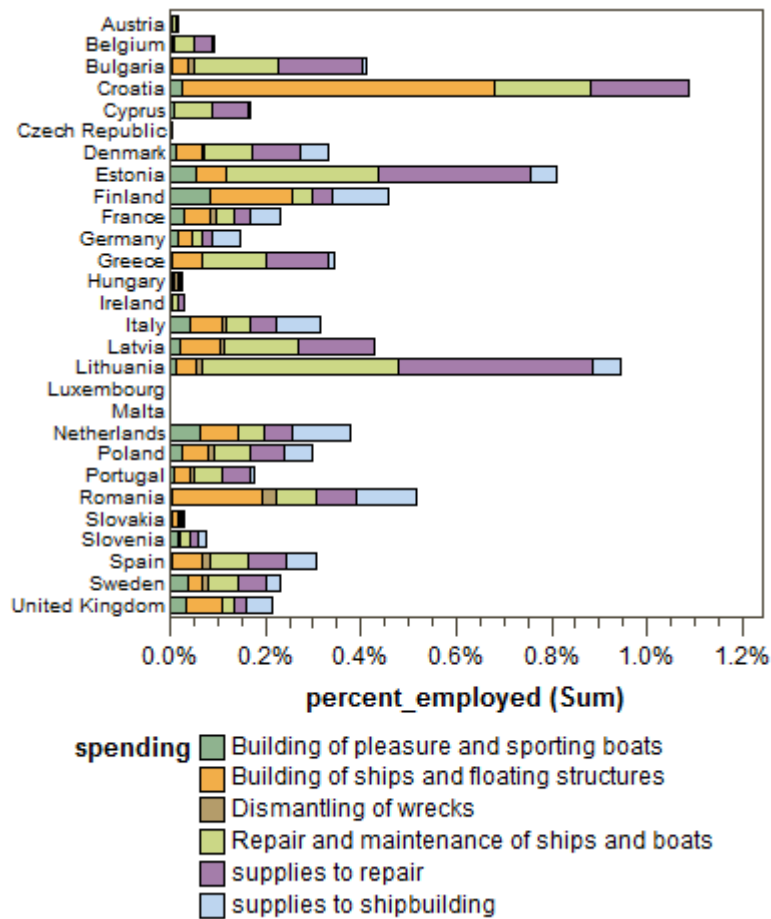
In 2013, 207 ships were completed in EU yards for a total of 1,704,000 GT. This represents 6.7% of the global total of ships completed that year and 2.4% of the tonnage. There were new orders for 219 vessels for a total of 2,781,000 GT which is 6.9% of global orders for ships and 2.7% of the tonnage<sup>15</sup>.

The defence market dominates in many countries. For instance 71% of UK shipbuilding revenue comes from the military sector. The latest French statistics do not distinguish between civil and military shipbuilding but between 2001 and 2009 the average military proportion was 63% of turnover, 82% of added value and 73% of employment. Exports accounted for 68% of civil production and 37% of military<sup>16</sup>.

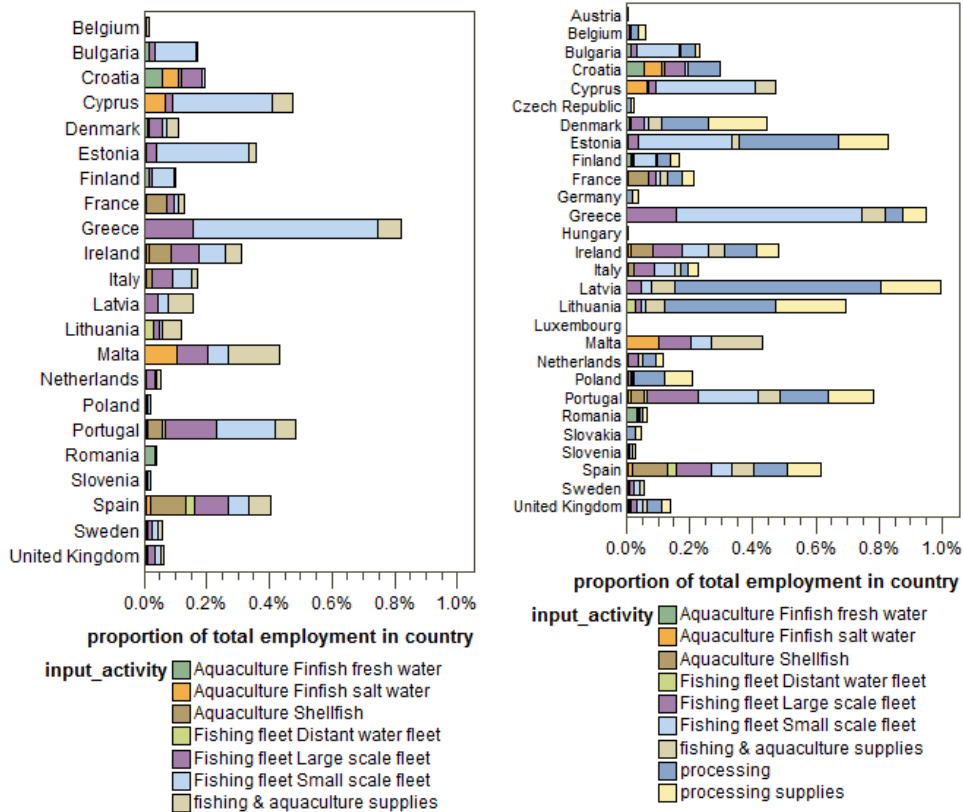
There has been a steady decrease in employment and turnover since 2008 of between 6 and 8% a year although the workforce that remains has seen average wages rise by about 6% a year which may mean a shedding of unskilled staff and an increase in skill levels. 87% of the workforce are male.

<sup>15</sup> These numbers are from the Shipbuilders' Association of Japan

<sup>16</sup> Ifremer, French Marine Economic Data 2009



### Fish and shellfish



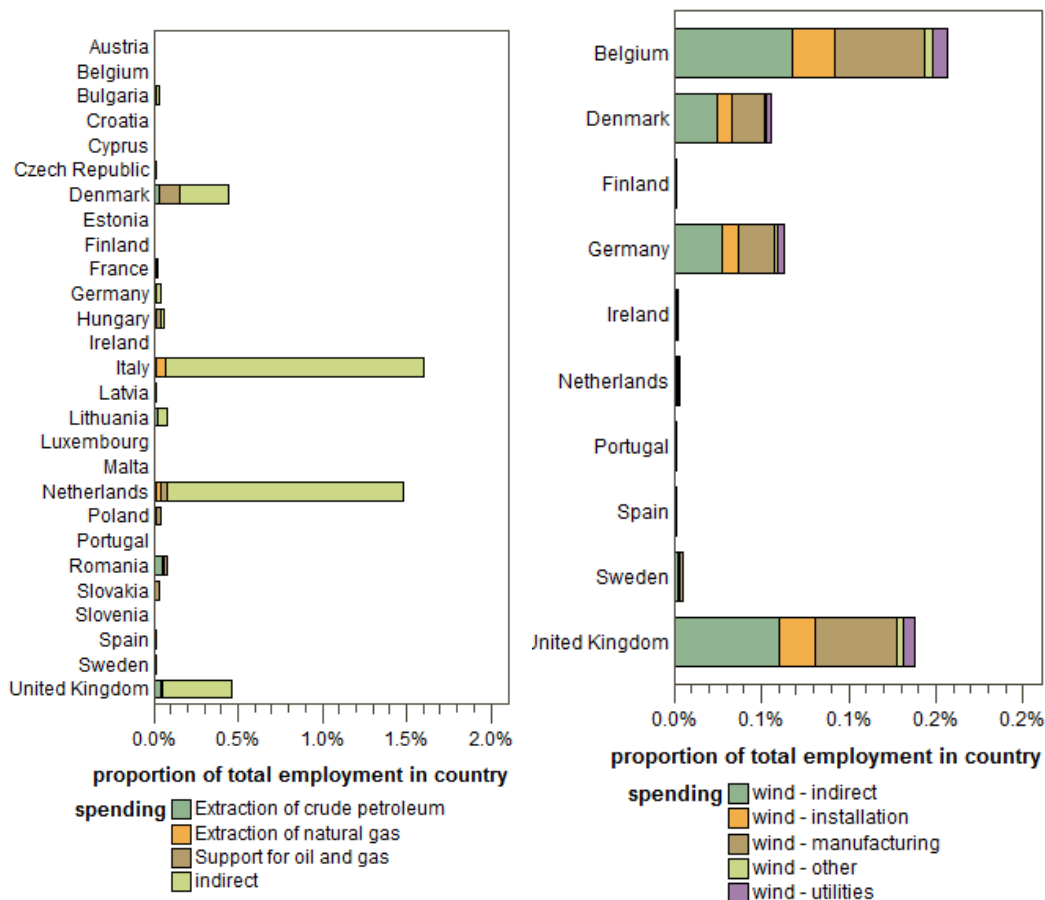
The small-scale fishing sector is defined as fishing with boats less than 12 metres in length without towed gear. It employs about the same number of people as the large scale sector but is five times less productive in terms of turnover per person employed. Approximately the same number of people are employed in processing, including those providing goods and services to the goods and services sector as in fisheries and aquaculture combined. The proportion of women in the industry is 10% for fishing, 21% for aquaculture and 56% for processing.

Greece has the highest number of fishermen in terms of the proportion of total national employment. The sector is also significant nationally in Cyprus, Estonia Portugal and Spain. Processing of fish, including indirect employment is more than 1% of total employment in all three Baltic States. This is the highest proportion in the EU although it is also significant in Denmark, Portugal and Spain.

### Energy

Eurostat does not collect or distribute business statistics for offshore renewable energy, or indeed any renewable energy, so the employment and investment statistics were obtained from the European Wind Energy Association. The oil and gas statistics need further examination as the Italian numbers are high compared to the production.

Nevertheless, employment in the offshore energy sector is rather high with exceptionally strong growth in the offshore wind industry in the North Sea. Most of the employment is indirect and this is consistent with published statistics from the oil industry themselves<sup>17</sup>.



<sup>17</sup> <http://www.oilandgasuk.co.uk/employment.cfm>

The proportion of women is 13% in the primary oil and gas industries but the proportion will be higher in the indirect activities such as "legal services" (making up 13% of the total)

### **Other activities**

There are about 9000 employees working in salt extraction, 3000 in marine aggregate extraction, 1000 in wind and tide energy and an unknown number on undersea cable laying . More accurate information on these will make a smaller difference to our estimate of the size of the blue economy than revising assumptions of the main sectors. But we will endeavour to improve our knowledge. European companies are globally competitive in some of these areas and their potential for growth both in Europe and outside, is considerable.