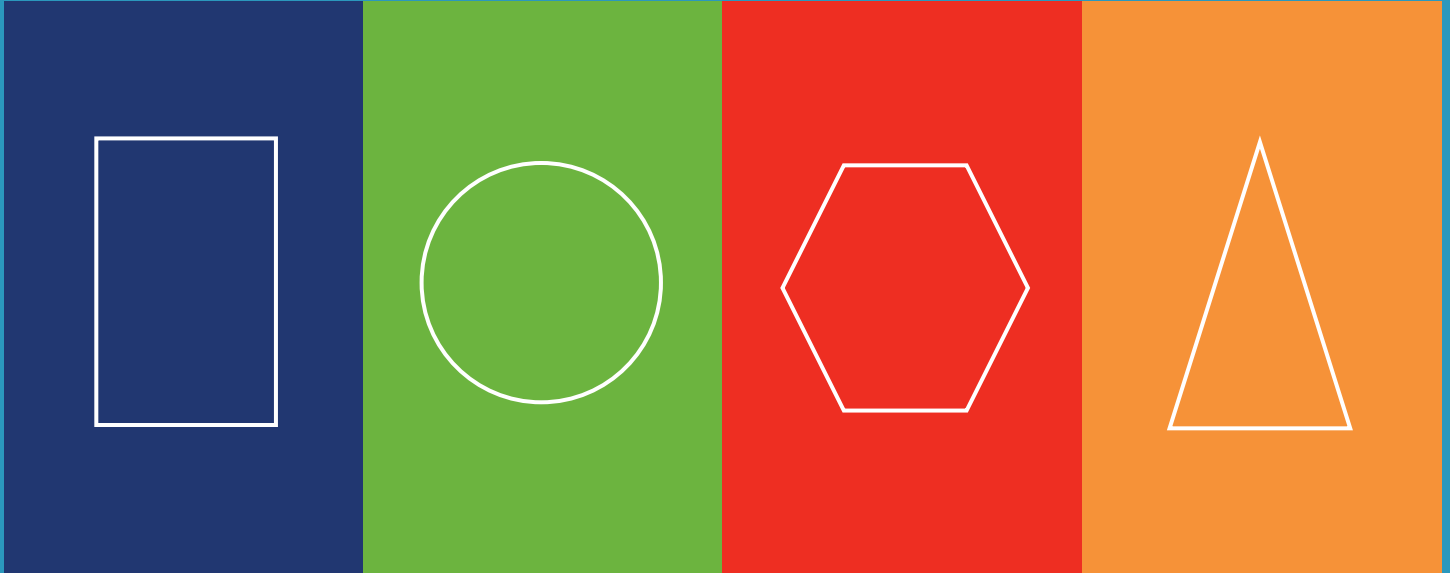




A Study of the Current and Future Skills Requirements of the Marine/ Maritime Economy to 2020

April 2015



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Introduction to the Expert Group on Future Skills Needs

The Expert Group on Future Skills Needs (EGFSN) advises the Irish Government on current and future skills needs of the economy and on other labour market issues that impact on Ireland's enterprise and employment growth. It has a central role in ensuring that labour market needs for skilled workers are anticipated and met.

Established in 1997, the EGFSN reports to the Minister for Education and Skills and the Minister for Jobs, Enterprise and Innovation.

The EGFSN Secretariat is a unit in the Strategic Policy Division of the Department of Jobs, Enterprise and Innovation (DJEI) and in conjunction with the Skills and Labour Market Research Unit (SLMRU) in SOLAS provide the Expert Group with research and analysis support.

About this document

This is the Executive Summary of the report entitled "*A Study of the current and future skills requirements of the Marine/Maritime Economy to 2020*". The full report is available on the Expert Group on Future Skills Needs website- www.skillsireland.ie

Acknowledgements

The EGFSN Secretariat would like to record its appreciation to the members of the Steering Group, who oversaw the progress and the development of this report, for their significant commitment and contribution - the membership is set out in Appendix 1.

The EGFSN Secretariat would like to thank the many industry executives, academics and staff at expert organisations and State Agencies who gave their valuable time and insights through interviews and at workshops.

The EGFSN Secretariat would like to acknowledge the work of the consortium comprising RSM McClure Watters (Leading), Dr Paul Brewster of Pure Marine Gen Ltd., Matt Rooke of PACEC (now part of RSM McClure Watters) and SEMRU (Socio Economic Marine Research Unit) of NUIG. The EGFSN would also like to thank the Marine Institute for their support and for making their photographs available for inclusion in the report.

Foreword

Our ocean wealth is a national asset, supporting a diverse marine economy, with vast potential to tap into a €1,200 billion global marine market for seafood, tourism, oil and gas, marine renewable energy and new applications for health, medicine and technology. *Harnessing Our Ocean Wealth - an Integrated Marine Plan for Ireland, (HOOW)*, sets out a roadmap for the Government's vision, high-level goals and integrated actions across policy, governance and business to enable our marine potential to be realised. One such action was to "Identify future skills needs and labour market supply and demand trends in the marine/maritime area in the context of *Harnessing Our Ocean Wealth*".



Under the *Government Action Plan for Jobs 2014*, the Expert Group on Future Skills Needs (EGFSN) committed to undertaking this assessment of the profile and diversity of the occupations and skills requirements of enterprises in the different sectors that make up the Marine economy. The overarching aim of this study is to ensure that the right skills base will be available to meet the needs of enterprises in the developing Marine Economy out to 2020.

The focus of the EGFSN study is on those sectors of the marine economy which have been identified by HOOW as key sectors which contribute to the Irish Marine Economy, namely; Seafood and Bio-Products; Maritime Transport, Shipbuilding and Services; Energy; Marine Tourism; and Maritime Monitoring, Security and Surveillance.

The 2014 employment estimate across the entire marine economy is 16,155 full-time equivalents (FTEs). The demand forecast analysis indicates that, due to the anticipated expansion and replacement demand some 16,915 job vacancies could become available over the period 2015-2020. The expansion component of this demand is forecast to be 10,138 FTE jobs, of which 4,928 jobs are forecast in the maritime transport, shipbuilding and services (MTSS) (driven primarily by the proposed International Shipping Services Centre) with marine tourism following with 3,447 new jobs, reflecting the upturn in the global economy and the return of foreign tourists.

No major skills shortage currently exists but in the seafood sector in particular, the workforce is ageing and this will present a skills difficulty unless measures are put in place to attract and upskill younger workers. While operatives and low skill roles are a major component of the Marine Economy there is evidence of a shift toward more professionals being employed in sectors such as seafood which is predominantly a low skill employer and the emerging sectors, such as marine renewable energy and maritime monitoring where professionals such as engineers is the major skill in demand.

A key finding in the study is the lack of awareness about possible careers in the Marine Economy and the time delay in obtaining current economic data for the marine economy.

I would like to express my thanks to all those who contributed to the report. Particular thanks are due to the many industry executives, academics and professionals who contributed their valuable time and expertise. I would like to thank Dr Brendan Murphy who chaired the Steering Group that oversaw the completion of the report and to each member of the Steering group for their commitment and sharing of expertise. Finally, I would like to thank the EGFSN Secretariat for their research and analysis input and managing this project to a successful conclusion.

A handwritten signature in dark ink, appearing to read 'Una Halligan'.

Una Halligan

Chairperson, Expert Group on Future Skills Needs



E.1 Introduction



Courtesy of photographer Tomasz Szumski

This report, *A Study of the current and future skills requirements of the Marine/Maritime Economy to 2020* was undertaken by the Expert Group on Future Skills Needs (EGFSN) to assess the profile and diversity of the occupations and skills requirements of enterprises in the different sectors that make up the Marine/Maritime Economy and to propose recommendations to ensure the right skill base to meet the enterprise needs.

In the context of this study the Ocean Economy and the Marine and/or Maritime Economy are used interchangeably and the terms Marine and Maritime are sometimes used together or individually. Irrespective of the term used, it means “all activities relating to the sea” unless otherwise specified.

The Ocean or (Marine/Maritime) Economy is defined as “*Economic Activity that indirectly or directly uses the marine as an input*”¹. The number of sub-sectors associated with the Marine/Maritime economy is vast and each of these in turn is interlinked and also interacts with other sectors outside the marine area. The sub-sectors of the ocean economy can be grouped in many different ways, e.g., established markets and emerging markets; or mature, growth and pre-development stage; or services, resources and manufacturing.

For the purposes of this study it has been decided to group the complex web of maritime economic activities around five marine sectors, namely:

- 1 Seafood and Bio-products;
- 2 Maritime Transport, Shipbuilding and Services;
- 3 Energy;
- 4 Marine Tourism; and
- 5 Maritime Monitoring, Security and Surveillance.

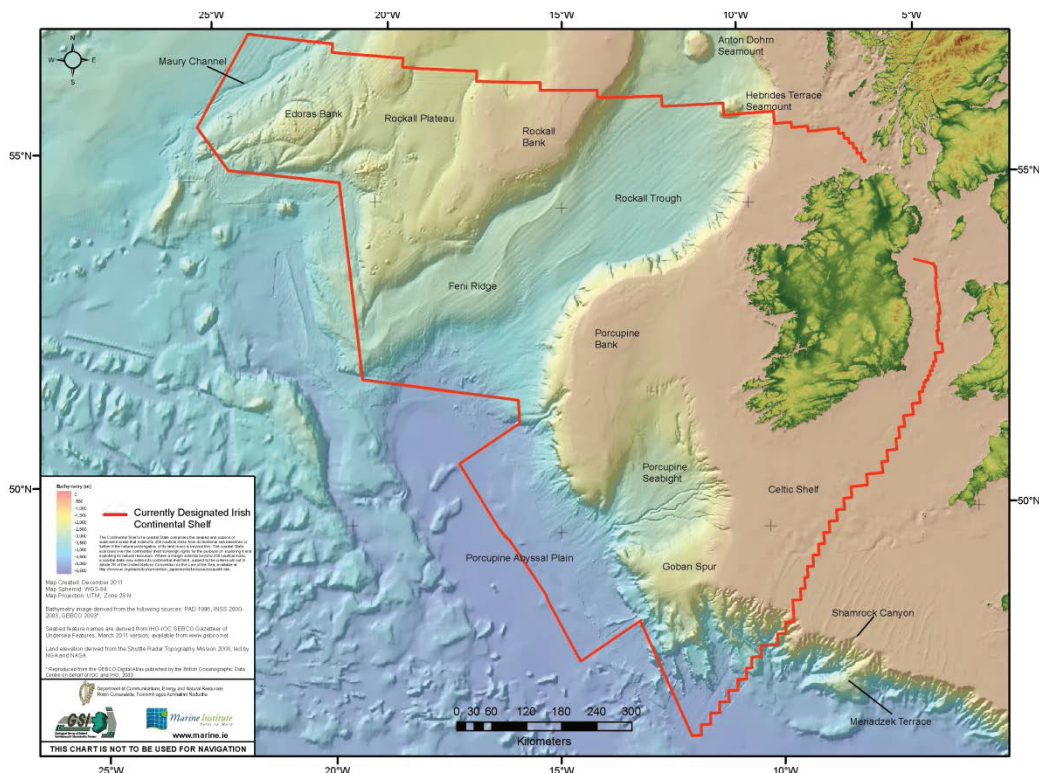
¹ Source: *Harnessing Our Ocean Wealth - An Integrated Marine Plan for Ireland*. 2012

E1.1 Background

Taking our seabed area into account, Ireland is one of the largest EU states; with sovereign or exclusive rights over one of the largest sea to land ratios (over 10:1) of any EU State (Figure E1). Our coastline of 7,500km is longer than that of many European countries and yet this is a resource we often overlook.

Our ocean is a national asset, supporting a diverse marine economy, with vast potential to tap into a €1,200 billion global marine market for seafood, tourism, oil and gas, marine renewable energy, and new applications for health, medicine and technology. In 2010, (the latest year for which data is published), Ireland generated 1.2% of GDP (€2.4bn direct and indirect Gross Value Added (GVA)) from its ocean economy, supporting about 1% of the total workforce. Global marine economic activity is estimated to contribute 2% of the world’s GDP and the European Commission estimates that between 3% and 5% of Europe’s GDP was generated from sea-related industries and services in 2007.

Figure E1: The Real Map of Ireland



© Marine Institute and the Geological Survey of Ireland

In 2012 the Government launched *Harnessing Our Ocean Wealth- an Integrated Marine Plan for Ireland (HOOW)*.² This Integrated Marine Plan:

- sets out a roadmap for the Government’s vision, high-level goals and integrated actions across policy, governance and business to enable our marine potential to be realised;
- provides a new momentum for growth in the marine area; and
- seeks to ensure that all nine government departments with responsibility for a marine activity work together more efficiently and effectively on the diverse issues related to the marine.

² <http://www.ouroceanwealth.ie/Pages/default.aspx>



Under the *Government Action Plan for Jobs 2014*, the Expert Group on Future Skills Needs (EGFSN) was tasked with undertaking a detailed assessment of “the future skills needs and labour market supply and demand trends in the marine/maritime area in the context of the targets set in *Harnessing Our Ocean Wealth*”. The overarching aim of this study is to ensure that the right skills base will be available to meet the needs of enterprises in the developing Marine Economy out to 2020.

The vision and goals set out in *HOOW* have been framed within the context of what is happening at the broader global and EU levels recognising the contribution the marine economy can make to global economic growth and the need for appropriate policies, strategies and funding mechanisms to enable this. In particular in 2007, following a Europe wide consultation process, the Commission took a landmark decision to establish a Directorate General for Maritime Affairs³ (DG MARE); and to publish an Integrated Maritime Policy for the European Union (IMP-EU) and an associated Action Plan⁴.



© Fáilte Ireland and Tourism Ireland

E1.2 The Ocean Economy

The marine economy in Ireland was been identified as having the potential to grow substantially in the next few years and therefore create employment for residents of Ireland directly and indirectly.

The Socio Economic Marine Research Unit (SEMRU) in NUIG (National University of Ireland Galway) undertook the extensive task of data collection and analysis of Ireland’s ocean economy. Marine socio-economic data are not readily available in Ireland (nor indeed in the other European countries) primarily because the economic profile of the ocean economy is not distinct from other aspects of the broader economy. Only a proportion of the NACE Codes⁵ relate solely to a maritime activity with the majority being only partially relevant. A list of the NACE codes relevant to the Ocean economy is in Appendix 2 of the full report.⁶

This study assessed the skills needs of the ocean economy across five marine sectors each with a number of sub-sectors. Table E1 provides some key economic indicators for each subsector, namely Direct Employment (FTE), GVA (€millions) and Turnover (€millions). This data is the 2010 data, the latest available, but it gives an indication of the size of the economy and the numbers employed.

³ http://ec.europa.eu/dgs/maritimeaffairs_fisheries/index_en.htm

⁴ http://ec.europa.eu/maritimeaffairs/policy/index_en.htm

⁵ NACE Code is a Statistical classification of economic activities in the European Community.

[http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_\(NACE\)](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_(NACE))

⁶ www.skillsireland.ie



Table E1: 2010 Direct Employment (FTE), GVA and Turnover for subsectors within the Marine Economy

Sector	Direct Employment (FTE)	GVA (€millions)	Turnover (€millions)	National Strategy/ Targets
Sub-sector				
Seafood and Bio-Products	5,633	256	745	
Sea Fisheries	2,825	116	202	FH(Food Harvest) 2020 - Target 14,000 FTE (from 11,000)
Marine Aquaculture	918	47	123	
Seafood Processing	1,586	80	390	
Marine Biotechnology and Bioprocessing	304	13	30	Turnover target - €1billion from €0.7b
Maritime Transport, Shipping and Services	5,689	540	1,658	
Shipping and maritime transport	4,633	422	1,422	HOOW Turnover Target >€1.2b (derived from baseline level of activity as measured by SEMRU - Ireland's Ocean Economy)
Marine Retail Services	252	34	58	
Marine Manufacturing, Construction and Engineering	726	44	111	
Marine Commerce and Ship Leasing	78	40	67	IMDO Turnover €2.6b for Marine Commerce and Ship leasing
Energy	1,077	65	138	
Oil and Gas Exploration and Production	861	61	126	
Marine Renewables - Offshore wind, Wave and Tidal	216	4	12	
Tourism	3,502	337	858	
Marine Tourism and Leisure	3,502	337	841	HOOW Turnover Target: €1.5b
International Cruise Industry	N/A	N/A	17	
Maritime Monitoring, Security and Surveillance	391	21	56	
High-tech marine products and services	391	21	56	>€61m projected turnover- based on 2007 SEMRU company survey
Total	16,292	1,219	3,455	

Source: SEMRU, Ocean Economy Report 2013 (Reference year: 2010)

E1.3 Jobs in the Ocean Economy

The marine economy offers a wide and diverse range of career opportunities. The types of jobs found in each of the sectors are detailed in Appendix 3 of the full report. The occupations within the ocean economy are distributed across all levels: management (including specialist management functions), professionals (including engineers, scientists); associate professionals (e.g. technicians), operatives (riggers, deck hands); sales and elementary occupations and reflect the diverse educational requirements: Higher (HE) and Further Education and Training (FET); Leaving Certificate; Junior Certificate and No Formal Qualifications.

Increasingly more complex technical projects and opportunities offered by convergence in the marine sector mean that far greater interdisciplinary knowledge and experience of working in multi-disciplinary environments is and will continue to be required. It will mean bringing together professionals from diverse backgrounds - such as engineers, planners and architects with ecologists, biologists, and chemists.



© Marine Institute - Photographer Paul Kaye

The marine economy, both nationally and globally, has a requirement for technicians and general operatives as well as highly skilled technical staff and professionals. The core skills and knowledge of these occupations, e.g. electricians, metal workers and mechanical engineers, are relevant to both land and sea based roles and as such are transferable. The land-based skills can be “marinised” to deal with the challenges of working in an off-shore and/or a marine environment.

E1.4 Methodology

Phase 1 - Assessing the current profile and diversity of skills

The objective of Phase 1 was to assess the profile and diversity of the current skills and occupations and the skills supply and demand of the marine economy for all five sectors and their sub-sectors, as listed in Table E1, and to assess qualitatively the anticipated future needs of enterprises within the marine economy.

This phase of the research comprised four main elements:

- 1 Desk review of relevant government policies, economic profile and data on education/skill levels within each subsector;
- 2 Telephone interviews were conducted, using a structured questionnaire format, with 60 maritime enterprises from across the ocean economy taking into account the size of company, ownership (foreign/indigenous) and stage of development (start-up/mature);
- 3 Interviews were undertaken with stakeholders from the key Government departments, development agencies, education providers, industry associations and other organisations involved in the marine economy to ascertain their views on the current and anticipated skills demand and how these skills requirements may best be met; and
- 4 Four thematic workshops were facilitated with selected companies and key stakeholders.



Phase 2 - Future Demand Scenarios

Phase 2 involved forecasting the future demand for skills in the ocean economy. The most recent official data is that provided by SEMRU (Socio-Economic Marine Research Unit in NUIG). Their first Ocean Economy Report, published in 2010, was based on the reference year 2007, at the height of the economic boom (2003 - 2007). The latest report, with a reference year of 2010 and published in 2013, represents the lowest point of the economic contraction (2007 - 2010) with a significant decrease in activity, particularly in the shipping and maritime transport sector and in water based construction. A comparison between 2007 and 2010 data saw a 25.4% decrease in turnover, a 20.9% fall in employment and a 29.7% decrease in direct GVA.⁷

In order to develop forecasts of the future skills demand to 2020 it was necessary that baseline estimates for 2014 be produced⁸. This was done using additional sources of information, such as: annual CSO (Central Statistics Office) employment trend data for broad sectors; Economic and Social Research Institute (ESRI) Medium Term Review (MTR) 2013 - 2020 and SOLAS Occupational Employment Projection 2020 (Jan 2014); results from company surveys; and discussions with stakeholders. The outcome from this exercise is shown in Table E2.

Table E2: 2007 & 2010 FTE Employment and 2014 Baseline FTE Estimates for the Ocean Economy

Sub-sector	2007‡	2010‡	2014*
Total - Seafood and Bio-products	5,615	5,633	5,359
Sea Fisheries	2,200	2,825	2,513
Marine Aquaculture	1,061	918	918
Seafood Processing	2,090	1,586	1,586
Marine Biotechnology and Bioprocessing	264	304	342
Total - Maritime Transport, Shipbuilding and Services	7,895	5,689	5,689
Shipping and maritime transport	5,903	4,633	4,633
Marine Retail Services	287	252	252
Marine Manufacturing, Construction and Engineering	1,600	726	726
Marine Commerce	105	78	78
Total - Marine Renewable Energy	891	1,077	1,148
Offshore Oil and Gas	790	861	862
Offshore Renewables	101	216	286
Marine Tourism and Leisure	5,836	3,502	3,502
High-tech marine products and services	350	391	457
Total Marine Economy	20,587	16,292	16,155

‡: SEMRU Data from “Ireland’s Ocean Economy”, Ref Year 2007, (2010) and Ref year 2010 (2013)

*: 2014 baseline estimates, developed by PACEC, based on the 2010 SEMRU data

⁷ SEMRU - Ireland’s Ocean Economy. -Dec 2013.

http://www.nuigalway.ie/semru/documents/irelands_ocean_economy_report_series_no2.pdf

⁸ The 2014 employment estimates were based on the SEMRU 2010 data which was the latest available data at the time. SEMRU are currently updating the 2010 data and will publish the 2012 figures later in 2015. The SEMRU publication will also present 2014 estimates but based on 2012 data.



The demand for skills arises from two sources, namely:

- Expansion Demand: additional employment owing to growth in the sector; and
- Replacement Demand: the replacement of workers arising from exits to inactivity and net losses from inter-occupational movements.



© Marine Institute - Photographer Cushla Dromgool Regan

Scenario 1 for each sector assumed that the turnover targets set out in HOOW would be met by 2020. Consultations with industry stakeholders, informed by the economic background data gathered, were used to determine how this increase in turnover could be achieved, how the additional turnover would be distributed between the various sub-sectors and how employment would need to increase in order to generate this turnover. A modelling exercise was then conducted using the information from the company interviews to estimate how the expansion demand would be distributed by occupational level in each sub-sector over the period 2014-2020. An estimation of the replacement demand was also conducted using data provided by the SLMRU (Skills and Labour Market Research Unit, SOLAS) and following the methodology used by them in the publication of the EGFSN National Skills Bulletin⁹ on the transitions from employment to economic inactivity, which vary by occupation.

An alternative scenario, **Scenario 2**, representing a no-growth scenario for Seafood and Bio-Products and a higher growth scenario for Energy were also developed. The no-growth scenario was driven by lack of expansion in the aquaculture sub-sector and the high growth scenario was driven by growth in the energy sector, in particular marine renewable energy.

For each of the five sectors the distribution of the future skills demand by occupation is presented in Tables E3 - E7. The first column shows the distribution of the 2014 baseline estimate of Full-Time Equivalent (FTE) employees across the occupations. The second grouping sets out the expansion demand by occupation expressed as the actual number and as a percentage of the 2014 baseline estimate. The next set of columns presents the replacement demand while the final set of columns present the gross demand, i.e. the expansion plus the replacement demand.

In addition to the initial telephone discussions and consultations with key stakeholders in Phase 1, follow-up consultations were conducted to validate the outcome of the forecasts of the future skills demand.

⁹ http://www.skillsireland.ie/media/23072014-National_Skills_Bulletin%20_2014--Publication.pdf



E.2 Seafood and Bio-Products

The sub-sectors assessed under this sector are:

- Sea Fisheries
- Marine Aquaculture
- Seafood Processing
- Marine bio-technology and bio-processing

E2.1 Economic Profile

In 2010, the Irish Seafood and Bio Products sector had an estimated annual sales value of €745 million and the Department of Agriculture believe that the potential exists to increase revenue to €1 billion by 2020.^{10 11}

Table E1 shows that GVA for the Seafood and Bio-Products sector in 2010 was €256 million while turnover was €745 million. In addition, direct employment was 5,633 FTEs; however this figure rises considerably if indirect employment is taken into consideration.



© Marine Institute - MRI Carna research facility. Photographer David Branigan

E2.2 Company Interviews

For the study 15 companies were interviewed from the Seafood and Bio-products sector with a total of 798 employees which constitutes 15% of the total number of employees in the sector (5359).

Over the previous three years these companies have seen their greatest expansion in the Administrative, Professional and Management Occupations (40%, 33%, 30% respectively), although the numbers are small at 15, 12, 18 respectively. Over the next six years these companies anticipated a continued expansion for these occupations, in particular for Professionals with a 58% expansion (28 persons).

¹⁰ Food Harvest 2020- A vision for Irish agri-food and fisheries. <http://www.agriculture.gov.ie/agri-foodindustry/foodharvest2020/>

¹¹ Harnessing Our Ocean Wealth: An Integrated Marine Plan for Ireland (2012) - <http://www.ouroceanwealth.ie/Pages/default.aspx>



Over the last three years six of the 15 companies saw an increase in their turnover while another six had a decrease in turnover with three indicating their turnover had not changed. By contrast over the next six years only two of the companies anticipated a decrease in turnover while seven anticipated an increase and six expected it to stay the same. The companies also indicated that on average over the last three years 67% of their turnover was from exports.

Currently, the majority of companies do not find skills or qualifications difficult to source. Where difficulties do exist, such as, onshore operatives and boat handlers, it was because they were not readily available in the local/rural area. This need could be met by the local Education and Training Boards (ETBs) in conjunction with Bord Iascaigh Mhara (BIM) which provides the Further Education and Training for the Seafood sector. In aquaculture, there are increased demands for energy and environmental monitoring, linked to new EU regulations which require up-skilling of professionals.

E2.3 Stakeholder Consultation

A number of skills issues were identified during the stakeholder consultation. The first of these was the ageing workforce, in particular for the sea-fisheries sub-sector and the second related to the new export markets which would require greater language and international sales, marketing and business skills. In addition it was identified that fisherman, with appropriate training, are in an ideal position to provide data for scientists through sample collection and data measurement.

E2.4 Future Demand for Skills 2015 - 2020

Scenario 1 assumes that the turnover target of an increase from €745mn to €1bn as set out in Harnessing Our Ocean Wealth will to be met by 2020.

It forecasts an expansion demand of 1,423 jobs increasing employment from 5,359 in 2014 to 6,782 full-time equivalent jobs by 2020. The replacement demand is 2,094 FTEs thereby giving rise to a gross demand of 3,517 which is 66% of the current work force. The distribution of the expansion and replacement demand by occupation level is shown in Table E3.



© Marine Institute. Sampling and Data Collection

replacing demand of 2,083 employees. The replacement demand for Scenario 1, the high growth scenario, is marginally higher than in Scenario 2, the no-growth scenario, simply because the sector is bigger. For Scenario 2 the replacement demand is equivalent to the gross demand.

The overall HOOW target of €1bn turnover by 2020 was driven by an increase in aquaculture production of 80,000 tonnes which was the target set in Food Harvest 2020. The evidence from the stakeholder consultations was that this aquaculture production target is very challenging and is unlikely to be realised by the 2020 timeline.

Therefore a second no-growth scenario was developed, **Scenario 2**, which forecast that employment over the seafood and bio-products sector would remain constant in all sectors over the period 2014-2020. In this no-growth scenario, the only driver of skills demand will be the

Table E3: Distribution of Expansion and Replacement Demand to 2020 by Occupation in the Seafood and Bio-products Sector

	2014 estimates		Expansion Demand Scenario 1 HOOW Target met		Expansion Demand Scenario 2 - HOOW Target NOT met		Replacement Demand Scenario 1 HOOW Target met		Replacement Demand Scenario 2 - HOOW Target NOT met		Gross Demand Scenario 1 HOOW Target met	
Occupation Level	Baseline	No.	% of 2014	No.		% of 2014	No.	No.	% of 2014	No.	No.	% of 2014
Operative Grades	3,043	514	17%	0	1,296	43%	1,328	1,810	59%			
Administration	392	180	46%	0	179	46%	166	359	92%			
Skilled Trades	934	237	25%	0	344	37%	341	581	62%			
Associate Professional and Technical	45	0	0%	0	10	22%	11	10	22%			
Professionals	365	373	102%	0	129	35%	100	502	138%			
Management	580	119	21%	0	136	23%	137	255	44%			
Total	5,359	1,423	27%	0	2,094	39%	2,083	3,517	66%			

Source: PACEC, 2014

E2.5 Supply-side Information

Bord Iascaigh Mhara (BIM) is the national agency with responsibility for training in the seafood sector. It has dedicated facilities through the National Fisheries College of Ireland (NFCI) at Greencastle, Co. Donegal and at Castletownbere in Co. Cork. BIM's courses cover a variety of disciplines including: Fishing - Skipper and Crew; Aquaculture; Processors and Retailers and Sea Safety training. Many courses are run in conjunction with the Education and Training Boards (ETBs). Courses range from three days to six months and are provided at NFQ (National Framework of Qualifications)¹² Levels 3-6.

Skillnets funds and facilitates training through networks of private sector companies, in a range of sectors and regions. Each network delivers training that is driven by specific industry and member company needs. The Taste 4 Success Skillnet runs two short courses namely: an Introduction to Fish Handling Skills and Smoking Fish.

Higher Education degree courses, at both undergraduate and postgraduate (NFQ Levels 7 - 10) which are "Marine" focussed and would provide a sound basis for moving into the broad Seafood and Bio-Products sector are predominantly taught in GMIT (Galway, Mayo Institute of Technology) and NUIG (National University of Ireland - Galway) with courses also available in QUB (Queen's University Belfast) and UU (University of Ulster - Coleraine).

A comprehensive review of courses available in Ireland for the Seafood and Bio-products sector is in the full report on the EGFSN website, www.skillsireland.ie

¹² The National Framework of Qualifications (NFQ) is a ten-level system giving an academic or vocational value to qualifications obtained in Ireland. QQI (Quality and Qualifications Ireland) is Ireland's guardian of the NFQ system. [http://www.qqi.ie/Pages/National-Framework-of-Qualifications-\(NFQ\).aspx](http://www.qqi.ie/Pages/National-Framework-of-Qualifications-(NFQ).aspx)



E.3 Maritime Transport, Shipbuilding and Services

The sub-sectors assessed under this sector are:

- Shipping and Maritime transport
- Marine Retail Services
- Marine Manufacturing, Construction and Engineering
- Marine Commerce and Ship Leasing

E3.1 Economic Profile

Economic indicators for the Maritime Transport, Shipbuilding and Services sector are outlined in Table E1. GVA in 2010 was €540 million, turnover was €1,658 million and direct employment was 5,689 FTE. Turnover decreased between 2007 and 2010 by 37.6%, with a 41.9% decrease in exports and a 28% decrease in employment in the same period.



© Marine Institute, Dublin Port 2014.

Shipping and Maritime Transport is by far the largest sub-sector within this sector with 4,633 FTEs directly employed which constitutes 81% of the entire grouping. The majority of shipping and maritime services activity occurs around the nine State commercial ports: Tier 1 - Dublin; Cork; Shannon-Foynes; Tier 2 - Waterford; Rosslare^{13 14}; Regional - Drogheda; Dun-Laoghaire; Galway; New Ross; and Wicklow.

By contrast Marine Commerce, which deals with the legal and financial services, insurance and ship leasing is a very small sub-sector with a turnover of €67 million and 78 FTE directly employed. That said, however, international ship leasing and charter operations are one of the fastest growing segments of the maritime services cluster and HOOW has set an ambitious target for an increase in turnover to €2.6 billion¹⁵ in maritime commerce and ship leasing by 2020. While this is an ambitious target, on-going work by the Irish Maritime Development Office (IMDO) and the IDA regarding a proposed International Shipping Services Centre (ISSC) in Dublin could deliver a significant aspect of this growth. It is expected that such a hub would attract firms involved in shipping, ship leasing, shipping finance and operations management.¹⁶

¹³ National Ports Policy, - Iarnród Éireann operates Rosslare Europort under a complex ownership involving Fishguard port that dates to the 19th Century <http://www.dttas.ie/sites/default/files/node/add/content-publication/National%20Ports%20Policy%202013.PDF>

¹⁴ Ireland's Ocean Economy - Reference Year 2010; NUIG, SEMRU , Published Dec 2013

¹⁵ Ireland's Ocean Economy - Reference Year 2010; NUIG, SEMRU , Published Dec 2013 The ship leasing component of this target is included in shipping and maritime transport in this report, and cannot be disaggregated due to data confidentiality

¹⁶ <http://www.imdo.ie/IMDO/business/maritime-development/ISSC+Dublin.htm>



E3.2 Company Interviews

For the study 17 companies were interviewed from the Maritime Transport, Shipbuilding and Services sector with a total of 531 employees which constitutes 9% of the total number of employees (5,689) in the sector.



© Fáilte Ireland and Tourism Ireland

Over the previous three years these companies have experienced a decline in employment of 16% for operative grades but for professional occupations employment increased by 24%. Over the next six years these companies anticipated that the largest employment growth would be for administrative occupations at 54% closely followed by the professional occupations at 49% and operatives at 40%.

Over the last three years 10 of the 17 companies saw an increase in their turnover while another four had a decrease in turnover with three indicating their turnover had stayed the same. By contrast over the next six years only one of the companies anticipated a decrease in its exports while ten anticipated an increase and six expected them to stay the same. The companies also indicated that on average over the last three years 43% of their turnover was from exports.

Approximately 50% of the companies interviewed had difficulty finding people in their local area with the right level of experience and/or skills for Associate Professional and Technical occupations and 82% of companies had roles which they found were difficult to recruit into, such as: ships captains; marine engineers; hydrographic surveyors; marine electricians; marine planners; and welders.

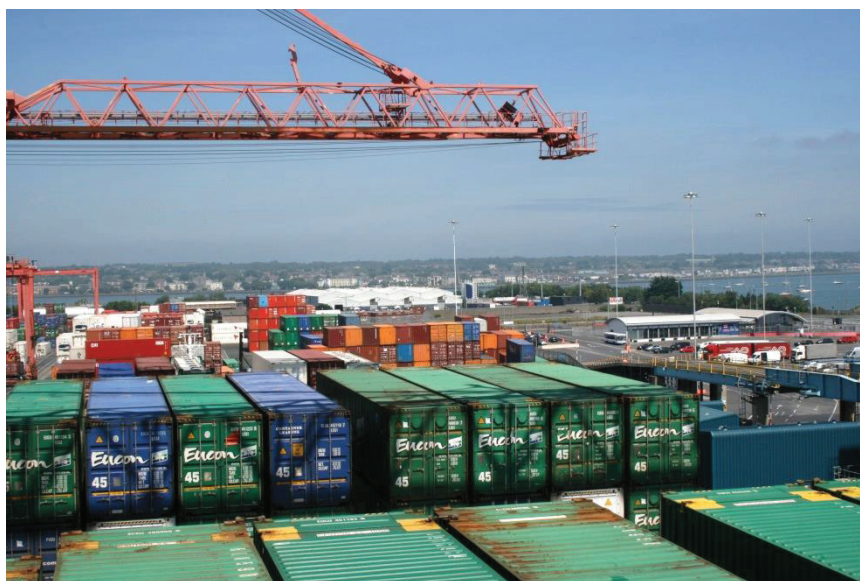
E3.3 Stakeholder Consultation

The main employment in this area of the ocean economy currently centres on the Irish ports, of which three have been categorised in the National Ports Policy as “Ports of National Significance (Tier 1)” namely: Dublin Port Company, Port of Cork Company and Shannon Foynes Port Company¹⁷. Each port is individually responsible for 15% to 20% of overall tonnage through Irish Ports. The ports companies themselves have relatively small numbers employed, with around 300 FTE employees between the three Tier 1 ports. Even though vacancies do not come up regularly, specialist skills can be difficult to find, for roles such as harbourmaster and berthing master. These positions are often filled by former merchant seafarers or naval officers. The majority of the occupations are at operative level but as port activities grow, there could be skills issues due to a lack of maritime training and experience of operatives.

The consultations highlighted a lack of awareness among school leavers about career options in the maritime sector and a lack of basic maritime knowledge combined with work experience in a maritime environment presented employers in the Maritime Transport, Shipping and Services sector with difficulty finding people with the right mix of skills and experience.

¹⁷ <http://www.dttas.ie/sites/default/files/node/add/content-publication/National%20Ports%20Policy%202013.PDF>

The proposed International Shipping Services Centre (ISSC) is a major project likely to impact on employment in the maritime transport area with a phased build-up to accommodate over 100 maritime companies and creating over 3,500 jobs, employing engineers, ex-captains and specialists in ship broking/chartering, maritime law and finance, crew management, logistics and freight. These maritime companies will need skills where business experience is combined with maritime knowledge. One approach to addressing this is to recruit ex-mariners and focus their training on business skills, or alternatively “marinise” the business skills.



© Marine Institute, Dublin Port 2014

E3.4 Future Demand for Skills 2015 - 2020

Estimating the baseline figure for 2014 for this large and diverse subsector was challenging. All the subsectors of the Maritime Transport, Shipping and Services lost substantial employment between 2007 and 2010, and this decline may not have ceased in 2010. However, the results of the interviews with companies suggested that many had increased employment and turnover over the last three years, and the stakeholder consultations revealed ongoing plans for investment to regrow the sector. The consensus view of stakeholders was that for the sector as a whole the best estimate was that employment was likely to be equal to the 2010 level.

Scenario 1 assumes that the targets of an increase in turnover to €2.6 billion¹⁸ in maritime commerce and ship leasing as set out in Harnessing Our Ocean Wealth will to be met by 2020. While this target is ambitious the conclusion was that the increase in turnover will be driven by the ship leasing component of the shipping and maritime transport sector, i.e. the proposed International Shipping and Services Centre (ISSC).

The scenario forecast an expansion demand of 4,928 jobs increasing employment from 5,689 in 2014 to 10,617 full-time equivalent jobs by 2020 with 3,500 of these jobs (71% of the total expansion demand) in the proposed ISSC. The remainder of the proposed growth (1,428 jobs) would take place in the shipping and maritime transport sector, driven by investment in ports. The replacement demand is 2,373 FTEs thereby giving rise to a gross demand of 7,301 which is 128% of the estimated current work force. The distribution of the expansion and replacement demand by occupation level is shown in Table E4.

¹⁸ Ireland's Ocean Economy - Reference Year 2010; NUIG, SEMRU, Published Dec 2013. The ship leasing component of this target is included in shipping and maritime transport in this report, and cannot be disaggregated due to data confidentiality.



Table E4: Distribution of Expansion and Replacement Demand to 2020 by Occupation in the Maritime Transport, Shipping and Services Sector

	2014 estimates	Scenario 1 HOOW Target met					
		Expansion Demand		Replacement Demand		Gross Demand	
Occupation Level	Baseline	No.	% of 2014	No.	% of 2014	No.	% of 2014
Operative Grades	814	850	104%	476	58%	1,326	163%
Administration	445	651	146%	283	64%	934	210%
Skilled Trades	1,727	821	48%	706	41%	1,527	88%
Associate Professional and Technical	803	793	99%	261	33%	1,054	131%
Professionals	1,183	1,416	120%	452	38%	1,868	158%
Management	717	397	55%	195	27%	592	83%
Total	5,689	4,928	87%	2,373	42%	7,301	128%

Source: PACEC, 2014

An examination of the expansion demand by educational attainment shows that the concentration is at NFQ Levels 6 - 8 of the Framework, driven by the substantial increase in the number of professional and associate professional occupations, 2,209 of 4,928 (45%) required by the ISSC.

E3.5 Supply-side Information

The National Maritime College of Ireland (NMCI) is a constituent college of Cork Institute of Technology (CIT) and is the national centre for education and training for careers in the Merchant Maritime sector and provides the non-military training needs of the Irish Naval Service (INS). The NMCI offers degree courses in Nautical Science, Marine and Plant Engineering and a Certificate in Seamanship.

The only specifically Maritime business courses available in Ireland are those provided by the Institute of Chartered Shipbrokers (ICS). The ICS is the only internationally recognised professional body in the maritime arena and it represents shipbrokers, ship managers and agents throughout the world. It is a major provider of education and training and sets and examines the syllabus for membership, providing the shipping industry with highly qualified professionals. An Ireland branch of the ICS was formed in 1974.

Maritime Safety applies to all sea-going vessels from merchant ships to passenger ferries, fishing trawlers and leisure craft. The Marine Survey Office of the Department of Transport, Tourism and Sport (DTTAS) is responsible for the certifications of seafarers' competencies. Safety training is provided by NMCI, BIM and several private operators. Radio operator courses are also provided by NMCI, BIM and one or two private operators.

A comprehensive review of courses available in Ireland for the maritime transport, shipping and services sector is in the full report on the EGFSN website, www.skillsireland.ie

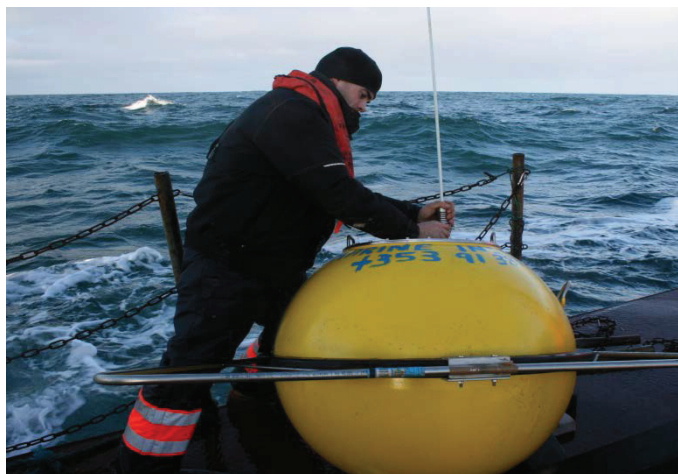
E.4 Energy

The sub-sectors assessed under this sector are:

- Oil and Gas Exploration and Production
- Marine Renewables - Offshore Wind, Wave and Tidal

E4.1 Economic Profile

There are two distinct industries in the energy sector that relate to Ireland's Ocean economy, namely the offshore oil and gas sector and the offshore renewables sector. The offshore oil and gas sector is a well-established, global industry, though activities in Ireland are at a low level. The oil and gas industry relies on a flexible, mobile and international workforce and there are many skilled Irish people working in the oil and gas industry abroad.



© Marine Institute, Marine Renewable Energy Services.

Offshore Renewables is an emerging sector, which has seen dramatic growth globally over the last ten years. The Communication from the Commission Com(2014) 254 “*Innovation in the Blue Economy the EU*”¹⁹ has shown there is a demand for marine renewables skills at a European level. The Marine Renewables Industry Association (MRIA) in Ireland carried out a study in 2011²⁰ and found that there was no real shortage of third-level skills in the nascent ocean energy industry in Ireland. During the course of this study the MRIA confirmed that this is still the situation.

Economic indicators for the Offshore Energy sector are outlined in Table E1. GVA in 2010 was €65 million, turnover was €138 million and direct employment was 1,077 FTE²¹. Due to the fact that the oil and gas sector is already well-established the turnover is significantly larger than the newly emerging offshore renewables sector which is expected to increase significantly in the coming years.

E4.2 Company Interviews

For this study ten companies were interviewed from the Energy sector with a total of 704 employees which constitutes 61% of the total number of employees (1,148) in the marine energy sector.

Over the previous three years these companies have experienced significant growth in employment, in particular, for professionals with an increase of 167 (80%) and associate professionals and technical staff of 55 which is a 250% increase. Over the next six years these companies anticipated continued employment growth for professionals and associate professionals.

¹⁹ Communication from the Commission. Innovation in the Blue Economy: realising the potential of our seas and oceans for jobs and growth. COM (2014) 254 <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=COM:2014:254:REV1&from=EN>

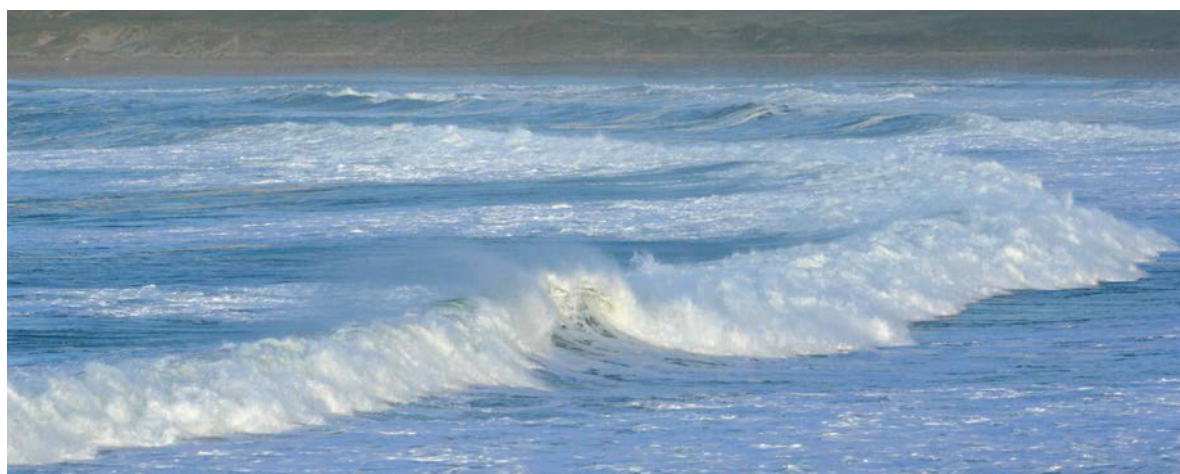
²⁰ Third-Level Education Needs of the Ocean Energy Industry. To maximize the job and income creation potential of Ireland's ocean energy resource. Discussion Paper. MRIA. 2011. <http://www.mria.ie/documents/92d05fb11cdab8d6531dd4cbb.pdf>

²¹ Ireland's Ocean Economy - Reference Year 2010; NUIG, SEMRU, Published Dec 2013



Over the last three years seven of the ten companies saw an increase in their turnover, of which four had moderate growth (10% - 20% pa) and three had significant growth (>20%pa), with the remaining three indicating their turnover had remained the same. By contrast over the next six years 50% of the companies anticipated a significant increase in their exports with four anticipating a moderate increase and only one expecting their exports to stay the same. The companies also indicated that on average over the last three years 49% of their turnover was from exports.

Approximately 70% of the companies interviewed had roles which they found were difficult to recruit into. The main occupations identified were electrical and specialist engineers; people with offshore energy skills; project managers with practical experience and people with basic technical skills e.g. riggers, algae biologists and software developers.



© Marine Institute - Photographer Cushla Dromgool Regan

E4.3 Stakeholder Consultation

The Oil and Gas sub-sector ranges from production to exploration and the supply chains for these areas. Production facilities need engineering skills and one such example is the Corrib Gas Field which will create approximately 131 FTEs during its 10-15 year life of field production. For exploration, the skills needed are for scientific research, typically MSc and PhD graduates. Tullow Oil, an Irish company, has its worldwide geophysics centre in Ireland employing around 90 geoscientists, though none of their activities are currently focused on exploration in Irish waters. Increased exploration is anticipated following the announcement from the DCENR for a licensing round in 2015²².

The emergence and rapid growth in the Marine Renewable Energy sector has been driven by European targets for generating renewable energy. The EU is supporting the establishment of the wave and tidal energy sectors and a European Ocean Energy Forum has been set up to deploy demonstration projects, such as Westwave, which the ESB are developing.

Ireland is particularly well placed to compete in this emerging sector and the Offshore Renewable Energy Development Plan (OREDPP)²³ published in 2014 by the DCENR provides the framework to

²² <http://www.dcenr.gov.ie/NR/ronlyres/9B40A9A2-10AE-4E6A-9382-1D07FC76A802/0/2015LicensingRoundNotice18June2014Final.pdf>

²³ The Offshore Renewable Energy Development Plan (OREDPP) - A Framework for the Sustainable Development of Ireland's Offshore Renewable Energy Resource was launched in February 2014 and sets out a vision for the sector that sees it contributing to sustainable economic growth and delivering jobs in the green economy.
<http://www.dcenr.gov.ie/Energy/Sustainable+and+Renewable+Energy+Division/OREDPP.htm>



develop offshore wind and wave energy in Irish waters without any significant environmental impacts.

Ireland also has the potential to become a centre of excellence and world leader in research, development and demonstration in the marine renewables field. At present there are five companies actively involved in developing offshore wind energy projects in Ireland. Employment opportunities are currently mostly for graduates as the sector becomes established. Once demonstration projects are deployed there will be a need for vessel operators and maintenance technicians.

E4.4 Future Demand for Skills 2015 - 2020

Offshore Oil and Gas increased employment between 2007 and 2010, but lost substantial turnover and GVA over the same period. Discussions with stakeholder suggested that further employment growth, between 2010 and 2014, would have been unlikely and so the 2010 employment figure has been carried forward as the 2014 baseline.

Employment and turnover in Offshore Renewables grew between 2007 and 2010 and the consensus position, based on the evidence set out above and discussions with stakeholders, was that this growth rate would have continued between 2010 and 2014 though at a slightly lower rate.

Table E5: Distribution of Expansion and Replacement Demand to 2020 by Occupation in the Energy Sector

	2014 estimates	Expansion Demand Scenario 1 HOOW Target met		Expansion Demand Scenario 2 - HOOW Target EXCEEDED		Replacement Demand Scenario 1 HOOW Target met		Replacement Demand Scenario 2 - HOOW Target EXCEEDED		Gross Demand Scenario 1 HOOW Target met	
Occupation Level	Baseline	No.	% of 2014	No.	% of 2014		% of 2014	No.	% of 2014	No.	% of 2014
Operative Grades	47	3	6%	8	17%	23	49%	24	51%	26	55%
Administration	70	2	3%	5	7%	32	46%	32	46%	34	49%
Skilled Trades	166	8	5%	22	13%	67	40%	69	42%	75	45%
Associate Professional and Technical	125	31	25%	82	66%	41	33%	46	37%	72	58%
Professionals	603	96	16%	258	43%	204	34%	220	36%	300	50%
Management	137	10	7%	25	18%	36	26%	38	28%	46	34%
Total	1,148	150	13%	400	35%	403	35%	429	37%	553	48%

Source: PACEC, 2014

Scenario 1 forecasts an expansion demand of 150 jobs, all in the Marine Renewable energy sector as the Oil and Gas industry was forecast to remain constant, thus increasing employment from 1,148 in 2014 to 1,298 full-time equivalent jobs by 2020. The replacement demand is 403 FTEs thereby giving rise to a gross demand of 553 which is 48% of the estimated current work force. The distribution of the expansion and replacement demand by occupation level is shown in Table E5.

A second high-growth scenario, Scenario 2, was also developed for the Energy sector. This scenario forecasts an expansion demand of 400 FTE by 2020 with 100 additional jobs in the oil and gas



industry and 300 in the Marine Renewable industry. The distribution of the 400 additional FTE jobs by occupation level is shown in Table E5.

An examination of the expansion demand by educational attainment for both scenarios shows that the concentration is in NFQ Levels 9 - 10 of the NFQ Framework, driven by the substantial increase in the number of professional and associate professional occupations, 127 of 150 (85%) for Scenario 1 and 339 of 400 (85%) for Scenario 2.

E4.5 Supply-side Information



Courtesy of photographer Tomasz Szumski

While the Offshore Energy Sector has two distinct sub-sectors there are many overlapping skill sets, e.g., engineering and working off-shore, fishermen providing services to the off-shore energy industry. In addition to offshore energy specific education and training other education and training apply such as the marine safety training and marine and environmental scientists.

The one year MSc in Petroleum Geoscience at UCD, which was launched in Sept 2013, offers science graduates a vocational training in the broad range of technical fields associated with the exploration and production of the petroleum industry.

In addition to the formal professional qualifications, specific training and qualification is required by the oil and gas industry before anyone can work on an oil rig. OPITO - Offshore Petroleum Industry Training Organisation - is the skills organisation for the oil and gas industry. Two organisations in Ireland are approved by OPITO to provide training. They are:

- Effective Offshore in Falcarragh, Co. Donegal and
- NMCI in association with SEFtec in Ringaskiddy Co. Cork.

The marine renewable energy sub-sector is still an emerging sector and its current skills needs are more for researchers at this point in time until the industry is more developed when it will have a greater need for associate professionals and technicians. With regard to undergraduates the industry prefers students to undertake a traditional/mainstream engineering degree such as mechanical and electrical and then to specialise afterwards.

A taught masters in Marine Energy was recently launched by UCC in partnerships with seven other colleges, including Queens University in Belfast, following a consultation of stakeholders by the MRIA (Marine Renewable Industry Association) of the education needs of the industry.²⁴

Two SFI (Science Foundation Ireland) funded Research Centres in Ireland have also been established, namely, the iCRAG (Irish Centre for Research in Applied Geosciences) in UCD and the Marine Renewable Energy Ireland (MaREI) centre in UCC.

A comprehensive review of courses available in Ireland for the energy sector is in the full report on the EGFSN website, www.skillsireland.ie

²⁴ <http://www.mria.ie/documents/92d05fb11cdab8d6531dd4cbb.pdf>

E.5 Tourism



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The sub-sectors assessed under this sector are:

- Marine Tourism
- International Cruise Industry

E5.1 Economic Profile

In 2010, the tourism industry contributed approximately €5.8 billion to the Irish economy and marine tourism is estimated to account for 10% of the overall value of the tourism sector in Ireland^{25 26}. The main marine tourism activities which are offered along the coastline in Ireland include angling, water sports and seaside/ resort trips.²⁷

Economic indicators for Marine Tourism are outlined in Table E1. GVA in 2010 was €337 million, turnover was €841 million and direct employment was 3,502 FTE. These figures are lower than the 2007 figures which stated a turnover of €944 million, a GVA of €453 million and full time direct employment of 5,836.²⁸ This decrease reflects the global downturn in the economy during this period.

Over 200 cruise liners, carrying 205,000 passengers, visited Ireland in 2010, an increase of over 200% in the last decade. Turnover from cruise passengers was €17 million. Increased tourism numbers from cruise passengers would give rise to increased employment in tourism services and attractions, such as, golf courses, equestrian centres, visitor attractions, car hire, coach hire, cruising and water based activity centres.

E5.2 Company Interviews

For the study nine companies were interviewed from the Marine Tourism sector with a total of 83 employees which constitutes 2.4% of the total number of employees (3,502) in the sector.

Over the previous three years these companies indicated that employment declined or stayed the same for all occupations except administration. Over the next six years these companies anticipated

²⁵ Ireland's Ocean Economy - Reference Year 2010; NUIG, SEMRU , Published Dec 2013.

²⁶ <http://www.failteireland.ie/News-Features/News-Library/Significant-growth-in-marine-tourism-achievable.aspx>

²⁷ Ireland's Ocean Wealth. 2010.

²⁸ SEMRU - Ireland's Ocean Economy, 2010.



the largest employment growth would be for operatives and skilled trades at a rate of 21% and 17% respectively.

Over the last three years four of the nine companies saw an increase in their turnover while three had a decrease in turnover with two indicating their turnover had remained the same. By contrast over the next six years none of the companies anticipated a decrease in the number of foreign tourists with six of the nine companies expecting the number of foreign tourists to increase.

Approximately 33% of the companies interviewed had difficulty finding people with practical experience and knowledge of working in a marine environment (i.e. boat skippers or boat men, and people with kayak/rock-climbing skills and qualifications).



© Fáilte Ireland and Tourism Ireland. Learning to sail.



© Fáilte Ireland and Tourism Ireland. Yachting Marina

E5.3 Stakeholder Consultation

Cruise Tourism has been identified as potential for large growth in visitor numbers, with the associated increase in visitor expenditure creating scope for increased employment.

Ocean racing offers a good career path into professional sport but currently there is little opportunity in Ireland for Irish Olympic level sailors, so they go abroad. With this local talent pool and the unique Atlantic facing coastal areas, Ireland is an ideal location for an Ocean Racing Training Base. Such a base could be modelled on the successful development in Lorient, France where there are 1,300 jobs in the local nautical industry cluster and over 700,000 annual visitors for festivals.

The establishment of a yacht racing hub to attract international racing teams to Ireland would increase requirements for sail making, boat building and associated supply chains, in addition to the impact on tourism numbers. It can be difficult to attract school leavers to a career associated with sailing in Ireland due to the perceived lack of status, as it is not a recognised career/profession.

E5.4 Future Demand for Skills 2015 - 2020

The consensus position from the stakeholder discussions was that despite the loss of employment during the recession, the prospects for growth are strong, and any continuation of the fall in employment which took place between 2007 and 2010 would have recovered by 2014. As such the 2010 employment figure has been used as the best estimate of the 2014 baseline.



Scenario 1 assumes that the turnover targets of revenue earnings of €1.5 billion in marine and coastal tourism and leisure (including cruise tourism) as set out in Harnessing Our Ocean Wealth will to be met by 2020.

The scenario forecasts an expansion demand of 3,447 jobs increasing employment from 3,502 in 2014 to 6,949 full-time equivalent jobs by 2020. The replacement demand is 1,752 FTEs thereby giving rise to a gross demand of 5,199 which is 148% of the estimated current work force. The distribution of the expansion and replacement demand by occupation level is shown in Table E6.

Table E6: Distribution of Expansion and Replacement Demand to 2020 by Occupation in Marine Tourism

	2014 estimates	Scenario 1 HOOW Target met					
		Expansion Demand		Replacement Demand		Gross Demand	
Occupation Level	Baseline	No.	% of 2014	No.	% of 2014	No.	% of 2014
Operative Grades	1,604	1,705	106%	1,100	69%	2,805	175%
Administration	422	371	88%	164	39%	535	127%
Skilled Trades	506	519	103%	265	52%	784	155%
Associate Professional and Technical	253	222	88%	57	23%	279	110%
Professionals	295	259	88%	74	25%	333	113%
Management	422	371	88%	92	22%	463	110%
Total	3,502	3,447	98%	1,752	50%	5,199	148%

Source: PACEC, 2014

E5.5 Supply-side Information

There are many routes into Marine Tourism such as Tourism, Business, Hospitality and Catering, and Hotel management courses. There are also specific training courses available in outdoor adventure activity tourism, watersports training and certification, boat and engine training and marine and countryside guiding. For the purposes of this study the focus has been on the water based tourism, such as angling, sailing, surfing and adventure centres with a focus on water sports.

Adventure/Outdoor Activity Tourism has become one of the fastest growing sectors of the tourism industry and many of the Education and Training Boards provide 1yr NFQ level 5 or 3 yr NFQ Level 7/8 qualifications in Outdoor Adventure Education.

National Governing Bodies for water based activities regulate the training, awards and qualifications. The relevant organisations are: the Irish Sailing Association - ISA; the Irish Canoe - ICU; and the Irish Surfing Association.

A comprehensive review of courses available in Ireland for the marine tourism sector is in the full report on the EGFSN website, www.skillsireland.ie



E6 Maritime Monitoring, Security and Surveillance

The sub-sector assessed under this sector is:

- High-tech marine products and services

E6.1 Economic Profile

Maritime Monitoring, Security and Surveillance is an emerging sector and produced a GVA of around €20.8m in 2010 and grew its turnover between 2007 (€43.6m) and 2010 (€56m) despite the recession. Likewise, exports increased from €10.8m in 2007 to €12.3m in 2010.

The numbers in direct full time employment (FTE) are quite low compared to other marine industries; but have increased from 350 FTE in 2007, to 391 FTE in 2010.

HOOW has set a target for an increase in turnover to in excess of €61 million in marine ICT and biotechnology by 2020.



© Marine Institute - Photographer Glenn Nolan.

E6.2 Company Interviews

For the study nine companies were interviewed from the Maritime Monitoring, Security and Surveillance sector with a total of 124 employees which constitutes 27% of the total number of employees (457) in the sector.

Over the previous three years these companies indicated that employment increased for Associate Professional and Technical occupations and Professional occupations. Over the next six years these companies anticipate the largest employment growth will be for Administration occupations with a modest growth also for Professional and Skilled trades. However, the sample base was very small so caution has to be exercised when drawing any conclusions.

Over the last three years seven of the nine companies saw an increase in their turnover with two indicating their turnover had not changed. By contrast over the next six years eight of the nine companies expect an increase in their exports, and only one expects their exports to remain the same.

Approximately 78% of the companies interviewed stated they had roles which were difficult to recruit into, such as, IT software developers, environmental scientists, high quality administration, technical engineers, project managers and satellite technicians.



E6.3 Stakeholder Consultation

This sector is centred on high-tech marine products and services. It is currently dominated by small start-up businesses, though these companies can grow rapidly as a result of being acquired or securing investment from venture capitalists and private investors for launching new products and expanding into international markets.



© Marine Institute - Smart Bay Buoy, Photographer James Ryan

Government support for research and the SmartOcean²⁹ Ireland strategy, launched in 2010, is promoting this sector with the aim of harnessing Ireland's natural marine resources and specialist expertise in Marine Science and ICT to establish Ireland as a leader in the development of high value products and services for the global marine sector.

The marine technology sector is one of the new growth areas for the general ICT industry and companies such as IBM are working on initiatives to develop this new market. Companies will need skills on data handling, cloud computing and analytics, similar to those in the mainstream economy.^{30 31}

E6.4 Future Demand for Skills 2015 - 2020

As the sector continued to grow between 2007 and 2010 (in turnover, exports and employment) it has been assumed that it continued to grow in employment between 2010 and 2014 at its trend rate of 4% a year and a baseline estimate for the 2014 employment figure at 457 FTEs was therefore set. Scenario 1 assumes that the turnover target of €61 million as set out in Harnessing Our Ocean Wealth will to be met by 2020.

The distribution of the expansion and replacement demand by occupation level is shown in Table E7. The scenario forecasts an expansion demand of 190 jobs increasing employment from 457 in 2014 to 647 full-time equivalent jobs by 2020. The replacement demand is 155 FTEs thereby giving rise to a gross demand of 345 which is 75% of the estimated current work force.

The largest increase in FTE jobs is professional occupations although there is also a significant contribution to growth from Administration and Associate Professional and Technical Occupations - combined they are 116 of the 190 additional jobs (61%).

²⁹ <http://www.smartocean.org> - SmartOcean is an initiative led by the Marine institute aimed at catalysing the development of high value products and services by creating a critical mass of research and development activities in Marine ICT through the development of a SmartOcean innovation cluster

³⁰ EGFSN report - Assessing the Demand for Big Data and Analytics Skills, 2013 - 2020
<http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2014/title,12194,en.php>

³¹ EGFSN report -Addressing Future Demand for High-Level ICT Skills
<http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,11287,en.php>



Table E7: Distribution of Expansion and Replacement Demand to 2020 by Occupation in the Monitoring, Security and Surveillance Sector

	2014 estimates	Scenario 1 H00W Target met					
		Expansion Demand		Replacement Demand		Gross Demand	
Occupation Level	Baseline	No.	% of 2014	No.	% of 2014	No.	% of 2014
Operative Grades	33	0	0%	14	42%	14	42%
Administration	44	43	98%	28	64%	71	161%
Skilled Trades	15	6	40%	6	40%	12	80%
Associate Professional and Technical	125	46	37%	32	26%	78	62%
Professionals	166	70	42%	55	33%	125	75%
Management	74	25	34%	20	27%	45	61%
Total	457	190	42%	155	34%	345	75%

Source: PACEC, 2014

E6.5 Supply-side Information

Marine Technology comprising maritime monitoring, security, surveillance and high-tech products is an emerging area and is the application of technology in the marine environment. The main roles in marine technology include: engineers, software developers, geo-scientists, satellite technicians, environmental scientists and hydrographers. With the exception of hydrography which is directly marine focussed all the others have applications outside of the marine area.

The Irish Maritime and Energy Research Cluster (IMERC) represents a tripartite alliance between UCC, CIT and the Irish Naval Service and aims to become a research and commercial cluster of world standing and to realise Ireland's potential in the global maritime and energy markets of tomorrow.

A comprehensive review of courses available in Ireland for the maritime monitoring, security and surveillance sector is in the full report on the EGFSN website, www.skillsireland.ie

E.7 Summary of Skills Demand across the Marine Economy

This section presents the aggregated and summarised demand forecasts for the entire marine economy by sector and occupation. A single table showing the employment, expansion, replacement and gross demand for each sector and combined is in Table E8.

Table E8: Future skill demand to 2020 by occupation and subsector for the Marine Economy

		Seafood		MTSS		Energy		Tourism		Maritime Monitoring		Total	
Occupation		No.	% of 2014	No.	% of 2014	No.	% of 2014	No.	% of 2014	No.	% of 2014	No.	% of 2014
Operatives	2014 baseline	3,043	-	814	-	47	-	1,604	-	33	-	5,541	-
	Expansion	514	17%	850	104%	3	6%	1,705	106%	0	0%	3,072	55%
	Replacement	1,296	43%	476	58%	23	49%	1,100	69%	14	42%	2,909	52%
	Gross	1,810	59%	1,326	163%	26	55%	2,805	175%	14	42%	5,981	108%
Admin	2014 baseline	392	-	445	-	70	-	422	-	44	-	1,373	-
	Expansion	180	46%	651	146%	2	3%	371	88%	43	98%	1,247	91%
	Replacement	179	46%	283	64%	32	46%	164	39%	28	64%	686	50%
	Gross	359	92%	934	210%	34	49%	535	127%	71	161%	1,933	141%
Skilled Trades	2014 baseline	934	-	1,727	-	166	-	506	-	15	-	3,348	-
	Expansion	237	25%	821	48%	8	5%	519	103%	6	40%	1,591	48%
	Replacement	344	37%	706	41%	67	40%	265	52%	6	40%	1,388	41%
	Gross	581	62%	1,527	88%	75	45%	784	155%	12	80%	2,979	89%
Associate, Professional and Technical	2014 baseline	45	-	803	-	125	-	253	-	125	-	1,351	-
	Expansion	0	0%	793	99%	31	25%	222	88%	46	37%	1,092	81%
	Replacement	10	22%	261	33%	41	33%	57	23%	32	26%	401	30%
	Gross	10	22%	1,054	131%	72	58%	279	110%	78	62%	1,493	111%
Professional	2014 baseline	365	-	1,183	-	603	-	295	-	166	-	2,612	-
	Expansion	373	102%	1,416	120%	96	16%	259	88%	70	42%	2,214	85%
	Replacement	129	35%	452	38%	204	34%	74	25%	55	33%	914	35%
	Gross	502	138%	1,868	158%	300	50%	333	113%	125	75%	3,128	120%
Management	2014 baseline	580	-	717	-	137	-	422	-	74	-	1,930	-
	Expansion	119	21%	397	55%	10	7%	371	88%	25	34%	922	48%
	Replacement	136	23%	195	27%	36	26%	92	22%	20	27%	479	25%
	Gross	255	44%	592	83%	46	34%	463	110%	45	61%	1,401	73%
Total	2014 baseline	5,359	-	5,689	-	1,148	-	3,502	-	457	-	16,155	-
	Expansion	1,423	27%	4,928	87%	150	13%	3,447	98%	190	42%	10,138	63%
	Replacement	2,094	39%	2,373	42%	403	35%	1,752	50%	155	34%	6,777	42%
	Gross	3,517	66%	7,301	128%	553	48%	5,199	148%	345	75%	16,915	105%

Source: PACEC, 2014

The jobs in the Marine Economy straddle the full gamut of occupations from Managerial and Professional to Operatives. While many of the skills are the same as for land based jobs but with some additional upskilling to work in the Marine Environment, e.g. electricians, some are specific to the Marine economy, such as tug operators, Ship Captains and Naval Architects where very specific

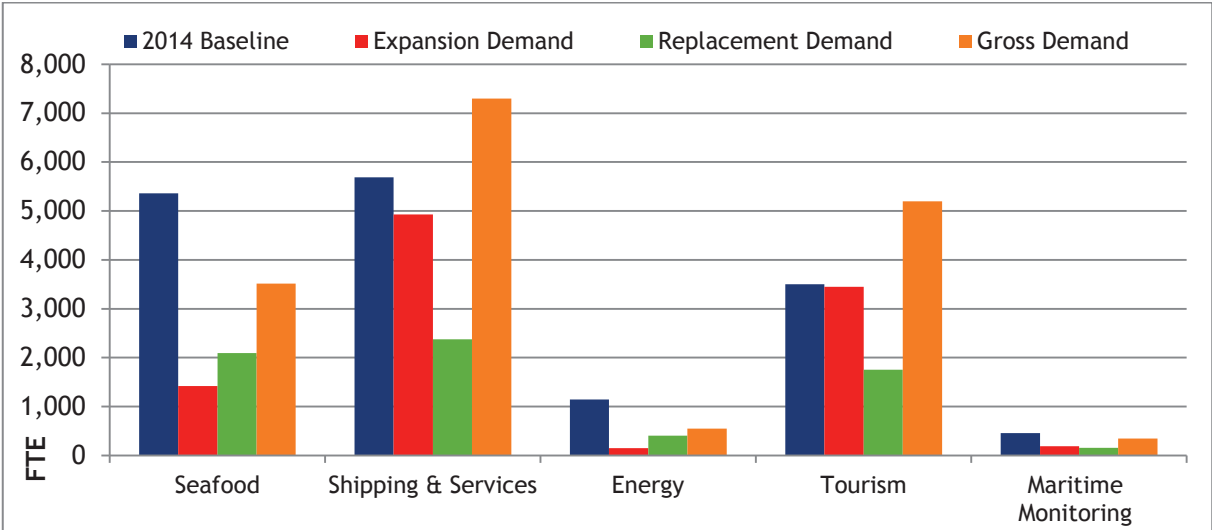
education and training is required. For many other occupations such as engineers in the energy sector this requires a basic engineering degree e.g. mechanical or electrical followed by a specialisation by completing a Masters degree.

E7.1 Future Skills Demand by Sector

The current employment across the entire marine economy is 16,155 full-time equivalents. Across the five broad sectors, the total expansion demand for Scenario 1, i.e., meeting the H00W targets, is forecast to be 10,138 FTE jobs, with the largest expansion of 4,928 in maritime transport, shipbuilding and services (driven primarily by the 3,500 expansion demand arising from the proposed International Shipping Services Centre (ISSC)) with marine tourism following with a 3,447 FTE expansion demand, reflecting the upturn in the global economy and the return of foreign tourists. If the growth in the seafood and bio-products sector does not occur owing to lack of growth in aquaculture then the total expansion is 8,715 (10,138 less 1,423).

The replacement demand is greatest in terms of actual numbers for the Maritime Transport, Shipbuilding, and Services (MTSS) (2,373) and Seafood and Bio-products (2,094) sectors but in terms of the percentage of the 2014 baseline employment marine tourism has the greatest replacement demand at 50% (1,752) of its current work force to be replaced.

Figure E2: Future Skill Demand by Sector



Source: PACEC, 2014

The sectors with the greatest skills demand are maritime transport, shipbuilding, and services (MTSS), marine tourism, and seafood. In the case of seafood unlike MTSS and marine tourism the replacement demand is greater than the expansion demand.

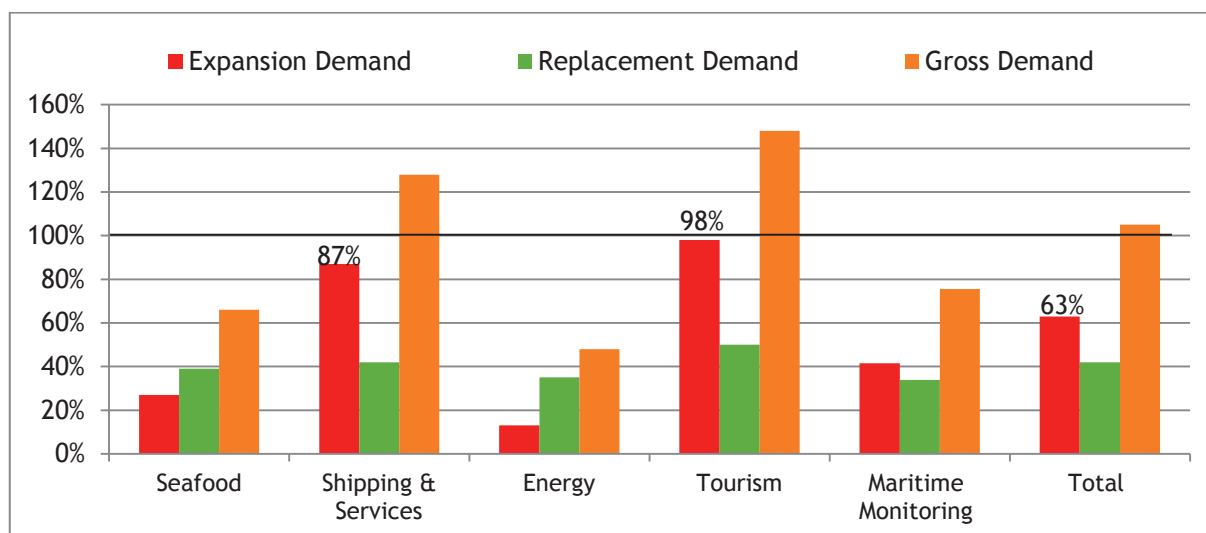
Over the entire Marine Economy the replacement demand is 6,777 some 3,361 less than the expansion demand. The total gross demand out to 2020 for the Marine economy is 16,915 FTE positions.

In Figure E3 the expansion, replacement and gross demand are displayed as a percentage of the current 2014 employment. In the case of tourism while its expansion demand is only 2nd highest, after MTSS, as a percentage of the 2014 employment it has the largest expansion at 98%, meaning



employment in tourism will almost double by 2020. Both MTSS and tourism are forecast to expand at a rate greater than the expansion demand of the total marine economy which is forecast to expand, in employment, by 63%.

Figure E3: Future Skill Demand by Sector as a % of the 2014 FTE Baseline estimate for the occupation



Source: PACEC, 2014

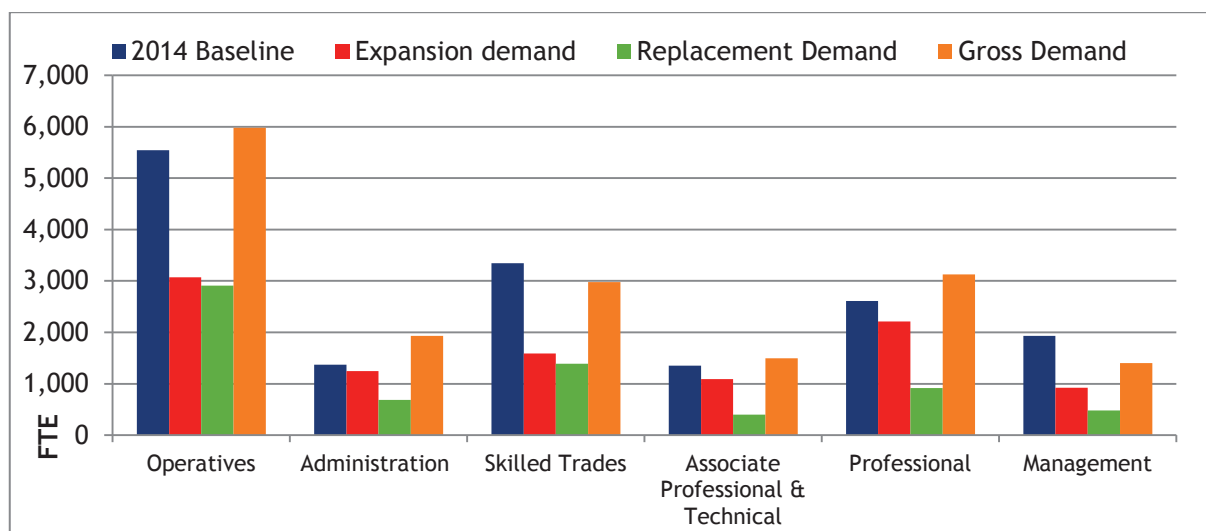
E7.2 Future Skills Demand by Occupation across the total Marine Economy

Operatives comprise the largest occupation across the marine economy with a 2014 baseline estimate of 5,541 FTEs which is 34% of the total full-time employment. Not surprisingly, therefore, it is also the occupation category with the largest expansion demand of 3,072 (30% of the expansion demand). This reflects the nature of much of the work within the Marine economy. There is also strong expansion demand for professionals (2,214 FTE (22% of total expansion)) which reflects the expansion demand arising from the ISSC but also the anticipated professionalisation of enterprises within the marine economy.

Skilled Trades is the next largest occupation category at 3,348 FTEs (21% of the total marine economy (Figure E5)) and has an expansion demand of 1,591 FTEs which is 48% of the total 2014 skilled trade employment (Figure E6) and 16% of total expansion (Figure E5) reflecting the skilled nature of the work within the marine economy.

The occupations generating the highest gross demand are operative roles (5,981 FTE, or 35% of the total gross demand). This is driven by expansion in the tourism sector (where expansion demand exceeds replacement demand (Figure E.2), and the high proportion of operatives in seafood. There is also strong gross demand for professionals (3,128 FTE) and skilled trades (2,979 FTE), the former being driven by the ISSC.

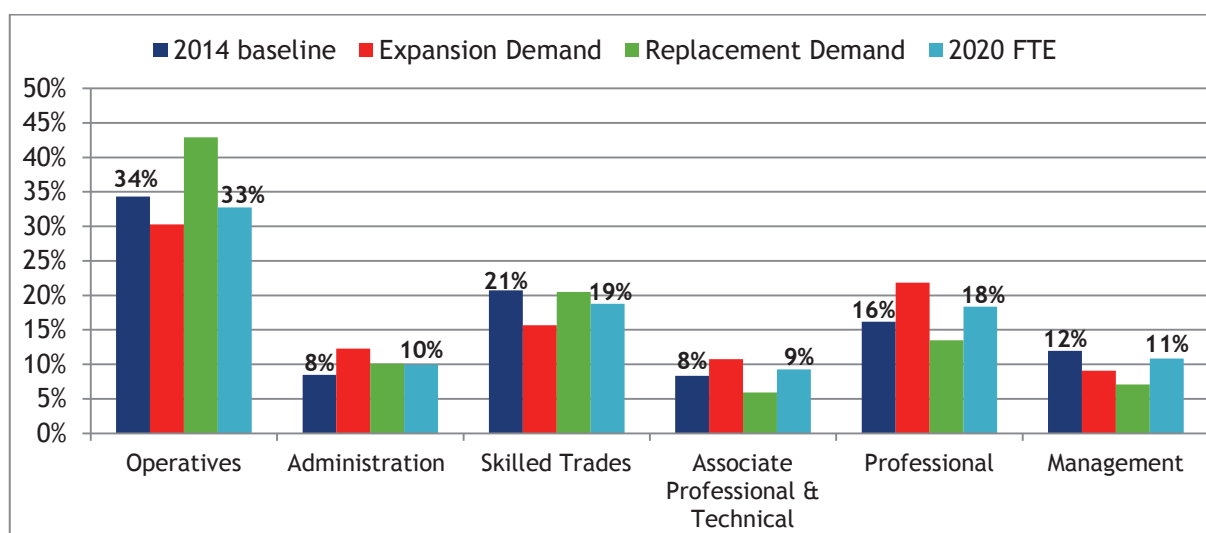
Figure E4: 2014 Future Skills Demand by Occupation Grade for the whole Marine Economy



Source: PACEC, 2014

While professionals have a lower 2014 employment then for skilled trades their expansion demand is greater at 2,214 FTE which is 22% of total expansion (Figure E5) and 85% of the 2014 Professional FTE (Figure E6), which is almost a doubling of the number of professionals working in the marine economy by 2020.

Figure E5: Proportion of an Occupation to the total within the displayed FTE cohort



Source: PACEC, 2014

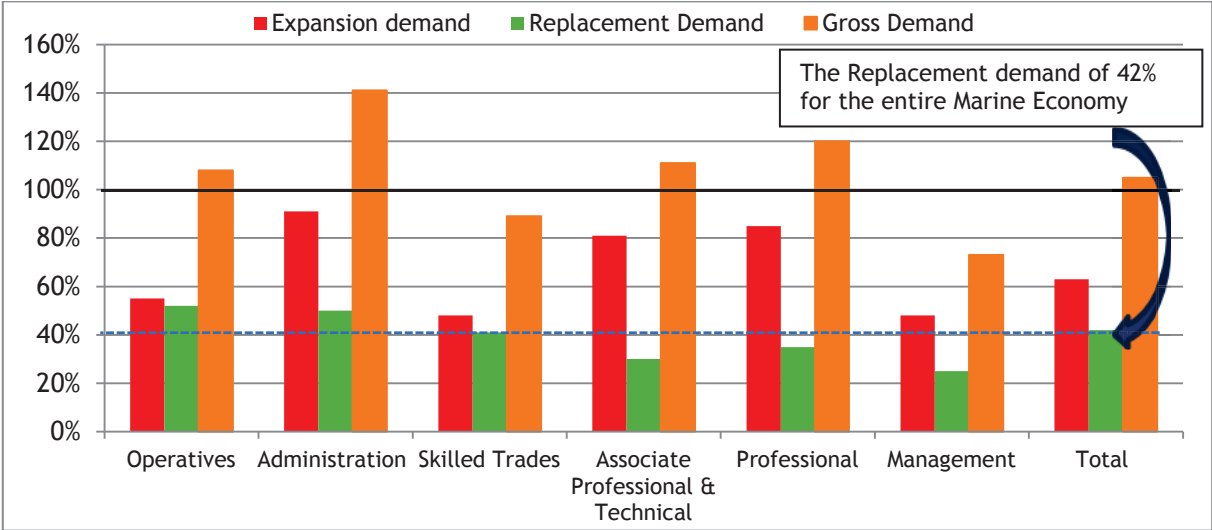
The proportion of an occupation to the total employment in 2014 and that forecast for 2020 is not hugely different. The largest component is operatives at 34% in 2014 and 33% in 2020 with the replacement demand greater than the expansion demand.

In the case of professionals the opposite picture emerges with the composition of professionals rising from 16% of total employment in 2014 to 18% in 2020 and the expansion demand in this case is greater than the replacement demand, largely driven by the ISSC. This is further emphasised when we take the combined Professional and Associate Professional & Technical occupations, which is 33% (22% & 11% respectively) of the total expansion demand, whereas the 2014 combined Professional

and Associate Professional FTE is 24% (16% & 8% respectively) (Figure E5) of the total marine employment. This 9% increase also points to an increasing professionalisation of the marine economy and the expansion of the emerging sectors which require more professionals in the initial years.

The expansion demand for the marine economy is 63% of the 2014 FTE employment. It is interesting to note that the expansion for professionals, associate professionals and technical and administration are all higher than this. While this indicates a degree of professionalisation of the marine economy all of these occupations are starting at a lower base which also would account for the higher percentage. However from Figure E4 we see that the expansion of professionals is the second highest. After operatives, at 2,214 which is an 85% increase in the number of professionals (Figure E6).

Figure E6: Future Skills Demand by Occupation as % of 2014 baseline for the occupation



Source: PACEC, 2014

E7.3 Future Skills Demand by Sector and Occupation across the Marine Economy

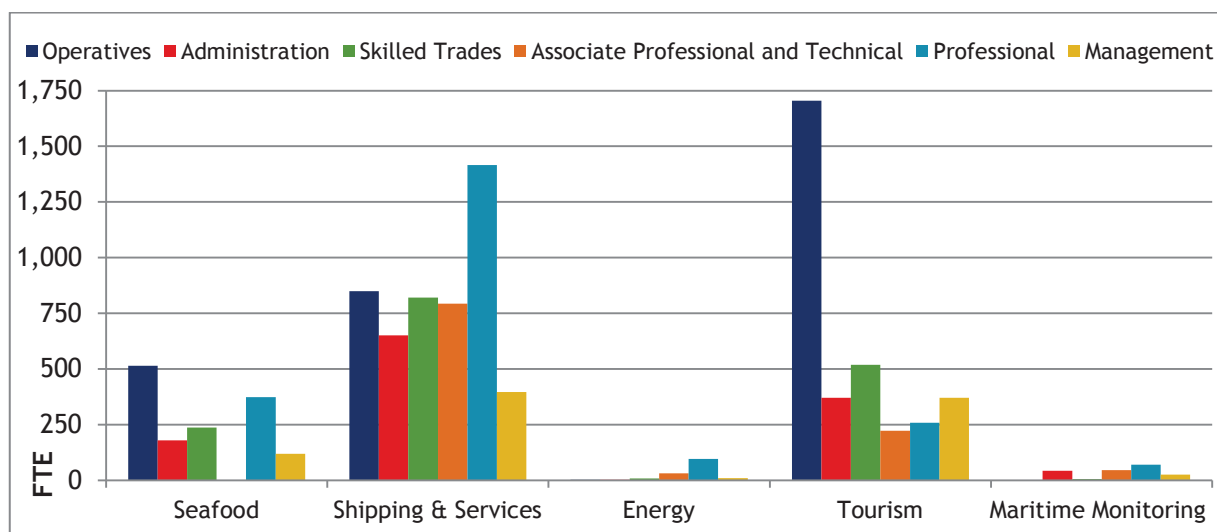
This section examines the skills demand by occupation and sector which demonstrates clearly the contrasting skills demand in the different sectors. The Figures E7 and E8 show the difference between the expansion and replacement demand for each occupation and sector.

The sector Maritime Transport, Shipping and Services requires the largest number of professionals largely attributed to the ISSC. The largest component of the expansion demand is for operatives in tourism. Seafood also requires 373 professionals which is 26% of seafood’s total expansion demand. While energy and maritime monitoring have small numbers their largest expansion is for professionals as both these sectors are emerging.

The picture of the replacement demand is somewhat different to the expansion demand. The single biggest difference is the large number of operatives for seafood, at 1,296 is the largest component. Replacement demand is higher for operatives and low skill occupations compared to professional and managerial occupations, so the sectors with a higher proportion of employees as operatives such as tourism and seafood have a higher replacement demand.

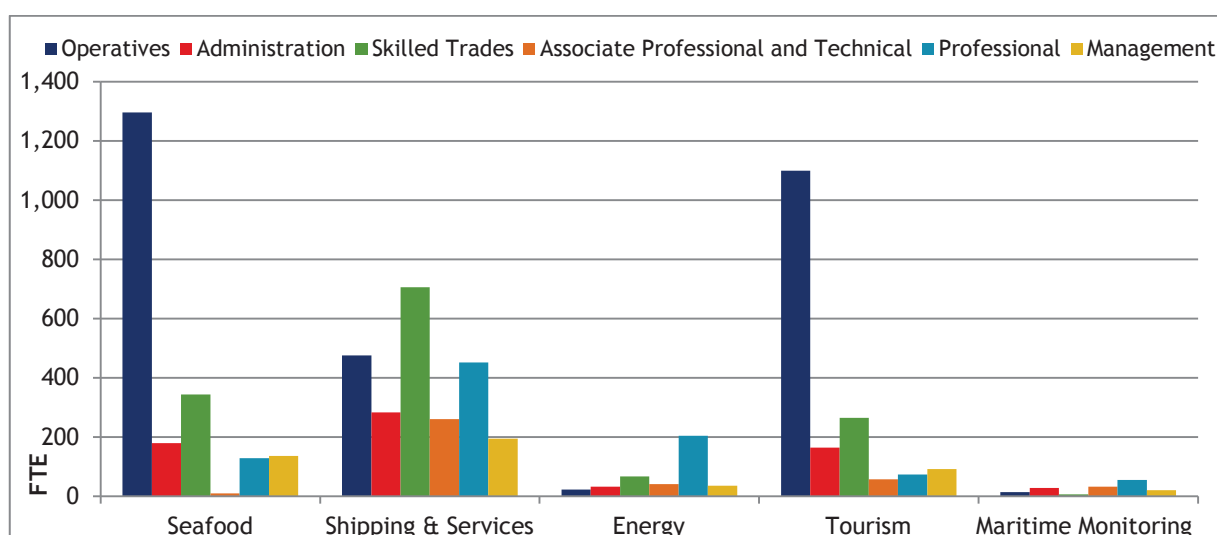


Figure E7: Expansion Demand by Occupation Group within a Marine Sector



Source: PACEC, 2014

Figure E8: Replacement Demand by Occupation Group within Marine Sector



Source: PACEC, 2014

E7.4 Conclusion

There are many opportunities for a career in the marine economy. As most of the industry is in coastal areas it therefore provides employment opportunities in these rural areas. Many of the skills are transferable across the different sectors, e.g. fishermen providing services to the offshore energy sector, merchant seafarers finding employment in the ports after they give up working at sea.

The sectors with the greatest skills demand are seafood, maritime transport, shipbuilding, and services (MTSS) and marine tourism. The replacement demand for the seafood sector is greater than its expansion demand, as the replacement demand of the operative-grade jobs, prevalent in the sector, is higher than that for professional or managerial grades. In the case of tourism the expansion demand is greater than the replacement demand even though like the seafood sector it has a large



number of operatives but this sector is expected to double its FTEs by 2020. In the case of MTSS the largest component of its expansion demand is for professionals. In seafood the workforce is aging and this will present a skills difficulty unless measures are put in place to attract and upskill younger workers.

A key finding in the course of the study is the concept of “marinisation”. Many of the occupations and qualifications are either non-technical, e.g., managers, professionals or associate professionals in fields such as law, accountancy and business development, or not specific to the marine economy, e.g., engineering and software development. None of these qualifications are specific to the marine sector, but may be “marinised” - that is, additional training or a top up qualification in a marine context. “Marinisation” applies across the full spectrum of occupations and qualifications such that a mechanical engineer, an electrician or a construction worker can upskill or “marinise” his/her skills and be able to work in a marine or off-shore environment. This upskilling or “marinising” of a skill provides more employment opportunities.

In addition to “marinising” traditional disciplines and training, ICT skills need to be embedded in existing maritime education and training as the pervasiveness of ICT in all aspects of the economy, including the ocean economy, takes hold. This extends to all occupations and the ICT skills of coastal communities needs to be improved so that ICT becomes an integral part of the marine economy.



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E.8 Recommendations

1 Establish a Marine Discover Programme modelled on the SFI Discover Programme to raise awareness among primary, second and third level students and the Irish public about the range of careers opportunities in the Marine Economy.

The SFI Discover Programme, seeks to promote the awareness and engagement of the Irish public with science, technology, engineering and maths (STEM), to increase interest in STEM among students, teachers and members of the public and to contribute to Ireland's continued growth and development as a society - one that has an active and informed interest and involvement in STEM.

A Marine Discover Programme should broadly follow the model used by SFI and in many cases would be part of the SFI Discover programme where the STEM subjects would be of relevance to the marine sector.

The Marine Institute should lead on and be the co-ordinator for this programme. Other organisations that should be involved are: Bord Iascaigh Mhara (BIM) The Maritime Development Organisation (IMDO), Fáilte Ireland, Maritime Safety Directorate and Marine Survey Office in Department of Transport, Tourism and Sport (DTTAS), SFI, SOLAS, HEA, IUA, IOTIs, NMCI, Institute of Career Guidance Councillors, Geological Survey of Ireland (GSI) and DCENR, Industry bodies and private training providers.

Lead: Marine Institute on behalf of the Marine Co-ordination Group

2 Monitor the skills needs in each sub-sector of the Marine Economy on an ongoing basis to ensure a sufficient supply of skills is available as the trigger points for accelerated growth of a sub-sector are reached.

When the International Shipping Services Centre (ISSC) is established with the predicted creation of 3,500 jobs, measures will need to be put in place to ensure there is a sufficient supply of qualified personnel, such as shipping brokers, legal and business professionals with knowledge of the maritime industry.

As the process for aquaculture licensing becomes streamlined and the number, size of farms and production increases there will be an increased demand for the skills in aquaculture.

As activity increases facilitated by the 2015 licensing round for oil and gas exploration and proposals for a new fiscal regime which would accelerate if there was a find, there will be a greater demand for skills. While the time scales for this process will give sufficient time to put measures in place the situation will need to be monitored.

Lead: Marine Co-ordination Group



3 Update Marine Economy data regularly to ensure accurate data

The SEMRU (Socio Economic Maritime Research Unit, NUIG) publication “Ireland’s Ocean Economy” which was published in December 2013, with 2010 as the data reference year and the 2010 publication with 2007 reference data is a cross cutting look at the entire marine economy and which was the reference data used in HOOW. However, there is a considerable time lag with the data owing to a time lag with the CSO data. The HOOW Development Task Force is addressing this issue as the need to have more up to date information to enable monitoring the performance of the Ocean Economy is accepted as being an imperative.

BIM surveys provide information on the seafood sector that could be used to monitor development and growth of employment and IMDO are piloting a survey scheme in relation to maritime shipping companies.

Ireland’s Ocean Economy should be updated, at a minimum every 2 years, to provide a more accurate and up-to-date set of figures of the economic profile of the marine economy which would facilitate a watching brief of the growing areas and the likely areas that will need more skills.

Lead: Marine Co-ordination Group, Marine Institute and SEMRU

4 Develop a mentoring programme for the Seafood sector.

The seafood subsector has an ageing workforce and the development of a mentoring programme so that those who will be retiring over the next few years can pass on their knowledge and experience to those younger than them would ensure their experience and expertise won’t be lost to the sector. It could also include the possibility of retaining the retirees as mentors for a period so the depth of expertise can be passed on.

Lead: BIM

5 Develop a data-collection and biological sampling course for fishermen

Fishermen trained in data-collection and biological sampling would be in a position to provide consistent and valuable data to researchers and industry/science partnership initiatives. Scientists and fishery managers are aware of the problems arising from lack of sufficient good quality data and using fishermen to provide timely and accurate data would be a significant advantage.

Lead: BIM

6 Provide ICT Training to coastal communities and workers in the marine economy

ICT skills need to be more broadly available to the coastal community as many people living in these areas have little knowledge or experience of ICT. An outcome from this initiative would be more mainstream use of ICT with the marine economy

Lead: BIM, in conjunction with SOLAS, ETBs and NALA



Appendix E1: Steering Group Members

Name	Organisation
Brendan Murphy - Chair	President, Cork Institute of Technology (CIT) and EGFSN Member
Peter Heffernan	CEO, Marine Institute
Archie Donovan	Dept. Communication, Energy, and Natural Resources (DCENR)- GSI (Geological Survey of Ireland)
Kevin McCann	DCENR - Petroleum Affairs Division
Yvonne Shields	CEO, Commissioners for Irish Lights (CIL)
Gearóid Mooney	Divisional Manager, Research and Innovation, Enterprise Ireland
John Bolton	IDA Ireland
Meadbh Seoighe	Údarás na Gaeltachta
Conor Mowlds	Head of National Maritime College of Ireland (NMCI)
John McGrath	Head of SLMRU (Skills and Labour Market Research Unit), Solas
Graham Brennan	Programme Manager, Ocean Energy, Sustainable Energy Authority of Ireland (SEAI)
Andrew Parish	Sound and Sea Technology
John Connaughton	Head of Training Services, BIM (Bord Iascaigh Mhara)
Sean O'Donoghue	Federation of Irish Fishermen (Killybegs Fisherman's Organisation (KFO))
Lorcán Ó'Cinnéide	Irish Fish Processors and Exporters Association (IFPEA)
Jan Feenstra	Marine Harvest
Liam Lacey	Director of Irish Maritime Development Office (IMDO)
Glenn Murphy	Irish Shipbrokers
Mary Stack	Fáilte Ireland



Appendix E2: Members of the Expert Group on Future Skills Needs

Name	Organisation
Una Halligan	Chairperson
Marie Bourke	Head of Secretariat and Department Manager, Department of Jobs, Enterprise and Innovation
Inez Bailey	Director, National Adult Literacy Agency
Peter Baldwin	Assistant Secretary, Department of Education and Skills
Ray Bowe	IDA Ireland
John Burke	Department of Public Expenditure and Reform
Liz Carroll	Training and Development Manager, ISME
Ned Costello	Chief Executive, Irish Universities Association
Margaret Cox	Managing Director, I.C.E. Group
Bill Doherty	Executive Vice President, EMEA, Cook Medical
Tony Donohoe	Head of Education, Social and Innovation Policy, IBEC
Bryan Fields	Director, Curriculum Development / Programme Innovation, SOLAS
Joe Hogan	Founder, Chief Technology Officer & VP Openet Labs & IP Management
Declan Hughes	Assistant Secretary, Department of Jobs, Enterprise and Innovation
Colm Mac Fhionnlaoich	Manager CMD and Client Skills, Enterprise Ireland
Deirdre McDonnell	Principal Officer, Department of Education and Skills
Frank Mulvihill	Former President of the Institute of Guidance Counsellors
Brendan Murphy	President, Cork Institute of Technology
Alan Nuzum	CEO, Skillnets
Peter Rigney	Industrial Officer, ICTU
Mary-Liz Trant	Higher Education Authority



Appendix E3: Recent Publications by the Expert Group on Future Skills Needs, 2012 - 2015

Report	Publication Date
Addressing the Demand for Skills in the Freight Transport, Distribution and Logistics Sector in Ireland 2015 - 2020	February 2015
Guidance for Higher Education Providers on Current and Future Skills Needs of Enterprise: Springboard 2015	February 2015
Regional Labour Markets Bulletin 2014	September 2014
Monitoring Ireland's Skills Supply: Trends in Education and Training Outputs 2014	August 2014
National Skills Bulletin 2014	July 2014
Vacancy Overview 2013	May 2014
Assessing the Demand for Big Data and Analytics Skills, 2013 - 2020	May 2014
The Expert Group on Future Skills Needs Statement of Activity 2013	March 2014
Regional Labour Markets Bulletin 2013	March 2014
Guidance for Higher Education Providers on Current and Future Skills Needs of Enterprise: Springboard 2014	February 2014
Addressing Future Demand for High-Level ICT Skills	November 2013
Monitoring Ireland's Skills Supply: Trends in Education and Training Outputs 2013	July 2013
National Skills Bulletin 2013	July 2013
Future Skills Requirements of the Manufacturing Sector to 2020	April 2013
The Expert Group on Future Skills Needs Statement of Activity 2012	April 2013
Guidance for Higher Education Providers on Current and Future Skills Needs of Enterprise: Springboard 2013	February 2013
Vacancy Overview 2012	February 2013
Regional Labour Markets Bulletin 2012	January 2013
Monitoring Ireland's Skills Supply: Trends in Education and Training Outputs 2012	July 2012
National Skills Bulletin 2012	July 2012
Key Skills for Enterprise to Trade Internationally	June 2012
EGFSN Statement of Activity 2011	April 2012
Vacancy Overview 2011	February 2012
Guidance for Higher Education Providers on Current and Future Skills Needs of Enterprise (<i>Forfás report based on EGFSN identified future skills needs</i>)	February 2012
Addressing High-Level ICT Skills Recruitment Needs: Research Findings	January 2012



Notes

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