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**A Measurement of Third Level Marine Education
& Training in Ireland**

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Introduction

This report provides an aggregate estimated value of Marine Education and Training in Ireland, in relation to the size of its ocean economy. The research estimates that the overall value of Marine Education and Training is €11.5m, which represents 0.4% of the total turnover of Ireland's Ocean Economy. According to the latest SEMRU estimates¹, the overall turnover of Ireland's ocean economy in 2012 was €4.2 billion, of which €1.3 billion was direct gross value added (GVA). This represents approximately 0.7% of national GDP. In 2012, Ireland's ocean economy employed approximately 17,425 people (FTE).

For the purpose of this report, the definition of the marine or ocean economy is in line with that used in previously published Ireland's Ocean Economy reports by SEMRU², where *the ocean economy is defined as any economic activity that directly or indirectly uses the sea as an input or produces an output for use in a sea-specific activity*. In order to be consistent with the methodology used in Ireland's ocean economy reports, the value of marine education reflects the total income generated by the Higher Education Institutes (HEIs) through marine-related education. Meanwhile, marine training is defined as any marine related course that does not result in a NFQ level 7, 8, 9 or 10³. Again, the methodology used to measure marine training is in line with that in Ireland's ocean economy reports, to reflect the total income generated through marine-related training.

There are limited data available on the value of marine education and training in Ireland. The value of Ireland's ocean economy does not currently include marine education and training. There are only a few countries⁴ that incorporate marine education and/or training in the valuation of their ocean economies, but the methodology for measurement is not comparable across countries⁵. In Ireland, there have been increasing discussions regarding the general definition of Ireland's ocean economy and the extent to which the value of marine education and training should be included in its overall valuation. This report contributes to fill in that gap by providing an aggregate economic value for marine education and training in Ireland for the 2014-2015 period.

Policy Context

The importance of the sector has been highlighted in Harnessing Our Ocean Wealth (HOOW) – An Integrated Marine Plan for Ireland (2012)⁶, where actions are set out to maintain and build capacity to meet the needs of the marine sector (Action 27), and also to establish Ireland as an international

¹ Vega, A., Hynes, S. and O'Toole, E. (2015). Ireland's Ocean Economy, Reference Year 2012, SEMRU Report Series; Vega, A., Corless, R. and Hynes, S. (2013). Ireland's Ocean Economy, Reference Year 2010, SEMRU Report Series

² Vega, A., Hynes, S. and O'Toole, E. (2015). Ireland's Ocean Economy, Reference Year 2012, SEMRU Report Series; Vega, A., Corless, R. and Hynes, S. (2013). Ireland's Ocean Economy, Reference Year 2010, SEMRU Report Series

³ As these are accounted for under marine education NFQ 7-9 and marine research NFQ 10

⁴ China, South Korea, Canada and the UK, among others.

⁵ Examples include: Zhao, R., Hynes, S. & Shun He, G. (2014). Defining and quantifying China's ocean economy, *Marine Policy*, 43: 164–173; Pinfold, G. (2009). Economic Impact of Marine Related Activities in Canada, Statistical and Economic Analysis Series (SEAS), Canada. Available to download at: <http://www.dfo-mpo.gc.ca/ea-ae/cat1/no1-1/no1-1-eng.pdf>; Park, K.S., & Kildow, J.T. (2014). Rebuilding the Classification System of the Ocean Economy, *Journal of Ocean and Coastal*, December 2014.; Pugh, D. (2008). Socio-economic indicators of marine-related activities in the UK economy. Available to download at: http://www.thecrownestate.co.uk/media/5774/socio_economic_uk_marine.pdf

⁶ Harnessing Our Ocean Wealth – An Integrated Marine Plan for Ireland (2012). Available to download at: <http://www.ouroceanwealth.ie/sites/default/files/sites/default/files/Harnessing%20Our%20Ocean%20Wealth%20Report.pdf>

marine training destination (Action 28). Subsequent progress reports on the implementation of HOOW have highlighted the role of the National Maritime College of Ireland (NMCI) and Bord Iascaigh Mhara (BIM) in continuing to provide training courses, as well as the Strategic Marine Alliance for Research and Training (SMART), which delivers a number of high-quality, offshore educational programmes⁷.

In 2013, the Development Task Force (DTF) was set up by the Minister of Agriculture, Food and the Marine and the Inter-Departmental Marine Coordination Group (MCG) with participants across a range of organisations, encompassing public, private and the NGO sectors. The task force presents an integrated range of eight transformative actions required to reach the HOOW targets. Among those recommendations, the task force suggests that the so-called ‘marinisation’ of existing economic sectors also takes place in the skills and education domain. In this context, the task force highlighted the need for a skills development agenda for the marine sector in response to the Action Plan for Jobs (2014) and in the context of reaching the growth scenarios and targets outlined in HOOW.

In this regard and as an action under HOOW and the Government Action Plan for Jobs 2014, the Expert Group on Future Skills Needs undertook a study to identify future skills needs and labour market supply and demand trends in the marine area⁸. The aim was to ensure that the right skills base will be available to meet the needs of enterprises in developing the marine economy to 2020, with the focus on those sectors of the marine economy identified by HOOW as key sectors that contribute to the Irish marine economy. The sectors with the greatest skills demand are maritime transport, shipbuilding and services, marine tourism and seafood. The latter has an ageing workforce for which measures will need to be put in place to attract younger workers. There is a need for a consistent supply of suitably trained staff, and at the same time a need to retain and upskill those currently working in the sector. As staff progress through their careers, there is a requirement for training in additional skills for both operations and management roles. In order to fill the skills gap, more emphasis on marine education and training is needed to meet future skills shortages in the sector. Industry and education providers must collaborate to ensure that the future skills need is met.

Blue Growth⁹, the European Commission's long term strategy to further harness the potential of Europe's oceans, seas and coasts, for sustainable growth in the marine and maritime sectors, also recognises the need to invest in highly qualified and skilled professionals to meet future labour requirements in the EU ocean economy. The Blue Growth Strategy highlights that the shortage of a skilled workforce is one of the main obstacles to the further development of the blue economy¹⁰.

⁷ Review of Progress 2014, Harnessing our Ocean Wealth – An Integrated Marine Plan for Ireland. Available to download at: <http://www.ouroceanwealth.ie/sites/default/files/sites/default/files/news/Final%20HOOW%20Progress%20Report%202014.pdf>

⁸ EGFSN 2015. A Study of the Current and Future Skills Requirements of the Marine/Maritime Economy to 2020

⁹ European Commission 2012. Blue Growth, Opportunities for marine and maritime sustainable growth, available at http://ec.europa.eu/maritimeaffairs/documentation/publications/documents/blue-growth_en.pdf

¹⁰ European Commission 2012. Blue Growth, Opportunities for marine and maritime sustainable growth, available at http://ec.europa.eu/maritimeaffairs/documentation/publications/documents/blue-growth_en.pdf; European Commission 2012. Declaration of the European Ministers responsible for the Integrated Maritime Policy and the European Commission, on a Marine and Maritime Agenda for growth and jobs the “Limassol Declaration”, available at http://ec.europa.eu/maritimeaffairs/policy/documents/limassol_en.pdf; European Commission 2013. LeaderSHIP 2020: The Sea, new opportunities for the future report, available at http://ec.europa.eu/growth/sectors/maritime/shipbuilding/ec-support/index_en.htm; European Wind Energy Technology Platform 2013. Workers wanted: The EU wind energy sector skills gap available at http://www.ewea.org/fileadmin/files/library/publications/reports/Workers_Wanted_TPwind.pdf

The Limassol Declaration, which is adopted by European Union Member States in 2012, is an agreement on a marine agenda and growth for jobs. Under this agreement, all Member States should 'Enhance marine and maritime careers and their attractiveness by bridging the gap between education, science and industry, ensuring relevant training, and promoting a safety culture and appropriate'.

There are numerous international conventions and agreements enforced by national authorities with regard to maritime safety and training, and in many cases these must be reflected in national legislation. The effect of these measures has been to improve safety at sea. In recent years, the International Maritime Organisation (IMO) has sought to regulate in terms of crew welfare and training. With the introduction of new legislation and conventions, there is a growing drive to maintain high training standards. Non-compliance with the international regime has become increasingly less viable as the repercussions can be severe¹¹.

The key priority in the maritime sector is to ensure that all countries meet and maintain compliance with international conventions, including the international convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). In June 2010 in Manila, the STCW was amended again (original 1978, complete overhaul in 1995 and in 2010 major revision since 1995), and came into force on January 1st 2012, with a five year transition period. All seafarers are required to meet the STCW 2010 standards by 1st January 2017, and must be in possession of a valid STCW certificate covering their functions performed on-board. Before this, sea service was accepted for progression instead of training. With these, amongst other changes in the regulatory environment, there is a greater needs for marine training courses¹².

Methodology

Marine education is provided primarily through the third level education system in Ireland. While there is evidence to suggest that there is some degree of interest in marine education at primary and secondary levels, the majority is provided by universities and institutes of technology in Ireland. In contrast, marine training is mainly provided through a range of marine related courses and modules across vocational or continuous professional development programmes and sector-specific training.

This report provides an aggregate value of marine education and marine training in Ireland (2014-2015 period). In order to be consistent with the methodology used in Ireland's ocean economy reports, the value of marine education reflects the total income generated by the Higher Education Institutes (HEIs) through marine-related education. The various third-level courses were classified by (1) fully marine, (2) partially marine and (3) has an element of marine/marine related. The Higher Education Authority (HEA) provided data on student numbers per course. The cost of the course per student was then applied (EU and Non EU), giving a total value for marine related courses.

For the purpose of this research, marine training is defined as any marine related course that does not result in a NFQ level 7, 8, 9 or 10¹³. Again, the methodology used is in line with that in Ireland's ocean

¹¹ IMDO, 2007. Strategic Review of Irish Maritime Transport Sector

¹² International Transport Workers Federation (ITF), (2012). STCW a Guide for Seafarers. Available at: <https://www.scribd.com/doc/93993260/Stcw-a-Guide-for-Seafarers>

¹³ As these are accounted for under marine education NFQ 7-9 and marine research NFQ 10

economy reports, to reflect the total income generated through marine-related training. Training operators in Ireland (both State and private) were surveyed and provided information on training costs and number of students per year. Data under marine training is in most cases commercially sensitive. To ensure confidentiality of company data, the report provides an aggregate value for marine training, taking into account the total turnover generated from the surveyed sources.

Marine Education

Ireland's third level education institutions offer a range of marine and marine-related undergraduate and postgraduate courses. There were approximately 42 - 44 marine related courses provided in the 2012 – 2015 period¹⁴. The courses can be classified as:

- 23% fully marine
- 9% partially marine (two or more marine modules)
- 68% marine element (one marine module)
- 24 undergraduate courses
- 20 postgraduate courses

The number of students taking marine related courses has increased from 2008/09¹⁵ to the peak in 2012/13 by 71.8%. Figure 1 shows the number of students taking a third-level marine related courses in the 2008-2015 period. Figure 2 shows the number of students taking a third-level marine related courses by type of course for the 2012-2015 period. The overall number of students taking fully-marine course has increased in this period from 446 in the 2012/13 academic year to 554 in the 2014/15 academic year.

¹⁴ Depending on the year as some courses are not offered every year, and some courses are replaced by an updated course/not continued depending on demand.

¹⁵ Data was collected by SEMRU as part of the INTERREG Marnet project. For more information on the Marnet project, please see www.marnetproject.eu

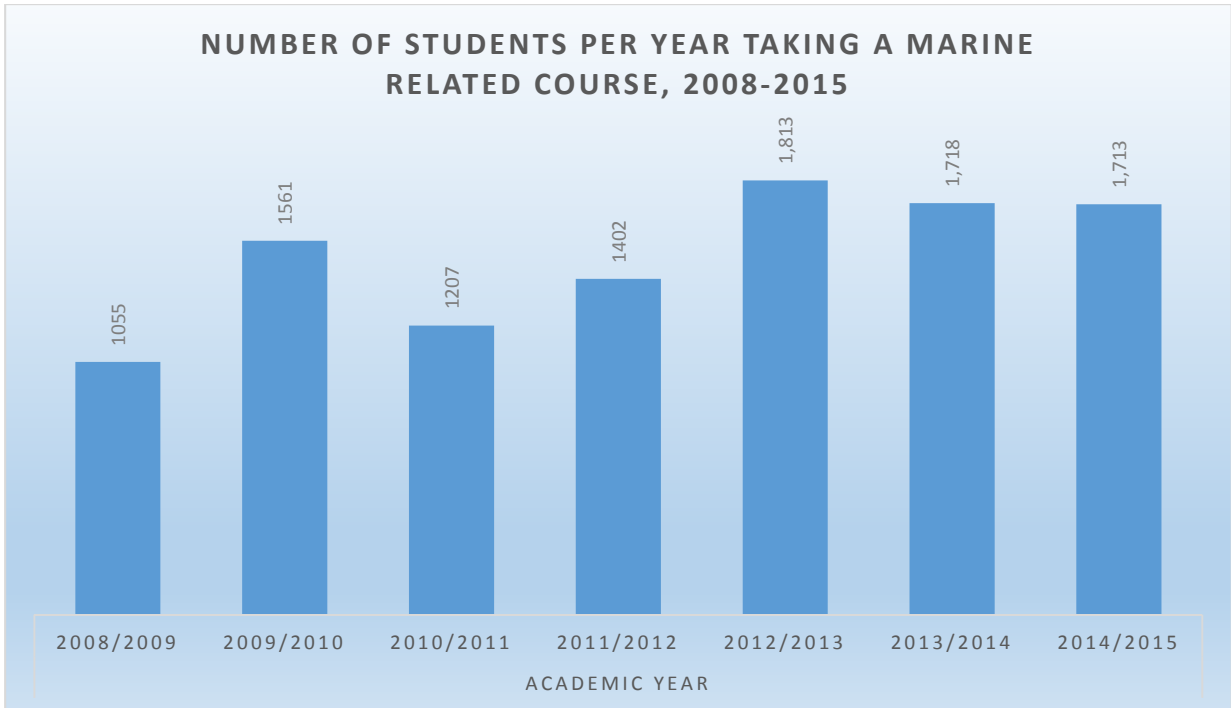


Figure 1: Number of Students per academic year taking a marine related course in third level education. Data Source: Higher Education Authority (HEA), 2016.

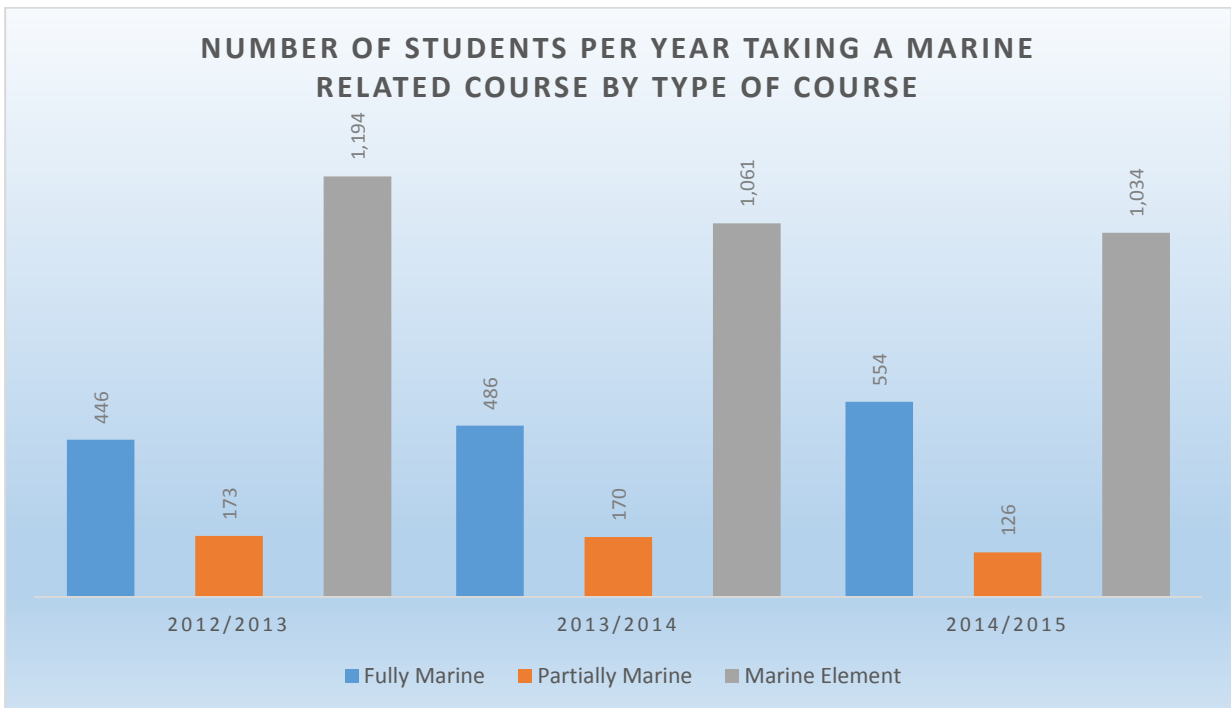


Figure 2: Number of Students per academic year taking a marine related course by type of course. Data Source: Higher Education Authority (HEA), 2016.

Figure 3 shows the number of undergraduate and postgraduate students taking a third-level marine related course in the 2012-2015 period. The overall number of undergraduate students has decreased

by 13.4% in the 2012-2015 period, while the postgraduate numbers have increased significantly by 62.5% in the same period.

Figure 4 shows the number of undergraduate and postgraduate students taking a third-level marine related course by type of course in the 2012-2015 period. The number of undergraduate students taking fully marine courses has increased steadily, with an average 8% increase in student numbers per academic year. The number of postgraduate students taking a fully marine course has also increased, primarily in the latest period of analysis (academic year 2014/15). The number of those taking postgraduate courses with a marine element (one marine module) has also increased by an average of 25% per academic year since 2012. The outlook for postgraduate student numbers continuing to increase in the coming years is positive, as there are three additional marine postgraduate courses enrolling for the next academic year 2016/17.

Ireland is a popular choice with international students and researchers from across the globe. Since the publication of Ireland’s international education strategy in 2010, international student numbers have risen to 6% of overall student numbers in the higher education sector¹⁶. It remains in Ireland’s interests to continue to attract a growing cohort of talented international students from priority markets to study in Ireland, although there is high competition from other countries, for example UK, Canada, Australia and New Zealand who are all investing significant amounts in promoting their countries to international students¹⁷.

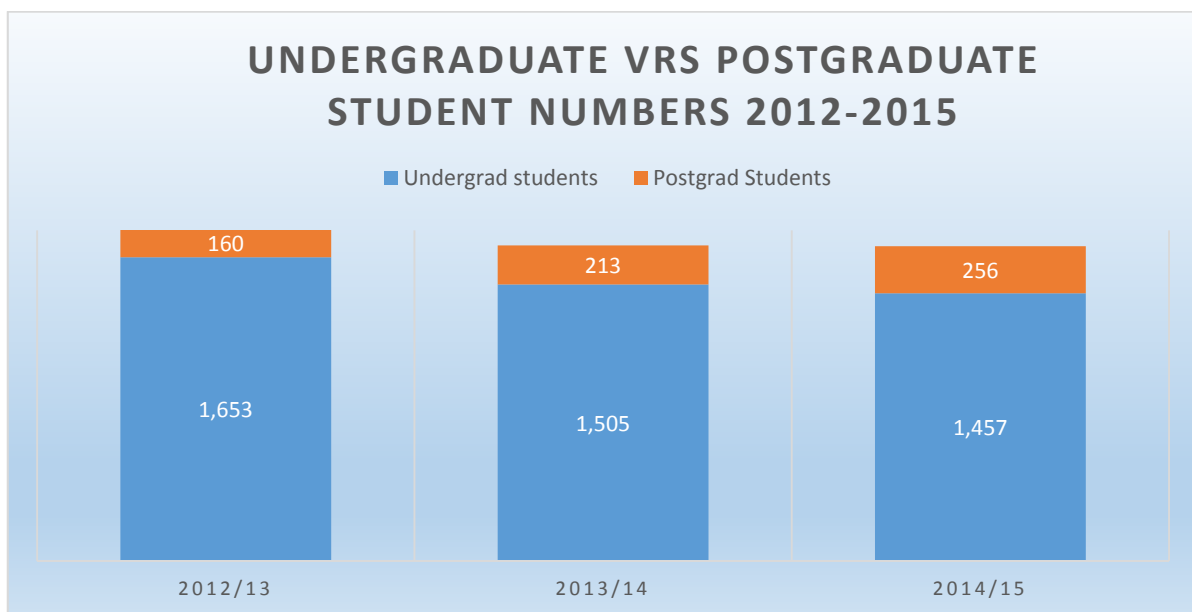


Figure 3: Number of undergraduate and postgraduate students taking a third-level marine related course, 2012-2015. Data Source: Higher Education Authority (HEA), 2016.

¹⁶ Development Task Force (2015). Our Ocean Wealth Development Task Force – Report to the Inter-Departmental Marine Coordination Group. Available to download at: <http://www.ouroceanwealth.ie/sites/default/files/sites/default/files/news/Final%20Our%20Ocean%20Wealth%20Development%20Task%20Force%20Report.pdf>

¹⁷ Development Task Force (2015). Our Ocean Wealth Development Task Force - Inputs to the DTF Report. Available to download at: <http://www.ouroceanwealth.ie/sites/default/files/sites/default/files/Documents/Final%20DTF%20Consolidated%20Input%20Material.pdf>

The number of students taking marine related courses by origin and type of course are outlined in Figures 5 and 6:

- 6.8% of overall students in marine related courses are international (includes both EU and non EU students – excludes national students). The EU students pay the same fees as national students.
- 4.6% of overall students in marine related courses are non EU, and account for almost 13.3% of the total fees from the marine related courses.

The overall number of EU students increased by 56.5% in the 2012-2015 period. Non-EU students peaked in 2013/14 at 82 students. Regarding the type of course, the number of EU students taking fully marine courses has increased by an average of 63% per academic year in the 2012-2015 period. Among non-EU students, the largest increase has taken place among those enrolling in courses with a marine element (60% increase per year as an average in the same period).

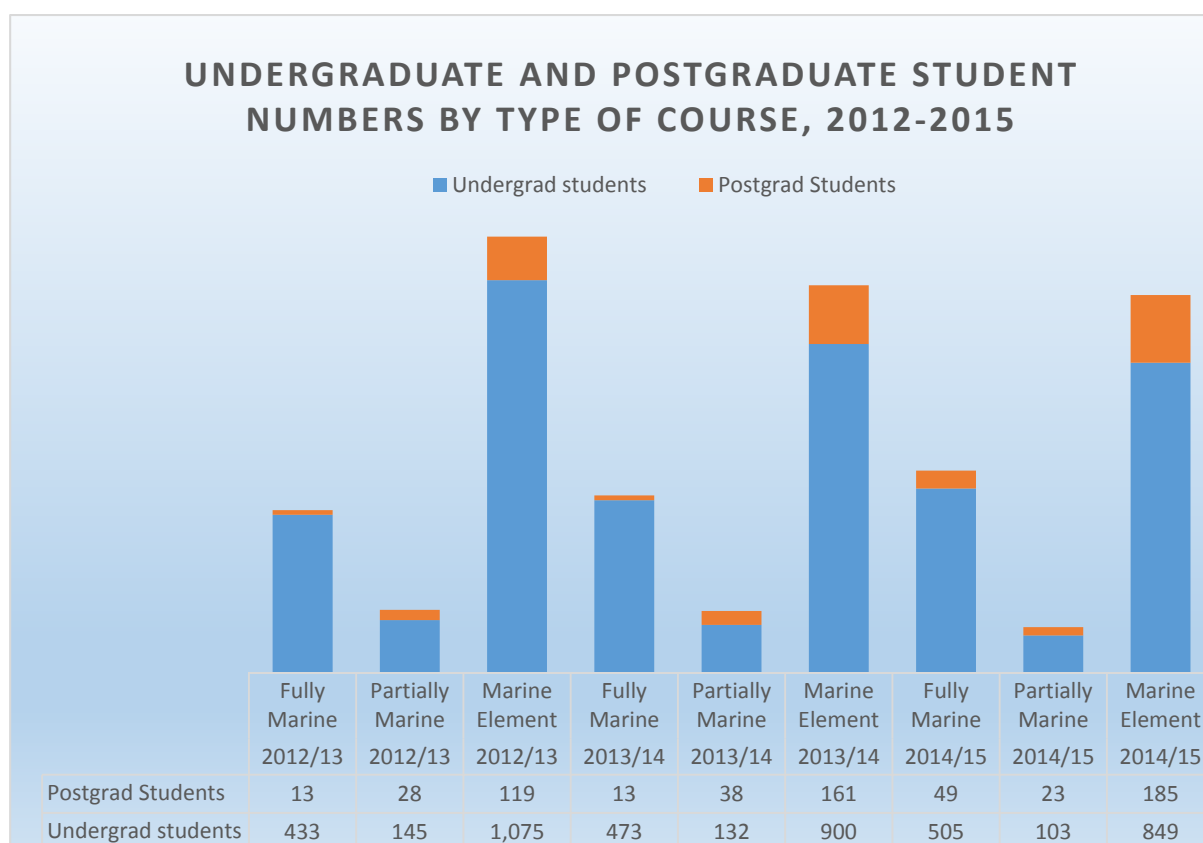


Figure 4: Number of undergraduate and postgraduate students taking a third-level marine related course by type of course, 2012-2015. Data Source: Higher Education Authority (HEA), 2016.

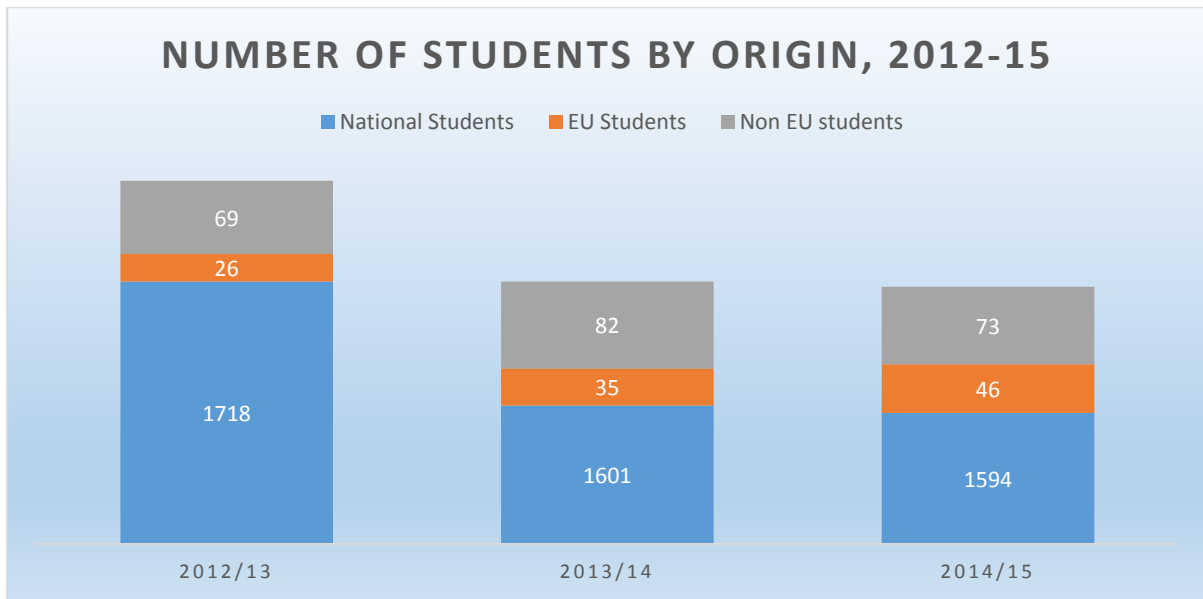


Figure 5: Number of students taking a marine related course in third level education by origin, 2012-15. Data Source: Higher Education Authority (HEA), 2016.

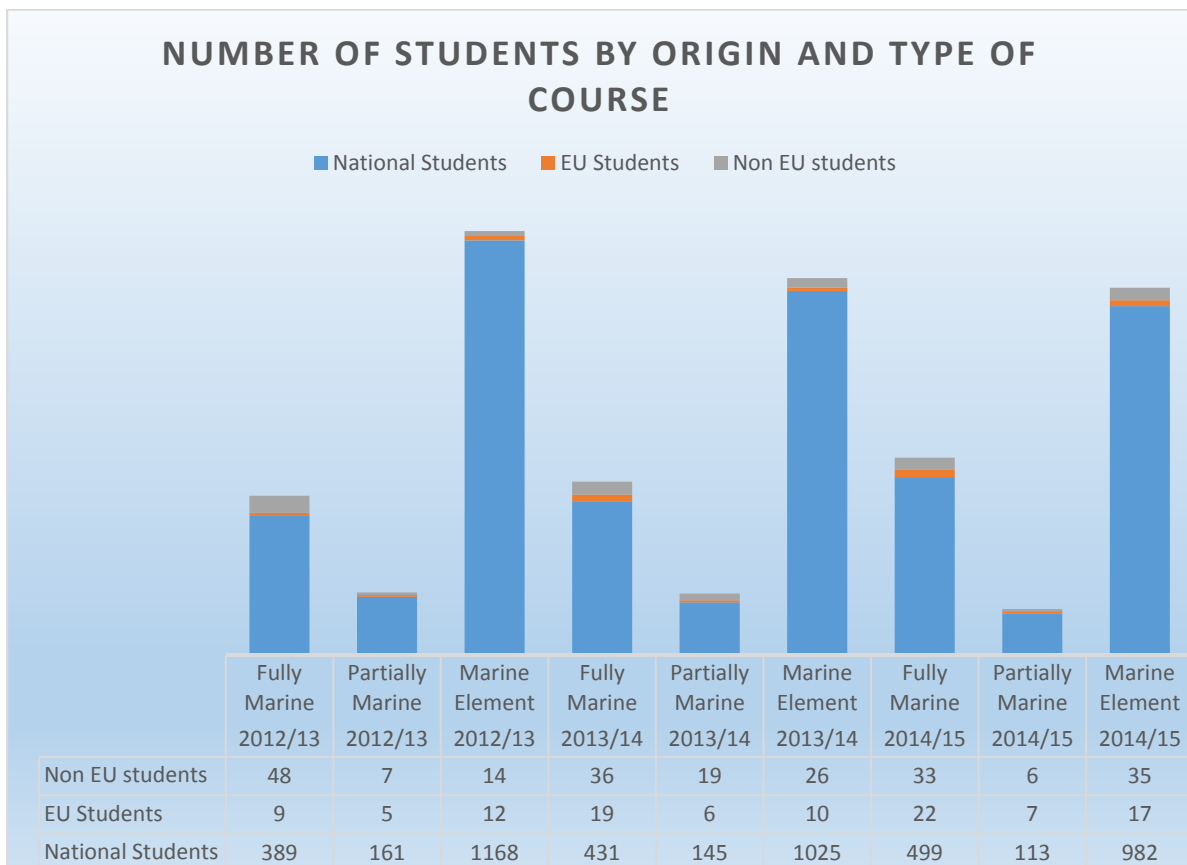


Figure 6: Number of students taking a marine related course in third level education by origin and type of course, 2012-15. Data Source: Higher Education Authority (HEA), 2016.

Measuring the Value of Third Level Marine Education

Table 1 shows the overall value of marine related third level education in the 2012-2015 period. In the academic years 2012/13, 2013/14 and 2014/15, marine education had a turnover of over €5m per year. Due to data gaps, this figure is likely to be an underestimate of the total turnover in marine education, as it does not include information on inputs, or indirect values.

Marine Related Fees	2012/2013	2013/2014	2014/2015
Undergraduate marine related fees	€4,900,000	€4,900,000	€4,500,000
Postgraduate marine related fees	€483,000	€610,000	€739,000
Total Fees	€5,383,000	€5,510,000	€5,239,000

Table 1: Income generated in marine related third level education, 2012-2015

In terms of employment, no data is available at a course level. According to the HEA for the academic year 2014/15, there were 17,326 core staff across all HEA institutions¹⁸. Using the methodology previously outlined, an estimate of 150 Full Time Equivalents (FTE) are employed in the provision of marine related third level education courses.

Marine Training

Marine training is defined as any marine related course that does not result in a NFQ level 7-10. Ireland provides a broad range of marine related courses across vocational and continuous professional development areas and sector-specific training e.g. seafood, merchant (seafarer) and ocean energy. These are provided by both the State and private operators. There are numerous international conventions and agreements enforced by national authorities with regard to maritime safety and training. With the introduction of new legislation and conventions, there is a growing drive to maintain high training standards¹⁹. Recent changes in the regulatory environment have increased the need for marine training courses²⁰.

Private Marine Training Providers

Information from private companies providing marine training courses was gathered via on-line and telephone survey. Maritime Safety applies to all sea-going vessels from merchant ships to passenger ferries, fishing trawlers and leisure craft. The Marine Survey Office (MSO) of the Department of

¹⁸ HEA, 2016. HEA Statistics Overview. Available at: <http://www.hea.ie/en/statistics/overview>

¹⁹ IMDO, 2007. Strategic Review of Irish Maritime Transport Sector

²⁰ International Transport Workers Federation (ITF), (2012). STCW a Guide for Seafarers. Available at: <https://www.scribd.com/doc/93993260/Stcw-a-Guide-for-Seafarers>

Transport, Tourism and Sport (DTTAS) in Ireland is responsible for the certifications of seafarers' competencies²¹. Private small and medium sized enterprises (SMEs) provide the training courses across Ireland. A total of 14 companies were included in the survey, including the National Maritime College Ireland Services (NMCI Services) and the Irish Sailing Association (ISA), with a response rate of over 70%. Based on the survey data, turnover from these courses decreased by 3% in the 2014 – 2015 period. The employment remained unchanged in the same period, while the number of students decreased by 6%.

In order to comply with data confidentiality issues regarding private sector training providers, aggregate data results in the following: turnover for the private marine training operators was €5.6m and accounted for training of approximately 13,000 students in 2015. The measurable employment is 82 full time equivalents (FTEs), although this is an underestimate as it does not include the employment in the companies providing the Irish Sailing Association certs (see Figures 7 to 9 below). Figure 7 shows the number of students taking training courses with private training providers in the 2014-2015 period; Figure 8 presents the overall turnover and Figure 9 shows the level of employment (FTE) in the same period.

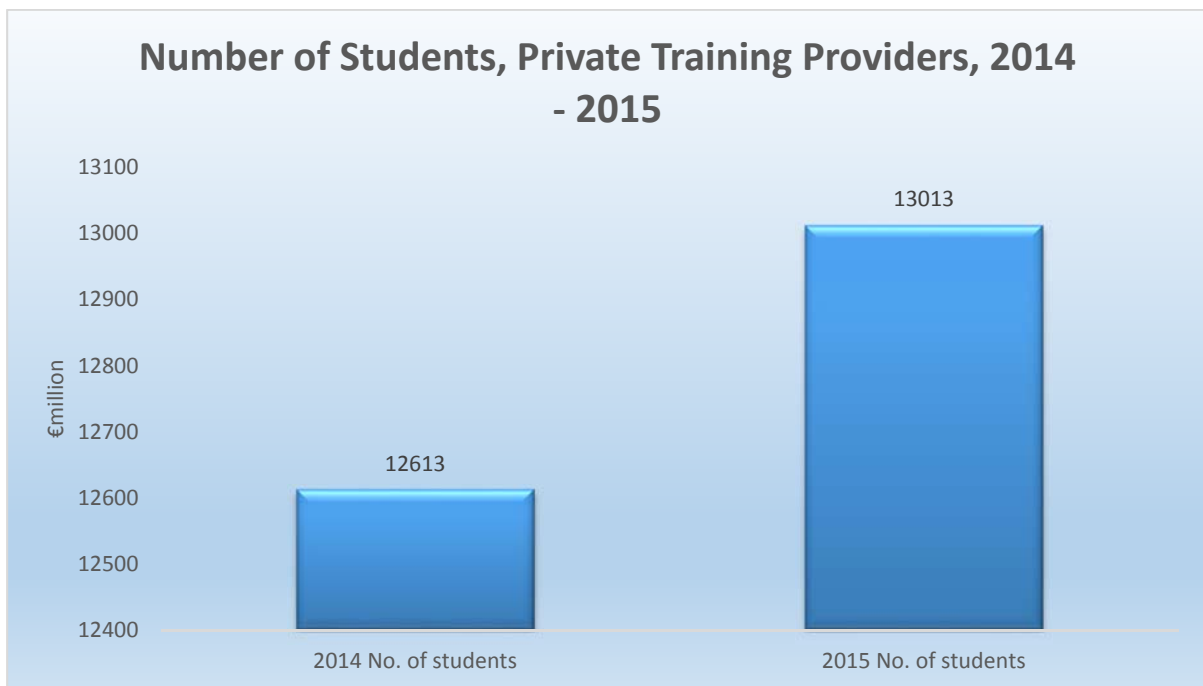


Figure 7: Number of students taking courses with private training providers, 2014 – 2015

²¹ EGFSN 2015. A Study of the Current and Future Skills Requirements of the Marine/Maritime Economy to 2020

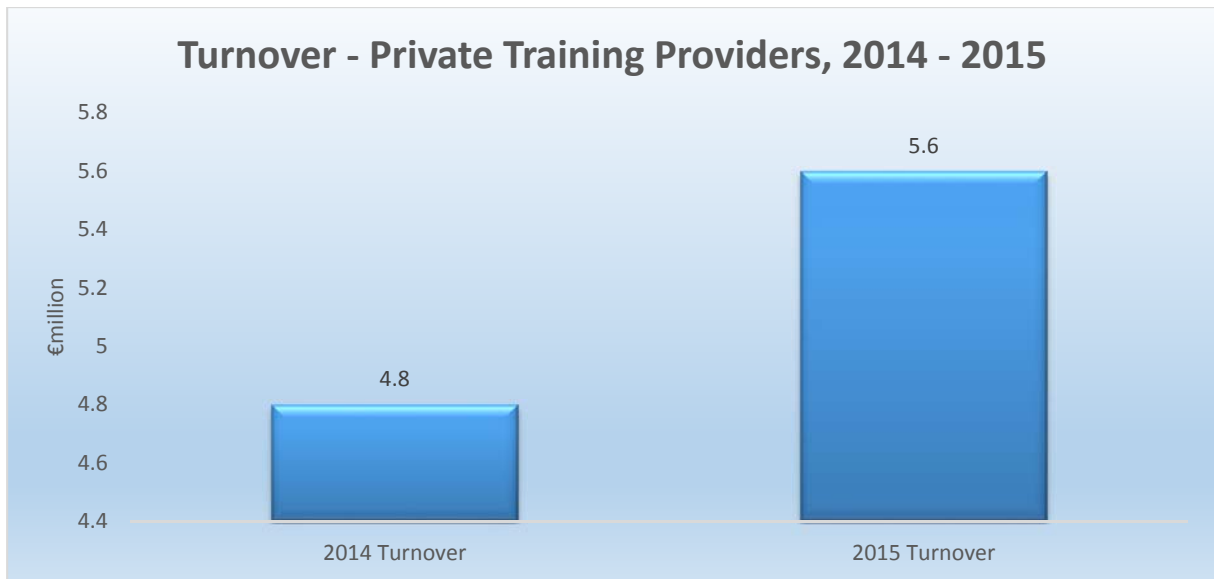


Figure 8: Turnover by private training providers , 2014 – 2015

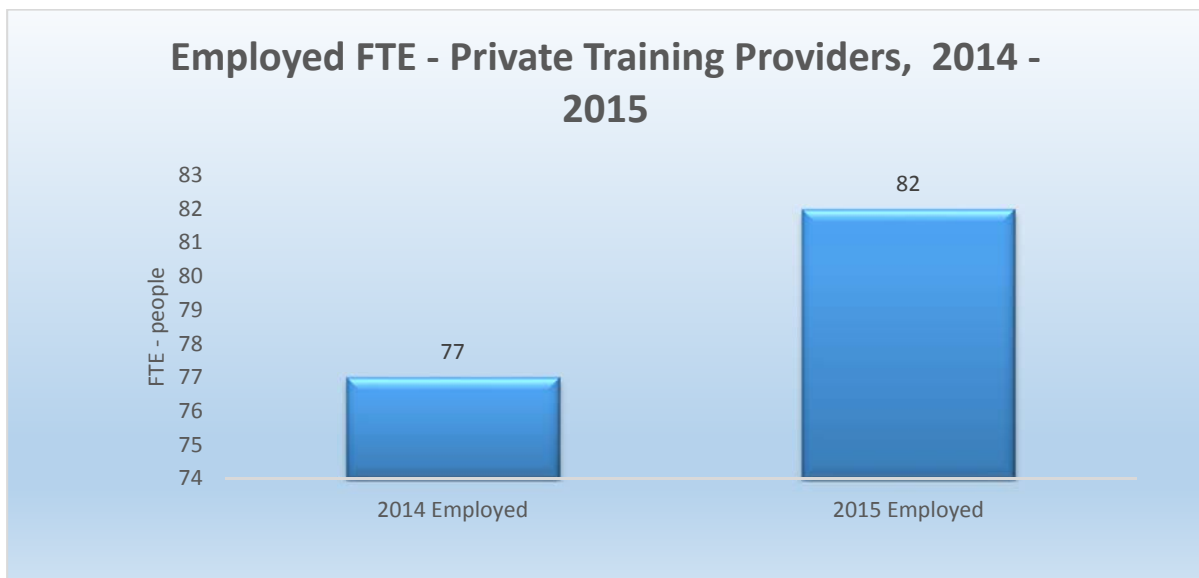


Figure 9: Employment by private training providers , 2014 - 2015

Public Marine Training Providers

Public organisations included in this category include Bord Iascaigh Mhara (BIM) and the Strategic Marine Alliance for Research and Training (SMART). BIM is the national agency with responsibility for training in the seafood sector. BIM’s courses cover a variety of disciplines including: Fishing – Skipper and Crew; Aquaculture; Processors and Retailers and Sea Safety training. BIM’s recent Strategy 2013 - 2017²² sets a target of 7,000 individuals to be trained by 2017. SMART is a cluster of Higher Education Institutions (HEIs) and the Marine Institute, led by GMIT. The consortium was established in 2011 to

²² Bord Iascaigh Mhara (BIM). (2013). Capturing Ireland’s Share of the Global Seafood Opportunity. BIM Strategy 2013 - 2017

develop and deliver practical offshore training on-board the national research vessels for students of marine science, technology and engineering with the aim of increasing national capacity in research and enterprise.

For BIM, turnover from marine training has increased by 22% over the period 2012-2015, with a peak increase in 2014. This number of students has risen by 64% in the same period. The main increase in numbers of students over the period 2012 – 2015 is due to a focus on fishing vessel safety training. This arose from recommendations coming from the Working Group on Safety, Training and Employment in the Irish Fishing Industry, which was established by the Minister for Agriculture, Food and the Marine in July 2013. In response to this, BIM introduced an Enhanced Safety Training & Equipment Scheme which offered refresher safety training and the option for the vessel owner to obtain, with grant-in-aid, a Personal Flotation Device (PFD) with an integrated Personal Locator Beacon (PLB).

In 2015 SMART delivered 24 national and international sea-going training courses to 285 third-level students of marine science technology and engineering, 176 of which were postgraduate students and early stage researchers, over 90 days at sea (with 51 days of international programmes).

Figure 10 shows the overall turnover by public marine training providers in the 2014-2015 period. Overall, turnover from training decreased by 3%. There was a peak in BIM students in 2014, hence the minor decrease in 2015 overall turnover for this group of training providers.

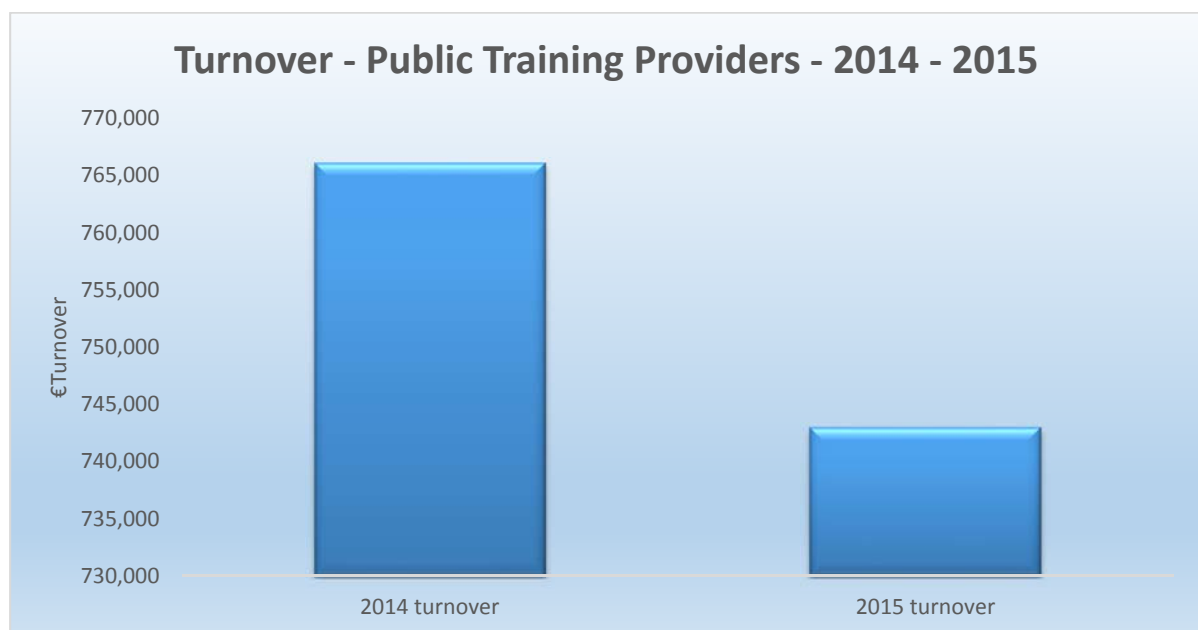


Figure 10: Turnover, public training providers, 2014 - 2015

Measuring the Value of Marine Training

As a sector, marine training is made up of public and private course providers, resulting in commercially sensitive data. To overcome this, the data has been aggregated to provide an overall figure of turnover for marine training in Ireland. The total turnover for the 2014-2015 period is of

approximately €6.3m (see Figure 11), which represents an increase of 14% from 2014. This figure is likely to be an underestimate of the turnover generated due to data gaps, as it does not include information on inputs, or indirect values.

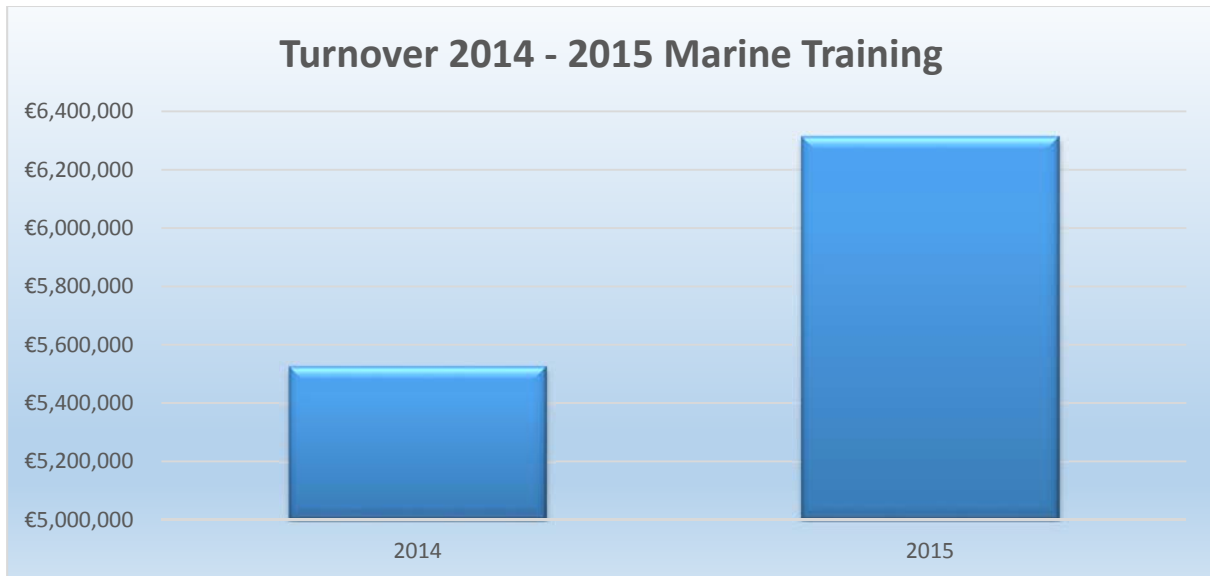


Figure 11: Total value of Marine Training, 2014, 2015

The Future of Marine Education and Training in Ireland

A number of reports²³ have addressed the importance of including marine-related subjects in the curricula at all levels of education. The need for the promotion of career prospects related to the marine sector has been regarded as a key priority in developing the sector. Our Ocean Wealth Development Task Force report²⁴ outlined the need for the development of marine ‘modules’ in the primary and secondary education sectors. At a primary education level, schools are being offered to take part in a national programme called The Explorers Education Programme. At a secondary level, new initiatives are being piloted, and in tertiary education, there is evidence of growth in interest in marine related courses, with three new postgraduate courses enrolling this year (2016/2017 academic year). There is an increasing demand for graduate level entrants to the sector to ensure a future provision of managers, planners and associated office workers with adequate skills. Graduates need to be equipped with broad based skills such as e-skills, languages, flexibility and cultural awareness which will help to underpin Ireland’s further integration into the global economy²⁵.

Ireland is also a popular choice with international students and researchers. Since the publication of Ireland’s international education strategy in 2010, attracting international student to Ireland has become a priority. From a marine perspective, HOOW identifies the opportunity to establish Ireland

²³ HOOW, 2012; DTF, 2015; EGFSN, 2015

²⁴ Development Task Force (2015). Our Ocean Wealth Development Task Force – Report to the Inter-Departmental Marine Coordination Group. Available to download at: <http://www.ouroceanwealth.ie/sites/default/files/sites/default/files/news/Final%20Our%20Ocean%20Wealth%20Development%20Task%20Force%20Report.pdf>

²⁵ Development Task Force (2015). Our Ocean Wealth Development Task Force - Inputs to the DTF Report. Available to download at: <http://www.ouroceanwealth.ie/sites/default/files/sites/default/files/Documents/Final%20DTF%20Consolidated%20Input%20Material.pdf>

as an international marine education and training destination. Therefore, it remains in Ireland's interests to continue to attract a growing cohort of talented marine international students from priority markets to study in Ireland.

The outlook for marine training is positive as trend data shows an increase in both turnover and students over the period 2014 – 2015. However, a possible challenging environment in the short-term could impact on certain providers, as they provide a significant amount of courses to the offshore oil and gas sector. In the last year, the price of oil had decreased considerably, at its lowest \$28 per barrel in January 2016. Although the global outlook for the sector is positive, it remains volatile with stock builds slowing down and supply decreasing²⁶. This could have related short-term effects on the offshore marine training industry in Ireland. Additionally, in Ireland and the UK, Shell is implanting reductions in its workforce after a slump in oil prices, which saw Shell report its lowest annual income in more than a decade in 2015. As a result, the company plans to cut their workforce by 20% in 2016²⁷.

Conclusion

The importance of marine education and training is highlighted in Harnessing Our Ocean Wealth (HOOW) – an Integrated Marine Plan for Ireland (2012). Enabling Education and Training in the marine economy is identified as a key action (Actions 27 and 28) to support the development of the marine industry and the provision of efficient public services in Ireland. Further recommendations from the DTF to achieve HOOW vision and targets emphasize the need to 'marinise' occupations and qualifications that are not essentially specific to the marine sector, but for which this upskilling or 'marinising' process would bring further opportunities for the marine sector.

This report contributes to measuring the size of this increasingly important sector by providing a profile of the value of marine education and training in Ireland for the 2014-2015 period. Overall, estimates suggest that the total turnover generated in marine related third level education in the 2014-2015 is €5.2 million. Marine training, as defined in this research, had a turnover of €6.3m in the same period. This gives an aggregate total turnover of €11.5m for the marine education and training sector in Ireland in the 2014-2015 period. To allow for comparability and consistency with other sectoral measures of the marine economy, the methodology used in this report is in line with the approach taken to measure Ireland's ocean economy²⁸. Previous studies²⁹ have addressed marine education and training data collection in the past. This report builds on the experience from these previous data collection exercises to provide a value for marine education and training in Ireland.

The current definition of Ireland's ocean economy³⁰ - *any economic activity that directly or indirectly uses the sea as an input, as well as any economic activity that produces an input for use in a sea-specific activity* - does not currently include activities such as those related to marine education. While marine training is essentially a service provided to the marine sector, equivalent to marine

²⁶ International Energy Agency (IEA), 2016. Oil Market Report. Available to download at: <https://www.iea.org/oilmarketreport/omrpublic/>

²⁷ Irish Independent, Shell to implement cuts in UK and Ireland gas production unit, Published online 26th May 2016

²⁸ Vega, A., Hynes, S. and O'Toole, E. (2015). Ireland's Ocean Economy, Reference Year 2012, SEMRU Report Series; Vega, A., Corless, R. and Hynes, S. (2013). Ireland's Ocean Economy, Reference Year 2010, SEMRU Report Series

²⁹ www.marnetproject.eu; O'Connor, J., O'Leary, J. and Shields, Y., 'Ireland's Ocean Economy and Resources', Marine Institute, 2005

³⁰ Vega, A., Hynes, S. and O'Toole, E. (2015). Ireland's Ocean Economy, Reference Year 2012, SEMRU Report Series; Vega, A., Corless, R. and Hynes, S. (2013). Ireland's Ocean Economy, Reference Year 2010, SEMRU Report Series

commerce³¹, the cross-cutting nature of marine education implies that under our current definition, the value of marine education is not accounted as part of Ireland's ocean economy. This report contributes to fill in that gap by providing the economic value of marine education and training in Ireland for 2014-2015 period.

At the international level, there are a limited number of countries that include marine education and training as an element of the valuation of their ocean economies³². There is an on-going discussion regarding this matter. However, the lack of an internationally comparable measurement for marine education and training is a major limitation, mainly caused by data availability at the country level.

In the course of this research, a number of data gaps have been identified, in particular in the case of marine training. A further assessment is needed to determine a more comprehensive list of private training providers in Ireland. This report only includes private operators (surveyed companies – 14 in total) which provide either ISA or DTTAS accredited courses. There are operators providing courses accredited by other organisations such as Royal Yachting Association (RYA), Opito, Global Wind Organisation (GWO) and more. Some of these courses are captured within the public/private training provider data, but there are still some private training operators remaining that have not included in this report.

This research has provided a value for marine education and training in Ireland. There is potential for future research into the inputs from the sector to other marine industries (to generate an added value), indirect value to the wider economy including possible case studies, international comparisons on methodology and to analyse global trends. Difficulties lie in attaining marine specific data from the national accounts or national economic databases.

³¹ Marine or maritime finance, insurance and legal services

³² Examples include: Zhao, R., Hynes, S. & Shun He, G. (2014). Defining and quantifying China's ocean economy, *Marine Policy*, 43: 164–173; Pinfold, G. (2009). Economic Impact of Marine Related Activities in Canada, Statistical and Economic Analysis Series (SEAS), Canada. Available to download at: <http://www.dfo-mpo.gc.ca/ea-ae/cat1/no1-1/no1-1-eng.pdf>; Park, K.S., & Kildow, J.T. (2014). Rebuilding the Classification System of the Ocean Economy, *Journal of Ocean and Coastal*, December 2014.; Pugh, D. (2008). Socio-economic indicators of marine-related activities in the UK economy. Available to download at: http://www.thecrownestate.co.uk/media/5774/socio_economic_uk_marine.pdf

