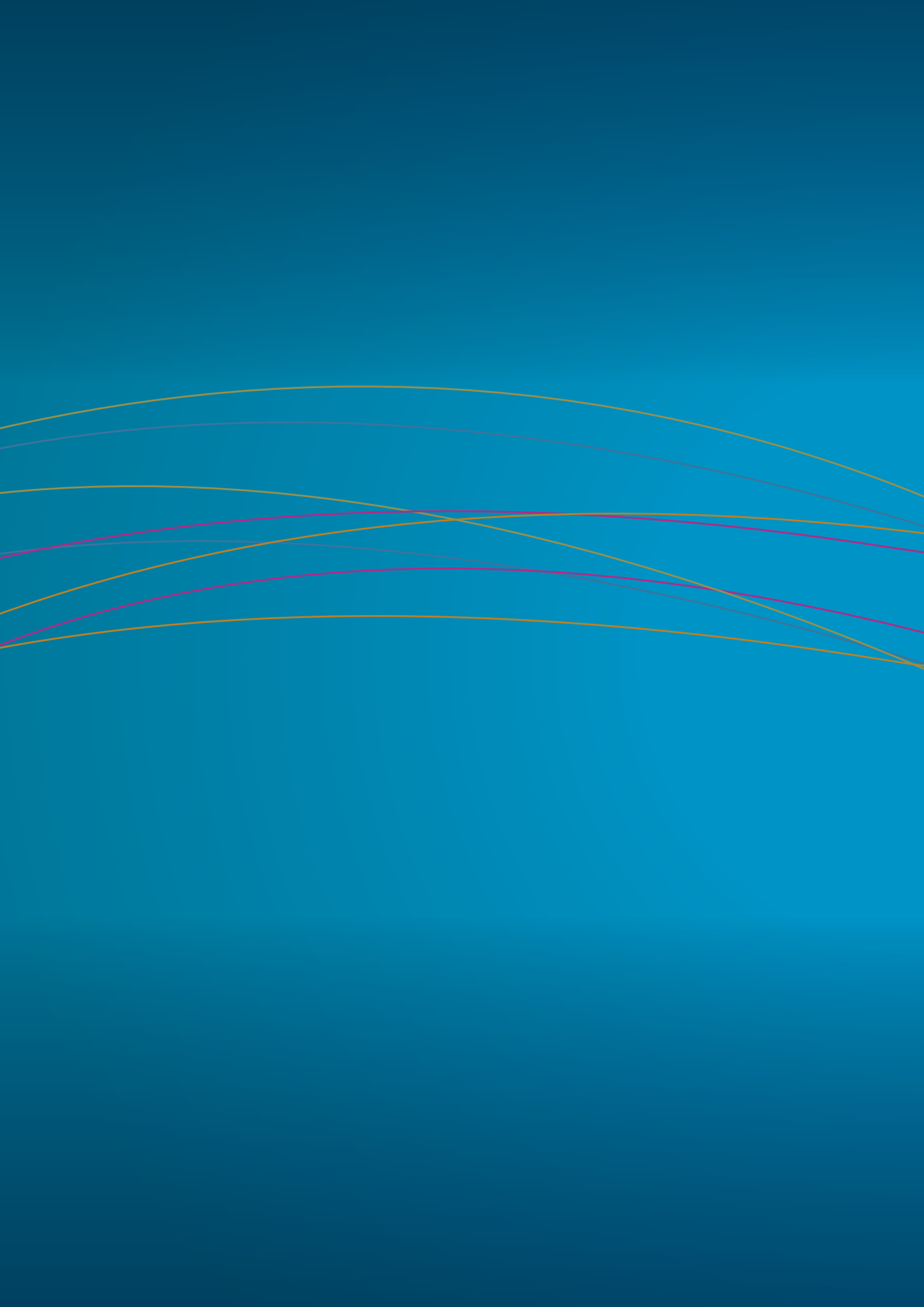
REVIEW OF PROGRESS 2014

HARNESSING OUR OCEAN WEALTH

AN INTEGRATED MARINE PLAN FOR IRELAND



Joint Statement

An Taoiseach and the Minister for Agriculture, Food and the Marine

We have great pleasure in publishing this second Progress Report on Ireland's Integrated Marine Plan *Harnessing Our Ocean Wealth*. It sets out the work done in 2014 to implement the actions outlined in the Plan and we thank all those involved for their contribution.

In 2014 key developments in the marine sector were:

- A new Naval Service vessel, LÉ Samuel Beckett, was commissioned.
- The Wild Atlantic Way was very successful in generating tourism in marine areas, supporting our rural coastal communities and raising awareness of Ireland's tourism potential internationally.
- The Science Foundation Ireland-funded Marine Renewable Energy Ireland (MaREI) Research Centre continues to focus on developing the scientific knowledge base required by industry to generate energy from wave, tidal and floating wind devices. This Centre has the potential to position Ireland at the forefront of the marine renewable energy research sector globally. MaREI researchers will be housed in the new state of the art Beaufort Building in Ringaskiddy, Co. Cork.
- Ireland's marine researchers secured €5.5m in the EU Horizon 2020 competitive funding in the areas of Blue Growth and Sustainable Food and Security.
- Over €4m has been invested in the Galway Bay Cable Project and sea station, an innovative project to establish a national shared marine research, test and demonstration platform to catalyse and facilitate the commercial development of cutting-edge marine renewable energy and marine ICT products and services. This investment will position Ireland to leverage additional opportunities through EU Horizon 2020 and European large-scale research infrastructures, both in renewable energy and ocean observation.
- The marine sector continued to recover and grow. A recent report from the Socio Economic Marine Research Unit (SEMRU) at NUI Galway provides a positive picture of Ireland's ocean economy with increased turnover and employment growth in the sector since 2010. In the period 2010 to 2012, Ireland's ocean economy grew by 9% and initial estimates up to 2014 are very positive.
- The development of Ireland's ocean economy will be supported by the development of a Marine Spatial Plan for Ireland (MSP) - a vital component in ensuring public participation and sustainable development and protection of Ireland's vast marine resources.
- A revised fiscal regime for oil and gas exploration in Ireland was announced.

2015 has seen and will see further Government measures to support the marine sector and encourage private-sector initiatives.

- A second naval ship, to be named LÉ James Joyce, is scheduled for delivery.
- The new €241m Seafood Development Programme will drive forward the development of our seafood sector, where the value of seafood exports has seen a 70% increase from 2009 to 2014 and where there are substantial opportunities for further development across the sector.
- Investment in coastal areas continues through investment in coastal infrastructure, with over €17m funding announced in 2015, through the harbours and coastal infrastructure development programme. Also the Government has committed €61m to the remediation of Haulbowline Island.
- A recent study by the Expert Group on Future Skills Needs (EGFSN), published under the Government Action Plan for Jobs 2014, says that an additional 10,000 jobs in the marine and marine-related areas could be created in the period to 2020.
- To ensure there is a supportive financial environment underpinning the marine sector and to this end, following a commitment in Budget 2015, the Minister for Finance has recently commissioned a review of the financial and taxation supports and opportunities available to the sector.
- Under the Common Fisheries Policy, a Discards Plan for Whitefish stocks in the waters around Ireland has been agreed by Member States following intensive negotiations chaired by Ireland. The Plan, which was developed in consultation with stakeholders, involves the phasing in of the discards ban over the 2016 to 2019 period. A national Discards Implementation Group, chaired by Dr. Noel Cawley, is helping to prepare the Irish fishing industry for the changes arising from the discards ban.

This Progress Report, plus the Report of the Development Task Force established in line with our commitment in HOOW, are being published to coincide with SeaFest 2015, on 10-11 July in Cork. This maritime festival showcases Ireland's abundant maritime resources and, as part of the festival this year, the annual Our Ocean Wealth Conference focuses on Ireland's ocean wealth and the enormous potential of our 'blue economy'.

The initiatives set out above for 2014 and 2015 show the Government's commitment to developing the marine sector and implementing our vision that Ireland's ocean wealth will be a key element of our economic recovery and sustainable growth. We call on the private sector to build on its own involvement in the marine and take advantage of the investment opportunities emerging in the sector.

Simon Coveney, T.D.,
Minister for Agriculture, Food and the Marine

Enda Kenny, T.D.,
Taoiseach

Image coutesy Port of Cork.

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1. INTRODUCTION

BACKGROUND

In 2012, the Inter-Departmental Marine Coordination Group (MCG), on behalf of the Government, published *Harnessing Our Ocean Wealth - An Integrated Marine Plan for Ireland* (HOOW).

HOOW sets out the Government's Vision, High-Level Goals, and Key 'Enabling' Actions to put in place the appropriate policy, governance and business climate to enable Ireland's marine potential to be realised. As part of the implementation of HOOW, the MCG publishes an Annual Progress Report which coincides with an Annual Ocean Wealth Conference. Further information on Ireland's integrated Marine Plan (HOOW) is available on www.ouroceanwealth.ie

OUR VISION

Our ocean wealth will be a key element of our economic recovery and sustainable growth, generating benefits for all our citizens, supported by coherent policy, planning and regulation, and managed in an integrated manner.

GOAL 1

THRIVING MARITIME ECONOMY

- Sustainable economic growth of our marine/ maritime sectors
- Increase the contribution to our national GDP
- Deliver a business-friendly yet robust governance, policy and planning framework

GOAL 2

HEALTHY ECOSYSTEMS

- Protect and conserve our rich marine biodiversity and ecosystems
- Manage our living and non-living resources in harmony with the ecosystem
- Implement and comply with environmental legislation

GOAL 3

ENGAGING WITH THE SEA

- Building on our maritime heritage, strengthen our maritime identity
- Increase our awareness of the value, opportunities and societal benefits
- Engagement and participation by all

ENABLERS

Harnessing Our Ocean Wealth – Enabling Our Sustainable Future

Governance	Clean – Green – Marine	Research, Knowledge, Technology & Innovation	Infrastructure
Maritime Safety, Security & Surveillance	Business Development, Marketing & Promotion	Capacity, Education, Training & Awareness	International & North/South Cooperation

Marine Coordination Group

In Ireland, responsibility for marine matters is spread across a number of Government Departments and State agencies. In recognition of the need for better co-ordination and the broad scope of the sector, the Inter-Departmental Marine Coordination Group (MCG) was established in 2009. The Group, chaired by the Minister for Agriculture, Food and the Marine and convened by the Department of the Taoiseach, meets on a monthly basis to bring together senior officials of Departments with an involvement in marine issues to drive forward the Government's marine strategy and coordinate issues that require cross-departmental action. The Attorney General's Office and the Marine Institute also participate in the Group.

The Group's major activities in 2014 were:

Our Ocean Wealth Conference

The *Our Ocean Wealth Conference* was the first annual review of the implementation of the *Harnessing Our Ocean Wealth* (HOOW) which was held on 18th June in Dublin Castle. The Conference focused on the promotion of growth and jobs in the marine sector and provided an opportunity for Government Departments and agencies in association with the marine community to review progress in implementing HOOW.

Development Task Force

The Minister established a Development Task Force (DTF) to report to the MCG on four specific actions in HOOW. These Actions address the areas of Business Development, Marketing & Promotion, Integrated Enterprise Strategy, Research, Knowledge, Technology & Innovation and International Education and Training. The MCG met with the Chairman and members of the DTF on a number of occasions to consider the findings of the

Task Force. The DTF was comprised of 24 members drawn from the industry, state and NGO sectors. Further details on the report of the DTF are provided in Section 2.

Expert Group and Future Skills Need (EGFSN) Study on the Marine

The MCG met with the secretariat for the Study to discuss its terms of reference and received frequent updates on the Study. The Study itself is discussed later in this Progress Report (Section 2).

Maritime Spatial Planning

The MCG established an Enablers Task Force to examine how marine spatial planning (MSP) should be developed and implemented in Ireland. Following consideration of the report by the MCG, the Taoiseach announced in June 2014 his intention that the Department of the Environment, Community and Local Government would play a leading role in the development of a maritime spatial planning framework for Ireland. In the period since the Report was presented, members of the MCG, particularly the Department of the Environment, Community and Local Government and the Marine Institute, have progressed the development of MSP in Ireland.

Maritime Affairs Attaché

The MCG has a Maritime Affairs Attaché based in Brussels who monitors maritime developments at the European Union level and represents Ireland at relevant meetings and initiatives. The Attaché provides updates on developments to the MCG at its monthly meeting.

In addition to the initiatives above, the Our Ocean Wealth website www.ouroceanwealth.ie has been redeveloped to strengthen communications with the public and stakeholders.

Second Annual Review of Progress

This second Annual Review of Progress focusses on the main activities undertaken by Government Departments and their State bodies in 2014, capturing the commitment to annually review progress in implementing *Harnessing Our Ocean Wealth* and provide feedback to stakeholders. The report also captures major deliverables for 2015.

This second Annual Review of Progress is an element of and coincides with SeaFest 2015 - Ireland's first national maritime festival taking place in Cork Harbour on the 9th and 10th of July. The second annual *Our Ocean Wealth Conference*, which is an important element of the Review of Progress, takes place this year on the 10th of July on the first day of SeaFest. Further details on SeaFest and associated events is provided below.

Our Ocean Wealth Conference 2015

The second *Our Ocean Wealth Conference* will focus on the commercial opportunities presented by Ireland's ocean wealth and the enormous potential of Ireland's 'blue economy'. The Conference aims to attract several hundred stakeholders including marine researchers, investors, entrepreneurs, maritime-related start-ups, businesses and organisations, from all over Ireland and from around the world, to hear from marine industry experts. The event also provides an opportunity to network with industry peers and develop opportunities for collaboration.

SeaFest 2015

SeaFest 2015, Ireland's first national maritime festival, is an initiative of HOOW and the MCG. SeaFest will showcase Ireland's abundant maritime resources; increasing awareness of Ireland's ocean wealth - a key Goal of HOOW. The events will bring together State bodies, marine business, educators, researchers, policy makers and the members of the general public at IMERC in Cork Harbour, the location of the National Maritime College of Ireland, UCC's Beaufort Building and home to the SFI Marine Renewable Energy Centre (MaREI). The festival will include industry exhibits, the best of Irish seafood and a family fun day.

As part of SeaFest 2015, Bord Bia and BIM are showcasing the best of Irish seafood. The showcase features seafood cookery demonstrations from celebrity TV chefs and demonstrations from expert fishmongers. BIM are presenting a large seafood display counter to showcase the huge variety of fish and shellfish species available in Ireland, with expert fishmongers available to advise members of the public on how to prepare and cook seafood meals at home. Visitors to the festival also have the opportunity to sample and purchase seafood products from 11 Irish Seafood Companies. The 'Seafood Experience' will bring visitors on a visual and sensory journey to explain how our seafood are caught and farmed, how sustainability is a key part of how our fishermen and fish farmers protect their stocks and how new innovative seafood end up on our supermarket shelves. 'Staying Safe at Sea' is another key theme of the 'Seafood Experience' and BIM's experienced training team will be on board the BIM mobile Coastal Training Unit organising regular demonstrations on how to prevent accidents at sea including how to wear your life-jacket correctly.

An investor's event is planned to take place in Cork on the 9th of July. The event, organised by the IDA and the Irish Maritime Development Office (IMDO).

A SmartOcean Networking Event is also planned. This Networking Event will take place in conjunction with a Canadian trade mission from Newfoundland and Labrador.

'Blue Growth' – Ireland's Ocean Economy

In developing *Harnessing Our Ocean Wealth*, the Government set ambitious targets for Ireland's ocean economy. There is an overarching target to double the value of our ocean wealth to 2.4% of GDP by 2030, exceeding the global average of 2% of GDP and moving towards the EU average of 3-5%. Furthermore, in light of market opportunities identified, the Government has set a 2020 target of exceeding €6.4bn in annual turnover, drawn from a diverse range of marine sectors. This would represent almost doubling the current turnover from these sectors.

An important element of measuring progress of *Harnessing Our Ocean Wealth* is the availability of the most up-to-date economic statistics on Ireland's ocean economy, comparable across years and other countries. Funded by the Marine Institute, NUI Galway's Socio-Economic Marine Research Unit (SEMRU) began the extensive task of data collection and analysis of Ireland's ocean economy in 2009. This resulted in the publication of a series of bi-annual ocean economy reports. Details on SEMRU's recently published report on Ireland's Ocean Economy is provided below.

Ireland's Ocean Economy 2014

The 3rd Report on Ireland's Ocean Economy, published by SEMRU, estimates that in 2014:

- the direct economic value of Ireland's ocean economy was €1.4 billion or approximately 0.8% of GDP;
- the sector had a turnover of €4.5 billion; and
- provided employment for approximately 18,480 Full Time Equivalents (FTEs).

The report, which provides trends across 13 marine sectors over the period 2010 – 2012 and estimates for 2014, represents a period of 'blue growth', a turnaround on the previous reporting period (2007-2010) that represented the period at the lowest point of the economic contraction with a significant decrease in activity.

Results are encouraging; the data shows that Ireland's ocean economy is performing on average better than the general economy:

- While growth in Irish GDP from 2010 to 2012 was approximately 4.75%, Ireland's ocean economy grew by 9% in the same period.
- Estimates suggest that GVA growth rates in Ireland's Ocean Economy for the 2012-2014 period are approximately 8%, which is again above the recently released growth trends from the CSO that shows an increase of 5% in Ireland's GDP for the same period.

	2010	2012	% Change 2010-2012	2014 (estimated)	% Change 2012-2014 (e)
GVA	€1.2 billion	€1.3 billion	9.2%	€1.4 billion	8.2%
%GDP	0.7% GDP	0.7% GDP	4.3%	0.8% GDP	3.1%
Turnover	€3.1 billion	€4.2 billion	33.1%	€4.5 billion	7.6%
Employment	16,614 FTEs	17,425 FTEs	4.9%	18,480 FTEs	6.1%

Source: SEMRU, Ireland's Ocean Economy Report (Published 2015).

This very positive picture of Ireland's ocean economy is reinforced by a recent study by the Expert Group on Future Skills Needs (EGFSN) which indicates that an additional 10,000 FTE jobs could be created in the period to 2020, which is in line with the targets set out in *Harnessing Our Ocean Wealth*. The EGFSN report, committed to in the Government Action Plan for Jobs 2014, analysed future skills needs and labour market supply and demand trends in the marine/maritime area in the context of *Harnessing Our Ocean Wealth*.

Further details on the status of and trends across Ireland's Ocean Economy are provided under Action 24. Details on the EGFSN Report are provided under Action 27.

2. SUMMARY OF KEY ACHIEVEMENTS ANNOUNCEMENTS IN 2014

Throughout 2014, Government Departments and other State bodies continued with the implementation of the actions outlined in *Harnessing Our Ocean Wealth*. This included a range of new initiatives and announcements, such as a review of tax and financial supports across a number of marine sectors, as well as a number of ongoing actions ranging from policy, legislation & regulation, environmental protection and conservation, business development and science, technology & innovation.

A summary of these key announcements and achievements during 2014 is provided below. Further details on progress across the eight enablers and over 30 actions outlined in *Harnessing Our Ocean Wealth* are provided in Section 3.

Figure 1: Minister Coveney at the opening of the first Our Ocean Wealth Conference in June 2014

First Our Ocean Wealth Conference – June 2014

The *Our Ocean Wealth Conference*, held in Dublin Castle on the 18th June 2014, was the first annual review of Ireland's Integrated Marine Plan - *Harnessing Our Ocean Wealth*. The Conference focused on the promotion of growth and jobs in the marine sector and provided an opportunity for Government Departments and agencies in association with the marine community to review progress in implementing HOOW. The Conference covered four main themes: The Global Opportunity for Irish Seafood; Research & Innovation and Emerging Sectors; Energy – Offshore Hydrocarbons and Where Land Meets the Sea – Opportunities and Challenges for Marine Tourism. The Conference discussed achievements to-date, sustainable growth and employment opportunities for the future and the actions required to drive progress.

The Conference proceedings were recorded and are available on www.ouroceanwealth.ie. The first Annual Review of Progress 2012/13, published to coincide with the Conference, is also available on the website.

Figure 2: Report of the Development Task Force

Development Task Force

Throughout 2014, the Development Task Force (DTF) continued to work on addressing the four focus areas tasked to them by the Marine Coordination Group (MCG), namely:

- Integrated Enterprise Strategy- Develop an integrated enterprise strategy to generate momentum in specific emerging market opportunities (*Harnessing Our Ocean Wealth Action* #1), chaired by Enterprise Ireland (EI).
- Business Development, Marketing & Promotion - Give a clear message to investors that Ireland is 'open for, and a good place to do, marine business' domestically and internationally (*Harnessing Our Ocean Wealth* Action #17), chaired by the IDA
- Research, Knowledge, Technology & Innovation - Support existing and new test-beds/facilities for demonstration and commercialisation purposes (*Harnessing Our Ocean Wealth Action* #25), chaired by Science Foundation Ireland (SFI)
- Education and Training - Establish Ireland as an international marine training destination, maximising the capacity and potential of existing marine training facilities/programmes (*Harnessing Our Ocean Wealth Action* #28), chaired by Commissioners of Irish Lights (CIL)

Ten plenary meetings of the Development Task Force (DTF) took place throughout 2014. Additional topic-specific meetings also took place throughout the year, including a workshop on *International Marine Education & Training* in September.

The DTF Report, submitted to the Minister for Agriculture, Food & the Marine and the MCG in early 2015, provides a framework to assist the development of the marine sector in accordance with *Harnessing Our Ocean Wealth*.

The Task Force identifies five thematic areas for action, as follows:

	**Food from the Sea** The development of new aquaculture technologies and innovations in production, supply chain and environmental management as well as the development of marine bio technologies and applications.
	**Energy from the Ocean** Realising Ireland's marine renewable energy potential, as well as enhancing offshore oil & gas exploration and production.
	**Tourism & Business in Marine & Coastal Areas** Providing employment to rural coastal communities by capitalising on and adding value to initiatives such as the Wild Atlantic Way, as well as other tourism related initiatives such as cruise ship tourism.
	**Enterprise & Industry** The development of new marine services in areas such as finance and training/education, together with new niche endeavours such as ocean racing yacht platform, ship design & repair and platform end-of-life services to the oil & gas industry.
	**Integrated Marine Capacity and Capability** Achieving an integrated view of the marine resource for security, environmental and development purposes, while developing new technologies and services.

Figure 3: Five Thematic Areas outlined in the Report of the Development Task Force.

The DTF Report outlines three specific interventions required to support and drive investment:

Intervention 1 – 'Marinising' Existing Enterprise Sectors

This will involve existing enterprise sectors, such as Energy, Clean/Green, Food, ICT, Finance and others, extending their businesses into a range of new marine-related markets e.g. ICT for the Sea, marine biotechnology and maritime commerce. This is built on Ireland's already recognised international competence and capacity across indigenous and Foreign Direct Investment (FDI) enterprises, which represent a significant national asset.

Intervention 2 – Strengthen Established Marine Industries

This requires interventions that are designed to strengthen established marine resource-based industries, adding value to their products and services. In effect these supports focus on moving what are often regarded as 'traditional' marine industries, such as aquaculture, fisheries and tourism, further up the value chain, while sustaining existing activity in a competitive global environment.

Intervention 3 – Developing Nascent Marine Industries

These are industries which utilise untapped natural resources or existing resources in new ways. It also includes developing new services exploiting investments in infrastructure, skills and knowledge. Examples include marine renewable energy and marine manufacturing, engineering and other offshore supply chain services.

The Report illustrates the interdependencies, and opportunities, that exist across the sectors; showing how interventions which achieve impact in one thematic area represent opportunities to maximise investment returns in another (Figure above). Identifying these synergies, and bringing investors, promoters and relevant state entities together, is seen as key to realising Ireland's ocean wealth.

The DTF Report sets out what it describes as a cohesive and integrated set of recommendations, which taken together represent the cultural, structural and economic changes required to achieve Ireland's ocean wealth targets in the medium (2020) and long-term (2030).

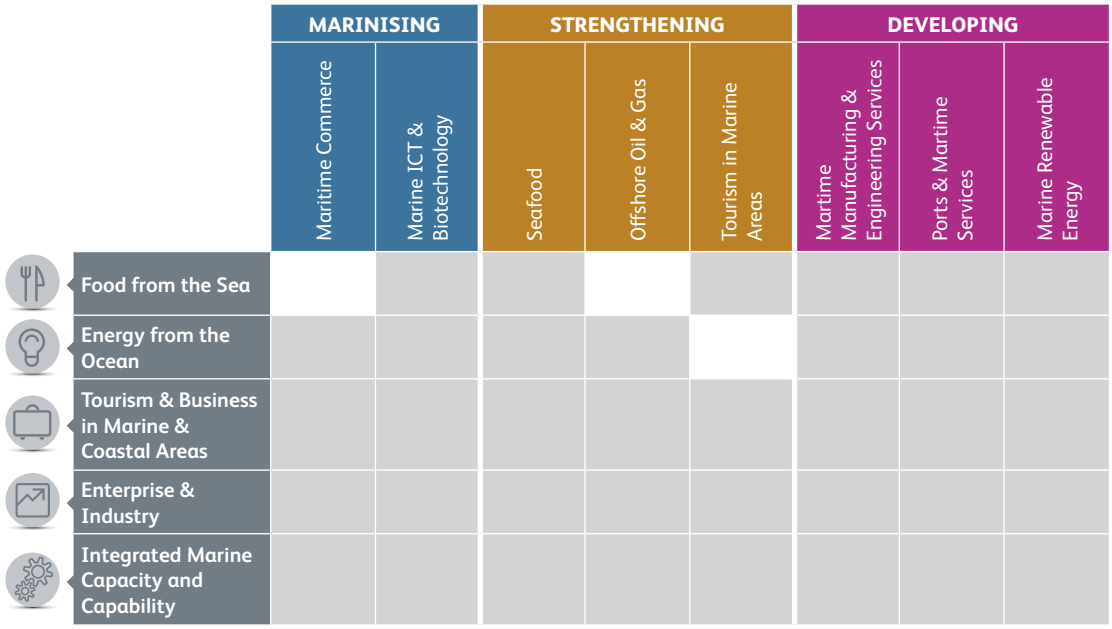


Figure 4: Interdependencies and opportunities across marine sectors (Source: DTF Report)

The DTF Report was presented to the Minister for Agriculture, Food & the Marine and the Marine Coordination Group in 2015 for consideration.

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

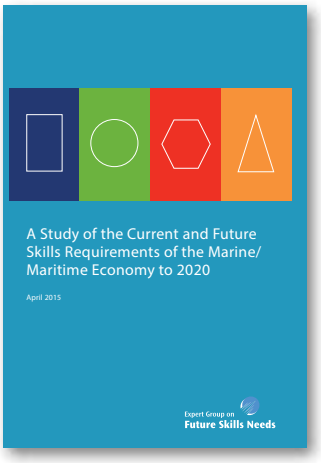


Figure 5. EGFSN Report on the Current and Future Skills Requirements of the Marine/ Maritime Economy to 2020

Under the Government Action Plan for Jobs 2014, the Expert Group on Future Skills Needs (EGFSN) undertook a study to identify future skills needs and labour market supply and demand trends in the marine area. 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 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 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 report estimates that Ireland has the potential to create up to 16,900 job vacancies in the period to 2020 arising through expansion and replacement demand with around 10,000 of these being new jobs owing to growth of the marine economy.

The EGFSN published its report in 2015. Further details on the recommendations are available on under Action 27 below. The full report, *A Study of the Current and Future Skills Requirements of the Marine/Maritime Economy to 2020*, and its recommendations are available on www.skillsireland.ie.

Review of Tax and Financial Supports for the Marine

In October 2014, the Minister for Finance, Mr Michael Noonan, T.D., announced in his Budget Statement of his intention to review the financial and taxation supports and opportunities available to the marine sector. The Minister for Finance pointed out that the Government has prioritised the marine as a key area for further growth under *Harnessing Our Ocean Wealth* with a target of doubling the value of Ireland's blue economy by 2030 and that he is keen to ensure there is a supportive financial environment underpinning this target. The exercise will not cover offshore petroleum exploration and production as a revised taxation regime for this area has already been determined.

The Department of Finance has established a working group made up of the Departments of Finance; Agriculture, Food & the Marine; Transport, Tourism & Sport; Jobs, Enterprise & Innovation and the Revenue Commissioners to oversee the Review and liaise with other Government Departments and agencies including with the Marine Coordination Group (MCG). The Group is currently undertaking a review of the costs and

benefits associated with tax measures impacting on the marine sector in Ireland, specifically with regard to seafood, ports and shipping. The Review is due to be completed in 2015.

New Naval Service ship L.É. Samuel Beckett

In May 2014, An Taoiseach Mr. Enda Kenny, T.D. attended the naming and commissioning ceremonies for the new Naval Service ship, LÉ Samuel Beckett beside the Samuel Beckett Bridge in Dublin city centre.

A second ship, LÉ James Joyce, is due for delivery in 2015 and an order has been placed for a third offshore patrol vessel for the Naval Service. A vessel replacement strategy for the Naval Service has been in progress since 2007 to provide for the replacement of existing vessels some of which are over 30 years old.

Figure 6: LÉ Samuel Beckett

IMERC - Ireland's Maritime and Energy Cluster

IMERC is Ireland's maritime and energy cluster delivering jobs through innovation and growth. The IMERC vision is to promote Ireland as a world renowned research, education, training and development location that unlocks Ireland's maritime and energy potential. IMERC and its partners, Cork Institute of Technology, the Irish Naval Service and University College Cork, aim to deliver upwards of 3,000 new jobs in the maritime and energy sector by 2025.

In 2014/2015, IMERC and its partners progressed the IMERC Masterplan with site development works undertaken to facilitate the development of four fully serviced sites to promote, with the IDA, as future space for maritime and energy FDI. IMERC and its partners also worked with stakeholders, including the Department of Defence and Cork County Council, to contribute to the development of the Haulbowline Masterplan.

In 2014, 80 jobs were announced by Resolute Marine, Exceedence and Marine Resolve, companies located in Cork Harbour. Both Exceedence and Marine Resolve are also engaged in the SFI MaREI project (see below). The Entrepreneur Ship, a 30 desk facility where companies within the IMERC cluster are provided with the space they need to conduct business, build networks, innovate and create, now hosts eight start-ups.

Further information on IMERC including details of other initiatives such as the IMERC Innovation Awards, held during IMERC Innovation Week in October 2014, are provided under Action 20.

SFI Marine Renewable Energy Ireland (MaREI) Research Centre

The SFI-funded Marine Renewable Energy Ireland (MaREI) Research Centre continues to attract and conduct world-leading research on all aspects of marine renewable energy from marine robotics and materials to endure ocean conditions, to offshore wind, wave and marine energy devices as well as technologies to deliver power to the grid for electricity supply at home and abroad. Over the six years of its SFI funding award, the MaREI Research Centre will train 52 PhD students and 18 postdoctoral students. MaREI will directly support 82 highly skilled jobs, with 45 industry market leaders in energy, marine technology, software and hardware providers investing over €10 million in an overall budget of €29 million.

MaREI's main achievements for 2014 have been the signing of 42 industry contracts, the increased targeting of SFI Spokes awards, and the hiring of researchers at both PhD and Postdoctoral levels to carry out the research. MaREI researchers have also achieved significant non-exchequer funding awards in 2014, with a cumulative total of €4.3 million in European Union Horizon 2020 and Framework Programme 7 funding having been won since the Centre was founded. MaREI will be hosted in UCC's Beaufort Building in Ringaskiddy (see below), in collaboration with University of Limerick, Cork Institute of Technology, NUI Galway, NUI Maynooth and University College Dublin.

UCC Beaufort Building

Work commenced in December 2013 on the construction of the Beaufort Building, UCC's flagship presence on the IMERC campus adjacent to the National Maritime College of Ireland in Ringaskiddy. The 4,500m^2 Beaufort Building, will host the headquarters of the Marine Renewable Energy Ireland (MaREI) Research Centre (see above). The €15.2 million Beaufort Building will also house the LIR National Ocean Test Facility for the development of marine renewable energy, including an Ocean Wave Basin, Survival Flume, Coastal/Flow Flume and Teaching Flume. These tanks are expected to be operational and fully commissioned in the latter part of 2015.

The Building will host a broad spectrum of researchers, with profiles ranging from civil, electrical and mechanical engineering to all aspects of oceanography and marine governance, conduct applied and fundamental research.

The Beaufort Building is due to be officially launched by the Taoiseach in July 2015, as part of SeaFest 2015.

Figure 7: Left: UCC Beaufort Building Under Construction, Ringaskiddy, Co. Cork.
Figure 8: Right: LIR National Ocean Test Facility Ocean Wave Basin, UCC Beaufort Building

Irish Participation in EU Horizon 2020 Blue Growth & related calls

Irish marine researchers continue to perform well in European Union competitive research funding. In December 2014, it was announced that Ireland's marine researchers won €5.5m in EU Horizon 2020 competitive funding in the areas of *Blue Growth* and *Sustainable Food and Security.*

This represents 4.7% of total EU budget awards and 5% of *Blue Growth*, a much higher success rate than the 'normal' ratio for Ireland in competitive European funding calls. This shows that marine science continues to be carried out to the highest standards across third-level, State and SME sectors. In addition to the success rate in participation in retained projects, the quality of proposals in which Irish partners participated has been positive. Irish partners participated in 24 proposals, of which eight (33%) were retained; while a further 10 (42%) were placed on the reserve list.

Of the awards made, Irish research organisations will coordinate three significant projects. One of these projects will see the Marine Institute play a pivotal role in the implementation of the *Galway Statement on Atlantic Ocean Cooperation*. The *Galway Statement* was signed at the Marine Institute in May 2013 by representatives of the European Union, the Government of Canada and the Government of the United States of America; showing a strong commitment from the partners to align ocean observation efforts to improve ocean health and stewardship and promote the sustainable management of shared marine resources. Further details on Horizon 2020 and the *Galway Statement* are provided under Actions 37 and 39.

Offshore Renewable Energy Development Plan

In February 2014, the Department of Communications, Energy & Natural Resources published Ireland's Offshore Renewable Energy Development Plan (OREDP) and accompanying Strategic Environmental Assessment (SEA). In 2014, an Offshore Renewable Energy Steering Group (ORESG) was established to oversee the implementation of the OREDP. The ORESG, which draws on the support of relevant Government Departments and agencies, oversees the implementation of the OREDP via three work streams: Environment, Infrastructure, and Job Creation.

In 2014/2015 €8.1m funding was provided by the Department of Communication, Energy and Natural Resources to the Sustainable Energy Authority of Ireland's Ocean Energy Programme. Further details are provided under Action 1a.

Launch of 2015 Atlantic Margin Licensing Round

The 2015 A*tlantic Margin Oil and Gas Exploration Licensing Round* was formally launched by the Department of Communications, Energy & Natural Resources at the *Our Ocean Wealth Conference* in June 2014. The Round opens for licensing all of Ireland's major Atlantic basins: Porcupine, Goban Spur, Slyne, Erris, Donegal and Rockall. The form of petroleum authorisation on offer is two year Licensing Options; although the actual duration of each Licensing Option offered will be determined by the quality of the agreed work programme.

Where holders of Licensing Options wish to move forward to seek an exploration licence, the licence on offer will be a Frontier Exploration Licence of fifteen years duration, with a first phase of three years, and three subsequent phases of four years. The Round will close in September 2015 allowing sufficient time for exploration companies to devote resources and commence work on evaluating data, so that they can make strong applications.

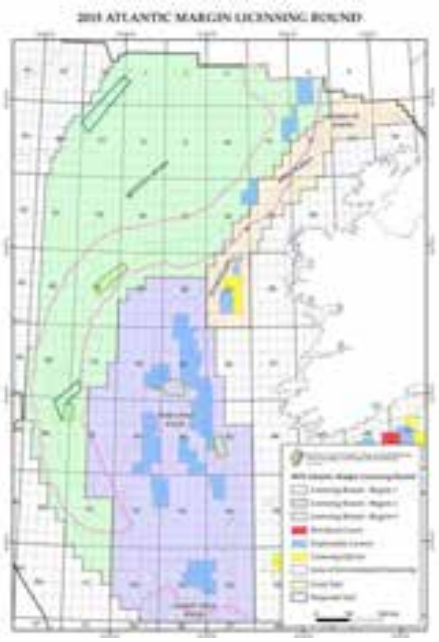


Figure 9: 2015 Atlantic Margin Licensing Round

ObSERVE Programme – protecting & managing sensitive habitats

The ongoing discovery, development and use of major hydrocarbon resources that occur in Ireland's seas have the potential to be very significant economic drivers for Ireland as well as delivering energy security. These seas are also home to a diverse array of species such as whales, dolphins, porpoises and seabirds many of which are protected under national and international legislation and agreements. Major marine industrial activities such as seismic exploration and the development and exploitation of hydrocarbon resources in Ireland's geological basins require careful management and regulation to ensure consistency with Ireland's environmental obligations.

Strategically, the importance for Irish Authorities to lead the delivery of a comprehensive knowledge base in relation to protected marine species in Irish waters was recognised. It was agreed such knowledge would facilitate efficient and robust decision-making and a corresponding positive investment environment particularly for the petroleum industry and in terms of attracting inward investment. In response, a collaborative research programme was developed during 2014 and early 2015 worth over €2.5 million funded by the Department of Communications, Energy and Natural Resources and in collaboration with the Department of Arts, Heritage and the Gaeltacht entitled *Management of Sensitive Habitats for Protected Vertebrates in Irish Waters* (ObSERVE).

This multiannual programme is intended to improve knowledge with respect to protected seabird and mammal occurrence (both spatial and temporal), habitat and population ecology along the Atlantic Shelf and Celtic Sea to inform and underpin appropriate management and regulatory actions. The ObSERVE Programme will see extensive aerial surveys of Ireland's offshore region being undertaken by a team of researchers led by University College Cork. In parallel, a research team being led by Galway Mayo Institute of Technology will deploy special underwater acoustic devices from the *RV Celtic Voyager* in Ireland's offshore canyon systems to explore their importance for whales and dolphins.

Wild Atlantic Way - where land and sea collide

Launched in February 2014, the *Wild Atlantic Way* (WAW) is one of the biggest tourism initiatives ever undertaken in Ireland. This relatively new and innovative project, developed by Fáilte Ireland, is designed to highlight Ireland's unique geographical positioning along the Atlantic Ocean.

The intention is to use the theme to allow tourists understand how the sea shaped Ireland's coastal communities, lifestyle and traditions and, naturally, to entice even more visitors to Ireland's shores and, importantly, to give them a reason to stay longer and spend more. This project has been in development since early 2012 and involves the creation of a themed and integrated touring route along the Atlantic coast of Ireland from Donegal to West Cork.

A five year Operational Programme for the WAW was progressed in 2014. The Programme is being based on extensive visitor/consumer insights, consultation with communities and businesses along the route, and a review of relevant national, county and local plans and strategies. The Programme will fit with and contribute towards the achievement of the overall sustainable growth targets for tourism which are identified in Fáilte Ireland's Corporate Strategy (to be published in 2015).

Tourism revenue in the WAW programme area is worth an estimated €2 billion to the economy, with six in every ten euro spent in the region was generated by overseas tourists. Further details on the Programme and associated initiatives can be found under Actions 17 and 19.

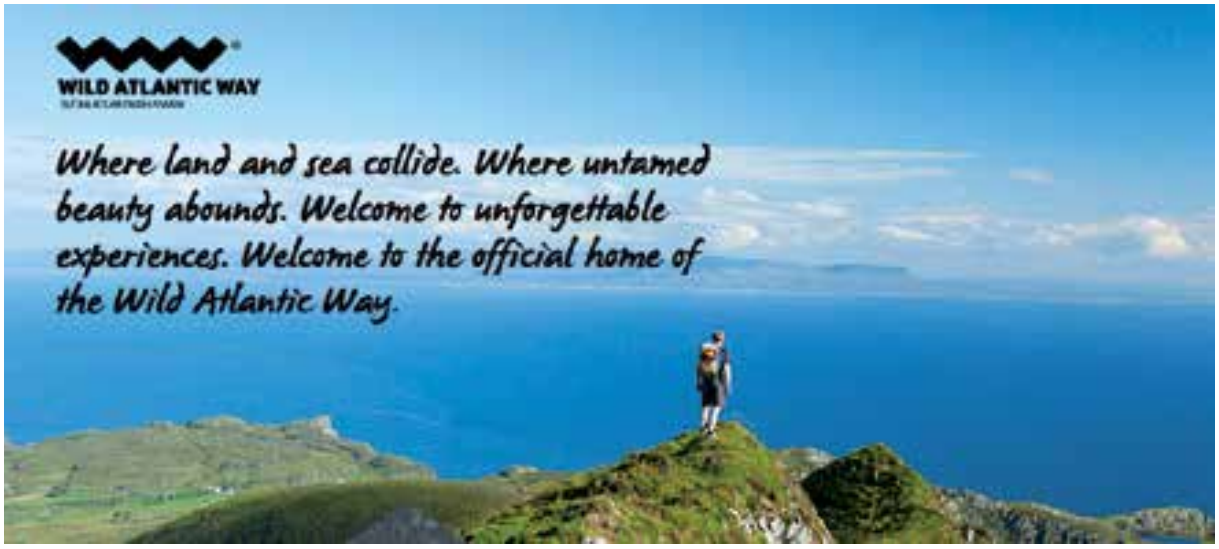


Figure 9: WAW Programme

3. PROGRESS ON ACTIONS

Section 3 provides an overview of progress on Actions across the eight Enablers identified in *Harnessing Our Ocean Wealth*.

GOVERNANCE

Good governance and coordinated cross-government action is essential to achieving our Vision and Goals (HOOW Pg 32).

Governance

Action 1a:

Develop and implement existing (e.g. Food Harvest 2020) and planned (e.g. Ports Policy, Offshore Renewable Energy Development Plan) sectoral strategies/plans through effective coordination of actions across a range of government departments and agencies.

Food Harvest 2020

In 2014, the Department of Agriculture, Food and the Marine published its 4th annual progress report on the implementation of *Food Harvest 2020 - Milestones for Success 2014*[1]. A summary of progress reported for seafood is presented below. In 2014, preparation of *Agri-Food 2025* Strategy commenced. Further information is available under Action 1c.

Additional information on business development, marketing & promotion, environmental sustainability and research & innovation is provided under Actions 10, 12, 16, 17 and 19.

Figure 11: Food Harvest Milestones for Success 2014

Extract from Food Harvest Milestones for Success 2014: Report on the Seafood Sector

> Growth in the seafood sector is currently being energised by the increased availability of raw material from sources, which were not envisaged when the Food Harvest report was being developed. These include the development of new fish species for human consumption and the increased processing in Ireland of fish caught by foreign vessels. By 2014, up to four foreign vessels a week landed their catch in Ireland for processing and onward sale. The underlying driver for this change has been increased fuel costs but the Castletownbere Fishermens' Co-Op has capitalised on this opportunity. Over the past three years, they have been developing a strategic partnership with a major Spanish retail chain, which has 1,500 retail outlets and a 28% market share. In 2014, they secured a contract to supply 2,000 tonnes of whitefish annually to this supermarket chain. The Co-Op sources the fish from both Irish and Spanish vessels and processes, packs and despatches it in consumer ready formats to Spain. The deal is worth around €10 million, has created 36 new jobs and resulted in significant capital investment in the company.
>
> Having noticed an increase in boarfish in the Celtic Sea shelf over a number of years, Irish fishermen decided to target it to ascertain its commercial potential. In 2012, a full management plan was submitted to ICES (International Council for the Exploration of the Seas) which was accepted in 2014. The potential value of

1 http://www.agriculture.gov.ie/media/migration/agri-foodindustry/2025agri-foodstategy/FoodHarvest2020MilestonesforSuccess2014.pdf

developing boarfish is significant as Ireland now holds almost 70% of the EU quota for this species. After mackerel, boarfish is Ireland's largest seafood resource in volume terms but commercially it had only been used as a lower value industrial raw material for fishmeal. In 2011, BIM began to focus on its human consumption potential. As boarfish had never been sold for human consumption, Ireland pioneered its development and marketing. Taste trials were positive and revealed the added benefit of being high in heart healthy Omega 3. A variety of concepts were produced and distributed to interested customers for market testing, with the rapidly developing Asian market showing most promise. As a consequence around 60 tonnes was sold in 2012, 120 in 2013 and close to 500 tonnes in 2014 due to a contract to source and distribute boarfish in China. In tandem with market engagement, the development of bespoke processing technology has proceeded well and is facilitating access to the ingredients and other markets.

In May 2014, a Biomarine joint venture between Killybegs Fishermen's Organisation and Norwegian Biomarine Science Ltd was announced. This €35million investment for Killybegs will primarily utilise boarfish and blue whiting to produce high quality proteins, oils and calcium for the infant formula, health food supplements and food ingredients markets. The completion date for this plant is 2016 and 70 jobs with further spin-off are anticipated. There is little doubt that this small quirky fish has the potential to establish itself as an important food source and the collaboration between industry and various state agencies is developing sustainable growth opportunities, which will particularly benefit the rural Irish economy.

National Ports Policy

In line with broader government reforms in respect of Local Government, the National Ports Policy, as published in March 2013, recommends that the designated Ports of Regional Significance (Drogheda, Dún Laoghaire, Galway, New Ross and Wicklow) are transferred to more appropriate local authority led governance structures.

In May 2014, Government approved the General Scheme of a Harbours (Amendment) Bill which will provide the necessary primary legislative framework to allow for later transfer of control by Ministerial Order. The General Scheme was subject to pre-legislative scrutiny by the Joint Oireachtas Committee on Transport in 2014. The Office of the Parliamentary Counsel commenced drafting in 2014 with publication expected in 2015.

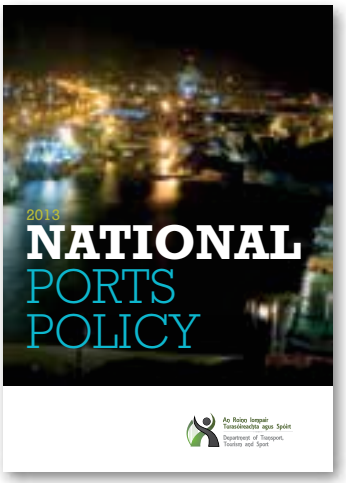


Figure 12: National Ports Policy

Offshore Renewable Energy Development Plan

In February 2014, the Department of Communications, Energy & Natural Resources published Ireland's Offshore Renewable Energy Development Plan (OREDP) and accompanying Strategic Environmental Assessment (SEA). The OREDP sets out the Government's policy in relation to the sustainable development of Ireland's offshore energy potential. It provides the mechanism through which actions across Government Departments and agencies, to support the development of offshore renewable electricity generation, can be fully coordinated in areas such as environmental monitoring and protection, research and development, consenting procedures, infrastructure requirements, and enterprise development.

Working in conjunction with existing structures, such as the Marine Coordination Group, an Offshore Renewable Energy Steering Group (ORESG) was established in 2014 to oversee the implementation of the OREDP. The ORESG, which draws on the support of relevant Government Departments and agencies, oversees the implementation of the OREDP via three work streams:

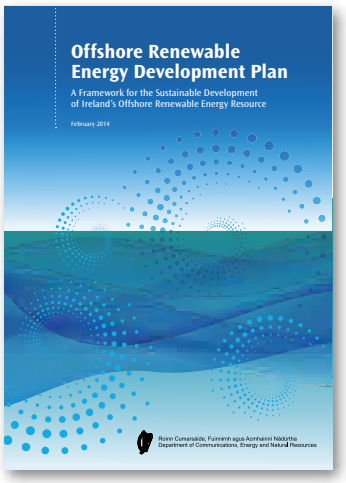


Figure 13: Offshore Renewable Energy Development Plan

- Environment – to ensure energy input to the new planning and consent architecture for development in the marine area (led by Department of Environment, Community & Local Government) and to take forward the findings and recommendations of the Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) carried out for the OREDP, to ensure robust environmental monitoring of offshore renewable energy development.
- Infrastructure – to support delivery of grid and port infrastructure (in the context of Grid 25 and the National Ports Policy), upon which the development of the offshore renewable energy sector is critically dependent.
- Job Creation – the coordination of existing Research, Development and Demonstration (RD&D) support for emerging ocean energy technologies, developing a supply chain for offshore renewable energy, exploring opportunities for international collaboration, working with State development agencies to attract investment and the introduction of an initial market support scheme for ocean energy (wave and tidal).

In 2014 (€3.6m) and 2015 (€4.5m) Government/DCENR have provided funding for the Ocean Energy Programme in the Sustainable Energy Authority of Ireland (SEAI) including the Ocean Energy Prototype fund. Since the launch of the OREDP in 2014 over 20 projects have received grant offers.

Work is ongoing on the implementation of objectives including the development of the offshore energy supply chain; integration with the IDA and Enterprise Ireland clean tech strategies for investment and job creation; input to the new legislative regime for licensing in the marine area; and exploiting opportunities for international collaboration on device development and deployment.

The focus currently is on the ongoing development of the national ocean energy test facilities in Cork (Beaufort Building), Galway (Bay) and Mayo (the AMETS test site). Work is also underway to undertake a study, from an environmental point of view, to map constraints and opportunities and identify suitable areas for offshore renewable developments. In addition, work is progressing on the development of guidance for developers on information to be contained in Environmental Impact Statements and Natura Impact Statements for offshore renewables, to identify the monitoring and data needed for site investigation and baseline monitoring of test and commercial developments.

In 2014, DCENR, SEAI and the Marine Institute, along with other agencies and organisations in the marine energy sector, launched the ocean energy portal www.oceanenergyireland.com and have been working proactively on international collaborations. Further details on the portal are available under Action 17.

Action 1b:

Develop an integrated enterprise strategy to generate momentum in specific emerging market opportunities prepared across development agencies (e.g. offshore renewables, offshore services, ICT and sensors, biotechnology).

Development Task Force

Action 1b was one of four addressed by the Development Task Force (DTF) set up by the Marine Coordination Group. To examine specifically this action, a sub-Group of the DTF was set up, chaired by Enterprise Ireland.

The Development Task Force Report was presented to the Minister and the Marine Coordination Group in 2015. Further details on the DTF Report are available in Section 2.

Action 1c:

Continue to develop new policies/strategies that address gap areas through an integrated approach

A number of new sectoral policies, strategies, and associated programmes in the areas of defence, food, tourism and science & technology commenced preparation in 2014. Although not primarily marine focused, Ireland's vast marine resource /maritime domain has an important role to play - in terms of maritime security, seafood, marine & coastal tourism and marine science. Further details on a number of these new emerging polices are provided below.

In addition to these non-marine sectoral strategies, the Department of Agriculture, Food & the Marine also commenced the preparation of a new Seafood Development Programme 2014-2020. As part of the development of this Programme a new Strategic Plan for Aquaculture is also being prepared (due for publication in 2015). Also in 2014 the Department of Transport, Tourism & Sport commenced the preparation of a new Maritime Safety Strategy, launched in April 2015.

Figure 14: Image courtesy of Irish Fish Producers Organisation Ltd.

EMFF Seafood Development Programme 2014-2020

Ireland was successful in doubling its allocation of EU funds under the European Maritime and Fisheries Fund (EMFF), compared to its predecessor for the 2007-2013 period, the European Fisheries Fund. Ireland secured €147.6 million in EU funds from the EMFF and combined with €93.9 million in Exchequer funds, this provides for a €241 million investment programme.

The EMFF Regulation (508/2014) was adopted by the EU Institutions on 15 May 2014. The EMFF is the fund specific EU Regulation providing for EU co-funded financial supports to the seafood sector to support the implementation of the Common Fisheries Policy (CFP), the Integrated Maritime Policy (IMP) and the EU 2020 Strategy. The EMFF covers the period 2014-2020.

Following a detailed analysis of investment needs of the seafood sector and a series of engagements with stakeholders, culminating in a public consultation between 27 March and 1 May 2015 on a draft of the Programme, the final national draft of the Programme is expected to be submitted to the European Commission in June 2015 for its consideration and adoption by end 2015.

The overall objective of the Programme is to support the economic, environmental and social sustainability of the seafood sector in order to maximise its contribution to jobs and growth in coastal communities and to the national economy. To achieve this objective, the Programme proposes to pursue the strategy first identified in *Food Harvest 2020* of *Smart-Green-Growth*. Built on a smart foundation of knowledge, training, and applied research, the Programme will seek to sustainably grow the industry through building scale, fostering competitiveness, adding value, new product development, and output growth. The Programme proposes investment as follow:

- Sustainable Development of Fisheries: Including supports for the implementation of the CFP, and supports for the implementation of the Habitats, Birds and Marine Strategy Framework Directives.
- Sustainable Development of Aquaculture: Supporting implementation of the National Strategic Plan for Sustainable Aquaculture Development, including capital investment by aquaculture sites and investment in knowledge, innovation, technology and training.
- Processing and Marketing: Including supports for capital investment by seafood processing enterprises to grow exports and add value to fish, fostering new product development capability, improving competitiveness and promoting seafood products internationally.
- Fisheries Local Action Groups: Supporting implementation of local development strategies in fishing communities by Fisheries Local Action Groups (FLAGS).
- Control and Enforcement: Including investment in database systems, traceability systems, vessel monitoring systems, training and investment in new fisheries patrol vessels.
- Data Collection: Including research vessel surveys, contracting of scientific and economic resources, and outsourced expertise to survey, compile and analyse data to support implementation of the CFP.
- Integrated Maritime Policy: Supporting implementation of *Harnessing Our Ocean Wealth*.

Maritime Safety Strategy 2015-2020

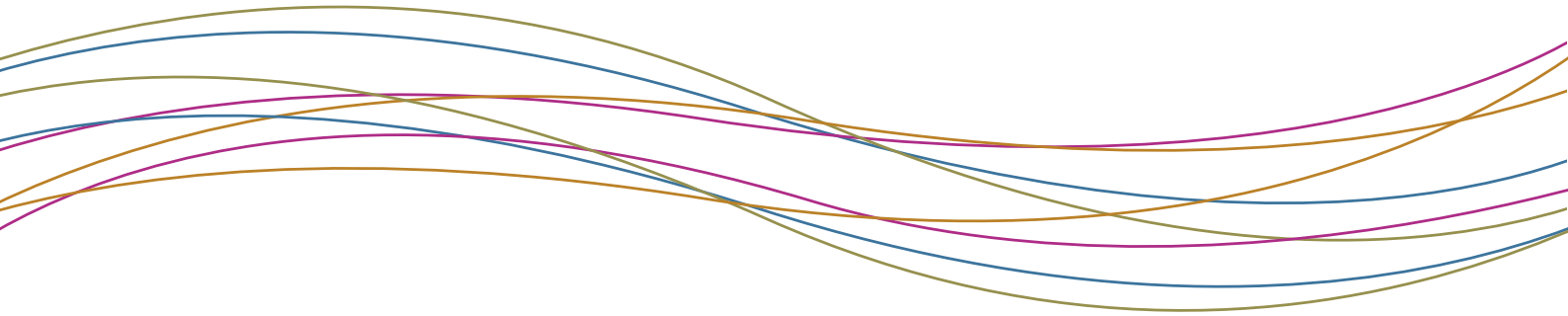
In 2014, a Maritime Safety Strategy was prepared to target key causes of maritime fatalities. A public and stakeholder consultation process was undertaken as part of the process. Published in early 2015, the new Maritime Safety Strategy's overall objective is to eliminate deaths and reduce incidents in the maritime sector, focusing on key factors contributing to fatalities and incidents arising on recreational craft, fishing vessels, passenger vessels and cargo ships.

White Paper on Defence

Work is continuing on the development of a new White Paper on Defence. The White Paper will include an assessment of anticipated future defence challenges, and the roles and tasks the Defence Forces, will be required to undertake, including maritime security and surveillance. It is expected that the White Paper will be published by the end of 2015.

Preparation of Agri-Food 2025 Strategy

In 2014, the Department of Agriculture, Food & the Marine announced a review of what has been achieved under *Food Harvest 2020* and plans to set out a new strategic vision for the sector to 2025. This new strategic vision- *Agri-food 2025*- will outline the key actions required to ensure that the agri-food sector (fisheries and fish processing, primary agriculture, the food and beverage industry, forestry and forestry processing) maximises its contribution to overall economic growth, job creation and environmental sustainability over the coming decade and builds upon the progress achieved under *Food Harvest 2020*. The preparation of the new *Agri-Food 2025* Strategy included a public consultation launched in 2014. *Agri-Food 2025* is being developed by a Committee of leading figures from the agri-food sector and is due for publication in 2015.



Strategy for Science and Innovation

A new national *Strategy for Science and Innovation* is under development by an Interdepartmental Committee to ensure it benefits from a whole of Government perspective. It will seek to, inter alia:

- Embed Research Prioritisation as a key policy objective to ensure a continued focus on public funding of research in areas of economic relevance to enterprise;
- Maintain and build further the capacity and capability of people in academia and enterprise through the acquisition and transfer of knowledge and in doing so, support excellent and impactful research across the full continuum from basic to applied as well as commercialisation of research;
- Maintain and build further relevant infrastructures across all the sciences but in particular in areas of economic relevance to the enterprise base to address the jobs crisis; and
- Build on consolidation of the system by further enhancing its coherence and its accessibility to enterprise and society.

The new Strategy will articulate a vision for science policy and in doing so will incorporate key sectors of relevance to the economy and society including the marine sector.

In addition, the Department of Jobs, Enterprise & Innovation is developing Regional Action Plans to better integrate the efforts of the enterprise development agencies and other regional stakeholders in supporting enterprises and to build on the competitive strengths and assets of the region to maximise the potential for job creation.

These will include a focus on the marine sector where it is relevant and appropriate. Eight Regional Action Plans will be published this year.

Over the coming year, the Department of Jobs, Enterprise and Innovation will bring forward a new *Enterprise Policy and Strategy Statement* for the period to 2025, setting out the vision for enterprise development over that period to secure full employment, and the key supports and business environment measures to be taken to ensure Irish based enterprises are among the most innovative, productive, competitive and entrepreneurial in the world.

In 2014/2015, the Department of Agriculture, Food & the Marine continues to work through the established Interdepartmental Committee and in collaboration with agencies on inputting marine elements into the Strategy. This spans across all sectors of the marine.

Action 2:

Develop an integrated approach to marine and coastal planning and licensing in order to maximise the potential for Ireland's ocean economy; assist with managing our resources effectively and sustainably; manage potential conflicts; and ensure harmonisation with coastal/terrestrial planning.

- Address the deficiencies in the current planning and licensing system by continuing to make business process improvements
- Update/improve legislation to streamline planning and consent processes
- Develop and appropriate Maritime Spatial Planning Framework for Ireland

Marine Planning & Licensing

Following Government approval for drafting of the Maritime Area and Foreshore (Amendment) Bill, the General Scheme was published in October 2013. The Joint Oireachtas Committee (JOC) on the Environment, Culture and the Gaeltacht subjected the General Scheme to pre-legislative scrutiny in November 2013 and the JOC issued its report in February 2014. Drafting of the Bill continued during 2014 with a view to its publication as early as possible in 2015.

In June 2014, the Taoiseach announced his intention that the Department of the Environment, Community and Local Government (DECLG) would play a leading role in the development of a maritime spatial planning framework for Ireland. In July 2014, EU Directive 2014/89/EU establishing a framework for maritime spatial planning was adopted. The Directive, developed with guidance from the Marine Institute and other Member State organisations, requires Member States to transpose the Directive by 2016 and to put maritime spatial plans in place by March 2021 at the latest. The DECLG has begun preparatory work on transposition of the Directive.

Aquaculture Licensing

Aquaculture licensing, administered through the Department of Agriculture, Food and the Marine, is carried out in line with very specific requirements under the EU Birds and Habitats Directives (Natura). The process continued in 2014 which included data collection, the setting of Conservation Objectives, carrying out of Appropriate Assessments and appropriate licensing, taking account of, among other things, Natura requirements.

Conservation Objectives are set by the Department of Arts, Heritage and the Gaeltacht on an ongoing basis, and the Appropriate Assessment process has been completed in respect of twelve bays – Castlemaine Harbour, Roaringwater Bay, Dundalk Bay, Lough Swilly, Donegal Bay, Dungarvan Harbour, Ballycotton Bay, Kenmare Bay, Valentia Harbour/Portmagee Channel, Galway Bay, Clew Bay and Drumcliff/Cummeen Strand.

Over 200 licences have been issued in the past three years. In particular, licensing determinations have been made in respect of aquaculture applications in three Natura sites: Castlemaine Harbour, Roaringwater Bay and Donegal Bay. The licensing process is at an advanced stage in a number of other bays (e.g. Dungarvan Harbour and Clew Bay). Based on current estimates, licence determinations in the order of 150 are planned for 2015.

MARITIME SAFETY, SECURITY & SURVEILLANCE

The creation of the conditions needed for economic growth, investment and job creation depend on the State ensuring a safe, secure and protected environment consistent with best international standards of governance and the protection of the maritime environment.... Ireland must have in place effective and efficient security and surveillance arrangements and quality maritime regulatory regimes that meet best practice within which our ocean wealth can prosper (HOOW Pg 34).

Maritime Safety, Security & Surveillance

Action 3:

Develop and implement systems to provide real-time operating, surveillance and monitoring information on activity within Ireland's maritime domain.

Developing a shared integrated maritime picture

During 2014, the Department of Transport, Tourism and Sport (DTTAS) commenced beta trials of the Coast Guard's shared integrated call logging and analysis system (SILAS). In June 2015, the Department commissioned SILAS, which is a significant step forward in the creation of a shared integrated maritime picture (IMP) for agencies involved in coastal state activities including the Coast Guard, Naval Service, Commissioners of Irish Lights and Met Éireann. The National Maritime Surveillance Steering Group has been re-constituted and will meet shortly under the Chair of the Irish Maritime Administration.

In 2014, the Irish Naval Service continued its involvement in the European Defence Agency Maritime Surveillance (MARSUR) project which enables information sharing amongst 18 EU participating Member States. The Naval Service has developed a Recognised Maritime Picture (RMP) to improve maritime domain awareness, provide near-real time situational awareness in Ireland's maritime domain, and provide a command and control information system for Naval Operations. The RMP is fully operational and is deployed on board all Naval Ships as well as being available and operated at the Naval Base. The Air Corps CASA aircraft will continue to be utilised to support the RMP. RMP will be maintained and enhanced in 2015 and data sharing protocols will continue to be maintained with external stakeholders.

Sea Fisheries Protection - fair regulation for a sustainable future

In conjunction with both national and international control partners, including the Irish Naval Service and Air Corps, the Sea Fisheries Protection Authority (SFPA) continued in 2014 to operate a risk and intelligence based approach to delivering an effective and credible sea-fisheries and seafood regulatory service. The services are aimed at supporting Ireland's reputation as a safe, innovative fishing industry that is recognised and respected worldwide.

Activities included a range of at sea inspection programmes including inshore patrols and joint deployment plans with the Irish Naval Service and competent authorities from other Member States operating in Irish waters and in those of other Member States.

The SFPA is also responsible for administering the points for serious infringements system, which was introduced in 2014.

Figure 15: SFPA role in regulating sea-fisheries conservation

Under this system the SFPA applies points to the licence holder of any fishing vessel (Irish or non-Irish) operating in waters under Irish Jurisdiction that seriously infringes the Common Fisheries Policy (CFP). The new system followed on from EU legislation which required the introduction of a points scheme for serious infringements in every Member State as part of measures to ensure a level playing field for fishers across the community.

In addition to maritime operation, landings of pelagic, demersal, deep sea and shellfish species by Irish, EU and Third Country fishing vessels continue to be routinely inspected by SFPA in Irish ports. SFPA inspections verify compliance with a wide range of EU technical conservation measures including those designed to protect spawning and juvenile fish as well as those conservation measures implemented by Ireland to ensure compliance with a range of Environmental Protection legislation. A new Landing Obligation was introduced for pelagic fisheries off Irish coasts on 1st January 2015. These fisheries already had explicit legal prohibitions on two significant discarding practices - slippage and high-grading - along with an obligation to log discards for several years. Under the new regulations, which will be phased in over the period 2015-2019, all catches will need to be retained on board, landed and counted against quotas with undersized fish being prohibited from being marketed for the purpose of human consumption.

Action 4:

Update national legislation code for an effective Irish Maritime Administration in accordance with national and international requirements.

Action 7:

Develop the Irish Maritime Administration to provide effective and efficient services to people, ships and ports.

- Enhance the maritime regulatory and marine emergency response services.

Irish Maritime Administration

During 2014, the Merchant Shipping (Registration of Ships) Act was enacted to update ship registration legislation dating from 1955. The Act provides for the establishment and regulation of a modern ship registration system with a new, centralised, electronic and accessible national ship register, the Irish Register of Ships, at its core.

In July 2014, Ireland ratified the Maritime Labour Convention 2006 and a package of Regulations was made to provide for the implementation of the Convention nationally. The Convention provides for improved living and working conditions for seafarers, and will enter into force for Ireland on the 21st July 2015.

A number of EU maritime Directives were transposed in 2014, including Directives relating to the Maritime Labour Convention, STCW (Standards for Training, Certification and Watchkeeping for Seafarers) and Marine Equipment.

Action 5:

Implement effective flag and port inspection regimes and improved enforcement of existing regulation, including new regulation standards emanating from the EU and IMO.

Action 6:

Maintain and improve Ireland's status on the international shipping benchmarks and use Ireland's positive status to promote shipping related enterprises.

Effective implementation of EU and international regulation

The Marine Survey Office (MSO) of the Department of Transport, Tourism and Sport continued in 2014 to fulfil its role of the maritime transport safety regulator carrying out a comprehensive regime of inspections covering issues such as safety, security, living and working conditions, and accessibility. This work encompasses recreational craft, fishing vessels, passenger vessels and cargo ships on the Irish flag (whether operating internationally or domestically); certification of Irish seafarers including fishers and recreational craft users; and security in Irish

ports. It also includes risk-based inspections on foreign- flagged ships calling to Irish ports using the internationally agreed methodology of the Paris Memorandum of Understanding (MoU) on Port State Control. The MSO carries out an average of 1,300 inspections every year.

During 2014, the MSO continued to provide effective implementation of EU and international regulation. Inspection continued for flag state vessels with new international merchant ships, domestic ships and fishing vessels entering the flag. The MSO also continued to implement the Port State Control regimes for foreign vessels. In particular Irish ships were issued with Statements of Compliance with the ILO Maritime Labour Convention, 2006.

Also in 2014, Ireland maintained its position on the latest Paris MoU 'White List' and remained on the IMO STCW 'White List' for seafarer training.

Action 8:

Collaborate with industry and R&D institutes to deliver leading-edge technology that supports more effective and efficient maritime surveillance capacity.

Delivering leading-edge maritime surveillance technologies

In 2014, the Naval Service continued its involvement with the Irish Maritime and Energy Resource Cluster (IMERC) and the National Maritime College of Ireland NMCI/Halpin in the development of innovative technologies and naval mariner training.

As part of the *Advanced Marine Technology Programme* and the wider *SmartOcean* initiative, the Marine Institute, engaged with the Irish Air Corps in association with researchers in the Higher Education Institutes (HEIs), Geological Survey of Ireland (GSI) and Enterprise Ireland (EI) to explore opportunities for collaboration and engagement.

In early 2014, a number of early stage activities took place to explore potential avenues for collaboration, including a visit to the Air Corps Headquarters. Following the visit, a number of potential use cases were outlined. In May 2014, researchers from the Marine Institute and two HEIs went on-board a routine maritime patrol operation on board the Casa aircraft. The researchers found the aircraft to be a valuable observation platform and outlined a number of research/innovation scenarios.

Following the outcome of a number of activities, a Service Level Agreement (SLA) between the Marine Institute and the Department of Defence was agreed which specifically references the Air Corps along with the Irish Naval Service and a selection of mutually beneficial services that will support research and development. In 2015, the Marine Institute will continue exploratory work with the Air Corps to develop potential projects with the research community to leverage available assets to support the development of innovative new technology.

Figure 16: Ned Dwyer, UCC, Glenn Nolan, MI and Timothy McCarthy, NUIM emarking on the Casa aircraft

CLEAN GREEN MARINE

Ireland's marine ecosystems are home to a rich and diverse range of species and habitats. We must protect and conserve these ecosystems, ensuring development strategies and management practices do not impair the capacity of ecosystems to deliver market and non-market goods and services (HOOW Pg 36).

Clean Green Marine

Action 9:

Implement the EU Marine Strategy Framework Directive:

- Carry out an initial assessment and related works required under the MSFD in order to provide an accurate picture of the environmental status of our marine waters;
- Set appropriate targets in the pursuit of good environmental status; and
- Develop an Atlas of the Irish Marine Environment, which will include the collation of all relevant information into a central GIS. This will be an important tool underpinning decisions on policies and actions to protect biodiversity and act as a stepping-stone to future, long-term measures (e.g. in the development of a National Marine Habitat Map and a Maritime Spatial Plan).

Preparation of Ireland's MSFD Monitoring Programme

Work on the preparation of Ireland's Monitoring Programme required under Article 11 of the Marine Strategy Framework Directive (MSFD) was progressed in 2014 by the Department of Environment, Community and Local Government (DECLG). The Monitoring Programme outlines what monitoring needs to be undertaken to measure progress towards the targets set in the initial assessment phase, in accordance with the associated indicators. An analysis was undertaken by the steering group with the assistance of RPS consultants to see what monitoring is already being undertaken by Irish agencies or organisations that meets these requirements, where there are gaps and what needs to be done to fill the gaps. DECLG has examined the final recommendations in terms of necessity for the purposes of MSFD and value for money and this has informed the final monitoring programme which was submitted to the European Commission in April 2015.

Throughout 2014, the Marine Institute continued to provide support to DECLG on the implementation of the Marine Strategy Framework Directive (MSFD). This included:

- The preparation of the national marine monitoring programme (as outlined above);
- Participation in various technical groups to develop indicators of Good Environmental Status (GES); and
- Maintenance and further development of Ireland's Marine Atlas containing spatial information of Ireland's marine environment and the activities that take place in it.

In 2015, the Marine Institute will commence work, in collaboration with the United Kingdom and France, and under the coordination of the International Council for the Exploration of the Sea (ICES), on the preparation of a Celtic Seas wide MSFD Assessment to demonstrate the potential use of fisheries-related science, infrastructure, data and knowledge acquired under the Common Fisheries Policy (CFP).

In addition, the Marine Institute will be carrying out development work to upgrade the Marine Atlas into a more flexible tool including making it accessible through mobile devices. The Atlas is available on: http://atlas.marine.ie

Action 10:

Deliver all measures relevant to Ireland as directed under the Common Fisheries Policy (CFP) and national measures including the conservation, management and rebuilding of fish stocks and long-term sustainable exploitation of marine biological resources

Status of fish stocks in Irish waters

In November 2014, the Marine Institute published the annual Stock Book, which contains the latest scientific information on the status of fish stocks in Irish waters.

The 2014 Stock Book gives scientific advice on 73 stocks, an increase from 60 stocks on the previous year's publication, due to the addition of skate and ray stocks. It shows that 23% of the stocks are above safe biomass levels, while 16% of stocks are below safe levels and 60% are of unknown/undefined status.

The latest Stock Book proved invaluable to the Minister of Agriculture, Food and the Marine, Simon Coveney, during negotiations in December 2014 to deliver a €123 million package of quotas for Ireland's fishing industry. The Minister was also successful in reversing a proposed 14% cut in prawn quotas by encouraging the Commission to follow the scientific advice and to apply a 3% increase in the Irish quota for this €60 million fishery. Quota for haddock stocks was cut by 12% based on the scientific advice which showed the stock had been fished too heavily and a decline in the biomass.

Figure 17: Annual Stock Book, November 2014

The majority of the scientific advice presented in the Stock Book is formulated by the International Council for the Exploration of the Seas (ICES) and by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

The Stock Book is the result of many research days at sea; data collection and analysis by Marine Institute scientists under the Common Fisheries Policy and it is used as a reference throughout the year by a wide range of stakeholders.

The Reformed Common Fisheries Policy

The reformed Common Fisheries Policy (CFP), agreement on which was secured during the Irish EU Presidency in 2013, came into force on the 1st January 2014. Over time this new policy will allow for the rebuilding of fish stocks in European waters which will support the viability of Irish fishing industry through long term management of stocks, reducing and eliminating discards and rebuilding stocks to Maximum Sustainable Yield. These reforms will govern the nature and operation of Irish and EU fisheries for the foreseeable future and are designed to usher in a new era of more sustainable fishing across EU waters.

Reducing unwanted catches and eliminating discards

One of the key challenges of the new CFP is the phased implementation from 2015 to 2019 of a landing obligation or 'discards ban' aimed at reducing unwanted catches and eliminating discards. The details of how the discards ban will be phased in will be decided by the regional Member States - Ireland, Belgium, France, Netherlands, Spain and UK – working closely with stakeholders.

Following the appointment of Dr Noel Cawley to chair a national Discards Implementation Group in November 2013, the Group worked intensively with industry in 2014 to prepare for the practical implementation of the discards ban for the Irish fishing fleet.

The landing obligation for pelagic stocks (herring, mackerel, etc.) came into force with effect from the 1st January 2015. Ireland, along with the other Member States of the North Western Waters region – Belgium, France, the Netherlands, Spain and the UK - worked closely with the North Western Waters Advisory Council and

the Advisory Council in developing a joint recommendation for a discards plan which was submitted to the Commission and came into force on the 1st January 2015.

Under the Chairmanship of Ireland, the Member States of the North Western Waters Group are currently engaged in discussions on a discards plan for whitefish species to take effect in 2016.

National Stock Conservation Measures (lobster and shrimp fisheries) and Inshore Fisheries Forum (NIFF)

Conservation measures aimed at ensuring long-term viability of lobster and shrimp fisheries by protecting their reproductive potential were announced in 2014 following extensive consultation. These measures come into effect in 2015. Management measures are also under consideration for razor clam fishing in the north Irish Sea.

In 2014, a National Inshore Fisheries Forum was established to assist in further development and management of stocks in inshore waters. The first meeting of the Forum took place in January 2015. The Forum is founded on a network of six multi-stakeholder Regional Inshore Fisheries Forums based in the geographical regions of the Fishery Local Action Groups (FLAGS). The Regional Forums include representation from inshore fisheries together with other marine stakeholders including tourism, leisure and environmental interests.

The Forum offers inshore fishermen the opportunity to focus the priorities on what is needed to ensure the long term future in their sector which in turn will protect revenue and employment in fishing-reliant coastal communities. Further details on these Forums and FLAGS are provided under Action 19.

Action 11:

Continue to implement the EU Water Framework Directive through the River Basin Management Plans.

EU Water Framework Directive

On behalf of the Environmental Protection Authority (EPA) and the Department of the Environment, Community and Local Government, the Marine Institute continued to carry out an extensive environmental monitoring programme in transitional and coastal waters for physico-chemical parameters, priority substances, phytoplankton and seabed fauna to fulfil key requirements of the Water Framework Directive in accordance with the agreed plan for 2011-2015. This included sampling water, biota and sediments from target water bodies, laboratory analysis and data management/reporting and working closely with the EPA and the Sea-Fisheries Protection Authority (SFPA).

Marine Institute staff undertook a winter environmental survey in January 2014 on board the *RV Celtic Voyager,* sampling at 284 stations from the Irish Sea, and on the north and west coasts for testing of nutrients and other water quality parameters. Also collected for analysis were 79 samples of the benthic fauna in six coastal water bodies.

In addition to this environmental monitoring programme, a new 3-tiered governance arrangement was given statutory effect in July 2014 in order to optimise the implementation of the Water Framework Directive (WFD). At Tier 1, the Water Policy Advisory Committee is a high-level advisory group drawn from key Departments, agencies and authorities; Tier 2 is led by the EPA and focuses on technical implementation and reporting; Local Authorities, at Tier 3, are responsible for regional implementation and promotion of the WFD.

Although the WFD requires 2nd cycle River Basin Management Plans (RBMPs) to be prepared by end-2015, the European Commission has been advised that 2nd cycle RBMPs will not be finalised in Ireland until 2017. Work is on-going in the development of the RBMPs which includes engaging with stakeholders on the process.

Action 12:

Continue to implement EU Natura 2000 legislation (Birds and Habitats Directives):

- Complete the preparation of management plans to facilitate sustainable development (e.g. aquaculture, offshore energy); and
- Complete the designation process for marine SACs (2012) and SPAs (2014).

Marine Designations

The designation of marine Special Areas of Conservation (SAC) under the EU Habitats Directive is currently being finalised by the Department of Arts, Heritage and the Gaeltacht. Six additional sites to protect bottlenose dolphins, sandbanks and reefs were notified to the European Commission during 2014 following public consultation. In early 2015, an intention to designate an additional new marine SAC in the Irish Sea to protect reef-like structures formed by methane leaking from the seafloor was published for public consultation.

Conservation Objectives

The Department of Arts, Heritage and the Gaeltacht has led a challenging programme for a number of years of setting and publishing site-specific conservation objectives for all marine sites designated as Special Areas of Conservation under the EU Habitats Directive and Special Protection Areas under the EU Birds Directive. While the immediate priority of this programme is to contribute to the resolution of ongoing difficulties in the licensing and regulation of aquaculture and fisheries, the publication of such objectives will provide support to the wider maritime planning and regulatory process as well as to marine stakeholders and end users. By the end of 2014, site-specific conservation objectives were finalised and published for 101 marine Natura 2000 sites. It is envisaged that all remaining marine Natura 2000 sites will have their conservation objectives published online in 2015.

Appropriate Assessments of fisheries and aquaculture activities in Natura Sites

As part of the efforts to carry out Appropriate Assessments (AA) of fisheries and aquaculture activities in Natura 2000 sites, the Marine Institute completed work on six sites in 2014: Dungarvan Harbour, Clew Bay, Valentia Harbour, Galway Bay, Kenmare Bay and Ballycotton Bay and significantly progressed work on a number of others. In addition, the Marine Institute commissioned surveys in a number of aquaculture sites and fishing grounds, e.g. Irish Sea, Donegal Bay, Dungarvan and Dundalk Bay, aimed at gathering data on the occurrence of protected species of birds and their potential interactions with fishing and aquaculture activity; to allow further licensing decisions.

Efforts to complete Appropriate Assessments will continue throughout 2015, with a target to complete work on an additional 16 sites. Further information on aquaculture licensing in relation to Natura areas is provided under Action 2.

Action 13a:

Maintain and where appropriate, expand key marine observations/sentinel sites for Essential Climate Variables (ECVs) as endorsed by the UNFCCC Global Climate Observing System (GCOS). Such measurements (collected, quality assessed and analysed on an on-going basis) are essential to support improved regional modelling, scenario development, forecasting and climate impact risk assessment.

Understanding climate change - marine observations and measurements

The Marine Institute continues to carry out research and monitoring of Ireland's marine resource to support improved climate change modelling, forecasting and risk assessment. Temperature is currently monitored at 12 tide gauge sites around the coast. High accuracy time series are also maintained at Malin Head and Ballycotton for climate studies. Atmospheric pressure is measured at 11 tide gauge sites and water level at 19 sites around the coast.

The Malin Head temperature and ocean climate Conductivity, Temperature, Depth (CTD) stations offshore Ireland continue to be monitored on an annual basis by the Oceanographic Services and Marine Chemistry teams in the Marine Institute.

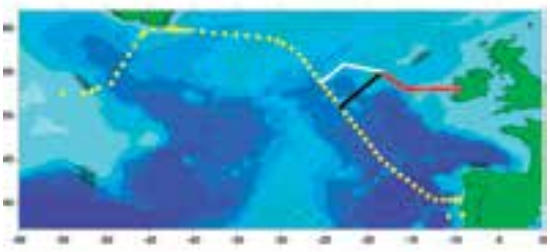


Figure 18: Marine Institute and OVIDE Project Stations 2014

An annual multi-disciplinary survey on board the *RV Celtic Explorer* to monitor and assess the ocean climate of waters to the west and northwest of Ireland was undertaken in 2014. The data collection on this survey is designed to gather and establish baseline oceanic conditions that can be used to benchmark future changes against. The data from the survey is combined with time series from five offshore buoys (SST, wave height, wind), coastal tide gauges, and other coastal monitoring stations for both weather and oceanic conditions (e.g. Malin Head station) in order for the Marine Institute to establish the oceanic baseline from which future changes are assessed. The collection of reliable and consistent offshore data in 2014 also supports reporting under the EU Marine Strategy Framework Directive.

Action 14:

Implement Ireland's National Biodiversity Plan "Actions for Biodiversity, 2011-2016", to conserve and restore biodiversity and ecosystem services in the marine environment.

The Department of Arts, Heritage and the Gaeltacht continue to implement *Actions for Biodiversity 2011-2016* with cross-departmental/agency input via the National Biodiversity Working Group. In 2014, an interim review of the implementation of the plan was drafted (for publication in 2015) which incorporates updates on the implementation of marine related biodiversity objectives and targets.

Red List for Sharks, Rays and Chimaeras

As part of the commitment under Ireland's National Biodiversity Plan to protect biodiversity and ecosystem services in the marine environment, a Red List is currently being prepared for Ireland's sharks, rays and chimaeras (Chondrichthyes) – a group of species recently assessed by the IUCN as the most threatened in European waters: http://support.iucnredlist.org/updates/first-complete-assessment-european-marine-fishes-highlights-major-threat-overfishing.[2]

The Red Listing process is being led by the Department of Arts, Heritage and the Gaeltacht in cooperation with the Marine Institute, the National Biodiversity Data Centre and the IUCN Shark Specialist Group. The list will provide an evaluation of the conservation status of the 80+ elasmobranch species recorded from Irish waters. Significant progress was made with the assessments in 2014 and a final publication is expected towards the end of 2015. The Red List, as with the previous eight in the Irish Red List series, is being prepared on an all-Ireland basis with input from the Agri-Food and Biosciences Institute and the Centre for Data and Recording in Northern Ireland.

For further information on other actions related to Ireland's National Biodiversity Plan see details reported under Actions 9-13 above.

Action 15:

Promote further research into economic values of marine biodiversity and ecosystem services to ensure best practice planning and management of the ocean resource.

Policy-related research, including research into non-market economic values and ecosystem services, is an important element of the new Marine Research Agenda currently in preparation. Further details are available under Action 21c.

2 http://support.iucnredlist.org/updates/first-complete-assessment-european-marine-fishes-highlights-major-threat-overfishing.

BUSINESS DEVELOPMENT, MARKETING & PROMOTION

Creating the right conditions for business, branding and building on Ireland's reputation as a high-tech, innovative economy, are critical for harnessing our ocean wealth (HOOW pg 38)

Business Development, Marketing & Promotion

Action 16:

Strengthen and develop a common message and theme that promotes Irish marine products and services using high standards of environmental compliance (the 'Clean Green' brand).

Expanding the reach of Irish seafood exports

Bord Bia continues to broaden and tailor its seafood export programme to assist Irish seafood companies to capitalise on the growing demand for premium, quality assured seafood in emerging seafood markets in the Asia Pacific and other non EU markets. In 2014, Irish seafood exports delivered a solid performance with values increasing by seven per cent for the year to reach €533million. Ireland exports seafood to 80 markets worldwide. The top five export markets for Irish seafood products are France, the UK, Spain, Nigeria and Italy. The four EU markets, plus Germany, continue to dominate seafood exports, accounting for 55 per cent of export values. However, this compares to a 58 per cent share in 2013 and demonstrates the on-going focus of the leading Irish seafood exporters in the development of new business in emerging markets to offset some price resistance in core European markets.

In 2014, the biggest growth was witnessed in international markets, which grew by around 20 per cent in value to €185 million. Notable growth was seen in African markets, such as Nigeria, Cameroon and Egypt, as well as in Asia, particularly in China, Hong Kong and South Korea. Exports to the three main markets in Africa – Nigeria, Cameroon and Egypt accounted for a total of 18 per cent of total seafood export values. Meanwhile, Asia reached approximately €50 million, led by China, where Irish seafood exports increased by 45 per cent in 2014. Exports to Hong Kong grew by 58 per cent during the same period, while South Korea experienced a growth in value of over 10 per cent.

Economic development in both Africa and Asia has been key to the increased demand for quality, safe protein in these markets. Bord Bia predicts that this will continue into the future with the middle class predicted to expand in both regions and GDP per capita projected to be the highest in Asia and Africa compared to other geographical zones over the next decade.

Further information on Bord Bia's trade development programme and extensive promotional campaigns for Irish seafood is provided under Action 17.

Green Seafood Business Programme

BIM introduced their new *Green Seafood Business Programme* in May 2014. This initiative aims to deliver resource efficiency improvements and reduce the operating costs for seafood businesses. This is important for seafood companies since in addition to leading to direct cost savings, eco-efficiency can also assist in increasing market advantage and differentiation. In addition to saving on operational costs, the Green Programme assists seafood companies to manage their business in a sustainable manner which links in with Bord Bia's *Origin Green Programme*.

During 2014, BIM partnered with IBEC, EPA's GreenBusiness.ie to run a series of free seminars to assist businesses to manage energy and explore smart and inexpensive methods of reducing energy costs. The seminars included case studies from a range of companies who have put strategies in place to substantially cut their energy costs. Examples included the Carbery Group which has saved over half a million euro per annum through a combination of technical improvements, management commitment and safety awareness and training and the Musgrave Group which has saved over €1 million per annum in the last five years by introducing energy reduction methods in warehousing, distribution and retail. The seminars were held in Clonakilty, Athlone and in Dublin.

Figures 19 & 20: Farming of oysters in Ireland.

Seafood safety

The effective implementation of seafood safety controls centred on robust traceability systems is essential for the protection of public health and consumer interests both at home and abroad.

In 2014, the Sea Fisheries Protection Authority (SFPA) continued to implement European hygiene package legislation for seafood, carrying out inspection and health certification of export consignments. This work is critical to the opening up and maintenance of a growing collection of Third Country markets such as China, USA, Canada, Japan and the Russian Federation/Customs Union.

Under service contract to the Food Safety Authority of Ireland, SFPA also in 2014 continued to carry out approval inspections, audits and inspections of food businesses (including vessels) in the seafood sector on a risk assessed basis in order to assess compliance with National and European food safety legislation. The authority also continues to implement the National Microbiological Monitoring and Classification Programme for shellfish production areas and the National Marine Biotoxin Monitoring programme in collaboration with the Marine Institute and Molluscan Shellfish Safety Committee.

In 2014, the Marine Institute, as the Competent Authority for Fish Health, was awarded ISO9001 to ensure the continued delivery of high standards in providing authorisations for aquaculture businesses under fish health legislation.

Action 17:

Give a clear message to investors that Ireland is 'open for, and a good place to do, marine business' domestically and internationally and continue to market and promote business opportunities associated with the marine through the IDA, EI, IMDO, Bord Bia, BIM, Údarás na Gaeltachta, Fáilte Ireland.

Development Task Force

Action 17 was one of four addressed by the Development Task Force (DTF) set up by the Marine Coordination Group. To examine specifically this action, a sub-Group of the DTF, chaired by the IDA, examined the international marketplace and key components of an internationally competitive value proposition (current and potential).

A pipeline of potential 'demontrators' was reviewed by the DTF members aimed at forming the basis for kick-starting Ireland's ocean economy to meet and surpass the targets set out in *Harnessing Our Ocean Wealth*.

The DTF also looked at potential holistic and integrated operating structures (including marketing and branding), to enable a new cooperative agenda across the range of development agencies and associated departments to be embraced. Further details are available in Section 2.

'First-stop-shop' - Ireland's Marine Renewable Energy Portal

Figure 21: Ireland's Marine Renewable Energy Portal

In 2014, the Marine Institute worked with the Sustainable Energy Authority Ireland (SEAI) and other partners on a marketing strategy to promote Ireland as 'Open for Business' as an all-island wave, tidal and floating wind research and development destination. In March 2014, Ireland's Marine Renewable Energy Portal (www.oceanenergyireland.com) was developed and launched. The Portal provides a 'first-stop-shop' through which developers can discover the relevant activities, infrastructure and supports available in Ireland and from where they can obtain the most relevant and up to date information. The Portal combines content from over 20 different groups.

The Portal was successfully launched at the International Conference on Ocean Energy (ICOE) in Halifax, Nova Scotia in November 2014, at an Ireland Pavilion organised and supported by SEAI. With the key objective of developing an Ocean Energy Portal achieved during 2014, the focus will shift to the creation of a National brochure promoting Irelands Marine Renewable Energy Test Facilities available at all Technology Readiness Levels.

The Portal, in conjunction with other activities such as Ireland's Marine Atlas and other initiatives will increase the quantum and quality of information available to all marine stakeholders and provide the basis for similar initiatives in other marine areas.

In 2015, Ireland's Marine Renewable Energy Portal was shortlisted for an Ireland e-Government Award in the category *Promoting Ireland Overseas*. The Portal will be developed further in 2015 with more advanced information-access features and additional detailed information such as for relevant port facilities

Showcasing Ireland's Marine Technology Products & Services

In March 2014, the Marine Institute sponsored and hosted an Ireland Pavilion at Oceanology International London, the world's largest marine science and ocean technology event. There were eight Irish exhibitors on the stand, representing the Irish marine technology sector. The Ireland Pavilion promoted Irish products and services in the area of marine technology to one of the largest gatherings of the international marine technology community. Preparations have commenced in 2015 for the Irish Pavilion at the Oceanology International event which will be held in 2016.

Irish researchers and companies, including those from the Marine Institute and SmartBay Ireland, also exhibited at the 5th International Conference on Ocean Energy (ICOE) in Halifax, Nova Scotia Canada, as part of the Irish Pavilion. ICOE is the global venue for exchange of information and building relationships, in order to grow a world-wide marine renewable energy industry. It is now recognised as the world's pre-eminent industry-development event with almost 1000 participants from nearly 40 countries.

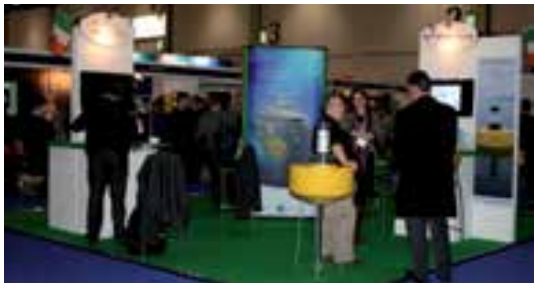


Figure 22: Ireland Pavilion at the Oceanology International Forum 2014

Promoting offshore Ireland's exploration & development opportunities

The Department of Communications, Energy and Natural Resources continues to actively promote exploration and development opportunities offshore Ireland to the international oil and gas industry. As at the end of December 2014 there were three Petroleum leases, 30 Exploration Licences and 18 Licensing Options active in respect of the Irish Offshore. Ten new Exploration Licences and Licensing Options were granted in the year. Four Licensing Options were granted in respect of areas in the Celtic Sea, and six Frontier Exploration Licences were granted in respect of areas the Atlantic Margin.

Ireland now has the highest number of exploration authorisations in place, since exploration began in Ireland's offshore four decades ago.

See Section 2 for details on the 2015 Atlantic Margin Licensing Round.

Capturing Ireland's share of the global seafood market

In April 2014, BIM hosted a major conference for the seafood sector which was formally opened by the Minister for Agriculture, Food and the Marine, Mr. Simon Coveney T.D. This Conference concerned the main themes in BIM's strategy of *Capturing Ireland's Share of the Global Seafood Opportunity* and in particular the need to build scale in the sector in order to compete effectively on global markets.

Leading experts from the global seafood industry from Canada, Iceland and Norway as well as notable players from Scotland and Ireland shared their experiences of growing seafood companies with the audiences. As well, experts from the worlds of corporate finance also shared insights into how the sector should be structured in the future to build scale and the capacity to compete in the international marketplace. The event, which was attended by more than 200 industry delegates, was seen as a considerable success and as paving the way for a new era of commercial development in the Irish seafood industry.

Following on the successful 2014 BIM Conference, BIM plans to hold a further conference in May 2015 with the aim of addressing leadership and scale in the seafood industry.

Origin Green - showcasing Irish seafood

Since 2011, Bord Bia has coordinated an Irish Seafood Pavilion at the China Fisheries Show which takes place annually in November. This is the second largest seafood trade show globally with an estimated 25,000 visitors from 100 nations attending annually. The presence of Irish companies on the Bord Bia stand has steadily increased since 2011, showcasing Ireland's leading seafood processors under the *Origin Green* banner.

Through Bord Bia's trade development programme, it has been very successful in encouraging high end retail and foodservice Chinese customers to visit Ireland to meet with Irish seafood processors on a one to one basis. These itineraries have been very effective in generating new business for the sector, providing Irish companies with an excellent opportunity to showcase their processing facilities and also allowing the customers to see first hand the excellent environment in which Irish seafood is produced. These visits are very effective in providing a guarantee to Chinese customers on traceability, sustainability and food safety, all key issues of growing concern to the Chinese middle class consumer.

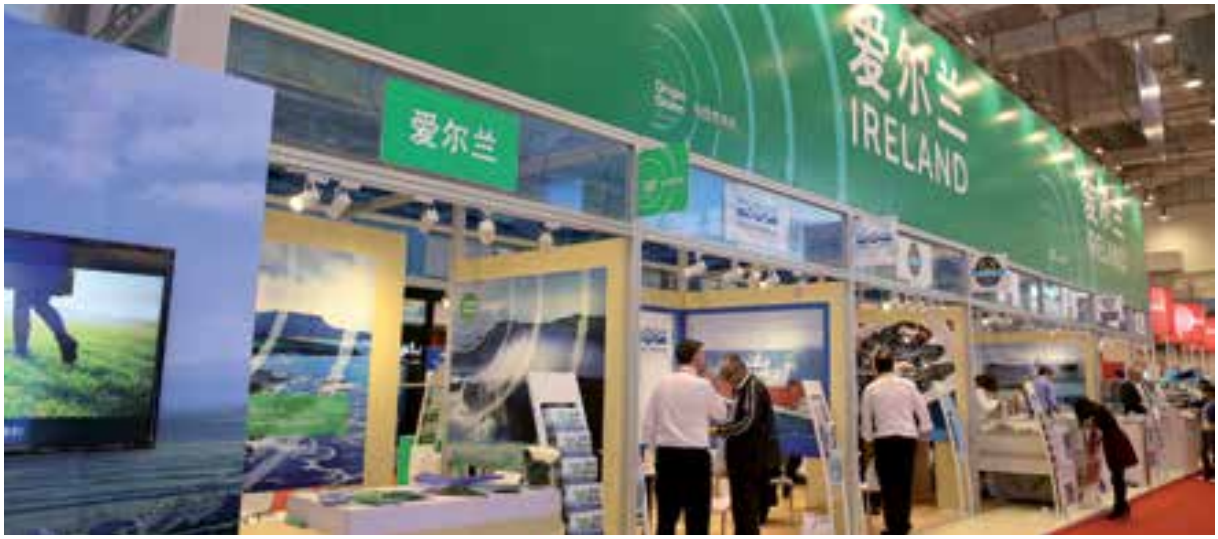


Figure 23: Ireland stand at the Chinese Fisheries Show in 2014

2015 will see the launch of a series of trade awareness events in Beijing and Shanghai. To increase exports of premium seafood from Ireland, Bord Bia is concentrating its promotional efforts on building awareness about new species from Ireland such as brown crab and Irish prawns.

Outside of the Chinese market, Bord Bia is also working closely with the Irish seafood industry to increase seafood exports in other growing seafood markets in the Asian region such as South Korea, Japan, Thailand, Vietnam and Taiwan to identify new trade customers

During the last 4 years, Bord Bia has welcomed more than 50 Asian customers to Ireland on customised itineraries which has directly led to firm orders being secured by Irish seafood processors with customers in this region. As the demand for premium seafood in Asia continues to grow and consumption of aquatic products continues to outpace growth in production of such products, Ireland is well placed to capitalise on the growing opportunity for Irish seafood in this region.

Fáilte Ireland Experience Development

In the course of 2014, ongoing communications and development workshops and meetings were conducted to encourage and support tourism businesses to improve their visitor experience offering, informed by market insight and the Fáilte Ireland Experience Development Framework.

This included a focus on water-based activity business and boat tripping along the *Wild Atlantic Way*, in Dublin Bay and Cork Harbour, in line with Fáilte Ireland's Strategic priorities. The *Wild Atlantic Way*, like many of Ireland's coastal and marine tourism assets, passes through some of Irelands' most valued wild places – many of which are highly sensitive to environmental impact. Strict environmental protection is in place for many of these areas and there are legal requirements to assess new developments to ensure that no harm arises. The continued and future growth of this sector and Ireland's unique selling point is dependent on protecting the credibility of this clean, green image.

In 2014, Fáilte Ireland continued to work with new adventure travel tour operators to increase exposure and sales opportunities for activity businesses, including water-based and gain greater understanding as to how these businesses can improve and grow. Highest standards of environmental and economic sustainability are central to this work. Ensuring the natural Environment is recognised, leveraged and enhanced is central to the work of Fáilte Ireland and initiatives such as the *Wild Atlantic Way*.

Action 17 continued:

Give a clear message to investors that Ireland is 'open for, and a good place to do, marine business' domestically and internationally and continue to market and promote business opportunities

Action 18:

Continue to market and develop Ireland as a world-class location for international shipping services.

Irish Maritime Development Office (IMDO)

Throughout 2014, the IMDO was actively involved in:

- encouraging investment in the maritime sector;
- offering policy advice on the development of our ports and shipping infrastructure;
- promoting higher standards in maritime education;
- increasing general awareness of the sector, in terms of career opportunities and the contribution that it makes to the national economy; and
- conducting economic analysis.

In advancing the IMDO's business development agenda, considerable effort has been put into building stronger relationships with the IDA, culminating in presentations to their financial services team and their emerging sectors team, while establishing a clearer understanding of the development potential of the sector. Following these presentations, contact was established with IDA personnel in China, Singapore and Germany, in order to maximise the impact of business development missions that are being planned to these countries.

The IMDO have also collaborated with embassies in the United Kingdom, Greece, Germany and Singapore, with the intention of further strengthening these relationships to exploit the business opportunities that exist in these regions.

In addition, there has been extensive engagement with professional services providers in Ireland in order to develop a shared understanding of how best to market Ireland's maritime industry internationally. The IMDO presented at the Irish Maritime Law Association, to an audience of 50 legal professionals, all with an interest in the development of Ireland's maritime economy.

Also in 2014, the IMDO continued its engagement with port companies. In September 2014, the IMDO presented at in Irish Ports Association Annual Conference (now The Irish Maritime Forum). This event is a collaborative endeavour between the Irish Ports Association, the Institute of Master Mariners, the Port of Cork, the Institute of Chartered Shipbrokers, and the Irish Chamber of Shipping. The event provided an opportunity to engage with the ports industry, to support and articulate National Ports Policy and encourage business development and investment in the sector. Addressing the need for research in the area of port performance metrics, as outlined in National Ports Policy, the IMDO sought a research fellow, under the Marine Institute's Cullen Fellowship Scheme to conduct research proposed by the Department of Transport, Tourism and Sport and the Competition Authority. The research project, commencing in 2015, will run for three years and aims to inform policy in the area of future port capacity. In addition, the IMDO will, at the instigation of the Department of Transport, Tourism and Sport, commence the development of a training programme for port directors. It is intended that these courses will run every three months and be available to new and existing directors of State ports and to public servants involved in the corporate governance of such companies.

A Tonnage Tax Report prepared by PwC was commissioned and launched in September 2014 with the aim of encouraging foreign shipping companies to locate in Ireland. Ireland's favourable tonnage tax regime is a key selling point for Ireland's maritime industry. The report found the regime fit for purpose and superior on many dimensions to the tonnage tax regimes operating in other jurisdictions.

The IMDO remains closely involved with the Irish Shipping Services Centre project, which seeks to establish Ireland as an international shipping hub. The centre will result in the creation of high quality jobs in Ireland and will catalyse investment in the maritime industry.

Action 19:

Encourage and facilitate coastal communities to avail of existing and future marine enterprise opportunities, e.g. through:

- Training programmes
- Business supports
- Provision of specialist marketing and investment advice, market intelligence and consumer research.

Wild Atlantic Way - supporting communities to act as custodians and advocates

Fáilte Ireland's objective, as exemplified by the *Wild Atlantic Way*, is to develop a world-leading destination proposition to increase awareness, visitor numbers and revenues from international markets, while ultimately supporting the national tourism sustainable growth strategy. Encouraging communities to act as custodians and advocates for the *Wild Atlantic Way* and become active participants in its management and delivery has been a core focus of Fáilte Ireland. Further details on the *Wild Atlantic Way* are available in Section 2 and Action 17.

In 2014, a series of community meetings and workshops were conducted in the Dublin Bay area and in Cork Harbour to share market insights and encourage and inspire greater community participation to improve the visitor experience and deliver on the destination proposition.

Seafood Industry Training

In 2014, a total of 1,918 seafood industry personnel were trained in BIM National Fisheries Colleges of Ireland (NFCI) in Donegal and Cork, on its mobile Coastal Training Units. A nationwide sea safety campaign resulted in a total of 602 BIM Basic Safety Training cards being issued in 2014. The training comprised of the following:

Department of Transport, Tourism and Sport (DTTAS) Certificates	159
Safety at Sea	1,556
Radio Communications	79
Quality and Qualifications Ireland (QQI) Certificates and Skills Training	124
Total Training Provision	1,918

Source: BIM

In 2014, A Level 5 Module in Manual Fish Filleting was rewritten and submitted to QQI for migration which resulted in twenty one personnel achieving QQI certification at Level 5. BIM completed, in conjunction with the Galway, Roscommon Education and Training Board (GRETB), the development and migration of new QQI standard for Level 5 Certificate in Aquaculture. Two food safety management awards were drafted by a Standards Development Group ('SDG') in conjunction with QQI and industry experts for migration onto the National Framework of Qualifications.

Creating employment in rural, coastal, Gaeltacht areas

Ireland's marine resource is vital to the creation of employment opportunities in the Gaeltacht. An tÚdarás in 2014, continued to support marine-based rural coastal enterprise in Gaeltacht areas through a range of incentives which are primarily directed at sectors such as seafood processing and aquaculture as well as seaweed processing.

From a business development point of view, Údarás na Gaeltachta has supported a number of feasibility studies for projects involving seaweed and other marine resources. A number of these businesses will be moving to the next phase of investment in 2015.

Grants of over € 600,000 were awarded to Údarás client companies under the Seafood Processing Business Investment Scheme in conjunction with BIM and co-funded by the European Fisheries Fund and the Exchequer. These grants involved a total investment of over €2 million and will increase the production capacities of the companies thereby increasing sales and employment.

In 2014, over €100,000 was approved in grant aid to shellfish aquaculture projects under the Commercial Aquaculture Development Scheme (CADS) in conjunction with BIM and co-funded by the European Fisheries Fund and the Exchequer. These grants involved a total investment of over €500,000 and will lead to increased production capacity and employment.

Údarás na Gaeltachta continued its involvement on the three Fisheries Local Actions Groups (FLAGS) situated in the Gaeltacht.

F.L.A.G - Fisheries Local Action Groups

The Fisheries Local Action Groups are implementing The Fisheries Local Area Development Scheme which provides grant aid towards the sustainable development of fishery dependent areas in coastal areas. Fisheries Local Action Groups (FLAG) are committees which represent fishermen, the seafood industry and communities and statutory organisations who are engaged in community and economic development for coastal communities. FLAGs were tasked to develop an integrated local development strategy for their region and make decisions on funding for projects that give effect to their communities' strategies. The scheme provide grants for eligible communities and individuals in coastal regions, fishermen, their families or persons and organisations whose work/life relates to fishing and the seafood industry. Particular progress has been made under Axis 4 since its inception in 2012 as all FLAGs have developed their local development strategies and calls for projects were issued which led to 247 projects being grant aided by the FLAG Boards.

In 2014, 128 projects were approved by the FLAGs in support of sustainable fisheries communities. The projects gave support to fishermen, their families and business who in turn boosted seafood services and marine events within their communities. The FLAGs helped fishermen to enhance their employment opportunities and remain within the fishing industry by assisting with upskilling and training.

Traditional skills within communities were supported including the restoration of Waterford punts ensuring this valuable craft and heritage is not lost. Companies worked with the FLAGs to improve their business and benefited by the purchase of equipment, updating systems and promotion of their business helping to ensuring employment and future opportunities within their communities. The FLAGs projects added value to seafood and assisted with the development of seafood products, improved pier facilities, supported Maritime Events and festivals and supported coastal community groups.

Project calls are currently underway for 2015 with a total of 55 projects approved to date. Projects address one or more of the following priorities:

- Maintain and support jobs
- Add value to fisheries and aquaculture products
- Support diversification
- Support economic and social restructuring of areas facing difficulties as a result of changes in the fisheries sector
- Enhance economic and social prosperity
- Promote the quality of the coastal environment.

Building Stakeholder Capacity- Inshore Fisheries Forums

As outlined earlier in this report, the National Inshore Fisheries Forum (NIFF) was established in 2014, supported by a network of Regional Inshore Fisheries Forums (RIFFs) based on and linked to the community-led Fisheries Local Action Groups (FLAGs) around the Irish coast. The Forum structures were set up to encourage inshore fishing communities to participate in decision-making. The NIFF now represents the inshore sector on a number of important fisheries policy advisory bodies.

Minister Coveney hosted the first ever meeting of the National Inshore Fisheries Forum at Agriculture House in January 2015. This followed on from an initiative the Minister launched in May 2014 to encourage inshore fishermen using small fishing boats and their communities to participate in the decision-making on fisheries and environmental management. Historically Irish inshore fishermen had been poorly represented in policy structures, lacked a formal representative body and needed a dedicated platform where to discuss inshore issues and develop common initiatives.

Replicating and harnessing the successful FLAG (Fisheries Local Action Groups) regional model, the initiative has led to the formation of six Regional Inshore Fisheries Forums which gives a 'local' platform for inshore fishermen and stakeholders from marine sectors other than fisheries, such as seafood processing/sales, marine leisure, marine tourism, environmental NGOs and community organisations to identify and discuss common interests relating to sea-fisheries and seafood.

Challenges facing the inshore sector include implementing the reformed Common Fisheries Policy and protecting Natura 2000 sites as well as managing important inshore stocks such as lobster, crab and bivalve shellfish. In recognition of the importance of giving a voice to the inshore sector, the Minister has provided seats for the National Inshore Fisheries Forum at the EMFF Monitoring Committee, the Quota Management Advisory Committee and the Irish Fisheries Science Research Partnership.

LEOs Local Enterprise Offices

The 31 Local Enterprise Offices (LEOs) throughout the country are charged with promoting entrepreneurship and micro-enterprise development and are the first-stop-shop for those beginning a new business as well as those wishing to expand their existing one. They are the single point of access to all local and national enterprise supports and services. The LEO structure provides a service which amalgamates national enterprise policy and local business supports in order to strengthen the local business culture and environment.

The LEOs provide information and guidance to all business ideas, including those with a maritime dimension, and can provide funding and mentoring/training to projects that have the potential to trade internationally and become commercially viable. For example in the marine area,

- West Cork LEO has provided training and financial assistance to boat building operations, yacht service facilities, fishing sector servicing, net production and repair;
- Clare LEO has funded a number of maritime projects and will be providing training programmes, investment advice and business supports with a particular marine focus in 2015;
- Mayo LEO are to hold training/information events about wind energy;
- Donegal and Kerry LEOs have developed Seafood Development Programmes in conjunction with BIM;
- Waterford LEO supports the Dunmore East marine group on their FLAG programme; and
- Sligo LEO has supported projects such as shellfish production and wind turbines.

Action 20:

Progress a number of targeted emerging business development opportunities (e.g. offshore renewables, offshore services, maritime security and safety, shipping logistics and transport, ICT and sensors, biotechnology). This would include the collection/collation of market intelligence and foresight and the promotion of clusters using SmartOcean and IMERC as vehicles for innovation-led commercial development.

Action 20 was examined as part of the work of the Development Task Force, further details are provided in Section 2.

IMERC - delivering jobs through innovation and growth

IMERC, Ireland's maritime and energy cluster, continued in 2014 to promote Ireland as a world renowned research, education, training and development location that unlocks Ireland's maritime and energy potential.

Specifically in 2014/2015, site development works were undertaken as part of the IMERC Masterplan to facilitate the development of four fully serviced sites to promote with the IDA as future space for maritime and energy FDI.

IMERC also continued working with stakeholders including the Department of Defence and Cork County Council to contribute to the development of the Haulbowline Masterplan.

In 2014, IMERC hosted a large range of events which continued to be an important meeting place for Ireland's maritime community. This included:

- IMERC Innovation Week bringing over 200 people to Cork City Hall for a public lecture.
- IMERC's Blue Sky Thinking for Blue Growth Lecture series providing an exciting forum for speakers to challenge audiences on new topics such as the potential of electric arc furnaces for decommissioning ships, wifi in port areas and composites.
- In association with Energy Cork, an event, Cork Harbour - Energising the Region was held in the National Maritime College of Ireland. Discussed at the event is the role of Cork Harbour and, in particular, its crucial role in national energy supply and innovation.
- The Mechathon, held in association with MaREI and the Halpin Centre for Research and Innovation challenged students to design, build and test underwater robots. The initiative brought together engineering students from across the IMERC partnership in University College Cork, Cork Institute of Technology and Irish Naval Service in a competitive environment, with use of the wave test tanks in HMRC on Pouladuff Road.
- The IMERC week of the Year Competition continued to grow with marine renewable energy company Jospa taking first prize in 2014. Tyndall National Institute Researcher Donal Kennedy was runner up in the competition with his wave sensor technology.

Figure 24: Participants at the MaREI Halpin IMERC supported Mechathon.

Figure 25: Claire Lambe and Joss Fitzsimons of Jospa receiving the IMERC Innovator of the Year Award from Minister Simon Coveney

In December 2014, 80 jobs were announced by Resolute Marine, Exceedence and Marine Resolve in the Cork Harbour region. Boston-based wave-energy technology developer Resolute Marine Energy will create over the next five years the majority of the new job announcements as it establishes its European headquarters in Cork. Exceedence Ltd, a spin-out from the Beaufort Research Centre at University College Cork, will create new jobs in the area of marine renewable energy financial consultancy in 2015, while Resolve Marine, a global salvage company, are also employing in the next 12 months in its European headquarters. Resolute and Exceedence will operate out of IMERC in Ringaskiddy. Both Exceedence and Marine Resolve are also engaged in the SFI MaREI project.

The Entrepreneur Ship, a 30 desk facility within the IMERC cluster, continues to provide eight start-up companies with space to conduct business, build networks, innovate and create.

SmartOcean Cluster

The Marine Institute has been promoting the development of the *SmartOcean* cluster through participation in key international conference and technology exhibitions. The Institute organised a successful Ireland pavilion at Oceanology International (2014), held at London, Excel in March 2014. See Action 17 above.

The Marine Institute also participated in two key trans-Atlantic conferences in Canada. During Oceans 14, held in St. John's Newfoundland in September, a number of meetings were held to create a research and enterprise plan to further develop a transatlantic bridge between Ireland and Newfoundland. The Marine Institute also participated in the Ireland Pavilion at the International Conference on Ocean Energy (IOCE), Halifax, Nova Scotia, in November, which also represented a key opportunity to promote the supply chain opportunities of the SmartOcean cluster and the Integrated Digital Ocean as a key enabler of the sector.

RESEARCH, KNOWLEDGE, TECHNOLOGY & INNOVATION

Research and Development (R&D) and other knowledge-generating activities (e.g. seabed mapping) support sustainable economic growth and job creation through the development of new products and services, facilitate better management and protection of marine ecosystems; and inform policy, governance and regulation of the marine sector (HOOW Pg 39).

Research, Knowledge, Technology & Innovation

Action 21a:

Continue to implement Sea Change – A Marine Knowledge Research & Innovation Strategy for Ireland 2007-2013, taking account of the Report of the Research Prioritisation Steering Group (March 2012) and the relevant action plans (under development), that address marine opportunities; e.g. sustainable food production and processing, food for health and marine renewable energy.

Action 22:

Provide direction and focus for expenditure of marine research funding where appropriate through the relevant action plans for priority areas being developed by the Prioritisation Action Group.

Action 27d:

Continue to build marine research capacity and capability through targeted national and international research funding.

Prioritisation Action Group

Implementation of research prioritisation through the Research Prioritisation Action Group continued through 2014 across all Priority Areas including *Sustainable Food Production, Food for Health* and *Marine Renewable Energy*. In June 2014, the first progress report was published. The report provides a comprehensive update on the implementation of the *National Research Priority Exercise* from its inception up to the end of June 2014. The report summarises developments at a system level, as well as that the programme level across, the 14 Priority Areas.

The *Marine Renewable Energy Priority Area* is developing well at a national level, with clear policy interventions, and a growing RDI community. The SFI-funded Marine Renewable Energy Ireland (MaREI) Research Centre, which was established in 2013, focuses on developing the science required by industry to generate energy from wave, tidal and floating wind devices. The MaREI Research Centre has the potential to position Ireland at the forefront of the marine renewable energy research sector globally. MaREI had a number of funding successes in 2014, securing over €16m from exchequer and non-exchequer sources. MaREI directly supports 77 highly skilled jobs and partners with over 40 industry market leaders in energy, marine technology, software and hardware providers who have invested over €10 million. MaREI acts as a catalyst to Ireland establishing a safe, sustainable and profitable marine energy supply for domestic and international markets. The latest enterprise supports include the SEAI prototype development fund, the development of the Atlantic Marine Energy Test Site (AMETS), and the Galway Bay and Cork test sites.

In terms of the *Food for Health and Sustainable Food Production and Processing Priority Areas,* there has also been significant progress to date in implementing the Action Plans, with considerable activity by all concerned across the board. A new strategic research and innovation agenda, *Sustainable, Healthy Agri-food Research Plan* (SHARP) was published in June 2015. The Plan is built around three guiding principles - competitiveness, sustainability and citizen/consumer orientation, recognising the need to maintain a strong collective focus on the production and processing of safe, high-quality, nutritious food in an efficient, competitive, and sustainable manner. Throughout 2014 the new Plan was prepared with consultation across relevant Government Departments, funding bodies, the research community, industry and the broader society. The Plan identifies a clear set of research priorities, including marine-related, that will act as a blueprint to guide the funding decisions over the next few years.

Marine Institute Marine Research Funding

In 2014, €3 million in funding was provided by the Marine Institute for dedicated research programmes and training on the National Research Vessels. This allowed for the completion of 14 research surveys, including two for policy support and 11 training programmes. During 2014, over 300 students were trained over 220 ship days on both the *RV Celtic Explorer* and *RV Celtic Voyager*.

The Marine Institute also launched in 2014 a new initiative for Masters and PhD programmes The Cullen Fellowship. The pilot programme launched four PhD fellowships in the following areas:

- Ocean Climate
- Remote Sensing
- Imaging Technologies
- Port Performance Metrics

In 2014, the Institute continued to operate the Networking and Travel Grants scheme, providing five grants for hosting marine related conferences in Ireland, 10 grants were awarded for mobility and technology transfer and 32 grants were awarded to researchers presenting at international conferences overseas.

Other work carried out during 2014 included managing existing suite of awards (18 projects total grant-aid to the value of €31 million) and overseeing financial management of €7.5 million budget paid in 2014.

The Marine Institute's Research, Technology, Development and Innovation (RTDI) allocation for 2015 is circa €8.5 million. This will be invested in the following key areas:

- Existing Research Projects/Programmes
- Access to Research Vessels for Research & Training
- Capital Equipment (Scientific /IT)
- Policy Priorities (e.g. HOOW Priorities)
- Networking and Travel Grants
- Cullen Fellowships Call for Masters/PhD Programmes
- New Call for Research Proposals. In 2015, the Institute will work with Science Foundation Ireland (SFI) on a potential joint call under SFI's Investigators Programme.

The Marine Institute are currently finalising the Marine Research and Innovation Agenda for Ireland 2014-2020 (and associated Action Plan) that will set the sectoral priorities for marine research for the current funding cycle until 2020. The agenda will guide the new investments in 2015 (see Action 21c below).

Science Foundation Ireland (SFI)

SFI currently funds one Investigator Award that aims to model ocean waves, their energy potential and their interactions with wave energy converters, and one Investigator Award that aims to predict the wave energy-potential of the Irish offshore environment. Both projects aim to provide modelling frameworks to support the production of ocean wave energy and to train several PhD students in the field.

As referred to previously, over the six years of its SFI funding award, the MaREI Research Centre (see 21a) will train 52 PhD and 18 postdoctoral students/researchers. For MSc students, the MaREI investigators have set-up an All-Island Marine Renewable Energy Master's Programme. This Master's programme is the only one of its kind in the world, educating engineers for successful careers in the marine renewables industry. The MSc students gain advanced engineering skills in areas such as wave energy, tidal energy and power systems as well as relevant non-technical expertise in areas such as geological surveying and environmental impact assessment, whilst industry placement hosts benefit from access to cutting-edge expertise in marine renewables, as well as an opportunity to develop existing projects and new R&D ideas. 12 students have participated in the Master's Programme, and the first industry placement programme ran from June 2014 to September 2014.

The SFI Research Centres Programme Call 2013 was themed to include Geosciences underpinning sustainable economic development and earth and ocean observation. Resulting from this call, the Irish Centre for Research in Applied Geosciences (iCRAG) was one of five SFI Research Centres announced in October 2014. The funding announcement for iCRAG represents a total investment of €30 million of which €19.4 million comes from the exchequer with the balance of €10.6 million represents the contribution from industry partners. The iCRAG Research Centre will undertake applied geoscience research focused on areas of strategic importance to Ireland including, marine geoscience, groundwater and hydrocarbons underpinning a range of economically important activities including, for example, the characterisation of seabed geological conditions that impact on hydrocarbon exploration. iCRAG will address issues of national strategic importance in areas such as raw materials and energy security.

The SFI Targeted Research Professorship Programme aims to recruit into Ireland top tier research talent and leadership in key areas of strategic importance. The 2014 Targeted Research Professorship Programme included the thematic areas of Marine and Energy awards and is expected in the second quarter of 2015. Through this Programme, it is planned to attract outstanding research talent to Ireland by assisting research bodies in the recruitment of world-leading researchers for Professorial Chairs, or other research leadership positions in targeted scientific areas as covered by SFI's legal remit.

Two awards were made in 2014 under the Technology Innovation Development Award (TIDA) programme:

- Seaweed-based Integrated Biorefinery in Ireland: A new approach for extraction of high-value products and biogas generation (€62,486)
- Assessment of marine derived linear tetrapyrroles as immunosuppressive agents for organ transplantation (€100,000).

Through SFI's Investigator Programme it is proposed to support the development of world-class research capability and human capital in areas of science, technology, engineering and maths that demonstrably support and underpin enterprise competitiveness and societal development in Ireland. Novel Products from the Marine Environment and Sustainable Food Production and Processing, including efficiency and sustainability of wild fish harvesting and aquaculture, were included in the 2014 call.

A major objective of the SFI Investigators Programme call for 2015 will be to stimulate and catalyse strong participation by Irish researchers in the European Commission's Horizon 2020 research framework programme. Whilst all proposals to the call must align with SFI's legal remit, they will also be required to demonstrate a clear relevance to, and alignment with, topics that are encompassed by the Industrial Leadership and Societal Challenges pillars of Horizon 2020.

It is also aimed to conduct world-leading research on all aspects of marine renewable energy from marine robotics and materials to endure ocean conditions, to offshore wind, wave and marine energy devices as well as technologies to deliver power to the grid for electricity supply at home and abroad.

SmartBay Ireland National Infrastructure Access Programme

Since its inception, the SmartBay Ireland National Infrastructure Access Programme (NIAP) has awarded funding to in excess of 20 small-scale projects conducting research in the following areas: acoustics, biofouling, high frequency radar, water quality, off shore wifi communications, sensor design, surface currents and remote observation vehicle testing. The fund was made available in 2012 through Dublin City University over a two year period to enable researchers to access the National Test and Demonstration Facility in Galway Bay. Research proposals were invited for funding under a number of activity types that are in line with the objectives of the SmartBay PRTLI Cycle 5 programme.

SmartBay Ireland National Infrastructure Access Programme Activity II Large Scale Projects began in late 2013 with the four large scale projects with awards up to €25,000. In excess of €100,000 had been awarded to researchers from NUI Galway, the Coastal & Marine Research Centre, University College Cork, Tyndall National Institute and Dublin City University covering research and validation in oceanography, fisheries and aquaculture, novel marine technologies, underwater acoustics and development of a low cost CTD. Further calls are anticipated in 2015.

Action 21b:

Continue to implement research supporting increased hydrocarbon prospectivity through government-industry and international collaboration, supported by research teams in the third level sector across a range of national and international funding mechanisms (2012-2013), to address data, knowledge and specialised research capabilities to support and enable offshore exploration for indigenous oil and gas resources.

Regional Seismic Survey

2014 saw the completion of the Regional Seismic Survey Project. This 2D survey undertaken by the Department of Communications, Energy and Natural Resources (DCENR) in conjunction with ENI Ireland BV saw the acquisition of 16,800 km of full-fold 2D regional seismic in the Atlantic Offshore West of Ireland. The Project is by far the largest regional seismic survey acquired in the Irish offshore, and provides a regional grid of high-quality seismic data over Ireland's frontier basins.

The newly acquired data will aid understanding in identifying potential prospectivity for oil and gas offshore Ireland, and will be of particular interest to Government, industry and researchers.

Irish Offshore Strategic Environmental Assessment (IOSEA)

DCENR commenced a Strategic Environmental Assessment (SEA) to inform applications under the 2015 Atlantic Margin Licensing Round. This SEA will not only inform the Department of specific environmental considerations in its future licensing rounds in the Atlantic Margin Basins, but it will also review earlier SEAs and the recommendations arising. This process will also be an efficient means to provide exploration companies working offshore with an operational baseline against which they can conduct their work and ensure the protection of the marine environment.

ObSERVE Programme

DCENR, in liaison with the Department of Arts, Heritage and the Gaeltacht, commenced the establishment of a marine mammal data acquisition programme. This five year environmental baseline data acquisition programme will set out to address the knowledge gaps that remain in the understanding of protected marine species and sites in key Offshore basins. Acquiring a detailed understanding of species distribution, relative abundance and sensitivity/vulnerability in Ireland's offshore waters will ensure that petroleum exploration activities can be permitted and carried out in an environmentally compliant and robust permitting manner. Further details on the ObSERVE programme are available in Section 2.

Figure 26: Marine Institute Laboratories, Galway

Action 21c:

Develop and implement a new Strategic Marine Research Agenda 2014-2020 and associated Action Plan, focused on industry, policy and discovery research through cross-agency collaboration on joint initiatives.

Strategic Marine Research Agenda 2020

In 2014, the Marine Institute commenced drafting of a new Marine Research and Innovation Strategy, including inputs from the work of the Development Task Force and work of the Research Prioritisation Action Group. An important aspect of the new Strategy will be continuing to collaborate both nationally and internationally on joint funding calls. For example, in 2014 the Marine Institute signed Memorandums of Understanding to participate in joint funding calls by the Marine Biotechnology ERA-Net and JPI-Oceans consortia. In 2015, the Institute will continue to progress and launch a number of joint funding calls.

In 2015, the Institute will continue to consult with a range of stakeholders and review the outputs of the Development Task Force, with the aim of completing and publishing the final Strategy in 2015.

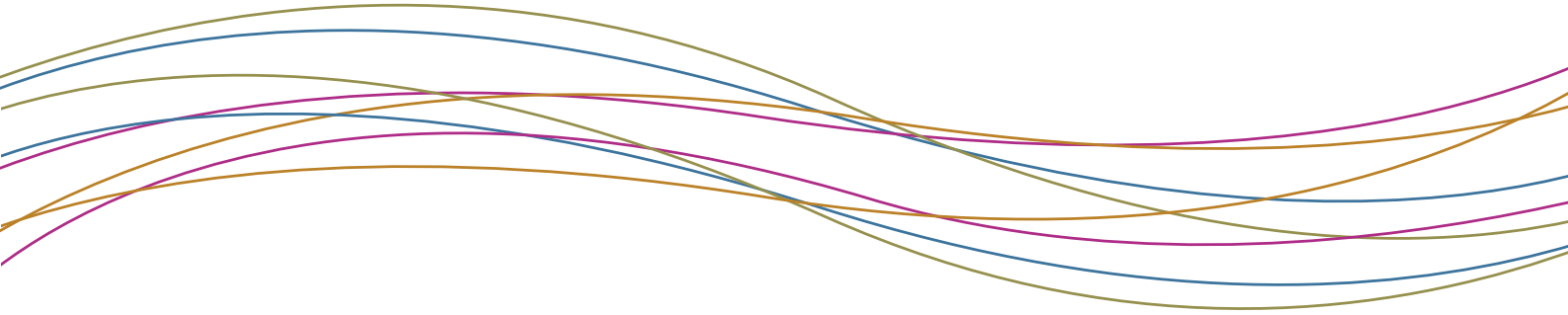
Action 23:

Complete the INFOMAR seabed mapping programme, to provide data, products (e.g. databases, charts, physical habitat maps) and services (marine decision support tools) as critical inputs to maritime spatial planning and enablers of infrastructural development, research, education and value-added products. Further develop the role of INFOMAR in:

- Training of Irish graduates in latest techniques in seabed mapping, which are applicable world-wide;
- Utilisation of data in major research projects; and
- Development of collaborative added-value products through engagement with SMEs and the research community.

2014 INFOMAR Programme

The 2014 INFOMAR Programme, a partnership between the GSI and the Marine Institute, included the successful continuation of shallow water and coastal survey effort. Significant infrastructural upgrades took place and are ongoing, to place INFOMAR strategically for engagement in Phase 2 of the programme delivery, and to potentially leverage future research funding opportunities. The *R.V. Celtic Voyager* was fully commissioned with a new multi-beam mapping system, and two new multi-beam systems were also procured for the *R.V. Celtic Explorer,* with installation and commissioning scheduled in early 2015.



An additional shallow water vessel and survey system will be deployed by the GSI in 2015 to augment the *R.V. Geo* very shallow water mapping capacity. A capacity build initiative was undertaken, with external personnel trained to support data processing and analytics requirements, PhD funding proposals submitted, and vessel based graduate training provided, in partnership with the SMART School Programme (see also Action 21a). A summary of the key data acquisition, management, integration and value added activities is provided below.

Programme 1 – Data Acquisition, Management & Interpretation

In 2014 the programme mapped over 2,000 km^2 of seabed, with data acquisition focussed in Lough Swilly, Killary Harbour approaches, Mulroy, Donegal, Blacksod and Tralee Bays, as well as off the West and South West coast. In addition survey was undertaken for BIM in Sheephaven Bay, and SEAI off the Clare Coast. The data are vital for marine safety/charting, offshore energy and aquaculture development, coastal and environmental protection, heritage (shipwrecks) and research.

Programme 2 – Data Integration and Exchange

One of the key bottlenecks identified in delivery of an integrated data and product suite, is the time lag between acquisition of inshore survey data, and delivery of processed survey leg data. Cleaned and levelled hydrographic data is required to merge with historical data, before final chart production can be undertaken.

Workflows were streamlined during 2014 to expedite data integration of individual survey leg data, for seabed classification charting which is ongoing for both INFOMAR deliverables, and contributing to EC EMODNET integrated mapping products.

To improve access to the data and associated products and information, the INFOMAR website was given a preliminary update to direct users more clearly towards relevant material and data resources. Work will continue in 2015. Web map services have been developed and maintained, to ensure systems are compliant with current data exchange standards, and are accessible through stable and current platforms and technology.

Programme 3 – Value Added Exploitation

Significant activity has been ongoing under the Value Added Programme, in line with recommendations from the 2013 PwC INFOMAR Programme Review recommendations.

The focus of this sub-programme during 2014 has been on:

- Development and delivery of some specific long term potentially high impact projects supported by the Dublin Business Innovation Centre, including a prototype Dive App, and Education and Outreach Development Programme;
- Raising public awareness of INFOMAR through use of social media, higher level engagement in national marine related conferences and events (tourism to heritage to policy), and more active outreach during field operations;
- Engagement in strategic large scale research collaborations and initiatives (Trans-Atlantic Research Alliance / SFI Clusters Calls / DG MARE Coast & Checkpoint / ESA Thematic Exploitation Programme). GSI are a partner on the successful SFI iCrag programme, awarded in 2014. INFOMAR supported the coordination of the European Commission Workshop on Seabed Mapping held in Dublin Castle in December 2014, as part of the Galway Implementation on development of the Trans-Atlantic Research Alliance; and

- Focus on third-level capacity build across the skill set shortage areas relating to seabed mapping required to underpin commercial and research opportunities. PhD research proposals have been submitted in the areas of fisheries acoustics, biotope mapping, and seaweed resource assessment. In addition, graduate field based training has been provided in partnership with the SMART programme

Action 24:

Strengthen the collation of marine socio-economic data to ensure the timely availability of marine socio-economic statistics, providing an evidence base for policy and decision-making, economic forecasting and scenario planning.

Ireland's Ocean Economy

In 2014, the Marine Institute continued to fund and work with NUI Galway's Socio-Economic Marine Research Unit (SEMRU) on the ongoing collection of socio-economic data related to the Ireland's ocean economy. This included a review of data collection and issues arising such as time lag in the availability of economic data from the Central Statistics Office (CSO).

SEMRU, through the Marnet Project led by the BMW Regional Assembly, have in parallel been working with EU partner countries and DG Mara on improving the methodology and reporting on marine-related economic activity.

In 2014, SEMRU commenced the data collection for their third report on Ireland's Ocean Economy. Data was being sourced via the CSO and also via surveys of companies in sectors where data is unavailable. The report is due to be finalised and published in early 2015.

Figure 26: Ireland's Ocean Economy Report

NUIG's Socio-Economic Marine Research Unit (SEMRU) Report on Ireland's Ocean Economy, due for publication in 2015, estimates that in 2014:

- the direct economic value of Ireland's ocean economy is €1.4 billion or approximately 0.8% of GDP;
- the sector had a turnover of €4.5 billion; and
- provided employment for approximately 18,480 Full Time Equivalents (FTEs).

The report, which provides trends across 13 marine sectors over the period 2010 – 2012 and estimates for 2014, represents a period of 'blue growth', a turnaround on the previous reporting period (2007-2010) that represented the period at the lowest point of the economic contraction with a significant decrease in activity.

SEMRU reported trends 2010-2012 and 2013/2014 estimates:

- Shipping and maritime transport experienced a significant increase in activity, both in turnover and GVA. This is due to a moderate increase in the volume of international trade in the 2010-2012 period, as well as a result of an increase in activity for support services associated with the sector, including those related to ship financing and leasing. The levels of activity experienced in 2012 are expected to remain stable in the 2012-2014 period.
- Marine tourism and leisure saw a decline in turnover, employment and GVA in 2012. This year represents a turning point in marine tourism activity, with a gradual expected recovery in 2013 and 2014 in line with the trends in general tourism.
- The Irish international cruise industry experienced an increase of 15% on 2010. Estimates suggest that there has been a large increase in activity in the 2012-2014 period.
- Marine retail has experienced a notable recovery in 2012 and this trend is set to continue in 2013 and 2014.
- Sea Fisheries experienced increases in turnover, GVA and employment in the 2010-2012 period, which are expected to continue in 2013 and 2014. The growth in employment is expected to slow down in 2014.

- The aquaculture sector had an increase in turnover and GVA over the 2010-2012 period of 6% and 31% respectively. While a moderate increase in activity has been estimated for 2014, employment is expected to remain steady for the 2012-2014 period, similar to what has happened since 2010.
- There was a significant increase in activity in the seafood processing sector in the 2010-2012 period, accompanied by an increase in employment. Estimates for 2014 suggest a moderate increase in seafood processing activity in the 2012-2014 period.
- Moderate increases in turnover in the oil and gas sector for the 2010-2012 period are a reflection of increasing Irish oil and gas exploration activities, which are also reflected in the levels of employment growth in the sector. These activities have overcome the gradual decrease in oil and gas production activity as a result of the Kinsale Head Field reaching the end of its production life-cycle and the Corrib Gas Field not coming on stream until 2015.
- Marine manufacturing, construction and engineering is gradually recovering from the downturn it experienced in the previous 2007-2010 reporting period, with an increase of 25% and 15% in turnover and employment respectively in the 2010-2012 period. While GVA is still showing no major signs of recovery, estimates for 2014 suggest a 14% increases in GVA in the 2012-2014 period.
- Emerging industries continue to show very positive trends in the 2010-2012 period. Marine commerce presents the largest increase in turnover and employment, which reflects the overall slow recovery of the Irish economy in this period. The sector was also the largest contributor of turnover to the marine economy in 2012 among the emerging industries, followed by high tech products & services, biotechnology & bio-products and marine renewable energy, respectively.

Source: SEMRU Ocean Economy Report (Published 2015)

Economic Impact Assessment Model for the Marine Sector

In addition to the above work, SEMRU and the Rural Economy and Development Programme of Teagasc have developed, under Beaufort Award funding, an Economic Impact Assessment Model, the Bio-Economy Input Output Model (BIO). This model has been developed to assess the output and employment multipliers of public policy initiatives such as *Harnessing Our Ocean Wealth*, *Food Harvest 2020* and the forthcoming *Agri-Food 2025* Strategy.

The model disaggregates the national Input-Output Model of the Central Statistics Office to incorporate primary, industry and service sectors across the bio-economy incorporating detailed agri-food, forestry and marine sectors. It captures economic flows between these and other sectors in the economy, inputs such as labour, profit and imports and final destinations such as households, industry, government and exports.

Results in relation to the employment multipliers associated with *Harnessing Our Ocean Wealth* are expected to be reported in 2015.

Irish Maritime Economics

The Irish Maritime Development Office (IMDO) provides regular economic commentary on the Irish maritime sector. In 2014, quarterly bulletins were issued to the market, in addition to bespoke reports that addressed emerging areas of interest or topics of concern to industry.

The IMDO also produced its annual publication, the *Irish Maritime Transport Economist* (IMTE), that contains valuable statistics and economic analysis, which has become a valuable reference document for practitioners and policy makers in the maritime sector.

The IMTE shows that the Irish maritime sector continued to grow in 2014, closely tracking the growth of the Irish economy. Port volumes increased by two percent during the period, as measured on the iShip index, a composite index that combines five traffic types in a single indicator of total port throughput. The return of growth has bolstered confidence and resulted in a number of Irish ports advancing ambitious plans to add capacity.

Action 25:

Support existing and new test-beds/facilities for demonstration and commercialisation purposes that promote Ireland as a test-bed for renewable energy technologies and ICT (SmartOcean) focusing on the development of innovative technologies that support real-time information gathering (e.g. for security, surveillance, environmental monitoring).

Action 25 is also being examined as part of the work of the Development Task Force; further details are provided under Action 1 (b) above.

Galway Bay Marine Test and Demonstration Facilities

Ireland's Quarter Scale Marine Test Site is located 1.5km offshore in water depths ranging from 20m – 23m within Galway Bay. The license for the site has been held by the Marine Institute since 2006. The Site allows for developers wishing to undertake low-cost sea trials and validation of devices and components at various technology readiness levels. An underwater cabled observatory (known as the Galway Bay Cable Project – see below) is planned for the test site (due to be operational in 2015). The hybrid optical/electrical cable will terminate at an underwater node and will provide up to nearly 8kW of power and data communications. Several optical and electrical connectivity options will be available. A floating 'sea station' facility is also being planned as part of the facility. SmartBay Ireland manages the site on behalf of the Marine Institute and the Sustainable Energy Authority of Ireland (SEAI).

Figures 28 & 29: Galway Bay Marine Test & Demonstration Facilities

The Galway Bay Cable project, managed by the Marine Institute, has progressed very well over the course of 2014. Significant procurement was undertaken for the various components of the system and those contracts have been overseen by a project team of engineers and scientists. The main components of the system are on schedule for testing and delivery in early 2015. The shore station renovation was initiated and onshore civil works completed in the form of ductwork construction and installation of the onshore portion of the cable. The *R.V. Celtic Explorer* will install the system in April 2015.

In 2014, the Marine Institute also continued to work on the acoustic array and buoy at the Galway Bay Wave Energy Test Site on behalf of SEAI. This infrastructure will connect directly to the fibre optic cable being installed by the Institute in 2015.

Data systems to manage and publish data from the Ocean Energy test-beds will be developed further in 2015, including managing data from the Galway Bay test site cable.

A floating 'sea-station' facility is also planned for the Galway Bay site. The 'sea-station' will provide additional power to, and dissipate power generated by Ocean Energy Conversion (OEC) devices and/or components of OEC devices in addition to supplying high-speed data transmission for real-time monitoring.

Additional work in 2014 to promote and develop Irish research infrastructure and test-beds included:

- Signing of a Memorandum of Understanding (MOU) between SmartBay Ireland and SmartBay Newfoundland to further consolidate and develop the partnership that exists between the two Marine Institutes and the SmartBay infrastructures
- Signing of MOUs with the Marine Institute and SmartBay Ireland with a consortium of European research infrastructures including Obsea, PLOCAN, and CSIC
- Funding four SmartBay National Infrastructure Access Programme projects (see Action 27d); and
- Integration of infrastructure into European research projects under FP7 Oceans of Tomorrow and H2020 Blue Growth

These initiatives and investments will position Ireland to leverage additional opportunities through EU Horizon 2020 and European large scale research infrastructures, both in renewable energy and ocean observation.

Dublin Bay Digital Diamond

The Commissioners of Irish Lights' Dublin Bay Digital Diamond (DBDD) project progressed in 2014. This involved working with a broad industry based Technical Advisory Committee (TAC) to demonstrate the benefits of e-Navigation and other technology including coastal WiFi; vessel arrival warning systems; GNSS denial backups; camera systems; spar buoy technology and marine data gathering and transfer.

CAPACITY, EDUCATION, TRAINING & AWARENESS

A skilled and experienced workforce that adapts to changing requirements and new opportunities is essential for developing indigenous Irish industry, attracting foreign direct investment and providing efficient public services (HOOW Pg 42).

Capacity, Education, Training & Awareness

Action 27:

Maintain and build capacity (people) to meet the needs of the maritime sector; e.g. through tailored education and training programmes and research capacity building

See also Action 27d on building marine research capacity and capability.

Identifying future skills needs and labour market supply and demand trends

In 2014, under the Government Action Plan for Jobs, the Expert Group on Future Skills Needs (EGFSN) undertook a study to identify future skills needs and labour market supply and demand trends in the marine area. 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 Ireland's marine economy to 2020.

The EGFSN published its report in April 2015 and its key findings are as follows:

- Employment in the marine economy is spread across the key sectors and straddles the full range of occupations from managerial and professional to operatives, including engineers, marine biologists, maritime lawyers, environmental scientists, naval architects, technicians, and crane operators, fish filleters.
- Ireland has the potential to create up to 16,900 job vacancies in the period to 2020 arising through expansion and replacement demand with around 10,000 of these being new jobs owing to growth of the marine economy.
- While no major skills shortage was identified the skills in demand include engineers, people with boat handling skills and hydrographic surveyors. Many roles are not exclusive to a marine environment for example electrical and mechanical engineers, lawyers, technicians and welders which are all land based occupations but with a top up qualification or training an individual's skills can be 'marinised' to enable them work in a marine or offshore environment.
- The seafood sector in particular has an ageing workforce for which measures will need to be put in place to attract and upskill younger workers. Operatives and low skill roles are a major component of the marine economy but there is evidence of a shift towards more professionals being employed right across the economy including 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.

The full report, *A Study of the Current and Future Skills Requirements of the Marine/Maritime Economy to 2020*, and its recommendations is available on the Expert Group on Future Skills Needs website www.skillsireland.ie

The National Maritime College of Ireland

The National Maritime College of Ireland (NMCI) continued to develop its academic, Naval Service and professional training and education programmes in 2014. The NMCI provides a diverse range of maritime and offshore education, training, consultancy, research and innovation services both domestically and at overseas locations.

The first higher education facility in the State to be built using the PPP process, the College provides a number of full-time courses aimed at preparing seagoing Officers for the Merchant Marine, these include degree courses in Nautical Studies (Deck), Marine Engineering and Marine Electro-technology. Further education and professional development is also available for those moving up through the ranks to Master and Chief Engineer.

Figure 30: NMCI, Ringaskiddy, Cork

Approximately 400 students,'cadets' in respect of the seagoing degrees, are enrolled on these courses annually of which 10% are typically from non-EU counties, primarily from the Middle East.

In 2014, the NMCI continued to provide a comprehensive range of short courses for both national and international clients divided into the following categories:

- Safety at Sea, Rescue, Emergency Response, Navigation, and Radio refresher courses (STCW-95).
- Specialist short courses for the Oil and Gas and Offshore Industries (OPITO), including simulator-based courses.
- Bespoke or custom designed courses for individual commercial clients including Port Authorities, Shipping Companies and Operators, Ship Agents, Maritime Banks & trading houses, Bunker Operations, STS, petro-chemical, gas & commodity traders, emergency services, customs and non-armed defence force training.

The average number of students and delegates attending courses given by NMCI Services (the NMCI's commercial arm) reached over 1700 in 2014, with growth predicted at circa 30% year on year for both STCW and OPITO courses.

2015 will see further development and delivery of the four year programme for Chevron Shipping in safe operations and training, putting the NMCI to the forefront of innovative, bespoke training for international oil majors. 2015 will also see the NMCI act as patron for the inaugural Maritime Industry Awards, supporting an environment where the efforts of both individuals and organisations in the sector can be recognised. In addition to co-hosting the annual *Our Ocean Wealth Conference* and SeaFest 2015 in conjunction with UCC Beaufort, the College will act as co-ordinator and promoter of the Maritime Industry Forum and IASST Events in late 2015.

SMART - providing practical, bespoke, Research Vessel based training

The Strategic Marine Alliance for Research and Training (SMART) is a partnership programme of Higher Education Institutions (HEIs), supported by the Marine Institute and the Higher Education Authority, which pools existing expertise, facilities and infrastructure to increase capacity by providing offshore training for students of marine science, technology and engineering.

SMART provided practical, accredited, offshore training programmes for 263 students of marine science, technology and engineering in 2014. Training courses focus on the practical key skills and competences required to carry out research and operate at sea. All courses are multidisciplinary and address key marine science disciplines including oceanography, geology, benthic ecology, hydrography, marine mammal ecology, fisheries biology and ecosystem services.

Nationally, a number of bespoke courses have been developed and incorporated into accredited modules for delivery to marine-related undergraduate and postgraduate students. These blended learning courses have been developed in association with partner institutes and include reusable online resources, lectures, workshops in addition to training at sea:

- Multidisciplinary Offshore Operations (GMIT, NUIG, UCC, UU, MI)
- Geosciences and seabed mapping (UCC, UU, MI)
- Offshore energy and communications (AIT, NUIG, MI)
- Advanced marine technology (DCU, NUIG, SmartBay, MI)
- Marine renewable energy (UCC, CIT, MI)
- Applied Marine Biological Sampling (GMIT, IWDG, MI)

SMART is recognised as a unique programme internationally and has fostered strategic partnerships globally. For example, in 2014 the Atlantic Summer School, a collaboration with the Alfred Wegener Institute for Polar and Marine Research (AWI) in Germany, trained 14 postgraduates from eight countries on board the *RV Celtic Explorer* in cold-water coral ecosystems off SW Ireland. The 2015 Atlantic Summer School will be held on board the *RV Polarstern* for 30 graduates and will carry out oceanographic research on a trans-meridional Atlantic transect from Germany to South Africa.

Research-vessel-based training courses in multidisciplinary marine science and operational oceanography have also been developed for International graduates through the FP7 funded EUROFLEETS and delivered by SMART in Estonia (TUT & Bigelow Lab), Norway (DTU Aqua and OGS), Ireland (OGS and TUT) and Italy (CNR).

The SMART programme has been identified in many quarters as a natural springboard to develop future training and education in the marine sector and important contributor to making Ireland a leading international destination for marine education.

Marine Institute Employment & Training Programmes

The Marine Institute, similar to other public sector bodies, offers many employment and training programmes across all areas of business, including Internships, Job Bridge, Bursary Schemes, Work Experience/Student Placements and Stagiaire Programmes.

A total of 17 Internships under the Job Bridge scheme were offered in 2014, of these 94% were to graduates. These provide welcome support and up to date skills across all Marine Institute work areas:

- Six were in Fisheries Ecosystems Advisory Services providing work experience and skills development in the following work areas - Discard sampling in the ports, Inshore sampling, Fish Ageing, Salmon and Eel Assessment and Field Assistant duties at the Marine Institute's Newport location.
- 11 were for Marine Environment and Food Safety to gain experience and provide support with work programmes in Phytoplankton, Benthos Ecology, Marine Biodiscovery, Molecular Biology, Chemistry, implementation of ISO 9001 in the Fish Health Unit and Biotoxin analysis.

The Marine Institute annually operate a Bursary programme providing eight weeks paid work experience to undergraduates. In 2014, a total of 22 Bursaries were offered in the areas of Fisheries (Oranmore, Ports, Newport, Loughs Agency), Salmon Tagging (Newport), Shipping (Dublin), Oceanographic Services (Oranmore), and Communications (Oranmore).

Throughout 2014, the Marine Institute also supported a number of student placements and work experience requests:

- 22 students were facilitated on work placement programmes from colleges including GMIT, NUIG, DIT, TCD, UCD and Dundalk IT. These placements varied from three months to 12 months and supported research for PhD, MSc and HDip studies;
- Four students joined the Marine Institute on placement from international colleges based in Norway, Finland and the UK;
- Seven Transition Year student placements were supported in 2014, varying in duration from two to five days. The Marine Institute also held a TY open day in November, with over 150 transition year students gaining an insight into the work carried out at the Institute and receiving advice on pursuing a career in the industry; and

- Three people were also facilitated on work experience placements from other organisations including Solas, Vet Aqua International and one independent researcher.

The Institute's Stagiaire/Graduate Programme is a 52 week training programme aimed at recent graduates and those looking to gain practical work experience in their chosen discipline. Since 2009, 56 Stagiaires have been hired across all business areas. In 2014 the Marine Institute hired 12 Stagiaires across the organisation with similar number anticipated in 2015. The Programme has proved an extremely successful with 51% of Stagiaires securing further employment and 14% pursuing further education on completion.

Naval Service

The Naval Service continues to work closely with NMCI and IMERC and are fully engaged with both the Job Bridge and Springboard programmes. In November 2014 two civilian graduates were employed under the Job Bridge Programme in the Fisheries Monitoring Centre (FMC) at the Naval Base as GIS (Automatic Information System) analysts.

SmartBay Research Internship Programme

The SmartBay Research Internship Programme funded under the National Infrastructure Access Programme was launched in 2014. The Programme aims to provide a platform for recent graduates to apply their knowledge in a practical way. The structure of the programme is designed with the interests of the student in mind, allowing them to be embedded within SmartBay Ireland or within their own research institute, dictated by the requirements of their chosen project. Four researchers completed the Programme in 2014. Research institutions included Dublin City University, NUI Galway, Athlone Institute of Technology and Universitat Politecnica de Cataluyna in Spain.

Masters and PhD programmes in Maritime Law

Work commenced in 2014 in the preparation of new Masters and PhD programmes in Maritime Law. This is the first programme in Ireland specifically to train Maritime lawyers. It is targeted to service the anticipated demand for legal services in the new maritime economy. This initiative of lawyers in the Office of the Attorney General, the Naval Service, University College Cork and Cork Institute of Technology will be a collaborative programme where all of the law schools in the Irish Universities along with the Institutes of Technology have been invited to participate in.

The first intake of students is planned for the autumn semester 2016. It is designed to attract students form a wide array of marine related disciplines including science and the environment as well as law. This is seen as a key component of *Harnessing Our Ocean Wealth* by adding to the range of educational opportunities in the Marine sector for domestic and foreign students and, providing professionals for industry and the growing marine economy in Ireland.

Action 28:

Establish Ireland as an international marine training destination, maximising the capacity and potential of existing marine training facilities/programmes (e.g. BIM training, IMERC, Ryan Institute, NMCI, ship-based SMART initiative, private training operators); and integrate into national initiatives such as Education in Ireland.

Ireland provides a broad range of marine and marine-related courses across vocational, undergraduate (UG), post graduate (PG), and continuous professional development areas covering marine-related STEM areas and sector-specific education and training e.g. seafood, merchant (seafarer) and ocean energy. These are provided by Higher Education Institutes (HEI), State bodies and private operators. Ireland offers a number of unique accredited education and training programmes such as practical ship-based programmes delivered for the HEIs through the SMART Programme. Providers are continuing to evolve courses to meet the existing and future needs of both the domestic and global marine, maritime markets and clients.

Throughout 2014, Irish HEIs continued to provide focussed and applied marine-related courses to both domestic and international students (circa 1,400 students enrolled [3,4]). This is comprised of:

- eight wholly marine based courses, provided by NUIG, UCC, CIT and GMIT, comprising five undergraduate and three postgraduate courses, with an estimated 200 students per annum;
- seven courses categorised as modular marine based provided by NUIG, UCC, UCD, AIT, comprising four

undergraduate and three postgraduate, with an estimated 200 students per annum; and

- 22 courses categorised as partial marine based provided by NUIG, UCC, UCD , DIT, and TCD, UL, Institutes of Technology Galway-Mayo, Tralee, Carlow, Tallaght, Tipperary, Sligo and Limerick, comprising 16 undergraduate and six postgraduate courses, with in excess of 1000 students estimated.

On a national level, Ireland has signed a number of international collaborative Agreements and Partnerships with China, India, Brazil and the US that will enable increased international collaboration and mutually beneficial cooperation, including areas of education and research. Further information is available under Action 39.

To harness the potential to both attract international students and research to Ireland and also exports Irish maritime/offshore expertise, Action 28 was examined as part of the work of the Development Task Force (DTF). A summary of the DTF findings is provided below.

Development Task Force

Action 28 was one of four addressed by the Development Task Force (DTF) set up by the Marine Coordination Group. To examine specifically this action, a sub-Group of the DTF, chaired by the Commissioners of Irish Lights (CIL), examined building on Ireland's marine training and education offering, attracting international students to Ireland and exploring exporting services abroad.

Specific activities in 2014 included a survey of Higher Education Institutes (HEIs) on current offerings to international students including views on opportunities and barriers to expansion. A number of meetings with key providers such as the National Maritime College of Ireland (NMCI) and the SMART Programme were also held as well as discussions with the Department of Education and Skills and Enterprise Ireland's *Education in Ireland* Programme.

In April 2014, a survey of marine related courses in the Higher Education sector, by State bodies and private operators in Ireland with particular reference to international students was carried out as part of the work of the DTF. The survey including questions on Ireland's unique selling points for international education and training, the attractiveness of Ireland as a destination, current course capacities, opportunities and barriers to expanding offerings to international students.

The results and findings of the survey served as a discussion document at a strategic workshop on *Establishing Ireland as an International Marine Education and Training Destination* which took place at the Commissioners of Irish Lights in September 2014.

Results of the survey showed that marine-related courses offered by Ireland's HEIs have:

- 25% of students enrolled are classed as international (18% PG courses and 6% UG);
- An average of 15% are from EU countries (11% PG courses and 4 % UG); and
- 10% non-EU (8% PG courses and 2% UG).

International students are attracted from a wide range of countries including the UK, Italy, Greece, Poland and Ukraine. Those studying marine courses in Ireland from outside Europe comprised mostly of students from the USA, China, India, Iran and a number of sub-Saharan African countries.

In addition to marine related undergraduate and taught postgraduate course, it was estimated that over 300 marine related PhD students were active in Irish HEIs in 2014. The proportion of PhD students classified as 'international' is undocumented.

Irish Marine Research Institutes and Centres are offering and attracting international research students from across the globe.

GMIT and the related SMART Programme, see Action 27, hold a strong track record in attracting EU students and offer a wide range of joint international programmes:

- GMIT Joint International MSc Course in Marine Biodiversity with Ghent University, University of Pierre et

3 Note: The number of students represents the total number of students taking the course from year one to final year (not only new entrants).
4 Data provided by SMART, SEMRU and HEA

Marie Curie (Paris), Bremen University, University of Algarve, University of Oviedo (Spain) and Klaipeda University (average intake 55 students);

- GMIT International structured joint doctorate programme in Marine Ecosystem Health and Conservation under Erasmus Mundus action with University of Ghent, Algarve, Bologna, Pierre et Marine Curie, Pavia, Aviero, Gdansk, Klaipeda and Plymouth and two non-degree awarding full partners VLIZ in Belgium and NIOZ in Holland (average intake of 8 PhD students); and
- Atlantic Summer School – An initiative of the SMART Programme in collaboration with the Alfred Wegner Institute (Germany) Summer School.

NUI Galway's strong international links also offer significant opportunity; having the largest number of graduates in China of any Irish university, many working as senior academics in China's top universities. The growing network of NUI Galway graduates in China plays an important role in reinforcing the research links with some of China's leading universities. In December 2014, NUI Galway signed a Memorandum of Understanding with Tsinghau University in China to collaborate on education and research activities. The signing took place during the State visit by President Michael D. Higgins to China. NUIG have a long tradition in marine science. In addition to NUIG's undergraduate programmes, a new Master's degree in Marine and Coastal Resources has also been developed. Two additional marine related MSc Programmes are also under development that will increase the offering to international students.

Other unique and bespoke programmes have and continue to be being developed e.g. AIT conversion/ Springboard course for offshore renewable energy and DCU in the area of marine technology.

Ireland's has gained a significant global reputation and track record in the provision of tailored maritime/offshore training through the National Maritime College of Ireland (NMCI), attracting international businesses and students and targeting growing and new markets. This is delivered through an innovative commercial model.

Figure 31: Global footprint of NMC's Joint Venture Companies activities

In May 2014, the GAC Training & Service Solutions (GTSS), a joint venture between the National Maritime College of Ireland (NMCI) and global shipping, logistics and marine services provider GAC, signed a landmark €2 million training contract with one of the world's largest shipping companies, Chevron Shipping. It is the single largest maritime training contract in the history of the Irish State, cementing the NMCI's reputation as a world-class institution. Under this training agreement, more than 450 Chevron Shipping Company (CSC) officers from around the world will train at this state-of-the-art facility.

Through the work of the DTF and in consultation with key education and training service providers, a number of Ireland's significant strengths in marine and maritime sectors have been identified as having the ability to offer international students a unique, rewarding, and high-quality experience. These 'marine USPs' (Unique Selling Points) range from:

- Established track record and reputation (e.g. SMART, NMCI, NUIG, DCU, UCC, GMIT, UL etc.);
- Strong international networks through existing FP7 research and training programmes in the marine domain;
- State-of-the-art facilities and marine assets/infrastructure (e.g. laboratories, research vessels, test beds and sites, underwater cabled observatory);
- Strong and established research and applied collaboration with public sector organisations (e.g. Marine Institute, Navy, Coastguard, BIM, CIL, EPA etc.);
- Unique products developed e.g. ship-based training courses (graduate and Continuous Professional Development) delivered through the SMART consortium led by GMIT; and
- A strong competitive and high-successful cohort of marine specialists, academics and researchers.

In addition Ireland has:

- Unparalleled access to the North East Atlantic and ocean currents critical to climate change;
- A range of unique habitats and ecosystems (cold water corals, deep-sea habitat, L.Hyne marine reserve) in close proximity;
- Completed the largest civilian seabed mapping programme undertaken (INSS, INFOMAR) with associated integrated mapping products and datasets;
- A cohort of Research Centres/Groups that focus on aspects of marine e.g. MaREI, Ryan Institute, MESTECH; and
- A welcoming image and attractive aesthetically, historically and culturally.

The report of the DTF was submitted to the Marine Coordination Group in 2015. Further details are available in Section 2.

Action 29:

Embed knowledge of our ocean wealth into the primary and secondary curricula;

- Explore the potential to rollout existing pilot programmes (e.g. Explorers' Programme and Follow the fleet) across the primary school network; and
- Consider options for the inclusion of marine studies in the secondary school curriculum.

Action 30:

Develop outreach programmes that create an awareness of our ocean wealth (e.g. national sea week, maritime day, maritime festivals, showcasing state infrastructure such as the Naval and Air Corps, Coast Guard, Research Vessels).

Explorer's Programme – Our Ocean Our Future

The *Explorers Education Programme* provides lesson plans, resources and activities for primary school teachers to inspire their student's interest and knowledge in our ocean, marine environment, species and seashores.

In 2014, the Marine Institute delivered its *Explorers Programme* in Galway, Mayo, Clare, Dublin, and Cork with support from the programmes partners, Galway Atlantaquaria, Sea Life Centre Bray and the Lifetime Lab Cork.

The Marine Institute's *Explorers Programme* in Galway was restructured during the school year 2013-14 establishing a number of modules and requiring schools to apply to participate in the various modules offered. This model was rolled out in Mayo, Clare and Sligo in the school year 2014-15 reaching 100 schools in the West in the 2014-15 school year and a total of 131 participating schools. The Programme is delivered in the West by Galway Atlantaquaria with the support from the Galway, Mayo, Clare and Sligo Education Centres.

Figure 32: Explorer's Education Programme

The *Explorers Programme* is also run in South Dublin/Wicklow by the Blackrock Education Centre and Bray Sea Life where 12 schools participated in 2014 with the installation of a classroom aquarium over a six week project period during February-March.

The Programme was delivered to 19 schools in Cork through the Lifetime Lab who set up an aquarium at the centre and ran Explorers one day workshops over a two week period in March. The Dublin and Cork programmes are also supported by Galway Atlantaquaria.

In July 2014, the Marine Institute and Galway Atlantaquaria ran a one week teacher training programme in Galway, while Blackrock Education Centre, Bray Sea Life and AquaTT ran the teacher training programme in Dublin. This in-service teacher training is supported by the Department of Education and Skills.

A new website was launched in December 2014 for the *Explorers Programme* www.explorers.ie as part of the www.marine.ie website where over 100 marine related lesson plans are available to download freely. The lesson plans are designed around the NCCA primary school curriculum. The lesson plans are developed by the Education Officer at Galway Atlantaquaria and the Marine Institute communications team who worked closely with school teachers with 40 new lesson plans developed in 2014 with funding from Science Foundation Ireland.

It is planned to carry out a programme review early 2015 with international experts in marine education/ocean literacy to evaluate and identify opportunities to develop the programme.

Galway Science and Technology Festival

In November 2014, over 300 transition year students from Galway and further afield visited the Marine Institute as part of the Galway Science and Technology Festival. The students met scientists and staff, discovered the wide ranging work of the Marine Institute and got a glimpse of what it would be like to work in marine research.

The visit included a talk from Fisheries Ecosystem Advisory Services on the work of the Marine Institute, a Sea for Society video showing the importance of our ocean resource, and an exhibition on marine careers and training opportunities, including the Marine Institute's annual bursar programme for third level students. Staff and scientists demonstrated their work using touch screen interactive seabed maps, fish samples and a miniature submarine.

Figure 33: Galway Science and Technology Festival

BIM's Science Lesson on 'Managing Our Marine Resources'

BIM developed a science lesson for second level students as part of the Science and Technology in Action (STA) programme in producing a set of industry led lessons, designed to support the teaching of science and related subjects in second level schools. The lesson titled 'Managing our Marine Resource' covered topics about the Irish marine economy, pollution, ecology of Irish waters, human influences on the marine ecosystem. This lesson,was distributed to all 700 secondary schools in Ireland. The lesson is available on www.sta.ie/lesson/managing-our-marine-resources.

INFOMAR Transition Year Pilot Scheme

In 2014, INFOMAR launched its Education & Outreach Development Plan, a pilot scheme undertaken by transition year students. It incorporates five lesson plans focussed on development and use of Mobile Apps, a class website, and web map services, for field based scientific data gathering and reporting, and subsequent classroom data upload to a web based mapping environment. All resources are freely available on the INFOMAR website.

SmartBay Ireland Pilot Schools Workshop

SmartBay Ireland continued a number of outreach programmes in 2014 including a *Pilot Schools Workshop* specifically designed to inform students of the exciting and diverse career opportunities which have emerged through the application of Information Communication Technologies in the marine science sector.

Transition year students from Coláiste Chroí Mhuire, An Spidéal, were invited to attend a pilot workshop entitled 'Exploring the Sub-Sea Environment' which took place at the end of January 2014. The workshop provided students with insights into applications of gaming technologies, robotics, computer simulation and next generation communications technologies utilised when developing renewable energy, sensor technologies, environmental solutions and research activity within the marine sector. The day-long event was hosted by the Galway Mayo Institute of Technology through the schools liaison office.

Public Outreach Events

In addition to the outreach and education activities highlighted above, the *RV Celtic Explorer* opened for a number of schools visits in 2014, while the ROV Holland was used for public outreach events such as Central Bank coin launch.

A number of other projects/initiatives on Ocean Literacy are also being progressed nationally and internationally. For example, the Marine Institute is a partner in the EU FP7 Sea for Society project www.seaforsociety.eu, with Irish partners AquaTT and NUI Galway. As part of the Institute's collaboration with Newfoundland, plans are in progress to develop a project around a transatlantic ocean learning initiative. In addition, the Marine Institute was actively involved in planning for the mobilisation phase of the project which will involve a number of ocean awareness and engagement activities in 2015 which includes large media project with Sea Fever Production Company featuring deep ocean research.

In 2014, the INFOMAR team (GSI and the Marine Institute) supported the development of the Belfast Titanic Ocean Exploration Centre, showcasing seabed survey infrastructure and data, and careers in marine survey & science. The augmented reality work in the centre was undertaken by RealSim, building on an applied research project funded by INFOMAR, and has an audience of over 1.4m visitors to the centre annually. A brief assessment was also undertaken by INFOMAR in 2014 of the feasibility of web delivery of this type of 3D marine data resource at a national level, for potential use in public outreach in interpretive centres and museums, and to underpin tourism and leisure.

As part of the Defence Forces Public Engagement and Action Plan (PEAP) the Naval Service and the Air Corps have a very proactive scheme to raise awareness of our ocean wealth and showcase their infrastructure and capabilities. This is achieved through an integrated plan utilising social, print and electronic media with public engagement in ports, educational establishments and the private sector.

The Irish Coast Guard continues to carry out a range of local and national public awareness activities. For example, 2014's national Search And Rescue demonstration took place in Wexford harbour in June.

INFRASTRUCTURE

Maintaining, upgrading and providing [marine and coastal] infrastructures is critical to our national economy; energy needs and export potential, supporting coastal and rural communities, running [scientific] operational programmes, enabling research, development and innovation activities, facilitating technology transfer, the development of new products and services and ensuring the safety and security of the maritime domain (HOOW Pg 43).

Infrastructure

Action 31:

Maximise the utilisation of existing state maritime infrastructure (e.g. research vessels, coastal access points) through multi-purpose usage and sharing, in support of operational programmes, research, test and demonstration and monitoring.

Action 33:

Securely store all publicly funded marine data (e.g. seabed mapping, monitoring, research and scientific data) and where appropriate make available, as easily and freely as possible, in compliance with existing standards (e.g. INSPIRE) for multi-purpose usage (e.g. for research, governance, maritime spatial planning and commercial development purposes). Leverage for value-added purposes, including links to key EU projects in this area, such as, the EMODNET initiative.

Multi-purpose usage of maritime infrastructure

The two Research Vessels; *RV Celtic Explorer* and *RV Celtic Voyager* operated to capacity (550 days) in 2014, supporting a range of clients across the State and Higher Education Institutes. Offshore research cruises (including the ocean climate sections) include major multidisciplinary elements whereby physical, chemical, biological and geological data are collected by groups from different teams and agencies throughout Ireland and abroad, maximising the use of vessel time at sea.

In 2014, the Commissioners of Irish Lights also continued to work in cooperation with a number of other State bodies including Sustainable Energy Authority of Ireland (SEAI), the Coast Guard, the Marine Institute and the Naval Service to maximise national benefit from CIL resources including *ILV Granuaile*. The Commissioners of Irish Lights (CIL) has been working under a Memorandum of Understanding to support SEAI in ocean energy activity including provision of an offshore power platform and data services. CIL also cooperated in the SFI funded MaREI project; engaging with SmartBay Ireland on matters of common interest and facilitating ocean energy developers with data gathering, offshore asset tracking and provision of real and virtual aids to navigation; and also provided offshore buoy and data services to the Marine Institute.

During 2014, INFOMAR survey infrastructure expertise was deployed to underpin SEAI's ocean energy development programme, and BIM's assessment of deep sea fish farming sites during 2014 in West Clare, and Sheephaven Bay respectively. Survey infrastructure was also deployed during SMART school training programmes with INFOMAR personnel providing on-board third-level training to participating students.

Information on the Coast Guard, the Irish Maritime Administration (IMA) of the DTTAS, and the Naval Service collaboration in developing a shared integrated maritime picture is provided under Action 3.

As part of the *Advanced Marine Technology Programme* and the wider *SmartOcean* initiative, the Marine Institute,

engaged with the Irish Air Corps in association with researchers in the Higher Education Institutes (HEIs), Geological Survey of Ireland (GSI) and Enterprise Ireland (EI) to explore opportunities for collaboration and engagement. Further details are provided under Action 8.

Supporting Research & Innovation through test and validation

SmartBay Ireland continues to proactively support existing and new research capacity and capability through a range of services. This includes ongoing liaison, including an annual workshop, with users of the test and validation infrastructure, providing access to real-time data, and marketing and promotion activities related to the State's test and demonstration facility in Galway Bay (see Action 25).

In November 2014, SmartBay Ireland held its Third Annual Users Workshop at the Royal Irish Academy, Dublin. The workshop explored opportunities coming on stream with the installation of the subsea fibre and power cable and a range of other facilities at the Galway Bay test site in 2015.

SmartBay Ireland Data Portal, providing a real-time data acquisition system for the transmitting, collecting, parsing and storing of data, has now been added to the infrastructure available at the national marine test and demonstration facility. This award winning project (Information Technology Association, Galway (ITAG) Project Award 2014) is the corner stone of the SmartBay service offering and provides all users with real time data which can be visualised securely online through the SmartBay Data Portal. Throughout 2014, the portal delivered more than 150GBb of data to organisations and researchers. SmartBay Ireland has developed hardware and software to collect data from sensors deployed on its fleet of data buoy platforms. Organisation and projects utilising SmartBay Data Acquisition and Data Portal include Irish company Technology From Ideas, Wireless Sensing Network Group, Tyndall National Institute (TNI) and the Port of Cork, who base significant operational decisions on data received.

A market research study was conducted in 2014 by SmartBay Ireland which aimed to identify users for the cabled observatory within the sensor manufacturer industry. Sensor manufacturers were canvassed to assess their appetite for an end to end test trial and validation service of new sensor technologies at the Galway Bay Test Site. In excess of thirty manufacturers in both the UK and internationally, who have responded to date, will be provided with access packages for trial and validation services when the cable comes into service.

Integrated Digital Ocean

In 2014, the Marine Institute further progressed the Integrated Digital Ocean (IDO) framework that facilitates sharing data and other digital assets between teams and organisations. This provides an integrated pathway from data acquisition in a monitoring programme or research project to new product or service development. The initiative aims to help to unlock existing data and knowledge silos enabling sharing across organisational boundaries, and facilitate the addition of new data sources, tools and services. Existing services such as Ireland's Marine Atlas, Ireland's Marine Renewable Energy Portal, and Marine Data Online will be leveraged as part of the initiative. In addition, the Institute are working with GMIT and the SMART Programme on the development of research application tools.

Baselines

In the middle of 2015, Ireland will complete the survey of its baselines (points from which a coastal States' jurisdiction is measured and required by international law). This is the first time this has been done in over sixty five years. The survey is being carried out under the direction of Ordnance Survey Ireland (OSI) in cooperation with the Geological Survey of Ireland (GSI) with the assistance of the Air Corps and the Naval Service.

When completed it will bring Ireland into line with European and International standards using the World Geodetic System (WGS84) and permanently lay down fixed reference points for Ireland's coasts. It will also permit the conversion to and use of electronic charts and satellite based systems for all users of the marine space including locating structures in the marine environment.

When completed, a new Baseline Order will be drawn up by the Department of Foreign Affairs and Trade (DFAT) for the approval of Government which will replace the 1959 Baselines Order.

Action 32:

Put in place clear integrated policies and strategies for the development of new key strategic infrastructures to support job creation and economic growth (e.g. the grid and port infrastructure to support renewable energy and export potential).

Action 34:

Carry out national, regional and local initiatives aimed at tapping into the potential of new and existing coastal infrastructure to develop sustainable products, services and jobs. This would encourage investment along the coast.

€13m Fishery Harbour and Coastal Infrastructure Capital Development Programme

The Department of Agriculture, Food and the Marine in 2014 continued to support the ongoing development of 'Fishery Harbour Centres' at Killybegs, Ros an Mhíl, Dingle, Castletownbere, Dunmore East and Howth with funding from its annual Fishery Harbour and Coastal Infrastructure Capital Development Programme. Under the 2014 Programme €2.288 million was spent on development, safety, maintenance and upgrading works at the six State owned Fishery Harbour Centres. Major works included the completion of Phase 1 of the Electrical Upgrade in Howth. Circa €3.225 million has been expended for reconstruction and maintenance works at other harbours managed by the Department including stabilisation works at Cape Clear Bull Nose Development.

In addition €1.463 million was paid for harbour development works at 32 Local Authority owned piers and harbours located in nine coastal counties. This expenditure was supplemented by a Marine Leisure and Marine Tourism Capital Infrastructure Development Programme under the annual Fishery Harbour and Coastal Infrastructure Capital Programme. This Programme provided a further mechanism to support Local Authorities in maintaining and enhancing coastal facilities and provided support for the maintenance and development of marine tourism/marine leisure facilities at Local Authority piers and harbours. Funding in the amount of €686,000 was paid to the Local Authorities for this Programme.

As part of the Government's overall co-ordinated response to the damage caused by the winter storms of 2014, the Minister funded a Storm Damage Programme under the annual Fishery Harbour and Coastal Infrastructure Capital Programme. Funding in the amount of €5.316 million was paid to the Local Authorities for repair works to 107 piers and harbours.

Supporting tourism in marine & coastal areas

The *Wild Atlantic Way* (WAW), Ireland's first long-distance coastal touring route, was officially launched in February 2014. Fáilte Ireland invested €10 million during 2014 in the route which stretches from the Inishowen Peninsula in Donegal to Kinsale in County Cork, and continued to actively market and sell the route both domestically and overseas throughout the year. The core *Wild Atlantic Way* proposition attributes are 'where land and sea collide' and draws heavily upon the need to elevate visitor experiences on the Atlantic coastline, including boat trips, water activities, sea food, Atlantic culture, Atlantic flora/fauna and geology.

Activation plans are underway to maximise both awareness of the proposition and the opportunities for businesses and communities to create and sell visitor experiences, grow revenue, create jobs and develop economically. Fáilte Ireland carried out a very effective series of community briefings along the route in early 2014. It is estimated that 1,300 people attended these briefings in 13 locations across the seven counties along the route. Attendees came from a range of backgrounds including tourism businesses, stakeholders and community representatives.

189 Discovery Points have been identified along the WAW, with €2 million invested in these during 2014. All the 25 offshore west coast islands are Discovery Points, for which there are 28 Embarkation Points providing direction and access to the islands. In 2014, work continued on interpretation panels at these Discovery Points, providing information about aspects of the heritage of the local area, focussing on information relating to the life of coastal communities. Subject to the results of a Strategic Environmental Assessment and Appropriate Assessment some of the Discovery Points may be developed further to enhance the visitor experience.

The WAW presents opportunities for the development of further schemes such as the *Mayo - Galway Blueway*, which is more than a water trail but a 'distinct place' where the marine environment and a community partnership collaborate to offer a host of activities, enhancing the visitors experience and supporting the local economy.

The development of coastal walks and paths is a key aspect of the visitor experience on the WAW; attracting tourists to coastal communities and providing opportunities for local guides, activity providers, coffee shops, bars, restaurants and accommodation providers.

There are opportunities to deliver on a number of social outcomes, in addition to enhancing the visitor experience through initiatives such as 'Sharing your Stories', where local communities gather their own Atlantic stories for sharing with the visitor. This wealth of stories related to the Atlantic culture is in fact one of the most valuable assets for tourism along the WAW. A pilot project of this nature was undertaken by Loop Head Tourism with funding from the Heritage Council, Clare County Council and Fáilte Ireland. The project involved the collection of a local wealth of stories about the marine and cultural heritage of the Loop Head Peninsula, which resulted in the creation of an electronic database housing this interpretative material and a heritage trail map which integrates with the WAW.

Additional to the *Wild Atlantic Way*, in 2014 Fáilte Ireland:

- Carried out research into the infrastructural requirements around berthing and marine facilities for visitors. This research was quite focussed on the infrastructural needs of visitors as part of a sailing holiday experience.
- Completed a research study into the motivations of visitors who embark upon a sailing holiday, focussing on market preferences, needs and opportunities and provides further insight into the size and opportunity of the market and the issues impeding growth.

'Taste of the Atlantic Seafood Trail' – promoting Irish quality seafood

BIM is working with Fáilte Ireland to profile a pilot 'Taste of the Atlantic Seafood Trail' around the 'Bay' region of the *Wild Atlantic Way* (stretching from Ballycroy, Co. Mayo to Kinvara, Galway Bay). The aim is to link seafood producers in this region with suitable seafood restaurants to show the link in supply and to promote Irish quality seafood to visitors to the area. The majority of the producers are aquaculture businesses (oysters, mussels, salmon) and in addition BIM has engaged two fishermen who supply to local restaurants (lobster, crab) to participate in the project.

In order to promote the trail, which will possibly take the form of a Mobile APP as well as a strong presence online (websites and social media), BIM will produce a video that is in keeping with the WAW brand that tells the story and the connection of Ireland's wild rugged west coast and its abundance of seafood.

In addition to highlighting Ireland's aquaculture resource, the Trail will also provide an opportunity for chefs and restaurant owners to receive expert advice from BIM. This will include visits to aquaculture sites, production techniques and all round knowledge of this valuable resource and will also provide ideas on how to create awareness and consumption of these seafood products locally.

'Simply Breathtaking'- All-Island Lighthouse Tourism project

Great Lighthouses of Ireland, is a new all-island tourism initiative, developed by the Commissioners of Irish Lights (CIL), the General Lighthouse Authority for the island of Ireland. By the end of 2014 CIL was at an advanced stage of delivering an Interreg IVA funded All-Island Lighthouse Tourism project. The initial project will see economically sustainable accommodation and tourist facilities provided at St. John's Point (Down), Black Head (Antrim), Fanad Head (Donegal) and St. John's Point (Donegal); and a major upgrade of tourism facilities at Rathlin West (Antrim).

Figure 34: Great Lighthouses of Ireland

The project includes the branding and marketing of these properties which, along with existing Lighthouse Tourism sites, will form the basis for a comprehensive all-island offering. Fáilte Ireland, Northern Ireland Tourist Board, Tourism Ireland, Local Authorities, RSPB and community groups are all partnered in this project. The project will link closely with the *Wild Atlantic Way*, *Ireland's Ancient East* and the *Mourne Trail* and is expected to attract a significant number of additional domestic and overseas visitors to the coastal periphery. The project was launched by Minister Donoghue on the 20th May 2015. Eight of the lighthouses will provide tourist accommodation from July 2015.

Increasing Ireland's share of the cruise tourism market

In 2014, two port companies – Dublin and Galway – lodged planning applications with An Bord Pleanála in respect of strategic infrastructure developments which inter alia contain cruise related facilities. Also in 2014, the Port of Cork Company commenced Phase 1 of its 'Cobh Cruise Terminal Vision' through appointing consultants to lead a design team in respect of the proposed development.

In 2014, 172 cruise vessels called at Irish ports (down from 210 in 2013) facilitating 197,312 passenger visits (down from 215,460 in 2013).The IMDO is continuing to work with port companies, Cruise Ireland and Fáilte Ireland on refining the marketing for cruise tourism.

Port Development

Two Ports of National Significance (Tier 1) – Dublin and Cork – lodged planning applications with An Bord Pleanála in respect of strategic infrastructure developments. Oral hearings on both developments were heard in 2014 and a decision is expected in 2015. Both ports have also successfully applied for funding related to the developments under the EU's TEN-T Regulation and its associated funding stream known as the Connecting Europe Facility.

In 2014, Galway Harbour Company, a designated Port of Regional Significance, also applied to An Bord Pleanála for planning permission under the strategic infrastructure planning process. A decision is expected in 2015.

European Observational Infrastructure

The Marine Institute in 2014 continued to participate in initiatives and programmes at EU level leading to improved observational infrastructure for the Atlantic area. With the European Marine Seas Observatory project (EMSO) in the final stages of ERIC application, designation as a European Research Infrastructure Consortia (ERIC) will make EMSO a legal entity recognised by the EU and will enable more cost effective, integrated and standardised infrastructures for marine observation to be deployed in marine locations around Europe.

Copernicus, the new name for the European Earth Observation Programme GMES (Global Monitoring for Environment and Security) is a European initiative for the implementation of information services dealing with environment and security. Copernicus is based on observation data received from Earth Observation satellites and ground based information. The overall objective of the Copernicus initiative is to support Europe's goals regarding sustainable development and global governance of the environment by providing timely and quality data, information, services and knowledge. Through Copernicus the state of our environment and its short, medium and long-term evolution will be monitored to support policy decisions or investments.

Copernicus will provide services in six sectors: Marine monitoring, Atmosphere monitoring, Climate change monitoring, Land monitoring, Emergency management and Security. A number of Government Departments, agencies and organisations have an interest in aspects of the proposal as potential users of the system and Copernicus will also provide opportunities for commercial applications in the downstream sector based on full and open access to Copernicus observation data and information products. This ambitious Earth observation programme is headed by the European Commission in partnership with the European Environment Agency and the European Space Agency and entered its operational phase in 2014.

Action 35c:

Establish permanent tidal monitoring infrastructure (national tide gauge network) around the coast of Ireland.

National Tide-Gauge Network

The Irish National Tide Gauge Network is an on-going progamme involving the Marine Institute and a number of organisations in the public and private sectors to develop a permanent tidal monitoring infrastructure. The project is entering year five of an anticipated 10 year programme.

Current activities include:

- Strategic development of the network to work with new parties enabling the full resolution of the tidal regime around Ireland;
- Roll out of GSM enabled data logging and telecommunications equipment for the central collection of data;
- High precision site surveys to enable all data to be reported relative to the national datum (ordnance survey datum Malin Head); and
- Quality control of the stations to determine what outstanding work is required to get the best possible data.

Additional tidal monitoring equipment was procured in late 2014. An assessment is underway in 2015 to determine the optimal deployment locations and local stakeholder commitments for the new gauges.

The products from the network are wide-ranging and will be available as work progresses:

- Real-time data to an Internet site to support recreational users, navigation and commercial activities;
- Tidal predictions, both in the form of software tools and paper publications;
- Flood warning; and
- Long term sea level variability.

INTERNATIONAL COOPERATION IN THE MARINE AREA

International cooperation is an essential element of integrated marine policy and planning. Close cooperation with our Atlantic neighbours and international partners can also bring about economic returns and benefits (HOOW Pg 45).

International and North/South Cooperation

Action 36:

Influence the development and implementation of EU maritime policy, strategies and programmes (e.g. IMPEUSA, CFP, MSP, MSFD, EMODNET) to assist in the delivery of the goals of Harnessing Our Ocean Wealth.

Action 37:

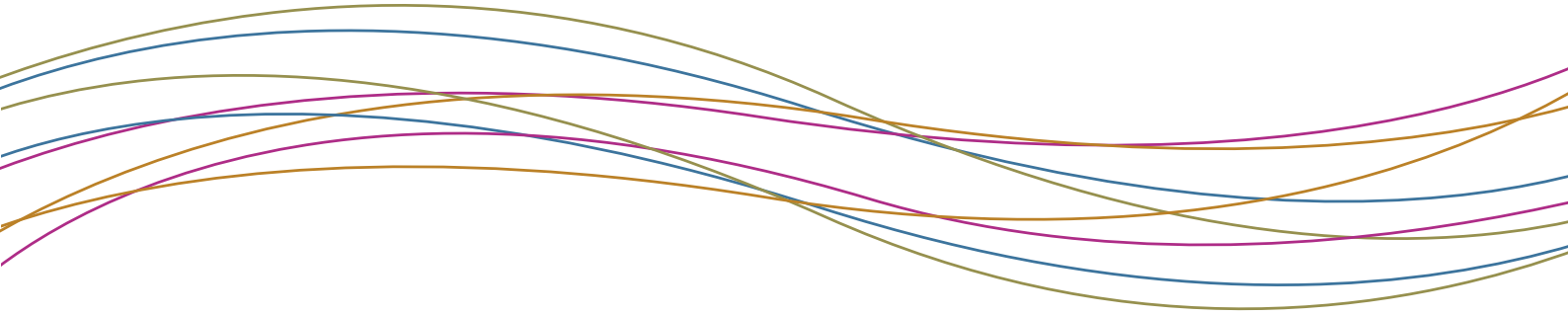
Ensure the inclusion of marine research in all relevant Work Programmes developed under HORIZON 2020 in order to maximise EU marine research funding opportunities and support the implementation of IMP – EU and its Sea Basin Strategies.

Ireland's Maritime Affairs Attaché

The Maritime Affairs Attaché is the Marine Coordination Group's representative in Brussels representing Ireland in relation to EU developments in respect of the marine and integrated maritime policy, as well as Atlantic Strategy developments. The Maritime Affairs Attaché negotiates, monitors and reports on developments in the maritime sector, promotes Ireland's maritime interests and expertise, liaising with the European Commission, Member States, the European Parliament and relevant agencies and Non-Governmental Organisations, while keeping relevant Departments and agencies in Ireland abreast of issues to help shape Ireland's contribution to EU policy and legislation in this area.

The Attaché's focus for 2014 included:

- **The Maritime Spatial Planning Directive**, on which negotiations began during Ireland's Presidency of the EU, was concluded in 2014. The Directive, which concerns planning and regulation of all human uses of the sea and the protection of the marine system also encompasses cross-border engagement.
- The development of Council Conclusions on **Integrated Maritime Policy** which emphasise the importance of *Blue Growth* to EU's economic development and underline the development of maritime policy in areas such as research and innovation, transport and security.
- The development of the **EU Maritime Security Strategy** and subsequent Action Plan was also achieved in 2014. This Strategy, which reflects Ireland's security concerns and outlook, recognises the all-inclusive and cross-sectoral nature of maritime security and encompasses maritime safety, fisheries protection, marine environment protection, port security and maritime surveillance.



- Council Conclusions on **strengthening tourism** by leveraging Europe's cultural, natural and maritime heritage also lend political impetus to the further development and sustainable exploitation of coastal tourism as they emphasise, economic and social benefits of the marine and coastal tourism sectors and their contribution to the enhancement of local economies.
- The European Commission Communication on **Innovation in the Blue Economy** was also welcomed in May 2014. This Communication sets out a course of action from now until 2020 to tackle barriers to *Blue Growth* such as under-investment in knowledge, poor access to finance, duplication of research, and progress of research outputs to market. These will be challenged through the development of an information platform on marine research across the whole Horizon 2020 programme as well as information on nationally- funded marine research projects, ensuring that marine data is easily accessible, interoperable and free of restrictions of use, and through the development of a Blue Economy Business and Science Forum. This latter forum will be launched at European Maritime Day in 2015 and Ireland will be among the five marine business partners showcased.
- The ongoing rollout of the **Action Plan for the Atlantic Strategy** has been a further focus for Ireland at EU level, with active participation through the Atlantic Strategy Group which oversees the implementation of the Action Plan and assisting in the smooth operation of the accompanying Assistance Mechanism. This Mechanism began operations in September and aims to disseminate information and offer guidance on funding opportunities relevant to the Strategy. The Atlantic Strategy Group will be chaired in 2015 by France. Ireland will take over the chair in 2016 and for 2015 will act as shadow chair, in support of France's work.
- The operationalisation of the **Galway Statement on Atlantic Ocean Cooperation** has been gaining pace throughout 2014, with meetings of the Galway Stakeholders group taking place in Washington, Ottawa and Dublin, examining areas of mutual concern and benefit, with an eye to delivering tangible results. One area yielding results is that of sea-bed mapping where at a conference in Dublin in December 2014, agreement was reached on developing an *Atlantic Seabed Mapping Strategy* with Ireland contributing to its achievement with a provision of ship-time. The range of projects supported through the EU's Research Fund, Horizon 2020 linked to the *Galway Statement* is further testament to the progress being made. In this, Ireland has been particularly successful, partnering on some 10 related projects and leading on the Atlantic Ocean Research Alliance Support Action, which is designed to support the European Commission in developing and implementing marine research cooperation between the EU, USA and Canada.

Horizon 2020, maximising EU marine research funding opportunities and supporting the implementation of Integrated Maritime Policy

In 2014, Ireland influenced the process of determining the nature of future calls under Horizon 2020. Specifically, the Scoping Paper produced by the European Commission for Societal Challenge 2 ('Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research, and the Bio economy') prioritised research relating to ocean observation, marine bio-resources, multiple use platforms for activities such as ocean energy and aquaculture and sustainable food security based on marine resources.

Similarly, the scoping paper for Societal Challenge 5 ('Climate Action, Environment, Resource Efficiency and Raw Materials') included commitment to continuing the efforts undertaken in the 2014-2015 Focus Area call 'Water Innovation: Boosting its value for Europe'.

The European Commission's Horizon 2020 Strategic Programming Document, Guidance for the development of the Work Programme 2016-2017 states that key priorities for 2016-2017 have been identified for the development of the next work programme. In alignment with the new Commission's agenda, the Work Programme for 2016-2017 will contribute to the Jobs, Growth and Investment Package helping to strengthen Europe's global competitiveness, create new and sustainable jobs and promote growth. All the calls for proposals and activities will contribute substantially to this policy area as well as contributing in broader terms to other policy areas including 'A Deeper and Fairer Internal Market with a Strengthened Industrial Base', which includes in the *Blue Growth* call, targeted innovation in our seas and oceans that will demonstrate the commercial application of new technologies (algae bio-refineries, deep sea mining, multi-purpose floating platforms, new medicines) while respecting ocean ecosystems, and maximise synergies with activities funded at national and regional level. This has the potential to provide more jobs, growth, renewable energy sources as well as climate-smart and ecosystem solutions. Important contributions to bring technologies to readiness level for commercial applications for the generation of renewable energy in the marine environment (tidal, wind) in potential synergy with other sectors will also be provided.

In 2015, the focus of effort by Irish National Delegates to the Horizon 2020 Programme Committees and other Irish representatives interacting with the European Commission will be on ensuring that the priorities set out in the scoping document translate into call topics. Consultation of the Horizon 2020 Advisory Groups on input for the development of the content of the 2015-2016 Work Programme will take place during the first quarter of 2015 followed by exchanges with Member States through the configurations of the Programme Committee during the second quarter of 2015, with the formal opinion expected towards the beginning of the summer. This will lead to the adoption of the Work Programme for 2016-2017 in the third quarter of 2015.

Ireland's representatives on the Horizon 2020 Programme Committees (in particular Department of Jobs, Enterprise and Innovation on the Strategic Programme Committee and Marine Institute on the European Bioeconomy Societal Challenge Programme Committee) will be in a position to monitor and work to influence inclusion of marine research in all relevant Work Programmes.

Ireland performed strongly in the most recent round of call results announced in December 2014 in relation to Societal Challenge 2 '*Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research, and the Bioeconomy*'. These included topics under the *Blue Growth* and *Sustainable Food Security* areas.

Action 38:

Continue to foster a North/South and East/West approach in developing/enabling the marine sector (e.g. grid/all-island energy strategy, marine tourism and leisure) through existing structures and bodies.

Action 39:

Establish key trade and research links in non-EU markets and countries (e.g. China and transatlantic initiatives).

In addition to specific initiatives highlighted below, 2014 saw continuing positive North-South co-operation with joint meetings held between Inland Fisheries Ireland and the Loughs Agency. Details on the All-Island Lighthouse Tourism Project are provided under Action 34.

North South collaboration on Horizon 2020

The importance of North South collaboration in the areas of research and innovation is recognised by both jurisdictions, especially when it comes to collaboration on Horizon 2020. Both jurisdictions on the island are striving to build on the obvious advantages of a shared border between two Member States and there is also the advantage of the same language and the existing strong links between academic institutions and individual researchers as well as the close relationships between the key supporting agencies including the North/South body InterTradeIreland, Enterprise Ireland and Invest NI.

InterTradeIreland, chairs an All-Island Steering Group for Horizon 2020 and this Group launched its All-Island Strategic Action Plan for Horizon 2020 in December 2014.This Plan is a new North South joint initiative and is seen as an important step in building awareness of collaborative elements under the programme. Other significant actions which InterTradeIreland has taken to encourage North South collaboration in research and innovation include the publication of a Horizon 2020 Guide, an interactive app and their annual Collaborate to Innovate Conferences. Under the Plan, a specific target of €175 million has been set by relevant Departments for North South collaborative Horizon 2020 projects. This represents approximately 10% of the combined targets of Ireland (€1.25 billion) and Northern Ireland (€145 million) for drawdown from this programme.

Horizon 2020 is supporting the *Blue Growth* strategy with a dedicated Focus Area for the 2014-2015 Work Programme. North South collaboration and cooperation in marine research is traditionally strong. For example, marine research funding provided by the Marine Institute is open to research organisations across the island of Ireland. Also in 2014, the Marine Institute hosted its *SmartOcean Forum* in Belfast.

Figure 35: Marine Renewable Energy Masters Graduate, Mr. Darren Hayes (DA Renewables Ltd.), being presented with the UCC Entrepreneur of the Year Award for his "Mari-Turb" portable wind generator invention that could see energy costs plummet aboard commercial marine vessels

All-Island Master's Degree in Marine Renewable Energy

Linked to the SFI-funded MaREI Centre is the All-Island Master's Degree in Marine Renewable Energy; a 12-month, full-time taught Master's in Engineering Science, which is hosted by UCC, and involves heavy participation by MaREI lecturers and staff members. The Master's is an all-island programme, and is delivered in conjunction with University College Dublin, NUI Maynooth, NUI Galway, University of Limerick, Cork Institute of Technology, Dublin Institute of Technology and Queens University Belfast.

The Programme is the only one of its kind in the world, educating engineers for successful careers in the marine renewables industry. The Masters students gain advanced engineering skills in areas such as wave energy, tidal energy and power systems as well as relevant non-technical expertise in areas such as geological surveying and environmental impact assessment, whilst industry placement hosts benefit from access to cutting-edge expertise in marine renewables, as well as an opportunity to develop existing projects and new R&D ideas.

The Master's Programme was launched in 2013, with an intake of 12 students in the inaugural year. The first cohort of the Programme graduated in Autumn 2014, and the second year is underway.

Seabed Mapping – Inter-regional cooperation & knowledge transfer

INFOMAR worked with INTERREG IVA INIS Hydro partners in Northern Ireland, Scotland, and other UK organisations and separately with INTERREG IVB Atlantic Boarder partners to scope potential follow on INTERREG V projects, which are anticipated to be submitted 2015. Extending these Irish and Celtic Sea hydrographic and habitat data resources and working partnerships will continue to strengthen inter-regional cooperation, knowledge transfer, and development.

Trans-Atlantic Research Collaboration

The *RV Celtic Explorer* was chartered to Memorial University, Canada in 2014 with a contract signed for similar work in 2015. Preparations are in place to undertake Trans-Atlantic surveys in one or both transit legs to/from Canada.

Following a visit to Newfoundland in September 2014 for the Oceans Conference, a trade mission from Newfoundland to Ireland took place in November 2014 involving approximately 30 delegates from Government, industry and research. This enabled the further development of a research and enterprise plan to develop collaborative initiatives between Newfoundland and Ireland with key targets for 2015. An MOU was signed between SmartBay Ireland and SmartBay NL during the visit.

Also in 2014, SmartBay Ireland entered into a Trans-Atlantic collaboration agreement with the Fisheries and Marine Institute of Memorial University, St. Johns, Newfoundland and Labrador, Canada, Dublin City University and the Marine Institute Ireland. The agreement is designed to further consolidate and develop the partnership that exists between the Marine Institutes of Newfoundland and Labrador and Ireland and the SmartBay infrastructures.

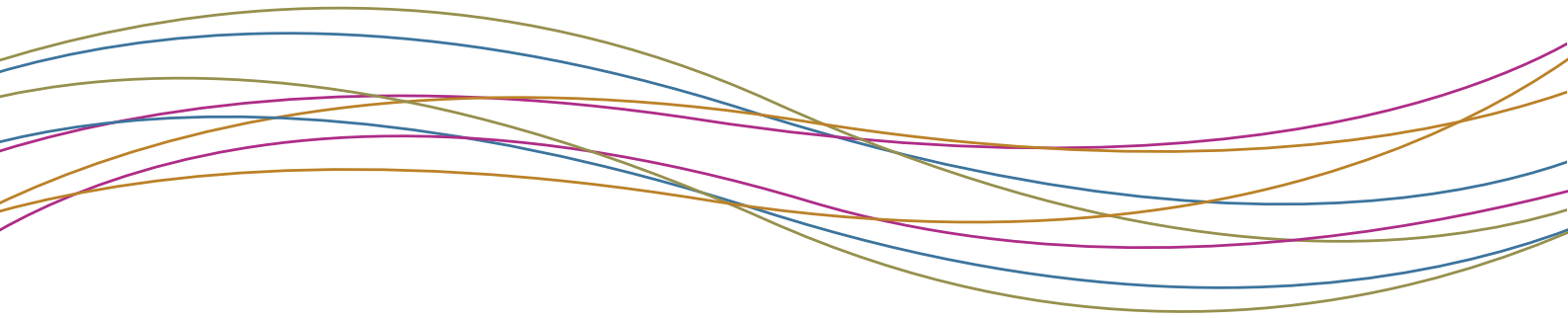
Figure 36: L-R: Craig McClean, NOAA; Peter Heffernan, Marine Institute; Stephen Locke, Geological Survey of Canada; and John Bell, Director Bioeconomy, DG Research and Innovation at the Dublin Castle Workshop held in December 2014

Implementing the Galway Statement

The *Galway Statement* was signed at the Marine Institute, Galway in May 2013 by representatives of the European Union, the Government of Canada and the Government of the United States of America. It is a strong commitment from the EU, US and Canadian Governments to align ocean observation efforts to improve ocean health and stewardship and promote the sustainable management of our shared marine resources.

A European Commission workshop, which was held in Dublin Castle in December 2014, marked a key step in the implementation of the *Galway Statement*, further strengthening seabed mapping and ocean observation research links between EU, Canada, and USA.

Milestones for 2015 include five collaborative projects initiated between Irish/Newfoundland researchers and innovators. The commitment to work together and co-operate is based on a common vision and cultural appreciation of the societal and economic value of the ocean and is another step toward the utilisation of the jurisdictions' joint facilities and expertise to deliver projects of scientific and economic benefit. These objectives will be achieved through a range of activities including: joint industry and academic research projects, outreach and education programmes and the identification of opportunities to leverage funding for joint research projects and the expansion of collaborative arrangements to include other jurisdictions bordering the North Atlantic.



International Collaborative Agreements and Partnerships

On a national level, Ireland has signed a number of international collaborative Agreements and Partnerships with China, India, Brazil and the US that will enable increased international collaboration and mutually beneficial cooperation, including areas of education and research.

In 2012, Ireland entered into a Strategic Partnership Agreement with China which sets out a framework to ensure mutually beneficial cooperation between Ireland and China in a number of important areas.

The US-Ireland R&D Partnership involves the governments of the United States of America, Ireland and Northern Ireland working together to advance scientific progress by awarding grants for research on a competitive basis. Areas of focus for collaboration include health, telecommunications and energy. SFI has supported the submission of a proposal in the area of Tidal Energy to the National Science Foundation under the US-Ireland Programme.

SFI's International Strategic Cooperation Award (ISCA) programme supports new and existing research-based collaborations between Ireland's Higher Education Institutions (HEIs) and partner organisations in four designated countries: Brazil, the People's Republic of China, India, and Japan—termed collectively as the 'Partner Countries'. The award provides the funding to coordinate and carry out a range of activities designed to initiate and/or strengthen academic and associated linkages between one or more of SFI's eligible research bodies and one or more organisations in one of the four Partner Countries as follows:

Research Brazil Ireland (RBI) brings together Irish third-level institutions and research centres as a consortium to drive a coordinated national approach to promote Ireland's scientific and technological reputation in Brazil and to highlight Ireland's attractiveness as an international research partner. The programme develops research and educational links between the two countries across five thematic areas:

- Information and Communication Technologies (ICT)
- Environmental Science and Technologies
- Advanced Materials and Nanotechnology
- Biopharmaceuticals, Biotechnology and Health
- Sustainable Energy and Agroproduction

The International Strategic Collaboration Programme: China (ISCP China) aims to build research capacity between Irish and Chinese universities and knowledge-intense industries in the strategically important areas of ICT, biomedical science and nanotechnology. The main objectives of ISCP China are to:

- Strengthen and extend the existing research relationships between Irish researchers, leading Chinese Institutions and key state laboratories through knowledge and people exchange.
- Develop new China–Ireland partnerships focused on research excellence in our strategic thematic areas that will prove competitive, sustainable and scalable in international funding programmes.
- Build greater cultural understanding between the research communities of the two countries as an important element of future research cooperation.
- Utilise the experience of research collaboration with China to help Irish companies compete in the world's second largest economy and to encourage foreign direct investment into Ireland for national economic benefit.

NUI Maynooth leads the programme in collaboration with Dublin City University, the Royal College of Surgeons in Ireland, Trinity College Dublin and the Dublin Institute of Technology together with 39 different Chinese Institutions.

The ISCA India consortium serves as a portal for any Indian academic or industrial group interested in expanding their activities to Ireland, and provides a coordinated national approach to promote Ireland's scientific and technological reputation in India. The programme aims to develop research and educational links between the two countries in all areas of mutual interest that lie within the remit of SFI, and to provide opportunities for the exchange of ideas and the development of joint innovative proposals. The envisaged outcomes include:

- Increased impact of Irish and Indian research through synergy of scale and engagement of complementary expertise
- Increased access to non-exchequer funds for both countries from international (EU-Horizon 2020) and private sectors
- Increased entry of high-skilled Indian students and scientists in Irish R & D
- The promotion of Ireland as a desirable place for education, research and technology
- Increased communication and improved relationships between the two countries

Trinity College Dublin is leading the ISCA Indian Consortium. The other Irish Institutions involved are Cork Institute of Technology, Dublin City University, Dublin Institute of Technology, NUI Galway, Waterford Institute of Technology and University College Cork.

The ISCA Japan consortium, announced by An Taoiseach Enda Kenny during his visit to Japan in December 2013, proposes to develop a programme of activities to expand on existing linkages between the Irish and Japanese research communities. The programme aims to establish a framework for a higher level of academic and industrial interaction between Ireland and Japan and will develop a range of activities around six broad themes:

- Advanced manufacturing and materials
- Environmental and climate sciences and technologies
- ICT and Big Data analytics
- Imaging and optics
- Future healthcare including connected health
- Medical devices and regenerative medicine

Led by NUI Galway, the Irish Institutions involved in the Japan consortium are Dublin City University, Dublin Institute of Technology, National Institute for Bioprocessing Research & Training, NUI Maynooth, Royal College of Surgeons in Ireland, Trinity College Dublin, University College Cork, University College Dublin, University of Limerick ad Waterford Institute of Technology.

Further information on trade links and other international business development initiatives ranging across seafood, international shipping services and maritime transport, education and training & tourism is available earlier in this report.

4. FOCUS & EXPECTATIONS FOR 2015

Governance

Maritime Safety, Security and Surveillance

- Seafood Operational Programme 2020
- Continue to progress in the implementation of the Enablers Task Force Report on Marine Spatial Planning
- Maritime Safety Strategy
- White Paper on Defence
- Maritime Legislation - Publication of the Maritime Area and Foreshore (Amendment) Bill and the Harbours (Amendment) Bill 2015; preparation of a Merchant Shipping Bill, preparation of priority domestic vessel legislation

Clean Green Marine

Business Development, Marketing & Promotion

- Preparation of a programme of measures under the MSFD
- Preparation of a monitoring programme for Transitional and Coastal waters for the next monitoring cycle 2016-2021, required under the WFD.
- Implementation of the CFP Reform
- Report of the Development Task Force
- Review of Tax and Financial Supports in the Marine Sector
- Increasing seafood exports through targeted sales in premium niche markets in Asia, the US & the Middle East along with a higher value positioning for key species in the traditional markets of France, Spain, Italy, Germany & the UK.
- Complete for consultation the Wild Atlantic Way Programme Plan and Environmental Impact Assessment.
- Support the development of cruise tourism including an All-Ireland Cruise

Research, Knowledge, Technology & Innovation

Capacity, Education, Training & Awareness

Infrastructure

- Report on Future Skills Needs and Labour Market Demand in Marine
- Latest Report on Ireland's Ocean Economy
- Launch of UCC Beaufort Building
- Laying of Galway Bay Cable
- New Naval Vessel L.E. James Joyce
- GSI shallow survey vessel *RV Tonn*
- Complete the survey of Ireland's baselines
- Continue to progress new Masters and PhD programmes in Maritime Law
- New Marine Research Agenda
- Targeted marine research funding(national and international)
- SeaFest 2015 including a national awareness campaign of Ireland's Ocean Wealth (economic, environmental and culture)
- Review of the Explorer's Education Programme & further development of the Programme

International and North/ South Cooperation

- First trans-Atlantic mapping survey to take place under the Atlantic Ocean Research Alliance (April 2015).
- Continue to lead on the implementation of the *Galway Statement* and commence Atlantic Ocean Research Alliance project
- Launch of All-Island Lighthouse Trail
- Assist in the further rollout of the Atlantic Action Plan and prepare and plan for the chairing of the Atlantic Strategy Group in 2016
- Further develop and enhance relations with the new European Commission and European Parliament to ensure that marine growth remains high on the European political agenda

GLOSSARY OF ACRONYMS AND TERMS

AA	Appropriate Assessment
AMETS	Atlantic Marine Energy Test Site (Mayo)
BIM	Bord Iascaigh Mhara
BIO	Bio-Economy Input Output Model
CADS	Commercial Aquaculture Development Scheme
CFP	Common Fisheries Policy
CIL	Commissioners of Irish Lights
CSO	Central Statistics Office
CTD	Conductivity, Temperature, Depth
DAFM	Department of Agriculture, Food and the Marine
DBDD	Dublin Bay Digital Diamond
DCENR	Department of Communications, Energy and Natural Resources
DEC	Defence Enterprise Committee
DECLG	Department of Environment, Community and Local Government
DJEI	Department of Jobs, Enterprise and Innovation
DTF	Development Task Force
DTTAS	Department of Transport, Tourism and Sport
ECVs	Essesntial Climate Variables
EGFSN	Expert Group on Future Skills Needs
EI	Enterprise Ireland
EMFF	European Maritime and Fisheries Fund
EMSA	European Maritime Safety Agency
EMSO	European Maritime Seas Observatory
EPA	Environmental Protection Authority
ERIC	European Research Infastructure Consortia
EU	European Union
FDI	Foreign Direct Investment
FLAGS	Fisheries Local Actions Groups
FMC	Fisheries Monitoring Centre
FTE	Full Time Equivelant
GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GES	Good Environmental Status
GMES	Global Monitoring for Environment and Security
GRETB	Galway, Roscommon Education and Training Board
GSI	Geological Survey of Ireland
GVA	Gross Value Added
HEIs	Higher Education Institutes
HOOW	Harnessing Our Ocean Wealth

IBEC	Irish Business and Employers' Confederation
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
ICOE	International Conference on Ocean Energy
iCRAG	Irish Centre for Research in Applied Geosciences
ICT	Information and Communications Technologies
IDA	Industrial Development Authority
IDO	Integrated Digital Ocean
ILO	Intgernational Labour Organization
IMA	Irish Maritime Administration
IMDatE	Integrated Maritime Data Environment
IMDO	Irish Maritime Development Office
IMERC	Irish Maritime and Energy Resource Cluster
IMP	Integrated Marine Plan
IMTE	Irish Maritime Transport Economist
INFOMAR	Integrated mapping For the sustainable development of Ireland's MArine Resource
IRCG (page 80)	Irish Coast Guard
ISCA	International Strategic Cooperation Awards
ISCP	International Strategic Collaboration Programme
ITAG	Information Technology Association, Galway
IUCN	International Union for Conservation of Nature
JOC	Joint Oireachtas Committee
LEO	Local Enterprise Office
MaREI	Marine Renewable Energy Ireland
MARSUR	European Defence Agency Maritime Surveillance
MCG	Marine Coordination Group
MoU	Memorandum of Understanding
MSFD	Marine Strategy Framework Directive
MSO	Marine Survey Office
NCCA	National Council for Curriculum and Assessment
NFCI	National Fisheries Colleges of Ireland
NIAP	National Infrastructure Access Programme
NMCI	National Maritime College of Ireland
ObSERVE Programme	Management of Sensitive Habitats for Protected Vertebrates in Irish Waters
OEC	Ocean Energy Conversion
OREDP	Ireland's Offshore Renewable Energy Development Plan
OREI	Offshore Renewable Energy Installation
ORESG	Offshore Renewable Energy Steering Group
PPP	Public-Private Partnership
PwC	Price waterhouse Coopers

QQI	Quality and Qualifications Ireland
R&D	Research and Development
RBI	Research Brazil Ireland
RBMPs	River Basin Management Plans
RD&D	Research, Development and Demonstration
RMP	Recognised Maritime Picture
ROV	Remotely Operated Vehicle
RTDI	Research, Technology, Development & Innovation
RV	Research Vessel
SAC	Special Areas of Conservation
SDG	Standards Development Group
SEA	Strategic Environmental Assessment
SEAI	Sustainable Energy Authority of Ireland
SEMRU	Socio-Economic Marine Research Unit
SFI	Science Foundation Ireland
SFPA	Sea Fisheries Protection Authority
SHARP	Sustainable, Healthy Agri-food Research Plan
SILAS	Shared Integrated call Logging and Analysis System
SLA	Service Level Agreement
SMART	Strategic Marine Alliance for Research and Training
STA	Science and Technology in Action
STCW	Standards for Training, Certification and Watchkeeping for Seafarers
TAC	Technical Advisory Committee
TIDA	Technology Innovation Development Award
UCC	University College Cork
WAW	Wild Atlantic Way
WFD	Water Framework Directive

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