

Our Ocean Wealth

Towards an Integrated Marine Plan for Ireland

*Seeking Your Views on
New Ways;
New Approaches;
New Thinking*



Background
Briefing
Documents

Part III: 'Enablers'-
Getting the Conditions Right
for Growth

Purpose of these documents

Three briefing documents have been prepared to accompany the Document *'Our Ocean Wealth – Seeking Your Views on New Ways; New Approaches; New Thinking'*. These documents provide further background information to support the development of an Integrated Marine Plan for Ireland. Further information is available on www.ouroceanwealth.ie

Part I: Context

- Provides an economic and environmental profile of our oceans and an overview of marine governance and policy (national and international) context

Part II: Sectoral Briefing Papers

- Profiles of our marine sectors including an overview of current government plans and policies in place:
 - Seafood (fisheries, aquaculture, seafood processing) and Seaweed
 - Shipping, Ports and Services
 - Marine Renewable Energy
 - Offshore Oil & Gas and Seabed Resources
 - Marine and Coastal Tourism and Leisure including cruise tourism
 - Marine ICT
 - Marine Biotechnology and Bioproducts

Part III: Enablers

- Describes the so-called 'enablers' that can assist Government in getting the conditions right for growth and investment.
 - Licensing, Planning and Compliance
 - Marine Research & Innovation
 - Integrated Mapping
 - Maritime Safety, Security and Surveillance
 - Education and Training
 - European Marine Policy Framework

PART III: ENABLERS (GETTING THE CONDITIONS RIGHT)

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I. LICENSING, PLANNING AND COMPLIANCE

I.1 Licensing & Development Consents:

Having an effective licensing and development consent process is vital to maximising the contribution of the marine sector to economic recovery and is seen as a priority under the Programme for Government.

I. Foreshore Consents

The foreshore is the seabed and shore below the line of high water of ordinary or medium tides and extends outwards to the limit of twelve nautical miles (approximately 22.24 kilometres).

The operation of the foreshore consent process is governed by the Foreshore Acts 1933 – 2011 which comprise of the following:

- Foreshore Act, 1933
- Foreshore (Amendment) Act, 1992
- Foreshore (Amendment) Act 2011
- Section 5 of the Fisheries and Foreshore (Amendment) Act 1998
- Fisheries (Amendment) Act, 2003 (Part 5)
- The Foyle and Carlingford Fisheries Act 2007 (Part IV)
- Maritime Safety Act 2005 No. 11 (Part 6)
- Foreshore and Dumping at Sea (Amendment) Act 2009

The Foreshore Acts require that a lease or licence must be obtained for the carrying out of works or placing structures or material on, or for the occupation of or removal of material from State-owned foreshore. In general, applications for foreshore permissions relating to aquaculture and sea fisheries activities, as well as activities within Fishery Harbour Centres (Howth, Dunmore East, Castletownbere, Ros a Mhil, Killybegs) are decided by the Minister for Agriculture, Food and the Marine. All applications for foreshore permissions relating to all other activities e.g. ocean energy, aggregate and mineral extraction, laying of pipelines & cables are decided by the Minister for Environment, Community and Local Government. Developments on privately owned foreshore also require prior Ministerial permission.

In addition to the above, Local Authority developments on the foreshore that require the submission of an Environmental Impact Statement (EIS) are decided by An Bord Pleanála as are developments that are determined to be of a strategic nature under the Planning and Development (Strategic Infrastructure) Act, 2006. Planning permission is also required for foreshore developments that adjoin the functional area of a Local Authority. Applications for *Dumping at Sea* permits are determined by the EPA. Hydrocarbon exploration and production is dealt with by the Department of Communications, Energy and Natural Resources.

With the exception of fishing and shipping, the principal legislative framework for permitting activities on the foreshore is almost 80 years old and predates planning legislation. The system, as currently legally structured, can also result in a number of related applications for development consent for a development each requiring Environmental Impact Assessment and separate public consultation.

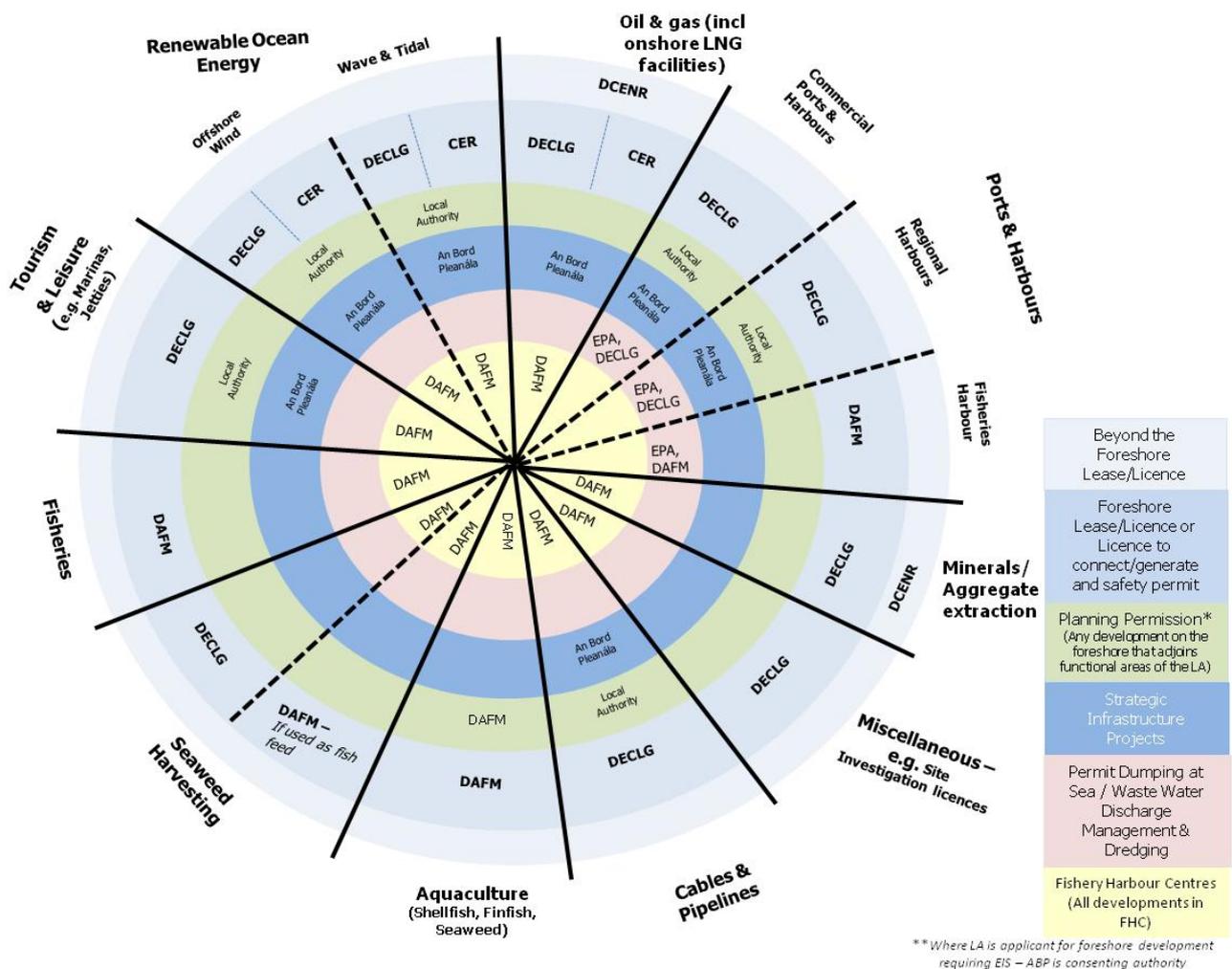


Figure 1: Current Licensing and Development Consenting Authorities for Marine Activities in Ireland (courtesy of the Marine Institute)

- DECLG Department of the Environment, Community and Local Government
- CER Commission for Energy Regulation
- DCENR Department of Communications, Energy and Natural Resources
- DAFM Department of Agriculture, Food and the Marine
- LA Local Authority
- EPA Environmental Protection Agency

Beyond the Foreshore

Beyond the limit of the Foreshore legislation (12 nautical miles) oil, gas and mineral exploitation activities are regulated by the Petroleum and Other Minerals Development and the Gas Acts with respect to authorised activities in areas designated under the Continental Shelf Act, 1968.

In January 2010, a range of foreshore functions were transferred to the Department of the Environment, Community and Local Government. Work has been undertaken to improve the throughput of foreshore applications, improve coordination and modernise the consent process. Improvements in processing times and better coordination are being achieved in a number of ways, but chiefly as follows:

- ✓ Introduction of a formal pre-application consultation process.
- ✓ A scheme of prioritisation for all foreshore applications.
- ✓ A caseload analysis on the basis of the scheme of priorities;
- ✓ Regulations have been approved to put a time-limit on consultations with prescribed bodies;
- ✓ Development of standard operating procedures.

The Department of the Environment, Community and Local Government are in the process of drafting a new Foreshores Bill.

2. Aquaculture and Wild Fisheries Licensing:

In December 2007, the European Court of Justice issued a finding that Ireland had failed to meet certain obligations under the Birds and Habitats Directives, including the need to adequately assess the potential impact on sensitive habitats and species within these sites when licensing aquaculture and fisheries activities. This finding resulted in a complete suspension of the issuing of new (or renewal of existing) licenses for aquaculture and fisheries activities in Natura 2000 sites and severely disrupted the industry.

In 2008, DAFM and DAHG¹ initiated a process to facilitate the development of a plan that would result in compliance with the Directives. The resulting three-year 'Roadmap to Compliance' was discussed with the EU Commission in May 2009. The Roadmap involves a five-step process to compliance:

1. Detailed data collection in 91 bays/estuaries (MI & NPWS)
2. Detailed raw data analysis (MI & NPWS)
3. Setting of Conservation Objectives to be met in each site/fishery (NPWS)
4. Carrying out of Appropriate Assessments of each licence application/fishery against the Conservation Objectives
5. Determination of Licences/Fisheries on the basis of the Appropriate Assessment and other relevant factors

A high-level group involving officials from DAFM, DAHG & NPWS, Marine Institute and BIM meet regularly to ensure efficient and effective progress of this technically complex, major, multi-year project.

In late 2010, an updated work-plan for the delivery of the roadmap was set by this high-level group, with timelines in 91 bays/estuaries for each of the steps to be delivered by each of the relevant agencies/departments. These include:

1. Data Collection for Benthic Habitats (Coordinated by the Marine Institute)
2. Data Collection for Wintering Waterbirds (Coordinated by NPWS)
3. Setting of Conservation Objectives (NPWS)
4. Assistance to industry in the preparation of Fisheries Natura Plans (BIM)
5. Mapping of existing activity (DAFM)
6. Appropriate Assessment of Fisheries and Aquaculture Licence applications (Marine Institute)
7. Public and Statutory Consultation followed by Licence Determinations (DAFM)

¹ Prior to May 2011, the National Parks and Wildlife Service (NPWS) was a line division of the Department of Environment, Heritage and Local Government (DEHLG)

Data collection in these bays/estuaries was prioritised on the basis of existing aquaculture and fishing activity. Most of the seabed (benthic) data collection relevant to the fisheries and aquaculture industry will be completed in 2011.

Licence determinations for the first bays have commenced as Appropriate Assessments are now coming on-line. Based on the current financial and human resources availability, and assuming no fundamental technical or scientific issues arise, licensing determinations continue on a phased basis through to mid-2015. Current timelines are set out as below.

Consenting and Licensing Objectives and Targets 2011-2016

Foreshore Consenting Process (DECLG)

- I. Draft Foreshore Bill to integrate the foreshore consent process into the planning system (2012)

Aquaculture and Wild Fisheries Licensing (DAFM)

- I. Ensure full compliance by Ireland with the EU Habitats & Birds Directives on Natura 2000 sites in respect of aquaculture and wild fisheries licensing

Targets

Complete data collection – End 2012

In parallel to Data Collection above, set Conservation Objectives and Appropriate Assessments (in consultation with the European Commission) to facilitate license determinations with a view to achieving compliance with the Habitats and Birds Directive.

Box I: Obligations – EU Environmental Directives

There is a range of legislative requirements that must be adhered to when planning and permitting maritime activities. The origins of these requirements have their roots in a combination of national, EU and international legislation, agreements and policies.

Ireland's record on the transposition of EU legislation relating to the marine environment is good. However, implementation, particularly in relation to environmental EU legislation has proved to be challenging. This is reflected in a number of judgements against the state by the European Court of Justice

A summary of the relevant environmental legislation is shown in Appendix (see part I). The following provides a list of the key legislative instruments and Departmental responsibility:

Legislation	Departmental Responsibility
Water Framework Directive (2000)	DECLG
Birds Directive (1979 and 2009)	DAHG
Habitats Directive (1992)	DAHG
Marine Strategy Framework Directive (2008)	DECLG
Environmental Impact Assessment Directive (1985 and 1997)	DECLG
Strategic Environmental Assessment Directive (2001)	DECLG
EU Data Collection Framework for the Common Fisheries Policy (2008)	DAFM
Shellfish Waters Directive (2006)	DECLG

1.2 A Maritime Spatial Planning Framework for Ireland

Maritime Spatial Planning (MSP) is a strategic tool used for planning, regulating, and managing the use of marine goods, services and space in a holistic, rational, forward-looking manner. It aims to:

- address the problem of how to deal with the myriad of marine users and activities, and the multiple and frequently conflicting uses of the sea and coastal zone;
- ensure that conflicting and compatible (synergistic) uses can be identified, mapped and planned, and also the individual, in combination, and cumulative impacts of these activities and developments are assessed; and
- enable the identification of the most appropriate locations for particular marine based activities and developments.

The majority of legislation and regulation in Ireland for marine-based activities and development is largely carried out on a sectoral demand driven basis with few mechanisms in place to ensure a holistic approach is taken to the sustainable development of the marine environment. A Maritime Spatial Plan (MSP) would provide a clear, spatial and locally relevant expression of policy implementation and delivery. Although MSP has many similarities to planning on land, the nature of the sea means that legal and property rights to the marine area are harder to define and enforce than on land, often resulting in open access which can lead to depletion of marine resources.

Likely Geographical Scope and implementation

While the likely geographical scope of any MSP in Ireland will need more detailed assessment in the future, there is however four main zones, which need specific consideration, bearing in mind obligations under international conventions such as the OSPAR and UNCLOS Conventions.

- 1) The boundary for the Irish Planning system
- 2) The limit of the territorial waters (12 nautical miles measured from the baselines²)
- 3) The Exclusive Economic Zone (EEZ), which is the maritime zone that extends to 200 nautical miles from the baselines
- 4) The Irish Continental Shelf.

Planning & Co-ordination Activities

Although there is at present no body with overall responsibility for the management of activities in the marine environment, there are various agencies with a great level of expertise in the elements needed for maritime spatial planning.

There is a significant amount of data that is already being collected by various bodies including the following;

- Seabed survey data from the Geological Survey of Ireland (GSI) and the Marine Institute (MI) including Irish National Seabed Survey and INFOMAR Data;
- Fisheries information and databases - Marine Institute;
- Marine monitoring data such as carried out by the Marine Institute, the EPA and other agencies which includes data on nutrients, contaminants, biotoxins and phytoplankton;
- Habitat mapping data for inshore and offshore Natura2000 and other sensitive habitat sites gathered by the National Parks and Wildlife Service, the Marine Institute and other agencies;
- Research data gathered by Universities and Institutes of Technology, in particular data funded by national research programmes such as *Sea Change*; and
- Other data collected by the State e.g. by the Coast Guard through its AIS network and through SafeSeasIreland (see section below on Maritime Safety, Security and Surveillance).

Additionally, the location and extent of a range of developments in the marine space can be identified from information on foreshore leases and licences, Dumping at Sea Permits, Petroleum Prospecting permits etc held by DAFM, DECLG, DCENR and other Departments and State Agencies.

A key gap in national socio-economic data collection relates to marine socio-economic indicators. Much of the baseline socio-economic, environmental and marine use data will be compiled for the Initial Assessment required under the Marine Strategy Framework Directive and this would go a considerable way toward developing marine spatial plans at no additional cost to the State.

² Except where otherwise provided by UNCLOS, the normal baseline will be the low-water line along the coast. Article 5, UNCLOS.

1.3 Turning Compliance into Competitive Advantage

Environmental compliance and associated marine regulatory system is often perceived by industry as a barrier to development. While it is accepted that protecting the marine environment is critical, it is sometimes forgotten that regulation and compliance also plays a very important role as an enabler – supporting and creating economic development.

Ireland's Clean Green Image

Environmental compliance can play a critical role in the promotion of Irish marine products and services. Ireland's 'clean green image' has, in the past, provided a competitive advantage for our food and tourism industries. Through ongoing environmental compliance to the highest standards, Irish food and tourism products can continue to be proud of our brand on both the international and domestic markets

Globally, within the **seafood sector**, retailers, consumers and regulators are increasingly seeking assurances regarding the sustainability and ethical standards relating to seafood products. This has led to the development of seafood certification schemes that give an assurance to buyers and consumers that their seafood comes from a well managed and sustainable source. Such schemes satisfy the food sourcing policies of key retailers and have been proven to add value to seafood products. Both BIM's Seafood Stewardship Scheme and the Marine Stewardship Council's (MSC) certification are widely used in Irish fisheries. At the end of 2010 70% of the Irish mackerel fishery was MSC certified. By the end of 2011 it is anticipated that 80% (by value) of Irish pelagic landings 50% (by value) of whitefish, crab and prawn landings will be certified under the BIM Stewardship Scheme. Seafood certification can contribute to the 'Brand Ireland' concept, whereby consumers will recognise that by buying Irish seafood they are choosing to value and respect the natural environment. Ireland's organic salmon production has been very successful and is an example of excellent certified brand development.

Within the global **tourism** industry, ecotourism is a sector which is steadily gaining significant credibility. The core ethos and principles of the ecotourism sector are permeating mainstream tourism businesses in response to increasing demand by tourists. The future sustainability and growth of our tourism industry including marine and coastal tourism products depends on the protection of the credibility of our clean green image. Compliance with key EU legislation, in particular legislation that is recognised by the public (e.g. Bathing Water Directive, Natura legislation, Water Framework Directive), and the ability to back this up with up-to-date information offers Ireland a unique opportunity in the tourism and leisure sector and further strengthens the Irish 'clean green' brand, supporting sectoral development.

Data Assets: Supporting Economic Development

Data collection for licensing and compliance purposes is a significant and ongoing cost for both the state and industry. Marine data is a key requirement of all stakeholders. Timely, up-to-date and accurate data (e.g. environmental, oceanographic and human activity) are fundamental to policy formulation, good governance and optimising development opportunities in the marine sector.

From an industry/user perspective marine data is essential in considering any sort of commercial or developmental activity at sea and in supporting ongoing operations. From a licensing, regulatory and environmental monitoring perspective Government Departments/Agencies have significant data requirements to support compliance with EU and national obligations (e.g. EU Habitats Directive, EU Water Framework Directive, and EU Strategic Environmental Assessment Directive).

The substantial costs involved in data collection can, to some extent, be offset against its value to industry and importance in ensuring the viability and long-term sustainability of marine industries in Ireland. The EU INSPIRE Directive seeks to establish an infrastructure for sharing and accessing

spatial information. Under the Directive all public environmental data must be made available, in part to **avoid duplication**, but also to **ensure public participation in the decision-making process** and to **stimulate value-added enterprise**.

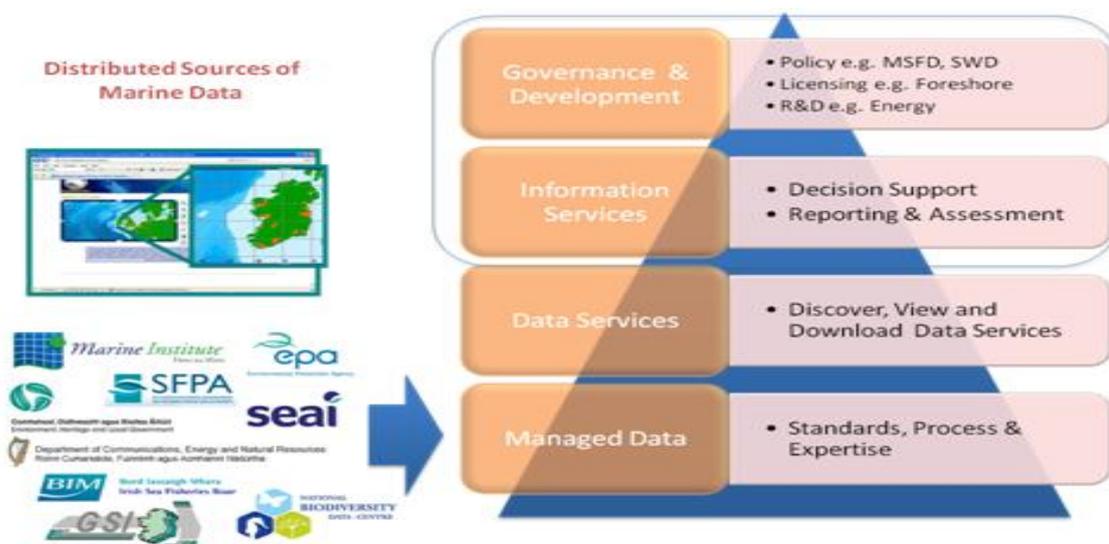
Combing the data collection requirements with marine planning process supports policy decisions, and can be turned into a major asset in support of economic development by putting in place the mechanism and services required to support businesses to:

- **Gain easy access** to data for use in the design and development of marine projects and in the EIA and licensing processes, e.g. through a one-stop-shop for marine data.
- Use the data to **underpin new product development** (e.g. certified seafood products, sensors, geospatial mapping tools)

National Marine & Coastal Information Service

In 2007 the Marine Institute, set out an ambitious programme to develop a National Marine and Coastal information service³. A key element in this has been the establishment of the Irish Spatial Data Exchange (ISDE) service, put in place by the Marine Institute, the Environmental Protection Agency, the Geological Survey of Ireland, and the Coastal and Marine Resources Centre in UCC.

The system allows users to search in one operation for spatial marine data in each of the partner organisations meta-data catalogues.



To-date, good progress has been made and the distributed ISDE Metadata Catalogue contains an impressive and wide-ranging array of publicly available marine data sources. Under the aegis of the Department of the Environment, Community and Local Government, the ISDE is set to become the discovery component of Ireland's implementation of the EU INSPIRE Directive. Other initiatives such as MarSur (Maritime Surveillance) and SafeSeasIreland may also be relevant.

³ The requirement for a National Marine & Coastal Information Service was identified under *Sea Change – A Marine Knowledge Research & Innovation Strategy for Ireland 2007-2013*

2. MARINE RESEARCH AND INNOVATION TO SUPPORT INDUSTRY

2.1 Overview

The National Recovery Plan recognises the importance of continued investment in R&D and includes a range of actions to support innovation in the economy, with a strong emphasis on building strong linkages between the public research sector and enterprise, commercialisation of research and supporting start-up enterprises.

As with other sectors, R&D can support economic growth and job creation in Ireland's marine sector; by creating and exploiting knowledge that can contribute to the sustainable management and utilisation of Ireland's marine resources, and supporting the generation of new products and services across the various marine sub-sectors. In line with overall R&D investment, marine research investment has increased significantly over the last decade (see box below), albeit from a very low base.

Investment in Marine Research and Development 1995-2010

Investment under successive NDPs and competitive EU funding programmes (e.g. Framework Programme, FP6 & FP7) has transformed the Irish marine research landscape over the last 10-15 years. The first dedicated national marine R&D programme (1994-'99) focused €10m in investment on targeted research and upgrading of research infrastructure. The level of investment increased substantially over the period 2000-2006, with over €250m invested in marine infrastructure and research projects.

This investment increased research capacity and, more significantly, delivered advancements in Ireland's marine research infrastructure, including:

- Multi-purpose marine research vessels
- Specialist laboratory facilities
- Ocean energy test sites and wave tank facilities (see Section 4.3)
- Data assets arising from the Irish National Seabed Survey/ INFOMAR
- Operational ocean data buoy and tidal gauge networks
- National Maritime College (Cork)

The current NDP (2007-'13) incorporates a dedicated Marine Research Sub-programme (within the overall Science, Technology & Innovation (STI) Programme). This is the key investment mechanisms for delivering on the objectives of *Sea Change – A Marine Research, Knowledge and Innovation strategy for Ireland*. In the first four years of *Sea Change* (2007-2010), an estimated €155m has been committed to marine research—€52m from the NDP Marine Research Sub-programme administered by the Marine Institute; €67m from programmes (e.g. SFI, HEA, SEAI, EPA and EI) and €36m from competitive EU research programmes.

R&D investment has been central to the development of marine economies in other countries. For example, Norway, a country with a well developed and diverse marine sector, including a seafood sector that represents 4% (US\$5.8bn) of total exports, is investing significantly (e.g. 9% of the 2009 public R&D budget⁴) in marine research. This investment is targeted at further diversifying the sector—pursuing many of the same opportunities identified for Ireland, e.g. advanced marine technology, marine biotechnology and renewable ocean energy—and improving management and regulation.

⁴ NIFU (2011) Ressursinnsatsen til marin FoU og havbruksforskning i 2009.
<http://www.nifustep.no/Norway/sitepages/PublicationDetails.aspx?PublicationID=717>

In Ireland we invest approximately 2% of the national competitive research budget in marine research. Against this background it is worthwhile noting the success of Irish marine researchers (enterprise and public sector) in attracting competitive EU research funding. Of the €300m awarded to all Irish researchers since the inception of FP7 in 2007, an estimated 8% is focused on marine-related research spanning the areas of fisheries, aquaculture, ocean energy, technology, biotechnology, maritime transport, environmental management and climate change. This represents a significant return on state invested research funds.

Despite the significant increase in public investment in marine research, R&D engagement (and investment) by marine companies lags other industry sectors; for example, just 15% of the €155m committed in grant-aid towards marine research since 2007 is for industry partners. This is due to a number of factors including:

- The lack of scale and fragmented nature (large number of small companies) of many marine sectors is not conducive to R&D engagement;
- The research issues to be addressed are complex and the enterprise base can lack, individually and collectively, the capacity to tackle them; and
- Individual companies have no motivation to address large-scale issues that are best addressed by the public research base.

Ensuring industry engagement in defining and engaging in the research opportunities is critical.

2.2 Marine Research Needs

Given the broad scope of industries in the marine economy research needs in support of the sector are understandably broad and complex. Research in support of industry and marine policy is multi-disciplinary, drawing from a wide range of disciplines in the biological, physical, engineering and social sciences. The scope of current and future marine research to enable sectoral development, to stimulate growth and to respond to policy development needs can be categorised under the following broad headings:

Policy-Focused Research	Applied Research	Oriented Basic Research
<p><i>Research aimed at contributing to the formulation and implementation of policy, regulation of the sector, and spatial and economic development, e.g.</i></p> <ul style="list-style-type: none"> • Research in support of implementation of environmental legislation (MSFD, WFD, Natura etc.)— e.g. new monitoring methodologies • Climate change impacts and adaptation • Socio-economic research, including economic costing of eco-system services • New methods to integrate and interpret data in support of sectoral management • Research to guide the sustainable development of marine-based tourism and leisure activity and enterprise 	<p><i>Research aimed at addressing specific issues or developing new products/services, e.g.</i></p> <ul style="list-style-type: none"> • Development of new products (e.g. environmental sensors, OE devices, new seafood products) and services (e.g. data visualisation software, seabed mapping tools) • New approaches to data collection, data management, stock assessment and scientific advice and fisheries management (Ecosystem Approach) • New aquaculture species and offshore aquaculture research • Sustainable seaweed harvesting methods • Fish health (aquaculture) • Seafood safety (microbiological, toxins) 	<p><i>Research focused on delivering knowledge likely to form the background to the solution of recognised or expected current or future issues or opportunities, e.g.</i></p> <ul style="list-style-type: none"> • Baseline characteristics of marine and coastal ecosystems (e.g. primary productivity, ocean circulation) • Identification, isolation and purification of bioactive compounds from marine materials (seaweed, fish etc.) • Improved data integration to ensure the implementation of the Ecosystem Approach to Fisheries Management (EAFM)

These research needs are being met by a mix of private and public sector efforts, although the level of engagement by the private sector is low, compared with other sectors.

2.3 Current Status of Marine Research & Innovation

Unlike other European countries, Ireland, through the Marine Institute is implementing a dedicated and cross government approach to marine research through the implementation *Sea Change - A Marine Knowledge, Research & Innovation Strategy for Ireland 2007-2013*. This strategy sets out stakeholder-defined objectives, on a sector-by-sector basis, and associated R&D requirements. The overall aim of the strategy is to maximise the economic contribution of marine resources, whilst contributing to the achievement of key national strategic objectives (including Competitiveness and Growth, Innovation, Regional Development and Environmental Sustainability) and enhancing Ireland's profile as an international leader in marine research and innovation.

Since 2007, research investment of approximately €155m has been committed, via a number of national and international sources, to R&D that addresses the objectives of *Sea Change*. In contrast to previous investment periods where research infrastructure deficits were addressed, the majority of research investment now focuses on funding projects that address policy issues or potential development opportunities and build research capacity in specific areas – e.g. marine functional foods, marine biotechnology, fisheries management, ocean energy and marine technology.

Sea Change is currently undergoing an independent mid-term review (2007-2010), which will provide overall recommendations for the remaining period of the strategy.

In common with most industry sectors, Ireland's marine sector faces obstacles in improving its innovation performance. Before firms reach the status of being serial innovators, the conditions for successful knowledge transfer have to exist. Through implementing *Sea Change*, the capacity of the marine sector to enhance and develop its innovative capabilities is improving. Fundamental to this change is an effective technology transfer system which leads to higher levels of research outputs being commercialised and access to long-term capital to fund the commercialisation process. As is widely recognised, Ireland's track record in commercialising research outputs is only just developing and lessons need to be shared and successful experiences and models promoted.

Other actions also seen as contributing to building an innovation driven enterprise culture, include assisting firms to commercialise new product and process concepts more quickly; enabling firms to access the various innovation and enterprise supports within an environment which is more responsive; maximising the role of government and state agencies to unlock their innovation potential by partnering with innovative firms as a customer; maintaining investments in basic and applied research and targeting funds to areas of excellence that can support enterprise development.

The government has identified the need for *Technology and Innovation Centres* to close the gap between research and commercialisation and make new technologies 'investment ready'. These centres will stimulate innovation, accelerate growth and anchor high-value development activity in Ireland. A number of existing developments in the marine area offer potential in this respect and could be built upon, e.g.:

- BIM Seafood Development Centre
- Teagasc Nutraceutical Centre and MI Biodiscovery Lab
- SmartBay – National Technology & Innovation Centre for Marine ICT
- Irish Maritime & Energy Resource Cluster (IMERC).

2.4 Future National Research Priorities

In line with all spending, State expenditure on science, technology and innovation has reduced. This has led to a system-wide re-think on the focus of future expenditure and a move towards so-called 'priority areas'—where we have built up a critical mass of excellent research; where there is a market opportunity to exploit that research; and where Ireland has or can develop an enterprise sector that can benefit from the research and development. In the marine 'priority areas' that address these criteria include:

- Marine Bio-resources (including Seafood)
- Marine ICT/SmartOcean
- Renewable Ocean Energy
- Marine Functional Foods
- Marine Materials for Medical Applications (drugs and bio-materials).

2.5 International Dimension

Ireland's marine research strategy (i.e. *Sea Change*) is fully consistent with, and aligned to, the European research policy, specifically marine research policy, and European research funding initiatives. The European Strategy for Marine and Maritime Research (2008), an initiative under the Integrated Maritime Policy for the European Union (2007), recognises that research and innovation hold a key to reconciling the sometimes competing goals of sustainable economic growth and environmental protection in sea-based activities. The strategy aims to mobilise Europe's very considerable marine and maritime STI capabilities to address challenges—such as sustainable production, food safety and traceability, impacts of climate change and the protection of marine resources and ecosystems—through the application of science, technology and innovation and an evidence-based approach to governance and regulation.

Marine research is funded via a number of competitive research, development and innovation programmes in support of EU Structural, Cohesion, Regional Development, Research and Training policies and strategies—primarily EU 7th Framework Programme (FP7 2007-'13) and the European Territorial Co-operation Programme (INTERREG-IV 2007-'13). These programmes play a major role in facilitating and supporting Irish participation in collaborative European marine research, development and networking projects. Irish national delegates work closely with their counterparts in other Member States, and with other interest groups, to ensure that Irish priorities are adequately reflected in these EU Funding Programmes. The €36m in EU R&D grant-aid secured by Irish marine researchers, in the public and private sectors, since 2007 is supporting over 150 jobs (research and administrative) and is playing a major role in addressing national research objectives as set out in *Sea Change*.

The European marine research community is seeking to ensure marine research priorities are reflected in the Horizon 2020 Programme (the successor to FP7). In the case of the European Territorial Co-operation Programme (INTERREG) 2014-2020, the Inter-Departmental Marine Co-ordination Group is actively engaged with the Commission (DG MARE) in defining the scope and content of the proposed European Strategy for the Atlantic, of which marine research, technology and innovation is an important cornerstone.

2.6 Opportunities and Key Constraints

	Opportunities	Constraints
Marine Research	<ul style="list-style-type: none"> ✓ Potential for ring-fenced R&D funds for marine opportunities within the national list of priority research areas ✓ Establish greater ties between the significant public research base and marine enterprises ✓ Leverage significant public research base in the life and ICT sciences to target marine opportunities ✓ Development of marine-focused Technology & Innovation Centres ✓ Build on Irish marine research success in FP7 during Horizon 2020 (8th Framework), the European Framework Programme for Research and Innovation (2014-2020) 	<ul style="list-style-type: none"> ∨ Reduced overall national R&D spending ∨ High cost of conducting research in areas such as ocean energy, marine technology and marine biotechnology ∨ Poor awareness amongst wider science base and larger funding agencies of marine opportunities ∨ Low level of enterprise engagement in R&D and enterprise/public research collaborations compared to other sectors ∨ Lack of commercial focus in outputs from public sector research ∨

3. INTEGRATED MAPPING

3.1 Overview

INFOMAR (INtegrated mapping **FO**r the sustainable development of Ireland's **MA**rine **R**esource) is Ireland's national marine resource mapping programme. Following on from the Irish National Seabed Survey, all of Ireland's marine territory is being mapped and the extensive range of mapping and data products output are openly and freely available to all stakeholders. INFOMAR is a joint venture between the Geological Survey of Ireland and the Marine Institute, funded by DCENR at c.€4m p.a. and included in the National Development Plan and the Strategy for Science, Technology and Innovation 2006-2011. Constituting one of the largest civilian marine mapping programmes in the world it is cited as an international benchmark of best practice in relation to marine data acquisition, stakeholder engagement and data policy, based on the principle of "acquire once, use many times".

INFOMAR aims to deliver cost effective solutions for Government that are demanded by:

- A significant and diverse range of national legislation and EU obligations.
- Information requirements to underpin national policy and governance associated with appropriate development of the significant potential of our marine resources.
- The opportunity to maximise the international leadership position that Ireland has achieved through it's Mapping initiatives to date, through continued strategically focussed leveraging of international research funding in support of the jobs initiative and development of the Knowledge Economy.

The value of the INFOMAR Programme was analysed as part of the recent Options Appraisal Report and Cost Benefit Analyses on the programme, which estimated its value to the state as between four and six times cost and a current Net Present Value of €275m (PwC, 2008).

The INFOMAR Programme is composed of three core programme elements;

1. Data Acquisition, Data Management & Interpretation
 - Current Capacity: Research and commercial revenue generation, advisory role, data products, vessels, specialised survey equipment and software, advanced ICT infrastructure, training and upskilling
2. Data Exchange and Integration
 - Current Capacity: Advanced spatial data exchange and integration tools, research revenue generation, training and upskilling
3. Value Added Exploitation
 - Current Capacity: Stakeholder advisory role, decision support tools, integrated cross-stakeholder service delivery (single pass acquisition – multiple clients & users), research funder, coordinator and mentor role, strong international commercial partnerships, training and upskilling

3.2 Service Delivery

The marine resource mapping being carried out by INFOMAR is a key enabler for the development and implementation of an Integrated Marine Plan in several ways:

A. Mapping

i) **Charting:** The bathymetry (water depth) and physical habitat (sediment type & rock exposure) maps produced are used in updating charts of Irish waters, including shipping hazards, and they are critical for decision making in relation to planning of marine infrastructure, including:

- Site selection for aquaculture and ocean energy development through
 - a. provision of seabed topography, depth, and type for anchoring conditions
 - b. data facilitating generation of required oceanographic modelling resolution.
- Communication and energy cable route identification.
- Management of shipping channels, navigation aids, and infrastructural development (e.g. Shannon LNG Plant).
- Identification and optimisation of fishing areas through identification of nursing ground and habitat extents.

B. Value Added

ii) **Planning & Environment:** The programme currently provides a key basic input to the development of overall Maritime Spatial Planning and Environmental Management in Ireland, including:

- Data and advisory input into Strategic Environmental Assessments for both offshore oil and gas, and renewable energy.
- Support of Natura Designation for existing sites, and identification of new sites, towards meeting EC Directive obligations (e.g. Mapping Geogenic Reef within Irish EEZ, 2009, for the Department of the Environment).
- Support of industry submissions for environmental assessments and Foreshore Licensing applications.
- Development and delivery of GIS decision support tools for Aquaculture and Foreshore Licensing decisions, and provision of background supporting data.

iii) **Heritage & Tourism:** Information on shipwrecks mapped is passed on to Statutory Authorities covering both navigational hazard and protection of heritage. Consequently this data is used in the tourism, diving and angling sectors.

The Atlanterra INTERREG project based on the cultural mining heritage along the Copper Coast Geopark in SE Ireland is currently seeking to become the first worldwide UNESCO designated Land to Marine GeoPark. In addition, in the heritage area, the programme provides dive support vessels directly to Department of Heritage Underwater Archaeology Unit on important sites.

Opportunities also exist to harness data / technology to develop new tools to interpret and animate our marine and coastal environments which could be used for example to promote and motivate interest for tourists to come to Ireland and also developing applications that will enhance the visitor experience when in Ireland.

Fáilte Ireland is currently carrying out a GIS mapping of the marine infrastructure and amenities around the country in order to support the development of its marine and coastal tourism plan.

iv) Research & Education:

The international marine survey sector and impending Marine Strategy Framework Directive requirements provide significant job and market opportunities for international service provision which INFOMAR is well placed to support, in particular through:

- a) INFOMAR Research Programme: continued identification of market gaps in mapping technologies, and streamlining, funding and coordinating relevant applied research and development
- b) Education and training of marine field survey personnel and marine data analysts.
- c) Public outreach to communicate the multidisciplinary value of data assets (e.g. from lobster pot fishing to web delivery services)
- d) Oversight of development of ICT solutions for multidisciplinary data acquisition, monitoring, integration and visualisation in support of survey operations and decision management (e.g. ocean energy site selection, environmental assessment, monitoring, and in-situ device and site management)

4. MARITIME SAFETY, SECURITY AND SURVEILLANCE

As an island nation with one of the largest sea areas in the European Union, Ireland has a key interest in the protection, safety and security of its maritime domain. The protection of the maritime environment and its natural resources, providing security against organised crime and smuggling including countering people, drug and illegal trafficking, providing a secure operational environment for offshore industry, and a proactive approach to the security and defence of Ireland's sovereignty and exclusive or sovereign rights are key to delivering a safe and secure environment. This will allow all legitimate users of the maritime domain, and the State itself, to prosper. This is not alone a national prerogative but a priority in terms of the European dimension, given Ireland's key geographical position in the protection and governance of the western sea borders and shared sea area of the European Union.

International (e.g. IMO) and European Union policy are key drivers of national policies and strategies, defining primary and secondary legislation on maritime security, surveillance and safety. Continuing efforts to influence developing legislative proposals and its efficient and timely transposition into Irish law are vital to facilitate the growth and development of the marine sector.

Maritime Surveillance:

Ireland has specific national obligations in relation to the protection of the maritime environment and its resources, in particular its sea fisheries. It also has obligations, in ensuring safety and security in the seas around Ireland which are also a key sea gateway to the European Union for international trade and a transit area for other trade. The geographic location of Ireland in relation to Trans-Atlantic maritime traffic places Ireland in a pivotal position for the gathering of maritime surveillance data.

Maritime surveillance, driven from a global perspective, is now a key component in the development of National and EU policy aimed at ensuring fundamental conditions for safe, secure and sustainable activities at sea. This can only be achieved through an effective system of maritime surveillance and the capacity to deliver a presence at sea to protect those engaged in legitimate pursuits, to deter and/or apprehend those engaged in illegal activity and to defend the States sovereign interests and international obligations.

In 2009, the Inter-Departmental Group (IDG) of Assistant Secretaries on Marine Co-ordination established a steering committee and working group on maritime surveillance (MARSUR). The role of the Group was to explore the development of a maritime common information sharing and exchange system that would enable effective monitoring and response to incidents in the Irish maritime domain. The group comprises representatives from Department of Transport/ Irish Coast Guard, the Department of Defence and the Irish Naval Service, the Revenue Commissioners and An Garda Síochána. The group is tasked with the development of a shared common maritime picture, which will facilitate enhanced maritime data sharing not only at national level but also between our EU counterparts, including under the proposed EU common information sharing environment and the European Defence Agency MARSUR project. This shared common maritime picture will also support the primary taskings of those charged with ensuring the protection, safety and security of Ireland's maritime domain and the defence of Ireland's maritime interests, sovereignty and exclusive sovereign rights.

The Steering Committee set up a working group under the Chair of the Irish Coast Guard to facilitate the necessary technical discussion on data sharing and exchange. The MARSUR working group has now defined and identified the maritime data for sharing at national and EU level. The necessary Interdepartmental system connections for sharing of maritime data, point to point, are currently being linked up. The sharing of certain maritime data sets at EU level is already facilitated by connection to the European Maritime Safety Agency through SafeSeaNet, through the North Sea

Server for the sharing of AIS data, through the EU Commission for VMS Fishery Protection data. The sharing of data has also taken place, on a voluntary basis, among a number of EU Navies (including the Irish Naval Service) participating in EDA/MARSUR.

At national level, the identification of an architecture and system to enable a single window view of all pertinent layers within the maritime area is to be addressed by an independent review to be conducted by recognised industrial experts in the field.

In the security and defence domain, the Irish Naval Service is already engaged in the development of a tiered Recognised Maritime Picture to support its maritime protection, safety, security and defence commitments. This incorporates Defence generated data from Naval Service vessels, Air Corps maritime patrol aircraft, satellite based surveillance systems and other sources of maritime surveillance data available to it. It can then be made available to other key stakeholders as appropriate having regard to their security clearance classification.

The **EU Draft Roadmap towards establishing a Common Information Sharing Environment (CISE) for the surveillance of the EU maritime domain** (2010) represents an important development. In satisfying its aim to generate situational awareness of activities at sea, and in particular in European waters, it will provide niche opportunities for a range of high-tech product and service providers in sectors such as:

- **Maritime surveillance equipment and systems** including vessel tracking and management systems linked to satellite and GPS, associated sensors, monitoring compliance with traffic, fisheries and environment regulations; data collection, transmission, management, visualisation and associated services;
- **Safety at sea** including search and rescue equipment, early warning of ships/persons in distress, personal safety devices, etc;
- **Security** including security systems for port infrastructures and environmental monitoring and clean-up systems;
- **Defence**, excluding military issues, this includes products and services to assist customs/border controls and the detection and intervention in trafficking in narcotics and human beings.

Within the security and defence domain, the **EDA/MARSUR** project, in which Ireland now participates, provides the capacity to facilitate information sharing among participating Navies. Many of these are tasked at member State level to provide services in the safety, security and surveillance domain to civilian actors within their own national administrations. It also facilitates the sharing of maritime information among navies engaged in international crisis management operations under the European Union's Common Security and Defence Policy (CSDP).

In setting out a context for growth and development in the sector, the following areas represent a number of policy initiatives that are particularly relevant. They provide the legislative and regulatory underpinning for safety, security, surveillance and marine environmental protection from ship source pollution that establish and maintain a reputation of world class standards and quality control in the Irish maritime domain.

This has a much further reach than just providing for safety and security of the domestic maritime domain at national level. The establishment and maintenance of internationally recognised standards and certification in a global maritime industry context has the potential to create and sustain a business environment that can facilitate the development of maritime related services in ports and shipping, training and certification contributing to job creation.

SafeSeasIreland is a one-stop-shop web portal which facilitates trade by enabling ships to comply with their statutory reporting obligations. SafeSeasIreland ensures compliance with Directive 2002/59/EC and facilitates the collection and sharing of data on ship arrivals and

departures, dangerous cargo details, security status, results of ship inspections and information on ship waste and cargo residues. It also contributes to the efficient implementation of EU maritime safety legislation and other community policies such as environmental protection, security, immigration and allows Ireland to implement the Port Reporting Formalities Directive 2010/65. SSI is a key enabler for the development of shipping services, marine tourism and leisure and the cruise industry amongst others.

Seafarer Training is regulated by the IMO Convention on Standards and Training Certification and Watchkeeping (STCW). Ireland is on the IMO “White List” of States which means that it is in full compliance with the STCW Convention. Ireland successfully completed its 2nd renewal audit in 2010 which means that (a) seafarers holding Irish certificates of competency will remain highly sought after internationally and (b) the NMCI (Cork) and other course providers can continue to provide seafarer training to the highest international standards. Ireland is now implementing the latest amendments to the STCW Convention (Manila 2010) to be in force by January 2012.

Maritime Labour Convention: The MLC seeks to ensure that the employment and social rights of seafarers are fully implemented and is fully supported by the Irish government, IBEC and the ITCU. The Department of Transport, Tourism and Sport is currently making the necessary arrangements to ensure the required legislation is in place when the conditions for ratification are achieved (i.e. when there have been registered ratifications by at least 30 member states with a total share in the world gross tonnage of 33%). While the tonnage threshold has been passed, to-date, approximately half of the required 30 Member States have ratified the Convention.

International Shipping Benchmarks: The international shipping industry has developed a number of key benchmarks, the most important of which are: IMO STCW “White List”; IMO Audit; Paris MoU “White List” and Paris MoU “Low Risk Flag”. Compliance with these benchmarks has many positive benefits (e.g. fewer inspections, reduced insurance premiums) in the international shipping community and confers confidence in the capacity of the Irish Maritime Administration.

Maritime Passenger Transport – Accessibility: The commitment of the government to making Ireland a better place to live means that efforts continue to be made with a view to ensuring the transport needs of people with disabilities or mobility impairments, and that people in isolated, disadvantaged or socially excluded communities are properly catered for. Recent legislative developments at both national and EU levels have been taken to improve accessibility (e.g. Merchant Shipping Act 2010 – Part 4 and EU Passenger Rights Regulation No. 1177/2010) and guidance has been provided to inform owners, masters, crew and other persons with responsibility for passenger services.

In addition, research and technology development in the area of maritime sensor technologies and data fusion, communication and integration technologies, involving national and regional actors engaged in the provision of maritime protection, safety, security, defence and surveillance services, provides Ireland with a key opportunity to develop centres of excellence in delivering high-end technologies in these areas. Such developments contribute to high value job creation opportunities.

5. EDUCATION AND TRAINING

5.1 Overview

The development of the marine sector requires/demands a continuous supply of experienced and skilled personnel. Such personnel are critical to the consolidation and up-grading of traditional marine sectors (e.g. fisheries, maritime transport, marine and coastal tourism etc) and to support the development of new emerging sectors (e.g. renewable ocean energy, marine biotechnology, etc).

The National Expert Group on Future Skills Needs (EGFSN) continually emphasises that education and training plays a fundamental role in achieving economic and social progress, most notably by equipping individuals with the skills and competences needed for employment, personal fulfilment and social cohesion. In today's knowledge-based society, the importance of education and training is recognised across a range of bodies, including the European Union and the Irish Government. This is reflected in policies and programmes such as the EU 2020 Targets for education and training, the Government's National Skills Strategy and the announcement (July 2011) on the establishment of a new Further Education and Training Authority (SOLAS).

The EGFSN also emphasises that world-class skills, education and training are a pillar of Ireland's competitiveness. It has been consistently established that the availability of a skilled workforce is one of the key attractions for foreign companies locating in Ireland and a key factor that drives entrepreneurship, innovation and the development of indigenous Irish industry.

We need to ensure that we have the skilled workforce for the marine growth sectors of the future, including seafood, shipping, ports and services, marine renewable energy, offshore oil and gas, marine and coastal tourism and leisure, marine ICT, marine biotechnology and bio-products. Employers, unions, employees and education and training providers all have a role to play.

Investment in education and training at all levels (e.g. secondary, tertiary, technical, professional) is a high priority. Those in the education and training sectors must demonstrate that they are responding to identified needs and gaps. Research and innovation provide knowledge, ideas and skills which feed back into teaching and learning in higher education institutions and support *the three sides of the innovation triangle* — education, research and innovation/entrepreneurship.

There is also a strong need to *mainstream innovation to ensure that it can permeate all sectors*. Innovation, in this context, should not be confused with industrial development or be taken to mean industrial innovation alone. Innovation in academic research and development must also be supported. This can be a precursor to good education and training and to the public good, enhancing quality of life and benefiting society through more than economic goals as well as to direct commercial outputs. Business innovation is multi-faceted and encompasses the development of many research-based products, processes and services, with the overall aim of meeting market needs. The value of business innovation which is not of a direct technological nature should also be recognised and supported e.g. innovation through new business models.

5.2 Marine Sector Jobs

The marine sector offers a wide and diverse range of career opportunities. Increasingly more complex technical projects and opportunities offered by convergence in the marine sector mean that far greater interdisciplinary knowledge and experience of working in multi-disciplinary work environments is required. This requires bringing together professionals from diverse backgrounds working together in multi-disciplinary teams - such as engineers, planners and architects with ecologists, biologists, and chemists.

Marine subsector	Jobs
Shipping ports and services	Ship brokers, commodity traders, bunker brokers, charterers, ship operations, maritime analysts, fleet managers, Ship agents, pilots, tug operators, STCW training providers (health & safety training aboard), Ship Chandlers and equipment suppliers, Freight Forwarder, Marine Economics, crew, naval architects, marine surveyors, hull surveyors, cargo surveyors master mariners and other deck officers, chief engineers and marine engineers, shipping lawyers, radio operators, marine insurance (marine underwriters, hull and machinery, cargo claims), shipping accountants.
Seafood	Food technologists, microbiologists, food production, food processing, food analysts,; marine biology, fishery scientists, botanists, environmental scientists, maintenance technicians, fishermen, ships officers, marine engineers, boat crew, radio operators, animal nutritionist, veterinarians, geneticists, environmental management, nature conservation, pollution control, environmental consultancy, quality assurance technicians, quality auditors, lab technicians ,food process engineers, new product development technologists, food economist, production supervisor, process technician, market development staff, production managers, general operatives, mechanical and electrical trades
Marine Renewable Energy	Software development engineer, market data analysis, IT controller, hardware developer, turbine monitoring and diagnostic engineer, smart grid engineer, power systems software engineer, electrical engineer, process engineer, marine energy engineer, site development manager, marine operations manager, economist, structural engineer, hydrologists, mechanical design engineer, wave scientists, fabrication and welding technicians.
Off-shore hydrocarbons minerals and gas	Geologists, geophysicists, hydrologists, mineralogists, drilling engineers reservoir engineers production engineers facilities engineers energy economists environmental engineering, riggers, rough-necks and general operatives, network systems and data systems analysts, chemical engineers, naval architects, marine surveyors, master mariners and other deck officers.
Marine Tourism and Leisure	Guides, hotel and catering management, chefs, bar staff, beauty therapists, boat builders, sports and fitness trainers, retailer staff, marketing and public relations, accountants, drivers, maintenance staff, translators, tour operators, angling instructors, environmental management. marine park and oceanarium management, museum curatorship, teaching/training and teaching support (film-making, etc.).
Marine ICT and SmartOcean	Programmer/software developers, systems analysts, web developer, network engineers, telecoms engineers, technical sales, marketing, software engineers, project manager, mechanical, electrical, electronic and civil/structural engineers, geoscientists, maintenance technicians, mechanical and electrical trades, general operatives, divers and dive support.
Marine Biotechnology	Product and process development, quality analysts, safety officers, geneticists, chemists, biologists, botanists, biotechnologists, molecular biologists, biochemists, geneticists, laboratory and medical technicians and mathematicians, biostatisticians and statisticians, bioinformatics, process engineers, food technologists and scientists, nutritionists, veterinarian., medical doctors, microbiologists, fishery scientists, sales and marketing, data analysis, synthetic biologists, wide range of process technicians and plant operators, chemical engineers and process engineers.

5.3 Vocational Training and Skill Development

Opportunities exist for individuals with particular vocational and technical backgrounds in each of the marine sectors. The marine sector, both nationally and globally, will continue to need and attract technicians and general operatives and well as highly skilled technical staff. Individuals well trained in traditional disciplines; mechanical and electrical technicians and trades, laboratory technicians are required in all areas. Possessing core skills and knowledge in these disciplines is all important since they are relevant to both land and marine based jobs and as such are transferable. Many existing jobs (e.g. electricians, metal workers, machinists) will remain in demand by the marine sector, where core skills may be enhanced by an “exposure” to the challenges of working in an off-shore and sea-going environment that will undoubtedly bring about changes to work methods and occupational profiles. Jobs will be created and others maintained in developing Ireland’s marine sector; movement within and between sectors will take place.

The announcement by the Minister for Education & Skills (July 2011) on the establishment of a new Further Education and Training Authority (SOLAS, to continue the work of FÁS (the National Training and Employment Authority), provides a unique opportunity to look also at the marine sector in the context of new training, up-skilling and re-training, including specialised training courses, job placements and internships.

5.4 Professional Training and Skill Development

The Irish Higher Education sector (Universities and Institutes of Technology) provides a range of undergraduate and post-graduate education and training opportunities in support of the marine sector.

Undergraduate offerings range from specific marine science or engineering Certificates or Degrees (e.g. Nautical Science at NMCI; Marine Science in NUIG) to more general Certificate/Degrees with a substantial marine element (e.g. Applied Freshwater & Marine Biology in GMIT; Earth & Ocean Science at NUIG). Similarly, taught postgraduate courses can be entirely marine-focused (e.g. Coastal Management & GIS in UCC) or contain significant marine content (Environmental Science in TCD). While there are currently no marine specific Graduate Schools in Ireland, the recently funded (HEA) Graduate Schools in Engineering and Earth & Natural Sciences have significant marine elements. The continuation of the provision of certified training (e.g. Certificate in Marine & Countryside Guiding supporting adventure tourism) is considered an important tool supporting existing and new businesses. In addition, the improvement of marketing capabilities e.g. in the seafood and tourism sectors is also seen as key to growth in these sectors.

In July 2011, the Irish Marine Renewable Industry Association (MRIA) published a skills analysis report: ***Third-Level Education Needs of the Ocean Energy Industry: To maximize the job and income creation potential of Ireland's ocean energy resource.***

5.5 Dedicated Marine Training Infrastructure

Ireland has an extensive distributed training infrastructure built upon resources of the higher education and semi-state institutions, supplemented by private sector training providers. Examples of the major dedicated training centres include:

National Maritime College of Ireland (NMCI) - NMCI offers degree courses and other certificated course to school leavers and those with experience of working aboard merchant ships or fishing vessels. Professional seafarers seeking further training towards gaining Certificates of Competency are also catered for at NMCI. The NMCI training facilities include an array of vessel operation simulators, engine rooms, and sea survival training tanks.

Bord Iascaigh Mhara (BIM) provide dedicated training and skill development programmes, including certificated FETAC courses, to new entrants and more experienced people in the fishing, aquaculture and seafood processing sector. These courses are delivered at regional located fisheries training centres (Killybegs and Castletownbere) and via the mobile Coastal Training Units-which allows training to be provided at various coastal locations. Training support in seafood processing and seafood development is delivered by the BIM's Seafood Development Centre in Clonakilty.

Strategic Marine Alliance for Research and Training (SMART) The SMART alliance is a new collaboration between Universities, Institutes of Technology and state agencies that seeks to establish an inter-institutional programme in delivering high-quality ship-based training on board the national research vessels (RV Celtic Voyager and RV Celtic Explorer) and research supports for national and international students of marine science, technology and engineering.

6. EUROPEAN POLICY DEVELOPMENT AND CO-OPERATION

Ireland is recognised as a forthright supporter of the **Integrated Maritime Policy for the European Union** (IMP-EU, 2007), and in 2010, co-signed, with France, Spain and Portugal, a joint statement supporting the proposed **EU Strategy for the Atlantic (EUSA)**⁵.

Ireland has also been an active promoter of the view that science, technology and innovation are key drivers of success. In 2004, the **Galway Declaration** (EU-Ireland Presidency EurOCEAN Conference, Galway, May, 2004,) set the scene, arguing for an integrated European marine and maritime research strategy. This was followed up in the **Aberdeen** (EurOCEAN Conference, Aberdeen, 2007) and **Ostend Declarations** (EU- Belgium Presidency EurOCEAN Conference, Ostend, 2010)⁶. This co-ordinated initiative had a significant impact on:

- the inclusion of science and technology pillar, the **European Union Strategy for Marine and Maritime Research** (2008)⁷, in the IMP-EU;
- the **EU FP7 Ocean of Tomorrow Research Funding Programme**;
- the **EU Marine Knowledge Strategy** (2010)⁸.

Ireland's presidency of the European Union, in the first 6 months of 2013, comes at a very critical and fortuitous time, positioning Ireland to influence many important EU initiatives in the financial period 2014 – 2020, including the further development and implementation of initiatives under the IMP-EU, the EU's HORIZON 2014-2020 Research Funding Programme and the launch of the European Union Strategy for the Atlantic.

6.1 The European Policy Framework

The **Europe 2020 Strategy (2010)** is a 10-year plan, proposed by the European Commission, to revive the EU's economy by focusing on "*smart, sustainable and inclusive growth*". It updates the Lisbon Strategy (2000-2010) which sought to make the EU "*the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion*".

Europe 2020 is supported by seven major flagship initiatives. Of these, two are of particular relevance to the national efforts to drive sustainable economic growth from our marine resources:

- **The Innovation Union** (2010)⁹ aims to ensure that innovative ideas can be turned into products and services that create growth and jobs. The Innovation Union also proposes to improve conditions and access to finance for research and innovation.
- **The Resource Efficient Europe** (2010)¹⁰ initiative supports the shift towards a resource-efficient, low-carbon economy to achieve sustainable growth. This flagship initiative provides a long-term framework for actions in many policy areas, supporting policy agendas for climate change, energy, transport, industry, raw materials, agriculture, fisheries, biodiversity and regional development.

⁵ <http://www.marine.ie/home/aboutus/newsroom/news/IntegratedStrategyfortheAtlantic.htm>

⁶ <http://www.euroceanconferences.eu/>

⁷ http://europa.eu/legislation_summaries/research_innovation/research_in_support_of_other_policies/ri0008_en.htm

⁸ <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/10/404&format=HTML&aged=0&language=EN&guiLanguage=en>

⁹ http://ec.europa.eu/research/innovation-union/index_en.cfm

¹⁰ http://ec.europa.eu/resource-efficient-europe/index_en.htm

The remaining five initiatives relate to the digital agenda, youth, industrial policy, new skills and jobs and poverty.

6.2 The European Marine Policy Framework

In 2007, following a Europe wide consultation process, the Commission took a landmark decision to:

- establish a **Directorate General for Maritime Affairs**¹¹ (DG MARE); and
- to publish an **Integrated Maritime Policy for the European Union (IMP-EU)** and an associated **Action Plan (The Blue Book)**¹².

This initiative recognises that Europe's maritime spaces and its extensive coastlines are central to its economy, well-being and prosperity – they are Europe's trade routes, climate regulator, source of food, energy resources and a favoured site for its citizen's residence and recreation.

The IMP-EU:

- i. proposes integrated actions (The Blue Book – Action Plan) in all relevant policy areas related to the seas, including transport; environment; renewable ocean energy; enterprise, employment and research; fisheries; and external relations;
- ii. identifies three key cross-sectoral tools to underpin implementation:
 - Maritime Spatial Planning (MSP) and Integrated Coastal Zone management (ICZM);
 - Integrated Maritime Surveillance;
 - Marine Knowledge.

In support of the further development and implementation of the IMP-EU, the Commission has recently (December 2010) launched a Europe wide consultation to identify the most important growth scenarios and the domains where the EU can help unlock the full potential of the marine resource¹³. The consultative report will also recommend actions on **skills, research and capital** that are needed to develop Europe's maritime economy, in line with the key goals and objectives of **Europe 2020** and its' seven flagship initiatives; in particular A Resource Efficient Europe.

Important Europe wide initiatives have already been undertaken with a prominently integrated focus. These include:

- The **Marine Strategy Framework Directive (MSFD)**¹⁴, the environmental pillar of the IMP-EU, requires Member States to achieve *good environmental status* in their marine waters by 2020, thereby protecting the resource base upon which marine-related economic and social activities depend. The implementation of this Directive, with critical targets to be achieved in 2012 and 2014, will benefit from the further development of cross-cutting tools of the IMP-EU, such as **Marine Spatial Planning (MSP)**¹⁵ and **Marine Knowledge 2020**. The Marine Knowledge 2020 Strategy aims to improve the knowledge of Europe's seas and oceans and use this data to develop knowledge-based and internationally traded products and services.
- Closely related to the MSFD, the **reform of the Common Fisheries Policy**¹⁶ (CFP) has integrated the *ecosystem approach* as an overarching principle. The EU has also taken the lead in policy making at global level and has adopted a Regulation on the protection of vulnerable marine ecosystems in the high seas from the adverse impacts of bottom fishing gears.

¹¹ <http://ec.europa.eu/maritimeaffairs/>

¹² http://ec.europa.eu/maritimeaffairs/subpage_mpa_en.html

¹³ <http://www.ecorys.com/news-items-press-releases/ecorys-advises-european-commission-on-sustainable-maritime-p-2.html>

¹⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0056:EN:NOT>

¹⁵ http://ec.europa.eu/maritimeaffairs/pdf/com_2010_771_en.pdf

¹⁶ http://ec.europa.eu/fisheries/cfp/index_en.htm

- The **White Paper on Transport** (*Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System*)¹⁷ offers development opportunities for Ireland’s maritime transport sector, particularly through the ‘**Blue Belt**’ initiative, which will promote free transport movement within the internal market. By using the latest technology to monitor maritime transport, for example to support customs authorities, the administrative burden on short sea shipping could be minimised. A ‘technology roadmap for transport’ proposed in the White Paper will also feature the continued development of SafeSeaNet (a European Platform for Maritime Data Exchange between Member States’ maritime authorities) as a core integrated ICT-based system supporting maritime safety, security and environmental protection initiatives.
- A Commission proposal on **energy infrastructure** includes methodologies for identifying and selecting concrete projects of common interest necessary to implement the priority corridors. One of the priority corridors is the offshore grid in the North Sea, which could facilitate the development of ocean energy and its potential integration into the offshore grid and connection to the consumption centres of Europe.
 - The **Strategic Energy Technology (SET) Plan**¹⁸ is a crucial tool for the development of new renewable energy technologies. A review of progress to date (expected in 2012) by the Commission will provide the opportunity to include ocean energy as one of the initiatives of the Plan, which would contribute hugely to the technical credibility of the technology.
 - The Commission may present a **Communication on industrial policy** [of] marine energy, such as developments at ports and off-shore services, to include funding proposals through the Structural Funds.
- The **European Strategy for Marine and Maritime Research (2008)**¹⁹ promotes marine research, scientific excellence and development of cutting-edge innovations that i) foster development of key sectors of the maritime economy, ranging from renewable ocean energy through shipping and the new blue biotechnologies; and ii) help deliver on EU environmental legislation and policy goals. The Strategy informs research priorities addressed by the 7th EU Research Framework Programme (FP7 2007-2013) and those proposed under the HORIZON 2020 Programme (2014-2020). Over the period 2007-2011, Irish marine researchers, including research based SMEs, have drawn down over €40 million in competitive EU research funding.
- **Regional Policy**—considering the unique characteristics of the various European Sea-Basins, and the need to tailor specific targeted strategies and measures relevant to the each Sea Basin, the Commission is pioneering regional European Sea-Basin Development Strategies (see Box: **A European Union Strategy for the Atlantic**).

¹⁷ http://ec.europa.eu/transport/strategies/2011_white_paper_en.htm

¹⁸ <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/657&format=HTML&aged=0&language=EN&guiLanguage=en>

¹⁹ http://ec.europa.eu/research/press/2008/pdf/com_2008_534_en.pdf

A European Union Strategy for the Atlantic (EUSA)²⁰

Further to the publication of the IMP in 2007, significant effort has focussed on the development of strategies to implement the IMP in the different European Seas and Oceans, recognising their individual physical, socio-economic and environmental characteristics. To-date, Regional Sea Strategies have been prepared for the Arctic (2008) and the Baltic Sea (2009). Others are either in preparation (Mediterranean) or proposed (North Sea).

In 2010, the Commission initiated a broad consultation on a **European Union Strategy for the Atlantic (EUSA)**. The purpose of the Strategy is to develop a coordinated programme of actions across the economic, environmental, research, innovation, governance, safety and security dimensions of the Atlantic maritime region involving Ireland, Spain, Portugal, France and the UK. Ireland, together with other Atlantic partners (France, Spain and Portugal), was to the forefront in the consultation process and co-signed a joint statement supporting the EUSA focused strongly on driving economic recovery and spearheading the smart economy. Among the priority challenges and opportunities which Ireland identified included renewable ocean energy; hi-tech marine services; harnessing industrial value from sustainable marine biomaterials, maritime safety, security and surveillance; maritime transport and accessibility; and, more generally, research, innovation and capacity building.

It is anticipated that the Commission will publish a Communication on the EUSA in autumn 2011 and initiate a further round of consultations to identify priority actions/flagship projects to be carried in the Atlantic Sea-Basin. Member State Governments, Regional Governments and various other stakeholder groups are actively involved in inputting to the identification of priorities which will inform the aims and objectives of the EUSA and the financial instruments (e.g. Structural and Regional Funds) available to implement them. Ireland's presidency of the EU in 2013 occurs at a critical moment for the implementation of the EUSA.

²⁰ <http://www.marine.ie/home/aboutus/newsroom/news/IntegratedStrategyfortheAtlantic.htm>

GLOSSARY OF ACRONYMS / TERMS

AIS	Automatic Identification System
APB	An Bord Pleanála
BIM	Bord Iascaigh Mhara
DAFM	Department of Agriculture, Food and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
DCENR	Department of Communications, Marine and Natural Resources
DECLG	Department of the Environment, Community and Local Government
EDA	European Defence Agency
EEZ	Exclusive Economic Zone
EI	Enterprise Ireland
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EUSA	European Union Strategy for the Atlantic
FHC	Fishery Harbour Centre
FP6 & FP7	EU Sixth / Seventh Framework Programme for Research and Technological Development
GIS	Geographic Information System
GMIT	Galway-Mayo Institute of Technology
GSI	Geological Survey of Ireland
HEA	Higher Education Authority
IBEC	Irish Business and Employers Confederation
ICT	Information and Communications Technology
IMO	International Maritime Organization
INFOMAR	INtegrated mapping FOr the sustainable development of Ireland's MArine Resource
ISDE	Irish Spatial Data Exchange
ITCU	International Trade Union Confederation
LNG	Liquefied natural gas
MI	Marine Institute
MLC	Maritime Labour Convention
MSC	Marine Stewardship Council
MSFD	Marine Strategy Framework Directive

MSP	Maritime Spatial Planning
Natura 2000	EU wide network of nature protection areas established under the 1992 Habitats Directive comprising of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) designated under the 1979 Birds Directive.
NDP	National Development Plan
NMCI	National Maritime College of Ireland
NPWS	National Parks and Wildlife Service
NUIG	National University of Ireland, Galway
OE	Ocean energy
R&D	Research and Development
RV	Research Vessel
SE	South East
SEAI	Sustainable Energy Authority of Ireland
SFI	Science Foundation Ireland
SMART	Strategic Marine Alliance for Research and Training
STCW	Standards and Training Certification and Watchkeeping
STI	Science, Technology & Innovation
TCD	Trinity College Dublin
UCC	University College Cork
VMS	Vessel Monitoring System
WFD	Water Framework Directive

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