Irish Maritime and Energy Resource Cluster

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IMERC Strategy 2011–2016

Irish Maritime and Energy Resource Cluster

Summary: This Strategy presents the IMERC response to the maritime and energy economic opportunity for Ireland. IMERC core partners of University College Cork (UCC), Cork Institute of Technology (CIT) and the Irish Naval Service (INS) will deliver a new research and enterprise campus in Ringaskiddy, Cork.

The cluster features industry partners, the National Maritime College of Ireland (NMCI), the INS Headquarters, and the new UCC Beaufort Laboratory. A critical mass of expertise will be brought to bear on job creation in key areas of Marine Energy; Maritime Security and Safety; Shipping, Logistics and Transport; and Marine Recreation.

UCC
Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

CIT
Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

NAVAL SERVICE

The IMERC vision is to become a research and commercial cluster of world standing, by realising Ireland's potential in the global, maritime and energy markets of tomorrow.

Acknowledgements

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IMERC Director (V. Cummins)

October 2011.

Ireland currently faces economic difficulties of a depth and scale unknown since the foundation of the State. Our response to economic hardship in the 1930s was to take radical measures (e.g. the development of State companies and the creation of an industrial sector behind tariff barriers) and our challenges now demand a similar degree of innovation, coupled with public sector transformation.

Ireland has an opportunity to derive added value from its vast marine resource. Until now, we have failed to achieve optimum economic benefits from maritime sectors such as shipping, logistics and transport, offshore hydrocarbons, maritime technology, maritime security and marine recreation. Nevertheless, these sectors represent global growth areas where market opportunities exist for niche products and services. For example, a substantial gas field located in the South Porcupine basin off the West Coast of Ireland could yield €5 billion over its lifetime in taxes. Significant potential also exists in the marine renewable energy sector, including the creation of up to 52,000 jobs from ocean energy by 2030.

The Irish Maritime and Energy Resource Cluster (IMERC) initiative comes about at the dawn of a new era for maritime Ireland, stimulated by the growing realisation of the economic opportunities around maritime and energy. This awakening is evidenced by a number of complementary, strategic national initiatives. These include 'Smart Ocean', Ireland's submissions to the EU Integrated Maritime Policy and the Atlantic Strategy, and the work of the cross governmental Marine Co-ordination Group.

This Strategy document presents the IMERC response to the maritime and energy economic opportunity by the IMERC core partners of University College Cork (UCC), Cork Institute of Technology (CIT) and the Irish Naval Service (INS). The IMERC vision is to become a research and commercial cluster of world standing, by realising Ireland's potential in the global, maritime and energy markets of tomorrow. IMERC will be an engine for new ideas through research, and many of these ideas will translate into the sustaining innovative enterprises of the future.

Together, this tripartite alliance will deliver a new research campus in Ringaskiddy, Cork alongside the National Maritime College of Ireland. It will feature UCC's new Beaufort Building, which will house the largest marine renewable energy research group in the world (funded by The Higher Education Authority, the Department of Communications, Energy and Natural Resources, Bord Gais and the Glucksman Foundation).

The campus will cater for industry partners through the provision of co-located industry suites, incubation units, networking and brokering programmes, innovation partnerships and joint ventures. An industry centred approach will be used to develop an ecosystem of innovation that will yield Intellectual Property, High Potential Start Up Companies and jobs in Ireland's Smart Economy.

A critical mass of expertise will be brought to bear on job creation in the key areas of Marine Energy; Maritime Security and Safety; Shipping, Logistics and Transport; and Marine Recreation. The expertise within the cluster provides a unique mix of academic, end-user and professional elements focused on transforming traditional institutional approaches to problem solving.

Executive Summary

This strategy provides a roadmap for the organisational changes across the core partner institutes, required to deliver a new degree of joined-up-thinking and service delivery. It describes a model based on trust, centred on the delivery of added value from the core organisations.

IMERC core partners are committed to playing an active role in a partnership model with other key players. IMERC core partners will pursue collaboration with industry, Higher Education Institutions, and with national agencies such as the Marine Institute, Sustainable Energy Authority of Ireland, the Industrial Development Authority, the Irish Maritime Development Office and Enterprise Ireland, to attract funding, support the development of Small to Medium Enterprises and attract Foreign Direct Investment.

The success of IMERC will be measured according to the delivery of tangible benefits to the country in the form of income and employment. Key targets to be delivered by 2016 are for a minimum of 70 new research jobs, the development of UCC's Beaufort Laboratory (the world's largest marine renewable energy research facility), the incorporation of five new companies, an extended commercial campus, at least two major Multinational clients, the establishment of the NMCI as a research provider, and the establishment of the Naval Service as a Knowledge Institution.

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Glossary of Terms

4C	Cork Computational Constraints Centre, UCC
BEES	School of Biology, Earth and Environmental Sciences, UCC
CIT	Cork Institute of Technology
CMRC	Coastal and Marine Research Centre, UCC
DCMNR	Department of Communications, Marine and Natural Resources
EI	Enterprise Ireland
ERI	Environmental Research Institute, UCC
FDI	Foreign Direct Investment
GIS	Geographic Information Systems
HEA	Higher Education Authority
HEIs	Higher Education Institutes
HMRC	Hydraulics and Maritime Research Centre, UCC
HPSU	High Potential Start Up (Company)
ICT	Information and Communication Technologies
IDA	Industrial Development Authority
IERC	International Energy Research Centre
IMERC	Irish Maritime and Energy Resource Cluster
IMP	(European) Integrated Maritime Policy
INS	Irish Naval Service
IP	Intellectual Property
MI	Marine Institute
MNC	Multinational Corporation
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NMCI	National Maritime College of Ireland
PI	Principle Investigator
PRTLI	Programme for Research in Third Level Institutes
R&D	Research and Development
SEAI	Sustainable Energy Authority of Ireland
SEFS	College of Science, Engineering and Food Science, UCC
SERG	Sustainable Energy Research Group, UCC
SME	Small to Medium Enterprise
UCC	University College Cork

1.1 Introduction

Ireland has the largest maritime area (220 million acres) to land mass in the EU, yet it derives only 1% of its Gross Domestic Product from the maritime sector. Comparative figures are UK 5%, Denmark 11%, and Norway 20% [1].

Global megatrends in areas such as the redirection of technological innovation, the need for alternative energy, and shifts in the economic balance of power, represent both challenges and opportunities for Irish researchers, innovators and investors working in the maritime and energy space.

New opportunities exist in the development of **niche products and services** targeted towards global growth sectors such as marine renewable energy, shipping, logistics & transport, marine tourism & recreation, maritime security, maritime training, and maritime ICT [2].

The IMERC vision aims to target these opportunities, by becoming a research and commercial cluster of world standing, by realising Ireland's potential in the global, maritime and energy markets of tomorrow.

IMERC will be **an engine for new ideas through research,** and many of these ideas will translate into the **sustaining innovative enterprises of the future.** In this way, IMERC will contribute to **Ireland's economic recovery.**

IMERC brings together a strategic partnership between **University College Cork (UCC), Cork Institute of Technology (CIT)** and the **Irish Naval Service (INS).** These partners recognise the significant investment made in marine science in Ireland to date, and the need to add value to this investment with returns for both economy and society.

Introduction

The IMERC initiative is in line with the **EU Integrated Maritime Policy (IMP),** which strives for the optimal development of all sea related activities in an integrated way and the progression of maritime clusters as important support mechanisms.

IMERC is also a **response to national policy,** with particular regard to:- the 'Making it Happen Strategy' (Forfas, 2010); the IDA Strategy (IDA, 2010); the Smart Ocean Consultation Strategy (Marine Institute, 2010); the Energy White Paper (DCMNR, 2007); the Ocean Energy Strategy for Ireland (DCMNR, 2005); and the SeaChange Strategy (Marine Institute, 2006).

IMERC is a strategic, national initiative that helps to deliver specific objectives concerning Ireland's maritime and energy sectors. IMERC forms part of an integrated national research infrastructure, including the Higher Education Institutions (HEIs) and the Marine Institute in Galway. The IMERC core partners stand committed to playing an active role in collaborating with key players both nationally and internationally.

Section 1 of this document provides the context for the development of IMERC. This includes core partner profiles, an introduction to the cluster concept, and the economic drivers for IMERC. Section 2 describes the IMERC vision and objectives, and the approach to the implementation of the IMERC Strategy.

1.2 IMERC Core Partner Profiles

University College Cork

UCC has assembled the largest and most significant marine renewable energy research group in the world in IMERC.

The University's impact in this field [3] has been driven by the success of three main research groups, including the Hydraulics and Maritime Research Centre (HMRC), the Coastal and Marine Research Centre (CMRC), and the Sustainable Energy Research Group (SERG).

These groups will be merged into the new 14 million euro **Beaufort Laboratory (provisional title),** currently under development in Ringaskiddy. This will include the national marine energy test-tank facility, which will support device development from national and international industry and research groups.

The development of the Beaufort Building builds upon an international track record in marine renewable energy engineering, including hydraulic, mechanical and electrical engineering for wind, wave and tidal energy.

Other disciplines will be brought to bear on the maritime and energy challenge to inform marine environmental monitoring, resource assessment, marine forecasting, energy modelling, climate and coastal science, seabed mapping, data management and governance issues.

IMERC is an important cornerstone of UCC's energy alliance, which is complemented by the research activities of the International Energy Research Institute, run by the Tyndall National Institute, and the Environmental Research Institute.

The University also provides expertise and support from the College of Science, Engineering and Food Science (SEFS), with additional technical input from the School of Biological, Earth and Environmental Sciences (BEES), the Aquaculture and Fisheries Development Centre (AFDC), the Cork Computational Constraints Centre (4C), and the School of Geography and Archaeology.

The **HMRC** has an international track record in marine renewable energy engineering.

Principal Investigator: Prof. Tony Lewis
Administrative / technical staff: 4
Research staff: 21
Current location: Pouladuff Road, Togher, Cork City (includes wave test tank)

The **CMRC** is internationally renowned in its fields of marine ecology, marine geomatics, climate and coastal science, seabed mapping, and governance.

Principal Investigator: Jeremy Gault
Administrative / technical staff: 2
Research staff: 33
Current location: Naval Base, Ringaskiddy

The internationally recognised expertise in **SERG** includes marine forecasting, energy modelling, and structural engineering for offshore wind turbines.

Principal Investigator: Dr. Eamonn Mc Keogh
Current location: Main Campus, UCC
Research staff: 15

Irish Naval Service

Expertise in marine science, technology and engineering in the University is complemented by the knowledge base that resides in the Irish Naval Service. **The INS aims to be the smartest, most innovative, responsive naval service provider in the world by 2016.**

As **Ireland's largest maritime institution** (approximately 1,100 personnel), over 50% of personnel are technically focused in areas such as ship logistics, surveillance systems and subsea operations.

INS participation in IMERC represents a unique opportunity for professional development among Naval Service personnel, whilst providing added value to the State in its provision of a public good service.

The INS role in IMERC provides **end user driven solutions to end user identified problems.** Areas of interest include next generation monitoring/detection system technology for maritime situational awareness.

The environment facing the INS is rapidly becoming more complex and challenging and a key response by the Service is to be more closely embedded in the knowledge economy, thus to become itself a 'knowledge institution'.

The inculcation of a culture of innovation within the Navy provides an opportunity for transformation to a post-modern Naval Service for the State. INS targets in IMERC are for 30 Masters and 10 PhDs by 2016.

The Irish Naval Service is uniquely placed to support SMEs engaged in product development, specification, testing and demonstration.

Cork Institute of Technology

The CIT is the highest research-performing Institute of Technology in Ireland, with particular strengths in applications of research for economic benefit. Alongside the National Maritime College of Ireland (NMCI), the Institute has established multidisciplinary research groups that support the mission of IMERC, including the NIMBUS Centre for Research in Embedded Networked Systems *(Principle Investigator Dr. Dirk Pesch),* the Centre for Advanced Photonics and Process Analysis (CAPPA) *(Principle Investigator Dr. Guillaume Huyet),* the Sustainable Energy Group *(Principle Investigator Daithi Fallon)* and the Maritime Research and Development Group *(Principle Investigator Dr. Paul Walsh).*

For example, researchers in the NIMBUS Centre, an internationally recognised centre for fundamental and applications driven research networks of wireless systems and smart materials, are collaborating with colleagues in the Maritime Research and Development Group, the NMCI and INS to develop embedded sensors for personnel tracking on ships, as an innovation partnership with SEFTEC Ltd[1]. In addition to wireless sensor tracking systems, areas of interest among these groups include data fusion for sea border surveillance, maritime simulation, visualisation and scenarios for flood risk management.

National Maritime College of Ireland

The CIT has been the national centre for **training master mariners and cadets in navigation and marine engineering for over 30 years.** In 2004, the CIT and INS engaged in a Public Private Partnership to establish the NMCI to train **candidates for the merchant marine and the Irish Naval Service.** (The private partner is Bovis Lend Lease).

The NMCI represents a component of infrastructure in support of the development of Ireland's maritime and energy sectors, including its **bridges, survival training, fire and engine simulator suites, technical workshops, and the unique expertise and experience of its staff.**

Furthermore, the NMCI provides access to a wealth of end user expertise in all areas of navigation, maintenance, security, maritime engineering and logistics. This knowledge has led the NMCI to become a valued partner in recent FP7 Security projects such as Darius and Perseus, and in Interreg IV projects such as IMCORE and ACROPOL.

Professional training is offered in areas including dry cargo operations and chartering, Liquid Natural Gas carrier operations, oil and shipping operations, seismic replenishment at sea, rummage training for customs, anti-piracy and crisis management.

The **commercial potential of NMCI** is demonstrated by its joint ventures with SMEs such as Seftec Ltd, and with Multinational Corporation's such as GAC[2].

Head of College: Mr. Michael Delaney (Acting) *Staff: 60*
Associate Head of College: Cdr Martin Counihan *Location: NMCI, Ringaskiddy*

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1 Seftec Ltd. provide OPITO approved offshore training products and services in the international marketplace.

2 The Gulf Agency Corporation (GAC) is a world leading provider of shipping, logistics and marine services, with over 9,000 employees worldwide.

1.3 Why Maritime and Energy?

IMERC provides a response to market drivers and policy needs in key maritime and energy sectors.

1.3.1 The Maritime Market Opportunity

Ireland's maritime economy comprises a large number of companies operating in sub sectors such as shipping and transport, seafood production, hydrocarbon exploration, boat building, bio-discovery and technology. Ireland's share of the global maritime industries market is small. However, **opportunities exist if Irish companies can capitalise on research to target niche, high value, growth areas.**

Strong **global growth rates** are projected for areas such as marine renewable energy, shipping, logistics & transport, marine tourism & recreation, maritime training, maritime security and marine technology [4]. For example, employment in the international shipping services sector in Ireland grew by 10% last year. The Irish Maritime Development Office (IMDO) estimates that direct employment in this high-value sector could double over the next five years, leading to further investment and job creation opportunities.

Ireland's membership of the European Space Agency (ESA) has contributed to the development of a high knowledge-intensive industry sector with over 60 Irish technology companies having secured ESA contracts worth over €60 million since 2000. This figure is expected to grow significantly in 2011, with a large number of new projects focused on the integration of earth observation data with data from other monitoring platforms (e.g. ship-based, in-situ) to achieve an improved awareness of maritime activities (e.g. fishing, shipping, recreation, illegal trafficking).

Significant opportunities also exist in the development of niche products and services for the global maritime security industry. Enterprise Ireland and the Defence Forces were authorised by Government in 2011 to pursue initiatives with the European Defence Agency to leverage existing civil technology development in Ireland in the military capability development field. This gives further impetus for the role of INS in IMERC, as an innovator in areas such as the development and deployment of autonomous (e.g. Autonomous Underwater Vehicles) and semi-autonomous vehicles (e.g. Remotely Operated Vehicles and Unmanned Aerial Systems).

Irish national levels of R&D activity vary greatly across different sub sectors. For example, R&D intensity in marine renewable energy is high. However, there is a need to develop the role of research, technology and innovation in sectors such as shipping, logistics and transport.

IMERC can help to address the mismatch between growth potential and national R&D capacity. IMERC partners have established an excellent academic track record in marine geomatics, applied Geographic Information Systems and remote sensing. The challenge is to identify opportunities to convert this knowledge into value added products and services to industry.

For example, regulations concerning enhanced port and offshore security are driving demand for **innovative ICT products and services**. This will require projects that can deliver greater integration between port, security, navigation, logistics and environmental monitoring systems. These provide **opportunities that can be delivered in partnership between IMERC and industry.**

1.3.2 The Marine Energy Market Opportunity

A major opportunity for Ireland lies in the marine renewable energy sector, including **wave, offshore wind and tide.** For example, Ireland has one of the best wind and wave resources in the world, as well as significant hotspots for tidal energy on the east coast. The ocean energy sector (wave and tides) will potentially yield 52,000 new jobs by 2030 as well as contributing to the future security of energy supply [5].

Government has set a target of 500MW of wave and tidal derived energy by 2020, while the recent Ocean Renewable Energy Development Plan has identified the feasibility of at least 1,500MW from wave and tidal, and 4,500MW from offshore wind sources by 2030. Technological advances are required to adapt onshore designs for wind turbines to deeper and more challenging marine environments. There is also a need for research into areas such as modelling and control of wind microgrids, forecasting, and storage.

At the same time, the largest market in the world for offshore wind is currently in the UK. As a result, there are huge opportunities for Irish companies to target this sector. IMERC is perfectly positioned to help with the challenge of training and capacity building, for example by providing conversion courses and innovative products and services into the UK marketplace.

In comparison to wind, wave and tidal technology is at a nascent stage of development. However, deployment targets indicate that the growth in the sector will accelerate rapidly over the coming decade.

A number of Irish wave convertor device developers have undertaken prototype demonstration (e.g. Ocean Energy Ltd, Wave Bob Ltd) and are in transition towards early commercial array demonstration. It is imperative that this early mover advantage be maintained to ensure Ireland's place as a global centre of excellence in this area. To this effect, the Westwave project, under development by the ESBI, will be supported by IMERC as an associate partner.

Significant potential also exists in the **offshore hydrocarbon industry.** Studies by the Department of Communications, Energy and Natural Resources indicate that a substantial gas field located in the South Porcupine basin off the West Coast of Ireland could yield €5 billion over its lifetime in taxes. According to the Irish Offshore Operators Association (IOOA) such discoveries would improve the international markets' view of Ireland's economic prospects, while resulting in significant job creation, and the establishment of spin-off industries. Furthermore, the **potential to transfer knowledge from the offshore hydrocarbon sector to the marine renewable energy sector** is not to be underestimated.

Growth across all aspects of the marine energy sector will be contingent inter alia upon access to funding for developers, a strong foundation of R&D across a range of engineering, science and technology disciplines, and excellence in training to produce the requisite skilled workforce.

The **supply chain opportunities** in these sectors cover activities including planning (e.g. surveys, consents, regulation and control, work planning, stakeholder engagement), construction and installation (e.g. cable laying, construction management, drilling and piling, fabrication and assembly, lifting, marine engineering, underwater services), operation (e.g. anchor handling, training and safety services, harbours and service bases, monitoring and inspection, navigation maintenance, operational control, towage, vessels and craft), decommissioning and emergency response (debris clearance, salvage and recovery, search and rescue).

IMERC has a significant role to play in delivering a **one-stop-shop** for innovation across multiple aspects of the supply chain. IMERC offers a strong and broad base of expertise across its key strategic pillars of maritime operations, maritime ICT, ecosystem governance and ocean engineering, as well as significant focus in niche areas such as wave test tank modelling, simulation, training and governance. This will complement capacities and plans in other HEIs and in public sector organisations such as the Marine Institute and Sustainable Energy Authority of Ireland.

Section 2
IMERC Strategy
2011–2016

2.1 Vision

The IMERC vision is to become a research and commercial cluster of world standing, by realising Ireland's potential in the global, maritime and energy markets of tomorrow.

Our goal is for IMERC to be an engine for new ideas through research, where ideas will translate into the sustaining innovative enterprises of the future.

2.2 IMERC Objectives

1. To deliver a practical, applied and commercial focus to the research, teaching and training activities that IMERC will seek to influence in the areas of Marine Energy; Maritime Security and Safety; Shipping, Logistics and Transport; and Marine Recreation.
2. To foster industry, academic and end-user relationships that can turn new research ideas into jobs.
3. To consolidate a critical mass of expertise where an established academic track record already exists in Ocean Engineering, and Ecosystem Governance.
4. To build new and additional research capacity around the themes of Maritime Operations and Enabling Maritime Technologies.
5. To ensure a process of public sector transformation within the IMERC partner organisations, characterised by a culture of collaboration, and an evidence-based approach to applied maritime research and innovation.
6. To develop an expanded IMERC campus in Ringaskiddy, providing national facilities, industry suites and incubator units.

2.3 Approach

These objectives will be achieved by a **three-step approach** in the areas of:

1. Campus Development
2. Cluster Development
3. System Changes

These steps are described in more detail below.

2.4 Campus Development

As a priority area for national industrial development, targeted by the Industrial Development Authority (IDA), **Cork Harbour** provides an ideal location for the IMERC Campus (Figure 1).

Three major public institutions are co-located at the core of the Campus in Ringaskiddy:

- The **National Maritime College of Ireland** (750 students, 60 staff)
- The **Irish Naval Service** (1,100 personnel)
- **UCC's new Beaufort Laboratory** (provisional title at the time of writing) (up to 135 research staff and industry suites).

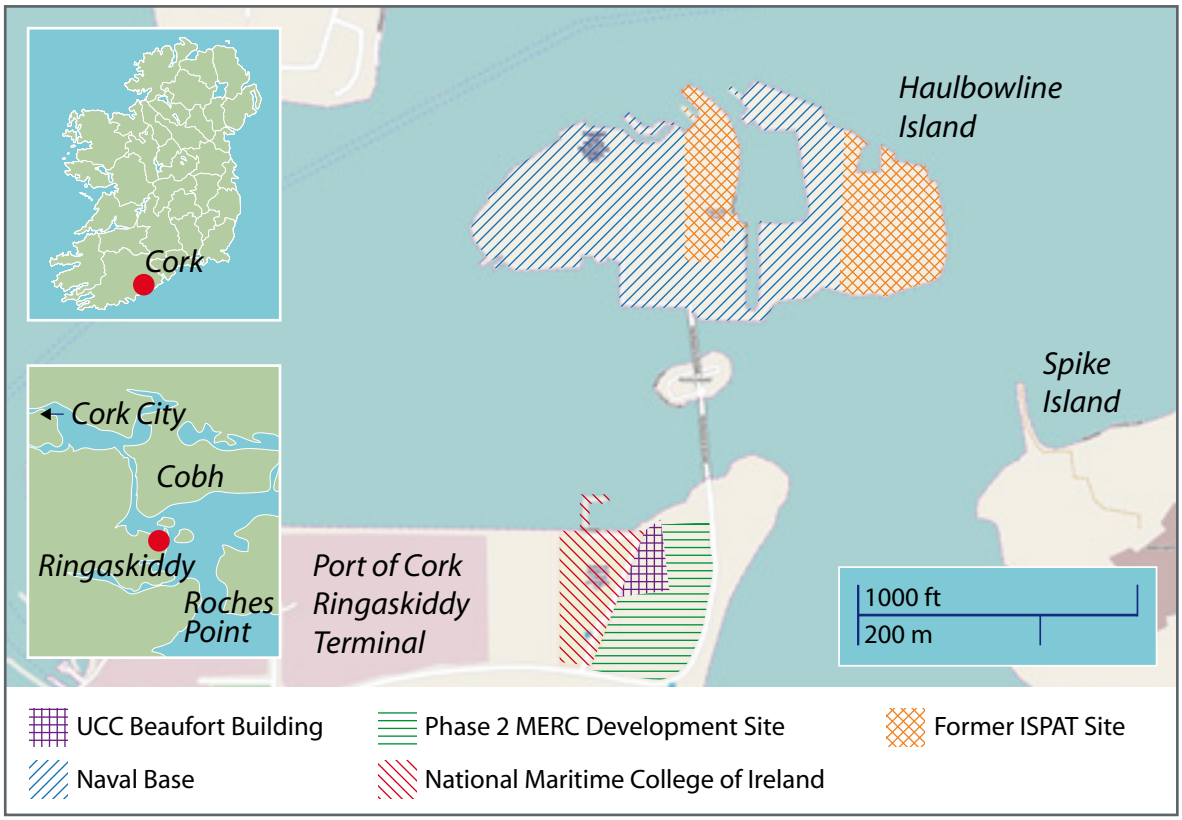


Figure 1. Locations of the initial IMERC campus facilities, including the three principle co-located institutes: the National Maritime College of Ireland, the UCC Beaufort Laboratory, and the Headquarters of the Irish Naval Service.

IMERC provides the framework for the development of an expanded campus, where researchers and industry clients can benefit from the facilities on offer including renewable energy wave test tank facilities, sea survival pool, the world's largest suite of bridge simulators, engine room simulators, industry suites, naval dockyard, auditorium, library, workshops and classrooms.

The 'bundling' of R&D, test tanks, simulators, naval dockyard, training and port facilities, provides an opportunity to present an **integrated package of both infrastructure and human capital to attract Small to Medium Enterprises (SMEs) and Foreign Direct Investment (FDI) into the region.** Investments will be sought from technology corporations, complementary to the maritime and energy pursuits of IMERC. IMERC will be used as a flagship by the Industrial Development Authority (IDA) to attract FDI opportunities to the Campus.

In tandem with Enterprise Ireland, IMERC partners will actively seek to develop and support indigenous innovation, through spin outs and collaboration with **Small to Medium Enterprises (SMEs)** working in the maritime and energy space.

Ultimately, the master-plan aims to enable IMERC to expand in its own right, and to cater for both FDI and domestic industry requirements, e.g. through the provision of **industry suites** and **incubation units.** The co-location of additional facilities will be vital both for academic and business growth. Two strategic locations will be targeted in the first instance: the site to the east of the NMCI (currently owned by the Port of Cork, with agreement for the site to be developed for IMERC related activities), and the site of the former ISPAT buildings on Haulbowline Island. The aim is to pursue the development of a master plan for campus expansion in close collaboration with the Industrial Development Agency (IDA).

The long term view is to work towards a fully integrated geographic cluster in Lower Cork Harbour. IMERC will be used to **underpin strategic, related developments in adjacent sites,** as well as in **Haulbowline, Cork Dockyard, Port of Cork, and by the Cork and Harbour Chambers of Commerce.**

2.4.1 Phase 1 of the Campus Expansion

The development of UCC's Beaufort Laboratory represents Phase 1 of a phased approach to campus expansion. Phase 1 is concerned with a three acre site to the east of the NMCI (Figure 2).

Figure 2. Campus master-plan for Eastern NMCI site.

Figure 3. Artists impression of the Beaufort Building (Source: McCullough Mulvin Architects)

University College Cork has secured funding to construct a new, dedicated, national research centre, adjacent to the NMCI. The Beaufort Laboratory will house some 135 researchers from the HMRC, the CMRC and SERG. It will also provide a number of state-of-the art industry suites within the building. The building itself will be a **'living laboratory'** showcasing best practice in energy efficiency (Figure 3).

A **Memorandum of Agreement (MOA)** between the core IMERC partners (Appendix A) specifies the governance arrangements in place to provide for shared facilities with NMCI, such as library, canteen and technical workshops.

This laboratory will include the **national marine renewable energy test tank facility.** This **€14 million** investment is funded by the Higher Education Authority, Department of Communications, Energy and Natural Resources, Bord Gais, and UCC Glucksman Foundation. The target date for occupancy is **May 2013, in time for Ireland's hosting of the EU Presidency.**

HEA Higher Education Authority An tÚdarás um Ard-Oideachas

BORD GÁIS NETWORKS

GLUCKSMAN

2.4.2 The National Marine Test-Bed Infrastructure

IMERC is already the home to the infrastructure associated with the NMCI and the INS. The development of the National Beaufort Laboratory will provide additional laboratory scale, marine renewable energy test tank facilities, as part of the enhancement of the national marine test-bed infrastructure of the State.

These include the **Marine Institute's quarter scale test site in Galway Bay,** and the Sustainable Energy Authority of Ireland's **full scale test site off the coast of Belmullet, County Mayo** (AMETS - The Atlantic Marine Energy Test Site). A strong track record of collaboration also exists with the Queens University Belfast tidal **test site in Strangford Lough.** Device developers are encouraged to adopt a phased approach to testing, which encompasses each of these facilities. Figure 4 shows the relationship between IMERC and other critical infrastructure of national importance.

IMERC complements the Smart Bay facility in Galway Bay by providing end-user and academic requirements for this unique monitoring and communications infrastructure. **Co-ordination between IMERC and Smart Bay will be ensured** by representation on both the IMERC and Smart Ocean boards, and by a number of collaborative research projects underway at the operational level.

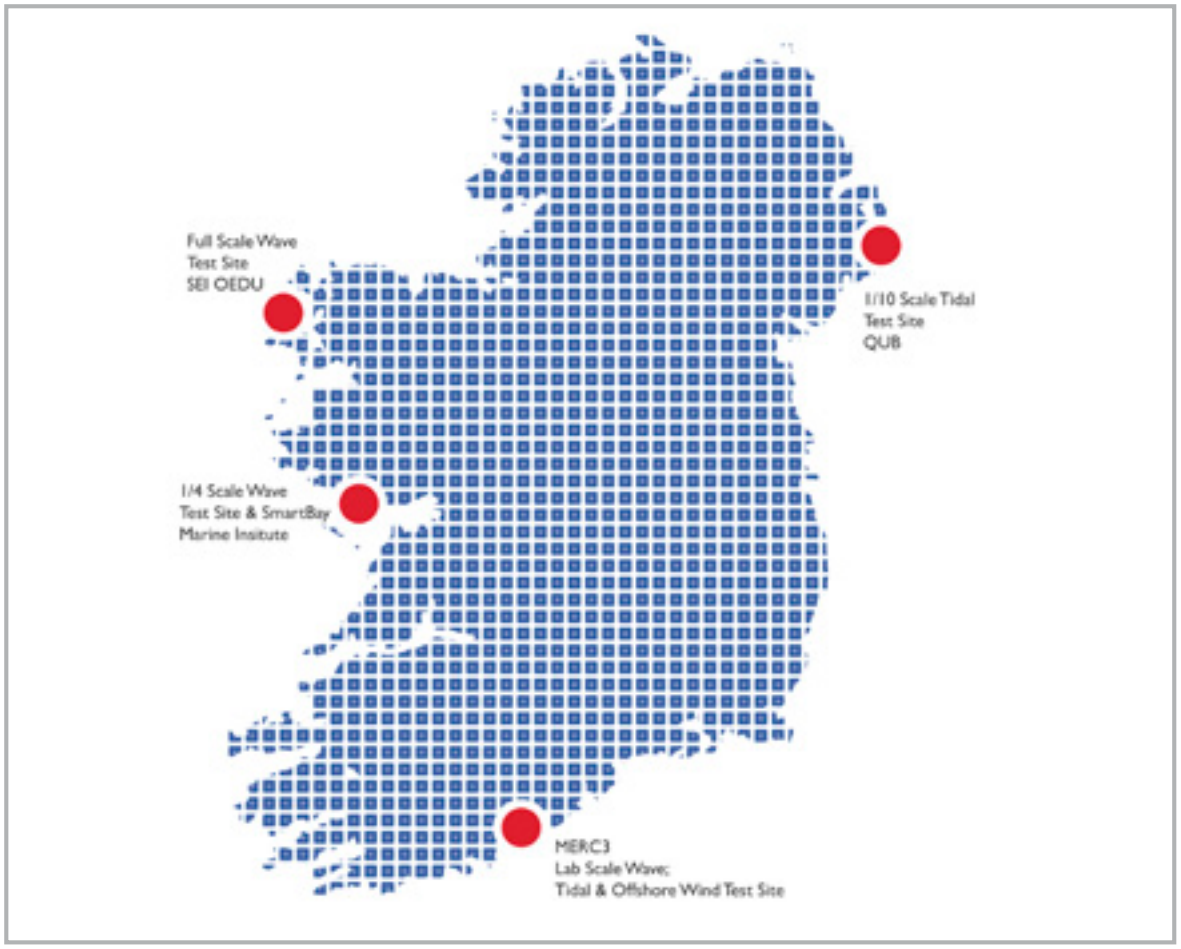


Figure 4. Relationship between IMERC and other critical marine renewable energy infrastructure of national importance.

2.5 IMERC Cluster

2.5.1 Cluster Development Model

Clusters can be defined as a group of economic actors and institutions that are located near each other and have reached sufficient scale to develop specialised expertise, services, resources, suppliers and skills [6]. IMERC meets this description through its strategic focus on the e**merging campus at Ringaskiddy in Lower Cork Harbour,** as the location for key maritime and energy research, training, industry and public sector institutions. The drivers for cluster development in IMERC are linked to the economic opportunities around the maritime and energy sectors described in Section 1.

The European Commission recognises the value of promoting Maritime Clusters across Member States, under its Maritime Policy [7]. IMERC will be linked to a network of European maritime clusters to identify best practice and derive value from lessons learned elsewhere.

The IMERC strategy is to develop a research and commercial cluster by focusing on four key components (Figure 5).

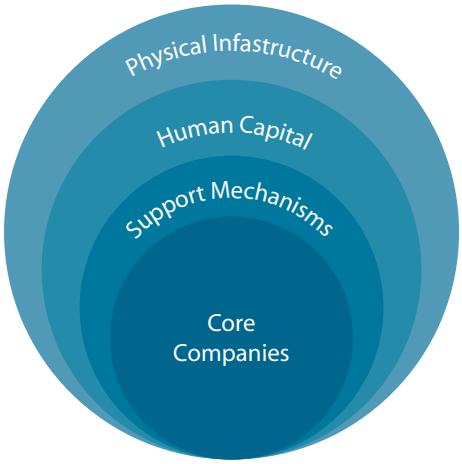


Figure 5. IMERC cluster development components

Physical Infrastructure (See Section 2.4)

2.5.1.1 Human Capital

Human capital / soft infrastructure is concerned with developing the **relationships that will yield productive collaborations.** The IMERC core partners of UCC, CIT and INS will nurture and build strategic alliances with industry, government, academia and civil society in pursuit of this aim.

IMERC partners collaborate within Ireland with the National University of Ireland, Galway; University of Limerick; National University of Ireland, Maynooth; Queens University, Belfast; University of Ulster, Coleraine; Trinity College Dublin; and University College Dublin, as well as with public agencies such as the Marine Institute, Irish Maritime Development Organisation, Sustainable Energy Authority of Ireland, Environmental Protection Agency, National Parks and Wildlife Service, Government Departments and Local Authorities. The Port of Cork are also

important supporters and collaborators in IMERC related activities.

International collaborations are facilitated through participation in Framework, Marie Curie, European Science Foundation and World Bank programmes. From a strategic perspective, Memoranda of Understanding (MOUs) with international partners give rise to important bi-lateral institutional exchanges. These include MOUs with:

- Marine Institute and Memorial University, St. Johns, Newfoundland, Canada.
- Virginia Institute of Marine Science, Virginia, United States.
- National Brazilian Space Institute, Brazil.
- Massachusetts Renewable Energy Centre, United States.

International collaboration will be pursued as a strategic objective, to develop further relationships with players of world renowned calibre, in both academia and industry.

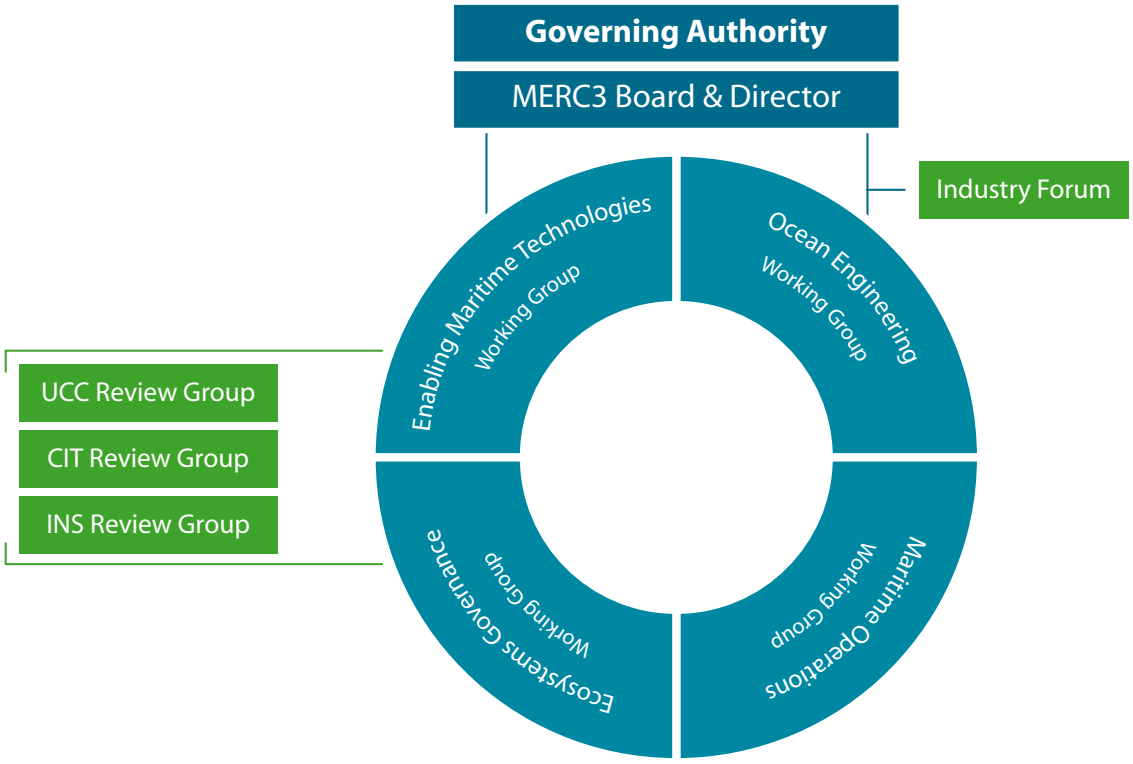


Figure 6. IMERC organisational approach

Exploitation of the human capital within IMERC, whether it is mobilised at the local, national, or international level, requires **a focus on priority thematic areas.** Figure 6 outlines the four horizontal themes around which, people, enterprise and institutions will be gathered. These are designed around the core disciplinary strengths within the IMERC community, which are **Enabling Maritime Technologies, Ocean Engineering, Ecosystem Governance and Maritime Operations.** These strengths will be applied to: **Marine Energy; Maritime Security and Safety; Shipping, Logistics and Transport; and Marine Recreation.**

Key deliverables anticipated from the four Technical Working Groups during the period of this Strategy are outlined in Table 1.

Table 1. Anticipated deliverables from the application of IMERC Technical Working Groups (TWGs)

TWG	Deliverables
Ocean Engineering	A world class hub of Marine Energy Test Bed Engineering. Excellence in Coastal Engineering, including protection from extreme climate events. New capacity in Offshore and Marine Transport Engineering projects.
Ecosystems Governance	Applied Marine Ecology and Ecosystems Governance Groups underpinning the sustainable development and spatial planning for offshore activities and informing the need for innovative technology. A 'think tank' and foundation for an informed Irish maritime constituency. Centre of Excellence in Adaptation to Global Coastal Change, including stakeholder engagement in coastal zone management.
Enabling Maritime Technologies	ICT enablers to underpin areas such as Maritime Safety and Security, Marine Recreation, and Shipping, Logistics and Transport (e.g. interoperability, constraint computing, artificial intelligence, cloud computing, autonomous vehicles). Centres of Excellence in Marine Simulation, Marine Geomatics, and Satellite Remote Sensing.
Maritime Operations	New research capacity in areas of Human Factors, Logistics and Supply Chain, Maritime Law and Route Optimisation. Focus on issues around safe, efficient and effective transit, including anti-piracy, fuel efficiency and maritime surveillance solutions.

2.5.1.2 Enabling Mechanisms

National policy and regulatory frameworks have a major influence on activities in the maritime and energy sectors. For example, constraints such as foreshore licensing, baseline data and grid infrastructure have to be overcome to support developments in offshore Ireland. The development of maritime sectors is contingent upon effective ecosystem governance, including expertise in areas such as marine environmental science and Maritime Spatial Planning. **There is a need for intellectual leadership and authoritative opinion that can underpin a new maritime constituency for Ireland. IMERC aims to fulfil this role by providing an important source of national policy support which will help to focus attention on the economic opportunities to be pursued for the country.** This will include contributions towards the EU Integrated Maritime Policy and the emerging Atlantic Strategy.

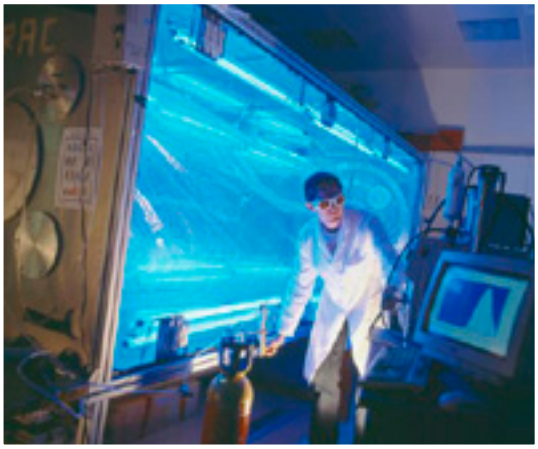
IMERC core partners will also seek to bring **external support mechanisms into the Cluster.** A business development plan will be developed to set out a r**oadmap for investment** into IMERC to stimulate the job creation potential. Private and public finance mechanisms will be sought, both nationally and internationally. At the national level, a **mandate** may be sought to optimise the functioning and impact of the Cluster at the national level.

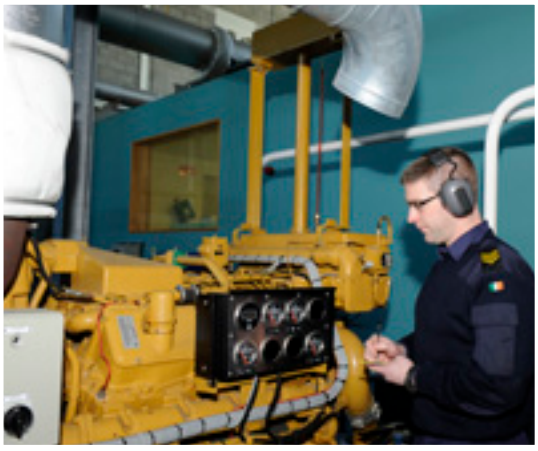
The **internationalisation of IMERC will be pursued where investment opportunities can be broadened and deepened.** IMERC presents an excellent example of the value to be derived from global philanthropic donations. The development of IMERC can be tracked back to the original investment in the CMRC via the Glucksman Foundation, which stipulated a close collaboration with the INS. Thus, IMERC presents a vehicle for **attracting investment led philanthropy,** and international foundation funding which will be sought in collaboration with the UCC Foundation Office and international foundations.

2.5.1.3 Core Companies

Industry partnerships are of vital importance to the success of IMERC. IMERC support to industry will span a range of activities including **access to national test bed facilities, collaboration in innovation partnerships, campus based industry suites, brokering events, networking, and joint venture partnerships.** IMERC industry clients range from **SMEs to Multinational Corporations (MNCs).**

Engagement with industry will be pursued on multiple levels. IMERC **industry clients** will be sought to co-locate into **IMERC industry suites,** for example in the Beaufort Laboratory. **High Potential Start Up Companies (HPSUs) and incubating firms** will be identified and supported through IMERC / Enterprise Ireland initiatives in the campus. Campus incubation will also be supported via the in-house





expertise in the Technology Transfer Offices of UCC (e.g. the Gateway Centre) and CIT (e.g. the Rubicon Centre).

Supporting firms from outside of the immediate vicinity of the campus, but with **intellectual links to IMERC related activities,** will also be encouraged to interact with IMERC activities, for example through **innovation partnerships, brokering and networking events.** Engagement with IDA client companies will provide links to MNCs. Collaboration with IMERC can be an attractor for MNCs already located in Ireland, whilst acting as **a magnet for attracting new Foreign Direct Investment (FDI),** such as those in the **Clean Technology** area.

The development of **a strong business core** for IMERC will be a key challenge, where IMERC industry liaison structures will have to **connect with more companies and more people.** The principles upon which industry liaisons will be based in IMERC will include **open exchange of ideas, efficient technology transfer and unrestricted interactions.**

2.5.2 Case Study: Marine Renewable Energy

A strong and broad based approach across numerous disciplines in the maritime and energy domains (science, engineering and humanities), as well as a significant focus on the niche areas around ocean energy engineering, will form the cornerstone of IMERC related R&D activities.

This section illuminates how the IMERC cluster model will be used to support the development of the marine renewable energy sector.

The IMERC approach will be to **focus *initially* on the marine renewables challenge, as a catalyst for growth among different maritime and energy sectors of activity.** The activities cover the three stages of:

- Device Development
- Manufacturing and Assembly
- Deployment
- Operations and Management

Device Development

The HMRC has been to the fore in conducting laboratory scale testing of marine renewable energy devices for over thirty years.

The IMERC strategy will provide upgraded infrastructure to encompass State-of-the-Art test tank facilities on the IMERC campus in Ringaskiddy. Industry led R&D activities will focus on mechanical, hydraulic and electrical engineering challenges such as power take off and control systems.

Other themes will include non-linear and extreme wave behaviour wave resource modelling, tidal device modelling and demonstration, structural engineering and next generation energy device integration strategies.

Capacity will also be built to generate Intellectual Property (IP) in the application of marine simulation to model how marine renewable energy devices react in the marine environment. Validation will be undertaken using the marine renewable energy test tanks and the expertise of end users from the NMCI and the INS.

Manufacturing and Assembly

Research and Innovation in IMERC will influence the design and development of products that will transition to a manufacturing and assembly phase. The human and physical capital within IMERC will be presented as an added value component to help attract related manufacturing and assembly activities within the Port of Cork, including the Cork Dockyard Facility.

Deployment

The deployment phase of an offshore energy project requires input in relation to marine site appraisal and impact studies, planning and logistics.

Research capacity will be developed to simulate various deployment scenarios with a view to the commercialisation of management and training products.

Existing capacity in marine science and governance within the CMRC will be enhanced to underpin activities such as numerical modelling and marine spatial planning.

Research into foundational engineering will be provided by SERG. Expertise within the NMCI and the INS will be utilised to inform best practice in vessel supply, moorings, boat handling and safety procedures.

Operations and Management

Research capacity in the NMCI will be developed to simulate O&M scenarios in relation to safety at sea resulting in indigenous technology solutions for the global marketplace.

Partnerships will be developed with teams such as the NIMBUS group in CIT and the Tyndall Institute to apply sensor and communications technologies in innovative situations.

CMRC activities in the areas of satellite remote sensing and marine geomatics will be applied to the O&M phase to develop enhanced maritime domain awareness and decision support

systems. SERG researchers will work within the partnership and with industry to provide marine forecasting.

The INS will play an increasingly important role in knowledge generation and support services related to the security of offshore energy devices in the O&M phase. Marine robotics, acoustic, and optical sensing techniques will be supported and developed.

Training and Education

Professional training, delivered primarily by NMCI, will focus on generic and bespoke courses in areas such as sea survival and safety training. NMCI will leverage from the IMERC partnership to development new opportunities in markets such as training in support of the UK offshore wind sector. The academic partners will collaborate to produce undergraduate and post graduate courses, with a particular focus on the delivery of a **marine graduate programme.** Innovation in teaching will be informed by the research undertaken within IMERC. IMERC will be a vehicle for **inter-institutional module development and joint promotion of existing and new courses.** Training and education in support of the nascent marine renewable energy sector will be an important focus of activities. A separate plan will be put in place to elaborate on the IMERC training and education activity.

2.6 System Changes

2.6.1 Governance

Our economic difficulties present us with an opportunity to question existing practice and to look for new approaches to how we do business. IMERC instigates the requisite organisational changes across the core partner institutes to deliver a **new degree of joined-up-thinking and service delivery.**

Systems changes are identified in this section of the IMERC Strategy, to ensure this happens in the areas of **governance, leadership and in the overall structure of the system.** IMERC is **not designed to become a legal entity,** relying instead on a **partnership model based on trust,** to deliver added value from the core organisations.

The governance model for implementing the IMERC Strategy is provided for, in part, by the **IMERC MOA** (See Appendix A). This outlines the relationships and expectations of the IMERC core partners.

Table 1 presents the **IMERC Board Members.** Implementation of the Strategy will be overseen by the Board and managed by the **IMERC Director.** The IMERC Office will facilitate relationship building between the partners and also with industry as described in Section 2.3.

Figure 5 provides an overview of the structures that will enable the implementation of the capacity building around the four IMERC strategic pillars. Each **Technical Working Group (TWG)** will be led by a Chair, and will include representatives from each of the IMERC core partners, industry and public sector stakeholders. These groups will meet quarterly to develop and implement their capacity building plans. Their terms of reference will be strongly orientated towards the development of industry and end-user led research with commercial outputs.

This will be complemented by three partner **Institutional Review Groups (IRGs)** tasked with overseeing progress on the IMERC Strategy in relation to the benefits that IMERC brings to their own organisations. These Groups will monitor and influence IMERCs ability to stimulate the transformation required to deliver the innovation culture aspired to within the IMERC Strategy. The IRGs will also meet on a quarterly basis. These review groups will provide reflective capacity for iterative learning on **public sector transformation within IMERC. The IRGs will also play crucial roles in ensuring those for academic excellence are achieved within the respective IMERC core partner institutions. This will include the pursuit of impact factors for publications emerging from the research coupled with continuing success in securing research income.**

The **Goals and Milestones** presented in Table 2 provide important progress indicators for the implementation of the Strategy.

This IMERC Strategy will be complemented by **Annual Business Plans.** The Annual Business Plans will include specific targets for:

- TWG projects
- New spin out companies
- Job creation targets
- Industry partnerships

Table 1. IMERC Board Members	
Sue Barr	Open Hydro Ltd.
Ray Bowe	Industrial Development Authority (IDA)
Colm De Burca	ESBI Ltd.
Peter Coyle	IMERC Chair
Valerie Cummins	IMERC Director
Michael Delaney	Cork Institute of Technology (CIT)
Brian Fitzgerald	Irish Naval Service (INS)
Patrick Fitzpatrick	University College Cork (UCC)
Cormac Gebruers	TRANSAS Ltd.
Chris Hearn	Marine Institute, Newfoundland
Peter Heffernan	Marine Institute, Ireland
Dave Hopkins	Mainport Ltd.
Neil Kerrigan	Enterprise Ireland (EI)
Michael McCarthy	Port of Cork (POC)
Barry McSweeney	Independent
Pat Mitchell	Bovis Lend Lease Ltd.
Henry Smyth	Bord Gais
Eoin Sweeney	Sustainable Energy Authority of Ireland (SEAI)

2.6.2 Roadmap to Implementation

Key IMERC targets / performance measures	
By 2012	4 new IMERC demonstration projects
By 2013	Beaufort Building opened
By 2014	70 new research jobs created Industry suites and incubator units opened
By 2015	5 new companies incorporated Best practice energy efficiency and management.
By 2016	Campus expansion catering for minimum two major FDI clients Establish Irish Naval Service as a knowledge institution Establish research and commercial cluster of world standing

Table 2. Strategic IMERC Goals and Mi Table 2. Strategic IMERC Goals and Milestones	
Goals	**Milestones**
Established Research and Innovation track record in IMERC Strategic Pillars	**2011** • Operational structures in place for establishing IMERC Technical Working Groups (TWG) around the four IMERC Strategic Pillars. • Institutional Review structures in place to facilitate transformation measures. • Launch and implementation of NMCI Research Strategy (including Perseus FP7 Project). • Support for the development of integrated governance and research models for the Beaufort Building and recruitment of initial PRTLI 5 positions. • Establishment of IMERC Innovation & Industry Forum. **2012** • Maritime Operations: Recruitment of strategic and world class academic researchers through mechanisms such as Fulbright, SFI and FP7 People to build new capacity in Maritime Operations (Maritime Safety and Security, Marine Recreation and Shipping, Logistics and Transport). • IMERC Demonstration projects submitted from Maritime Technology TWG. • IMERC Demonstration projects submitted from Ocean Engineering TWG. • IMERC Demonstration projects submitted from Ecosystem Governance TWG. • IMERC International training programme in 'Adaptation to Global Coastal Change' as outcome from Ecosystem Governance. • Actions to support the implementation of international MOUs. **2013** • First cohort of commercial spin out companies, including innovative products First cohort of Commercial spin out companies, including innovative products and services in Marine Geomatics. • IP and access arrangements in place for Beaufort Building. **2014** • Established world class hub of Marine Renewable Energy Test Bed Engineering (reference PRTLI5 research plan).

Table 2. Strategic IMERC Goals and Mi Table 2. Strategic IMERC Goals and Milestones	
Goals	**Milestones**
	• Demonstration of excellence in Coastal Engineering, including protection from extreme climate events. • New commercially orientated projects emerging in Maritime Operations. **2015** • Commercial and applied research Centre of Excellence in Marine Simulation via NMCI. • Commercial and applied research Centre of Excellence in the application of Satellite Remote Sensing to the maritime environment via CMRC. • Established recognition for IMERC contributions to Policy Advice. **2016** • Research and Innovation Quality Review of IMERC – benchmarked against commercial impact, jobs created, research grant income generated and peer review publications.
Campus infrastructure	**2011** • Planning and foundation stone for Beaufort Building. • Land bank options identified for Phase 2, e.g. with Port of Cork and the Office of Public Works. **2012** • Multinational tenants identified and secured. **2013** • Completion of Beaufort Building. • Incubation space and industry suites available. • Demonstration Marine Renewables device. • 2016 • Extended Campus under development.
Established Cluster	**2011** • MOA and governance arrangements in place. • Strategic linkages e.g. Tyndall, Marine Institute, University of Limerick (Marine Robotics Group). • IMERC Official Launch.

Table 2. Strategic IMERC Goals and Mi Table 2. Strategic IMERC Goals and Milestones	
Goals	**Milestones**
	• Communications and PR Strategy. • Forum for research and industry integration to identify opportunities, develop plans and share results with IMERC objectives in mind. • Acquisition of baseline data to monitor progress in IMERC against indicators such as public sector transformation, innovation culture, job creation, income generation. • Benchmark IMERC against similar clusters world-wide. **2012** • Development of long term financial model sustaining the IMERC Office. • Review of IMERC Strategic Plan. • Monitor progress indicators. • Enhanced cluster mandate. • Internationalisation objectives achieved. **2013** • IMERC Strategy Review. • Monitor progress indicators. **2014** • Networked with other European Clusters. • Strategic links with International Clusters. • Monitor progress indicators. **2015** • One stop shop, flagship cluster and synergy objectives achieved. • Internationally recognised centre of Maritime and Energy excellence. • Job creation and company start-up company targets reached.

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Appendix A
MERC3 MOA (signed March 2010)

Note: The name MERC3 was changed to IMERC in November 2011

University College Cork (UCC)
Cork Institute of Technology (CIT)
(including National Maritime College of Ireland (NMCI))
Irish Naval Service (NS)

Maritime and Energy Research Campus and Commercial Cluster (MERC3) rev 8

Background

Ireland currently faces economic difficulties of a depth and scale unknown since the 1930s. Our response then was to take radical measures (e.g. the development of State companies and the creation of an industrial sector behind tariff barriers) and our challenges now demand a similar degree of innovation.

The quality and educational attainments of engineers and scientists trained at University College Cork (UCC) and Cork Institute of Technology (CIT), as well as other Irish universities and institutes of technology, were key factors in the attraction of electronics firms such as Apple, EMC and Intel to Ireland from the 1980s onwards. UCC and its associated Tyndall National Institute carry out world class research and have a strong track record of support to leading national and international electronics firms. This continues to be a critical factor in attracting foreign direct investment and in the development of indigenous enterprises through the provision of a stream of highly professional researchers and production engineers, and of access to complex test facilities PF to insert latest version of HMRC piece

The Naval Service (NS) is a partner with CIT in the National Maritime College of Ireland (NMCI) and works with UCC in support of maritime research. It is well regarded by its peers and partners for its professionalism and innovation and is at the forefront in areas such as maritime security, and early new technology adoption and efficiency. The environment facing the NS is rapidly becoming more complex and challenging and a key response by the Service is to be more closely embedded in the knowledge economy, thus to become in itself a "knowledge institution".

Facing into the 21st century, Ireland has a significant economic opportunity in the fields of Maritime and Energy. The maritime sector holds out opportunity in technology (e.g. robotics, simulation), recreation, ICT, security, spatial planning etc., while energy is becoming increasingly significant, particularly in renewable energy derived from sources such as wave power and tidal currents (Marine Renewables or Ocean Energy).

Vision

The MERC3 initiative aims to develop a new "Tyndall-type" venture in Maritime and Energy for the 21st century that will attract job creating investment from home and abroad based on the highest educational standards, research skills and facilities, and access to industry. MERC3 brings UCC, CIT and NS together, for the first time in a tripartite relationship, with the mission of providing an integrated, high value, critical mass for the development of the Maritime and Energy sectors. For the NS, MERC3 will facilitate the transition of the Service to a knowledge institution.

The three key partners will work with associates such as Enterprise Ireland, IDA, Marine Institute, Sustainable Energy Ireland, Bord Gáis, Marine Renewables Industry Association and others. The project has been catalysed by the substantial funding pledged by the government to upgrade the technical facilities of UCC's HMRC which will form part of MERC3 – the HMRC is a key infrastructural support in the Government's Ocean Energy Strategy. The IDA and Bord Gáis have also promised to make significant support available to MERC3

The MERC3 vision is, as follows:

To promote Ireland as a world class maritime and energy research and development location, through the provision of a national Maritime and Energy Cluster, and thereby to achieve a competitive, high quality and sustainable maritime and energy sector.

The three partner institutions have agreed to develop a cluster of specialist academics, researchers, innovators, teachers and interested business people and enterprises aimed at creating an internationally renowned Centre of Excellence in the fields of Maritime and Energy. The cluster will be centred on the developing campus at Ringaskiddy, Co Cork. In due course, Commercial interests will be encouraged to develop appropriate facilities.

The achievement of the vision for MERC3 will result in a critical mass of expertise and infrastructure which will give Ireland a place at the forefront of two key industries of the future: Maritime and Energy.

The following Memorandum of Agreement will provide the framework for the achievement of the MERC3 vision.

Memorandum of Agreement
between
University College Cork (UCC)
Cork Institute of Technology (CIT)
[including National Maritime College of Ireland (NMCI)]
Irish Naval Service (NS)

(hereinafter individually a "Party" and collectively the "Parties")

1. Statement of Agreement

The President of UCC, the President of CIT (including the Head of College of NMCI) and the Flag Officer Commanding the Naval Service (including the Associate Head of College of NMCI) for the purpose of furthering collaboration in research and innovation, development, training and education, hereby affirm their agreement to promote such cooperation as will be of mutual benefit for their respective institutions and to the national economy through the development of the Maritime and Energy Research Campus and Commercial Cluster (MERC3) centred on a campus adjacent to the NMCI site at Ringaskiddy, Co. Cork.

Cooperation is expected to include but not to be limited to the following:

- Research, development and innovation
- Education to Masters and PhD level, including structured PhD programmes
- Vocational training e.g. for NS ratings
- Training courses e.g. for industry
- Provision of consultancy services and industrial support
- Incubation of new enterprises.

It is envisaged that as MERC3 develops and builds its international reputation, the campus at Ringaskiddy will become a flagship for Ireland and that the Ringaskiddy area will become a location of choice for both local and international enterprises engaged in the Maritime and Energy fields

The Parties to this Memorandum of Agreement (the "Agreement") will continue to be responsible for the provision of independent services for their own traditional target areas. However, the Parties will also actively seek out and promote opportunities for joint efforts with each other and with industry under the headings above, including especially interdisciplinary projects that cut across academic discipline boundaries e.g. programmes of study that encompass aspects of both Maritime and Energy

MERC3 will be a community of interests with common goals and objectives. There will be no reporting lines between the member parties (i.e. existing management structures will prevail) but there will an agreed approach to the business of MERC3 which will be led by the Director.

2. Expectations of the Parties

The Parties to this Agreement have different but complementary expectations

UCC and CIT anticipate that MERC3 will lead to a significant enhancement of current activity in terms of resources, skill levels, and research opportunities for centres and research groups within the two institutions, such as the UCC Hydraulics and Maritime Research Centre (HMRC), the UCC Coastal and Marine Resources Centre (CMRC), the UCC Sustainable Energy Research Group (SERG) and the CIT NMCI which will all be directly involved in the venture from the outset. MERC3 will also act as catalyst to the educational, research and industry outreach of both institutions in Maritime and Energy and will consolidate a relatively fragmented research effort, thereby increasing the international profile of the two institutions in these areas of expertise. It is expected that there will be particular benefits for applied research and scope to influence policy and strategy, at national and EU levels, in particular. For example, MERC3 will add value in the area of training services for the Ocean Energy sector through environmental training provided by CMRC, and technical and engineering training in Ocean Energy provided by HMRC, while NMCI's simulation facilities will be used for operational, maintenance and offshore survival training.

The NS regards its participation in MERC3 as a public service and as a means of adding further value to its work on behalf of the taxpayer. Moreover, MERC3 will help to ensure that the NS staff at NMCI will be to the forefront of the Maritime field with positive benefits for NS educational and training standards. It is anticipated that MERC3 will help with the transformation of the NS into a knowledge institution which in turn will enable it to deliver an enhanced service to the public. In addition, naval personnel who have developed their skill levels through MERC3 will be equipped to add more effectively to the national economy in their post-naval careers.

3. Ethos of MERC3

The partners in MERC3 are committed to norms and principles which, while furthering the aims of MERC3 itself, will also serve the national interest. These will define the culture in which MERC3 will exist and will reflect the values of the partners. At the centre of this culture is a commitment to learning, research, and innovation, which supports Government policy while striving to make a meaningful contribution to society in all dimensions, economic, cultural and social. MERC3 partners will strive to enhance the "public good" dimension of the relationship and they agree to be bound by the values of mutual trust and respect, and cooperative partnership in pursuit of common goals.

The three partners in MERC3 will enjoy parity of esteem in the relationship.

4. Legal Status of MERC3

MERC3 will exist solely as a consequence of this Agreement and will not be established as a separate legal entity. Sub-units on the MERC3 campus will be governed by their own internal arrangements. An Implementation and Service Level Agreement pursuant to this Agreement will be developed separately and will be deemed to be an integral part of it. The Implementation and Service Level Agreement will be submitted by the MERC3 Executive Board to the Governing Authority for final agreement in due course (see below for details of governance arrangements).

The Implementation and Service Level Agreement will specify arrangements for *inter alia*:

- Access to shared infrastructure
- Core funding
- Joint research bids e.g. via devolved authority
- Intellectual property
- Business plan and risk analysis
- Insurance and indemnities

5. Governance of MERC3

The Governance of the MERC3 will be structured as follows

i. Governing Authority

The Governing Authority will be the forum at which the senior representatives of the Parties to this Agreement will meet to:

- Agree and, from time to time review, the Implementation and Service Level Agreement.
- Consider overall strategy for MERC3, as recommended by the Executive Board.
- Consider progress reports and plans from MERC3.
- Optimise the relationship and, if necessary, resolve disputes.

The Governing Authority will normally meet annually (more frequent meetings can be called if deemed necessary). The members of the Governing Authority will be, *ex officio*, the Presidents of UCC and CIT and the Flag Officer Commanding the Naval Service or their nominees as well as the Chair of the Executive Board (see below), together with two further external members, one national and one international, who will be nominated by agreement among the three *ex officio* members. The Chairperson of the Advisory Board and the Chairperson of the Executive Committee will be nominated by the Presidents of UCC and CIT and the Flag Officer Commanding the Naval Services by agreement. The Director will attend by invitation when deemed necessary.

ii. Executive Board

The Executive **Board** is the forum in which the senior executives of MERC3 will meet together with nominated representatives of relevant external interests to

- Formulate a multi-annual strategy for consideration by the Governing Authority
- Agree the annual Business Plan
- Set progress indicators to monitor the activities of MERC3
- Ensure that coordinated and optimised use is made of all the facilities and resources available to MERC3, in particular, that MERC3 acts as a national resource and that MERC3 infrastructure is shared as far as possible among the Parties to this Agreement
- Agree plans for promoting MERC3 at home and abroad
- Agree major research plans and bids
- Devise an ambitious plan for industrial outreach and the translation of research into Commercial activity and its implementation
- Consider other matters which may be mutually agreed from time to time.

The Executive Board will comprise representatives of UCC, CIT and NS-plus a named alternate member for each institution- together with nominees of Enterprise Ireland, IDA Ireland, SEI, Marine Renewable Industries Association, Bord Gais, Port of Cork, VLL as well as the Chairman of 'Seachange'* and the MERC3 Director. The Executive Board will seek out and nominate up to five further members who would be representative of both the Maritime and Energy industries- ideally, at least one of these will be from overseas,. The Chair will be appointed by the Governing Authority. The final decision on the composition of the Executive Board will be taken by the Governing Authority. The Board will normally meet on a quarterly basis. It will have the power to establish working parties from time to time to deal with specific issues.

The initial members of the Executive Board will serve for an initial term of two years ie to the end of Q1 2012.

*also represents the Marine Institute

6. Director

A Director will be appointed by the Executive Board to support MERC3 and lead it on a day-to-day basis. Important areas of responsibility of the Director will include organising the submission of bids for competitive research funds and outreach to industry and the public. The employer, position, description and funding mechanism for this key post will be determined by the Executive Board and will form part of the Implementation and Service Level Agreement to be agreed between the Parties and submitted to the Governing Authority for approval.

7. Optimising the Relationship and Dispute Resolution

At all times every effort will be made by all Parties to optimise the relationship. The Executive Board will be responsible for the establishment of open and transparent reporting mechanisms to stakeholders. In the event of a dispute the Parties to this Agreement will ensure that

- the individuals and/or units involved make every effort to resolve disputes at the point of dispute by reference to *Ethos of MERC3* as outlined in Section 3. above
- if it does not prove possible to resolve a dispute at the local level, it is referred to the Executive Board
- a dispute which cannot be resolved by the foregoing two steps is referred by the Chairman of the Executive Board to the Governing Authority who will seek to make a final determination in the matter.

8. Duration of Agreement

This Agreement shall become effective from the date of signing by the Parties to this Agreement and shall apply for the period to the 31st December 2014 whereupon it will be subject to review by the Parties.

The Parties hereby agree that the terms of this Agreement are non binding on the Parties and it is not intended that this Agreement will create binding or legal obligations on the Parties.

An Implementation and Service Level Agreement pursuant to this Agreement will be developed separately by the Executive Board and will be submitted for approval to the Governing Authority. It will be deemed to be an integral part of this Agreement.

No revisions, modifications or amendments shall be made to this Agreement, and it shall not be renewed or cancelled, without the express consent in writing of the duly authorised representatives of the Parties.

Nothing in this Agreement is intended to, or shall be deemed to, establish any partnership or joint venture between the parties, constitute any Party the agent of another Party, nor authorise any Party to make or enter into any commitments for or on behalf of any other Party.