SIMCelt

Supporting Implementation of Maritime Spatial Planning in the Celtic Seas

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Component 1: Supporting Implementation of MSP

Component 1.2.4: Case Study 1 – Understanding specific cross border issues and opportunities: Offshore Renewable Energy and Shipping & Navigation
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AIS – Automatic Identification System

AtoN – Aids to Navigation

CEREMA – *Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement* [Centre for Studies and Expertise on Risks, Environment, Mobility and Development]

CROSS – *Centres Régionaux Opérationnels de Surveillance et de Sauvetage* [Regional Operational Surveillance and Rescue Centres]

DAERA – Department of Agriculture, Environment and Rural Affairs [Northern Ireland]

DGEC – *Direction Générale de l'énergie et du Climat* [Directorate General for Energy and Climate]

DHPCLG – Department of Housing, Planning, Community and Local Government [Ireland]

DIRM-NAMO – *Direction Interrégionale de la mer Nord Atlantique-Manche Ouest* [Interregional Directorate of the North Atlantic Ocean-West Channel]

EIA – Environmental Impact Assessment

EU – European Union

GES – Good Environmental Status

GLA – General Lighthouse Authority

IMO – International Maritime Organization

MCA – Marine and Coastguard Agency

MRIA – Marine Renewables Industry Association [Ireland: all-island]

MMO – Marine Management Organisation [UK]

MSFD – Marine Strategy Framework Directive

MSP – Marine/Maritime Spatial Planning

OECD – Organisation for Economic Co-operation and Development

ORE – Offshore Renewable Energy

OREI – Offshore Renewable Energy Installations

RTE – *Réseau de Transport d'Électricité* [Electricity Transmission System, France]

SAR – Safety and Rescue

SEA – Strategic Environmental Assessment

SEAI – Sustainable Energy Authority of Ireland

SOLAS – Safety of Life at Sea Convention

TSS - Traffic Separation Scheme

UNCLOS – United Nations Convention on Law of the Sea

UNCTAD – United Nations Conference on Trade and Development

WTO – World Trade Organization

The SIMCelt Project

SIMCelt[1] - Supporting Implementation of Maritime Spatial Planning in the Celtic Seas is a two-year €1.8 million project co-financed by DG MARE and focussed on promoting the development of transnational cooperation to support the implementation of Directive 2014/89/EU in the Celtic Seas. Led by University College Cork, the project consortium comprises both planners and researchers from seven partner institutes representing a mix of governmental authorities and academic institutes from Ireland, France and the UK. This consortium is particularly interested in developing meaningful cooperation between neighbouring Member States to support implementation of spatially coherent plans across transboundary zones of the Celtic Seas, building on previous work and leveraging new opportunities to identify and share best practice on technical, scientific and social aspects of transboundary MSP.

To explore how transboundary working for MSP is being undertaken in the Celtic Seas, SIMCelt project components focuses on understanding spatial demands and scenarios, data requirements for MSP and stakeholder engagement. To complement the outputs of these components, four case studies were selected to illustrate how MSP implementation and transboundary working are approached within the Celtic Seas.

This case study seeks to understand cross border issues and opportunities within MSP and discusses how these issues might be addressed in delivering a coherent approach spanning marine area borders. It specifically incorporates themes such as sectoral interactions, transboundary working, data for MSP to understand issues within the offshore renewable energy and shipping sectors and makes recommendations for coherent planning through the implementation of MSP.

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[1] See http://www.simcelt.eu/

1   Introduction

In the past decade, there has been increasing competition for ocean space in the Celtic Seas for offshore renewable energy installations (OREI), marine conservation areas, aquaculture, fishing sites and other maritime activities[2]. Maritime Spatial Planning (MSP) has been widely accepted as a practical approach to the ordering of maritime space and improving cross border cooperation between Member States. Coordinating sectoral policies is a crucial part of the MSP process in order to ensure coherency and efficiency of the plans. However, there are challenges to ensuring cooperation across borders as this involves working through various procedures at different spatial scales, addressing different governance and legal settings and engaging multiple users.

This case study seeks to understand transboundary issues and opportunities from a Celtic Seas perspective and concentrates on shipping[3] and offshore renewable energy[4] sectors. In addition it aims to understand issues and opportunities within the shipping & navigational safety and offshore renewable energy sectors within the MSP process. These two sectors have been selected due to the potential for conflicts between them and the need for coherent planning, especially of ORE, so as not to compromise shipping and navigational safety. The analysis identifies issues within the individual sectors, as well as issues that may arise when they come together in the same marine space and the opportunities for both sectors stemming from the implementation of MSP. Recommendations are aimed at supporting marine planners in the implementation of MSP and the effective, coherent planning of both sectors across the entire Celtic Seas. This case study is not a finite source of all issues and opportunities and, as the input is limited to that from the relevant competent authorities and those authorities directly involved with shipping & navigational safety and offshore renewable energy. As such, this case study should be used in combination with the other SIMCelt case studies and as an initial high level reference document for marine planners and interested stakeholders leading to facilitating further engagement with the relevant authorities and *all* marine users.

Section 1 introduces the case study and Section 2 outlines the objectives and methodology utilised in the case study. Section 3 focusses on shipping and navigational safety within MSP to date, based on key trends and policy drivers at EU and international level. Section 4 discusses the offshore renewable energy sector and MSP in the Celtic Seas based on the driving policies and approaches to planning by the Member States. Section 5 is a discussion of the general issues, opportunities and gaps identified via interviews with key sectoral authorities. Section 6 presents practice-focused and policy-relevant recommendations based

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[2] (Stelzenmüller et al., 2013)
[3] All shipping types including cargo, passenger transport, cruise, fishing vessels, recreational vessels, service craft
[4] Wind (inclusive of floating wind technologies), wave and tidal energy

on the findings of the interviews in order to support the implementation of MSP and coherent planning of both sectors in the Celtic Seas.

2   Objectives and Methodology

This case study focusses on two important maritime sectors in the Celtic Seas: shipping & navigational safety, which is the most established and truly transboundary maritime sector globally and Offshore Renewable Energy (ORE), one of the growing and emerging maritime sectors.[5] This case study is one of four in the SIMCelt project, constituted as part of the project to illustrate how MSP implementation and transboundary working are being approached within the Celtic Seas and used to assist in developing recommendations on how such challenges can be addressed both now and in future MSP. The objective of this case study, therefore, is to understand issues and opportunities within the shipping & navigation and offshore renewable energy sectors within the MSP process. It culminates with practice-focused recommendations that are aimed at supporting marine planners in the implementation of MSP and the effective, coherent planning of both sectors across the entire Celtic Seas region.

Review and assessment of the two sectors are based on other SIMCelt outputs such as the Maritime Sector Briefing Notes (Component C1.2.1) and the Initial Assessment (C1. 1). The issues identified, and recommendations presented, are based on data collected through semi – structured interviews which were carried out with the regulatory agencies for shipping & navigational safety and offshore renewable energy planning and development. The case study also includes pertinent information from academic literature, reports and guidelines on shipping & navigational safety and offshore renewable energy. Two semi structured interviews (shown in Annexes 1 and 2) were developed in order to gather information from the identified competent authorities for shipping & navigational safety and offshore renewable energy. The semi-structured interviews were carried out with the following agencies:

Table 1: Agencies who participated in semi structured interviews for this case study

Agency	Sector	Country
Commissioners of Irish Lights (Irish Lights)	Shipping & Navigational Safety	Ireland (ROI & NI)
Sustainable Energy Authority of Ireland (SEAI)	Offshore Renewable Energy	Ireland (ROI)
Maritime and Coastguard Agency (MCA)	Shipping & Navigational Safety	UK
Department of Agriculture, Environment and Rural Affairs	Offshore Renewable Energy	Northern Ireland
The Crown Estate (UK)[6]	Offshore Renewable Energy	UK (England, Wales and Northern Ireland)
Marine Scotland	Offshore Renewable Energy	Scotland

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[5] ABPmer & ICF International (2016)
[6] It is noted that Crown Estate Scotland became fully operational on 1 April 2017 but that entity was not interviewed as part of this case study.

Agency	Sector	Country
Marine Management Organisation	Offshore Renewable Energy	England
Préfet Maritime of the Atlantic	Offshore Renewable Energy/Shipping & Navigation	France (Atlantic Region)

The interviews were carried out in person, via video call and over the phone for a period of eight months (including initial contact to gather interest in participating). The agencies that were interviewed were happy to do so, viewing the project and case study as an interesting learning process. As each country is at a different stage of MSP implementation, lessons learned from regions that have more advanced MSP processes (such as the UK) can also be drawn upon. Contact was made with several other agencies but interviews were not secured due to various factors. Overall the interviews were recognised as mutually beneficial to both the case study and project participants. The relevant government departments in Ireland, the UK and France were also contacted as part of the process but they either did not respond to requests for interview or directed the case study team to their relevant agencies or other competent authorities. Nonetheless, given that each organisation has operational experience in one or both of the sectors, the recommendations from this case study are practice-based.

3   Shipping and Navigational Safety

Shipping is the one of the most traditional, established and mobile uses of marine space. Shipping is crucial for international trade and has steadily increased over the last number of years.[7] In 2015, estimated world seaborne trade volumes surpassed 10 billion tons as shown in Figure 1.[8] Under the EU's Blue Growth strategy, maritime jobs are expected to increase to 7 million jobs and €600 billion per year by 2020.[9] Maritime transport will be a crucial sector for Blue Growth within the maritime economy. As a mobile sector, it is vital that shipping is well represented and considered at an early stage within MSP. Other sectors, such as commercial fisheries, tourism, offshore renewable energy, amongst others also depend on the use of shipping vessels in their activities. Due to its importance and mobile nature, engagement with all sectors (e.g. aquaculture, fisheries and offshore renewable energy) will be vital for ensuring that shipping is adequately accounted for and that the safety of navigation is not compromised by an increase in other maritime activities.

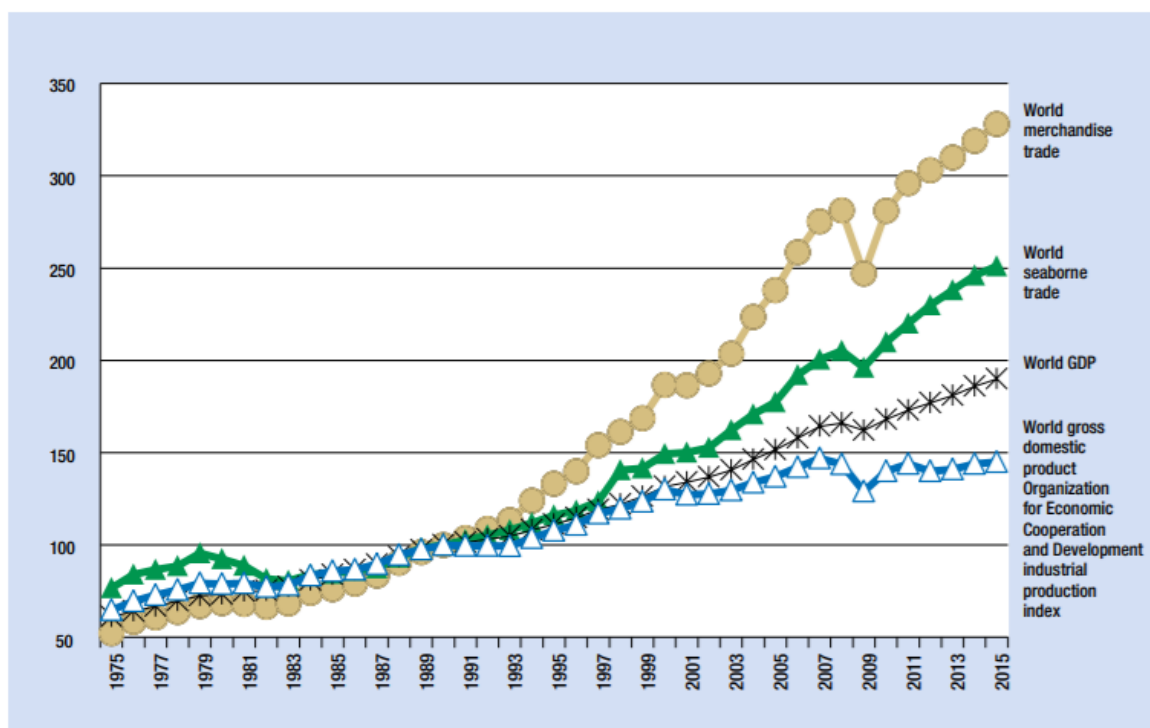Figure 1: OECD industrial production index and indices for world gross domestic product, seaborne trade and merchandise trade, 1975 – 2015 [10].

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[7] UNCTAD (2015)
[8] UNCTAD (2016)
[9] See further at: http://europa.eu/rapid/press-release_IP-12-955_en.htm
[10] UNCTAD (2015), UNCTAD (2016). Note: 1990=100. Indices calculated based on GDP and merchandise trade in dollars and seaborne trade in metric tons

The Celtic Seas contain traffic separation schemes such as the Ushant Traffic Separation Scheme (TSS), where approximately 117 vessels are in transit per day.[11] Maritime transport in the Celtic Seas is diverse; cargo vessels, fishing vessels, passenger vessels, operational vessels and recreation/leisure vessels (among others) all use the Celtic Seas on a daily basis. The varied nature of the vessels that transit the area can present complex challenges for MSP, issues such as the lack of Automatic Identification System (AIS) on recreational vessels, decreases in manoeuvrable space due to increases in traffic and offshore developments etc. These issues, as well as the opportunities presented by maritime transport and offshore renewable energy, will be discussed later in this case study based on a series of semi-structured interviews with the relevant competent authorities for each of the sectors.

Growth in the global economy is expected to result in an increase in shipping, which will consequently decrease the amount of free or available sea space.[12] Thus, it is crucial that shipping and the associated potential conflicts between the many uses of the sea, are accounted for in a timely, inclusive and efficient manner through MSP. Supporting facilities onshore such as ports and harbours will be central to the successful continued growth of both the shipping sector and offshore developments such as offshore renewable energy. Thus, it is important that MSP recognises the value of coordinated planning with the nearshore zone as well as further offshore. There are approximately 32 ports in the Celtic Seas, with the major ones located in Liverpool, Milford Haven, Dublin, Glasgow, Belfast, Bristol and Brest. Not only are these ports important for the Celtic Seas region, they are also key ports for international trade and the support of multiple services. Figure 2 shows the location of ports and harbours in the Celtic Seas.

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[11] CROSS Corsen (2015)
[12] The Nautical Institute (2013)
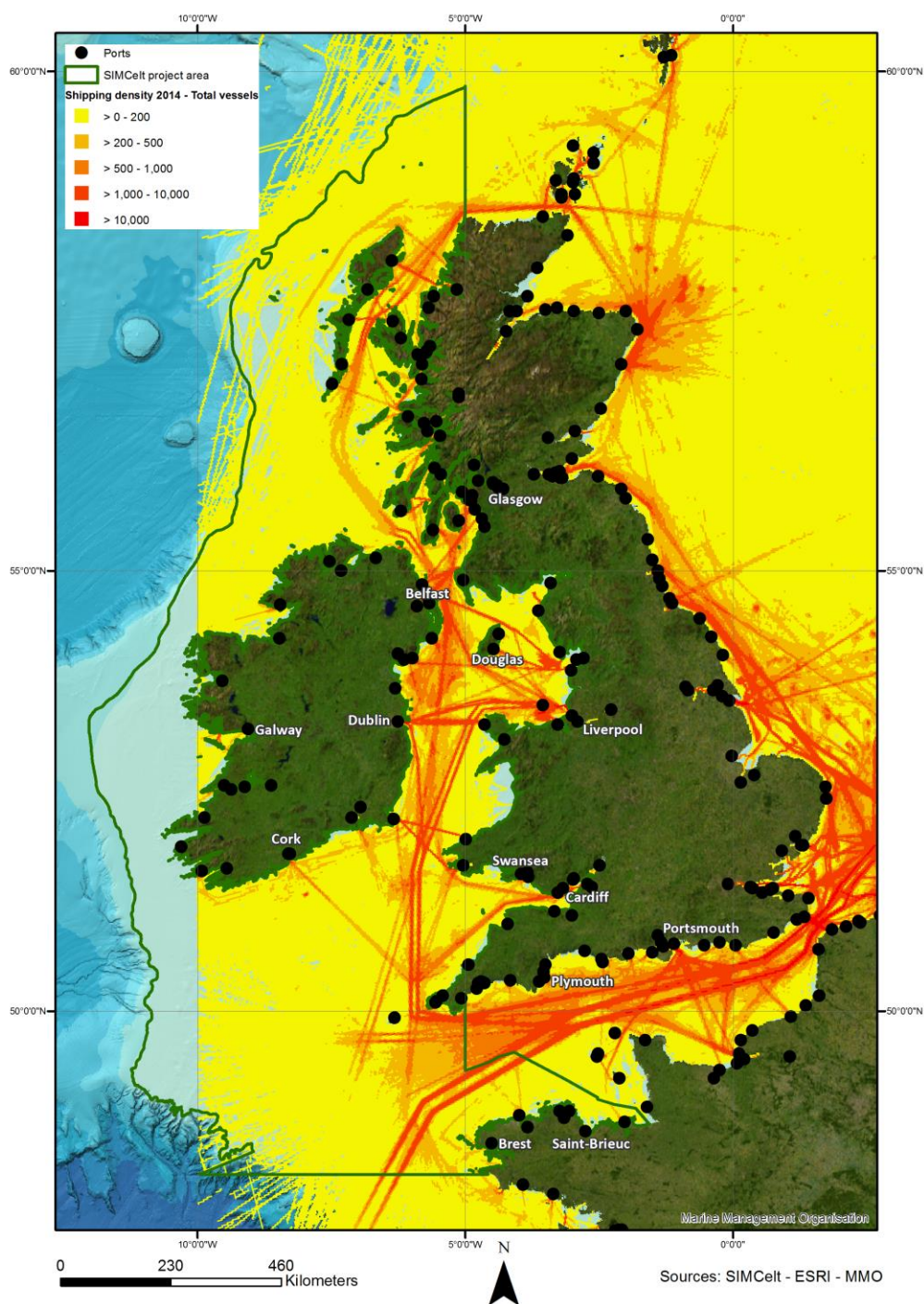
Figure 2:Shipping Density and Ports within the Celtic Seas[13]

The already bustling Celtic Seas region is predicted to grow in the future. A 50% growth of cargo handled in EU ports is predicted by 2030.[14] This is expected to increase shipping density in the Celtic Seas,

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[13] AIS data was translated from Mapping UK Shipping Density and Routes from AIS' project (MMO, 2014) which uses data collected by the Maritime and Coastguard Agency (MCA). The map does not include AIS data for western Ireland or ships starting their journey outside the UK.

[14] See further at: http://europa.eu/rapid/press-release_MEMO-13-448_en.pdf

especially in the English Channel as shown in Figure 3. An analysis of shipping density in the Celtic Seas based on AIS data from the Marine Management Organisation (MMO) shows that the South-West Channel Approaches (England, France and Ireland), South West of England and the Irish Sea (Isle of Man, Ireland and UK) are the busiest. Traffic density showed that fishing vessel activities are predominant in the south of Ireland and south west of England (35%) whilst cargo vessels are mostly located in the South-west Channel (43%) and 23% in the Irish Sea.[15]
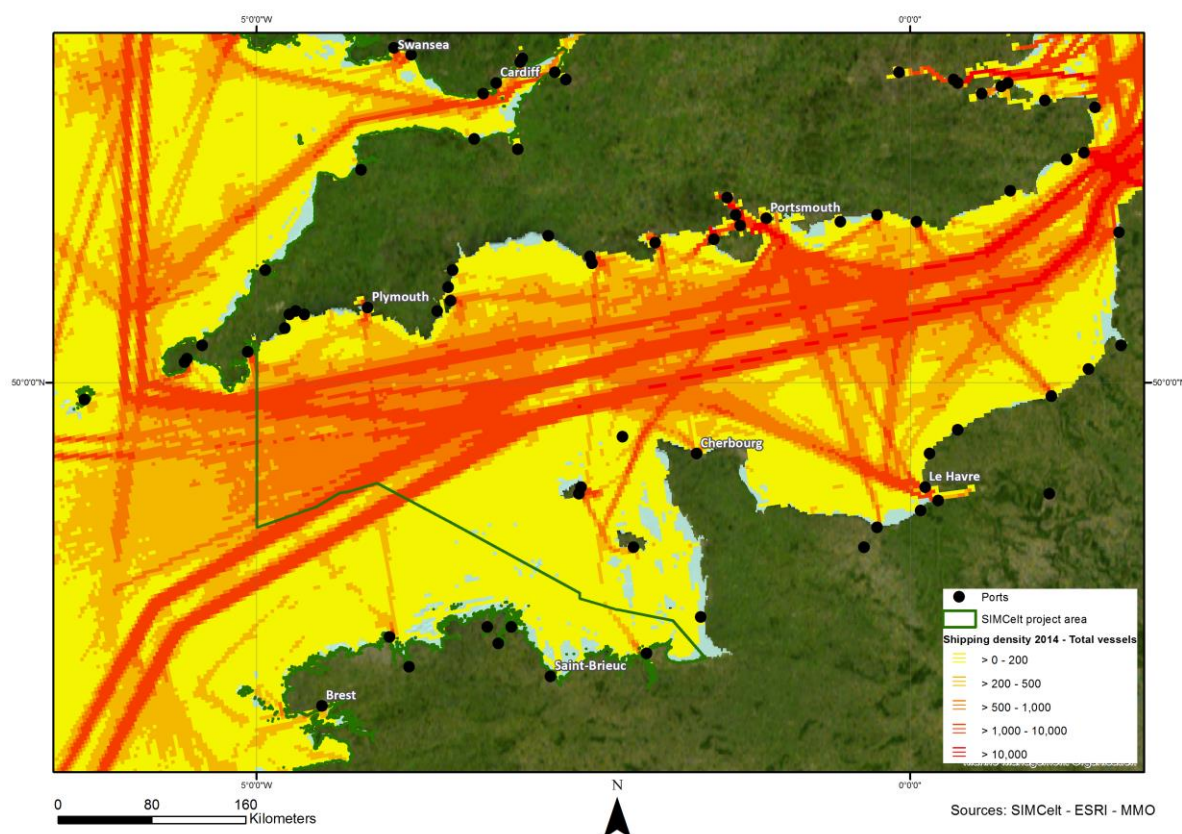
Figure 3: Shipping Density in the English Channel[16]

In order to offset any future threats to navigational safety presented by future growth, the EC's Communication on Strategic goals and recommendations for the EU's maritime transport policy until 2018 (COM/2009/8), addresses important issues and actions relating to maritime transport, safety, and port reception facilities.[17] Shipping is granted freedom of navigation in maritime space by international law. This legal right is set out in Article 87 of the United Nations Convention on the Law of the Sea.[18] UNCLOS is

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[15] MMO (2014), ABPmer and ICF International (2016)
[16] AIS data was translated from Mapping UK Shipping Density and Routes from AIS' project (MMO, 2014) which uses data collected by the Maritime and Coastguard Agency (MCA). The map does not include AIS data for western Ireland or ships starting their journey outside the UK.
[17] European Commission (2009)
[18] UNCLOS (1982)

currently ratified by 168 states.[19] MSP must not infringe on provisions set by UNCLOS but instead should complement it. Thus, MSP should not impede the freedom of navigation for *all* sea going vessels.

While safety and navigation is a priority under the Atlantic Strategy (COM/2011/782) and associated Action Plan (COM/2013/279), it is also important that it is fully considered in a timely and coherent manner within MSP in the Celtic Seas. An example of where the inclusion of shipping in MSP has occurred early in the process can be seen from the German MSP process and subsequent plan for the Baltic Sea. Shipping (recognised as the most established maritime sector) was accounted for firstly during drafting of the marine plan; by determining traffic densities using AIS, shipping lanes were then designated priority areas.[20] Other sectors were essentially planned around the spatial needs (e.g. traffic separation schemes, anchorage points etc.) of the shipping sector. Offshore renewable energy developments were also granted priority in the first marine plans for both the Baltic and North Sea.[21] While it may be argued that the Celtic Seas region is not as congested as the Baltic Sea, examples from German MSP are beneficial especially in relation to the early engagement and inclusion of both the shipping and offshore renewable energy sectors.

MSP must be accounted for across all management procedures within the shipping sector including pre-planning, training, monitoring, evaluation, e-navigation and enforcement. E-Navigation is a strategy developed by the International Maritime Organization (IMO). An input paper to the IMO's Maritime Safety Committee's 81st session in 2005 identified a need to equip vessel masters and those responsible for the safety of shipping ashore, with modern proven tools and processes to make maritime navigation and communications more reliable thus reducing navigational errors. E-Navigation should be viewed as a useful strategy to assist with shipping within the MSP process. Stakeholder engagement in the development of e-navigation strategies will also assist in strengthening the relationships between organisations that should be consulted during the MSP process not only in their own country but also at a transboundary level. The re-routing of shipping lanes should be carefully considered as a solution amongst other options when planning areas for other developments such as offshore renewable energy sites or aquaculture. Such re-routing may increase navigational risks e.g. the creation of choke points or risk of collisions. In cases, where there are no other solutions to re-routing ships, it is important that mariners and the shipping & navigational safety sector are involved in all stages of the planning process.

Poor planning for shipping within MSP could have serious consequences for, not only safety of life at sea but also, the marine environment as a whole. Therefore, the effective planning of shipping within MSP could also have a positive effect on other EU environmental Directives such as the Marine Strategy Framework Directive (MSFD). Specific international shipping policy that could contribute to the work of the MSFD is the International Convention for the Prevention of Pollution from Ships (MARPOL – IMO). The

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[19] As at August, 2017
[20] PartiSEApate (2013)
[21] MSP Platform (2017)

shipping sector can also have an active role to play in the MSP process, by contributing data, information on shipping routes and first-hand experience of navigating in the areas to be planned. Despite the sector not being traditionally engaged in the MSP process, especially at the sub-national scale,[22] engagement between the competent authority for MSP and the sector should be recognised as mutually beneficial.

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[22] Hassan et al. (2015).

3.1   Policy Drivers for Shipping and Navigational Safety Within Maritime Spatial Planning

3.1.1   United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea (UNCLOS) was agreed in 1982 and came into force in 1994. UNCLOS provides a regulatory framework for the use of the world's seas and oceans and ensures the protection and equitable usage of marine resources and the environment. UNCLOS grants free movement and rights of navigation for all maritime vessels. While UNCLOS does not mention MSP, it is an important driver setting out different maritime jurisdictional zones, and the responsibilities of actors therein, so it provides a fundamental basis upon which MSP must build. MSP should not infringe on any part of UNCLOS or the rights it guarantees. UNCLOS sets out a State's rights and responsibilities in zones subject to coastal State sovereignty (internal waters; archipelagic waters and territorial seas up to 12 miles offshore) and jurisdiction (the exclusive economic zone up to 200 miles offshore and the continental shelf) and in Areas Beyond National Jurisdiction (ABNJ – the high seas and the seabed beyond the continental shelf).

Article 60 of UNCLOS also grants State's the exclusive right to construct and authorise and regulate the construction, operation and use of: artificial islands, installations and structures for the purpose provided in Article 56 and other economic purposes, installations and structures which may interfere with the exercise rights of the coastal state in the zone. Thus Articles 60 and 56 provide an important basis for offshore developments, which is related to MSP. Article 60(4) and (5) refers to the establishment of safety zones around artificial structures (such as offshore renewable energy installations), discussed further later in this document. Creating such a buffer zone is at the discretion of the State, as is the breadth of the safety zone, however UNCLOS states that the breadth of such a safety zone should not exceed 500m around the structure. According to the IMO, any such safety zone greater than 500m, must be submitted to the IMO for adoption.

For international navigation, UNCLOS does not provide a definition of sea lanes, this falls under the competence of the IMO. UNCLOS states that regarding the designation of sea lanes and the prescription of traffic separation schemes under Article 22, coastal States shall take into account: the recommendations of the competent international organisation (IMO – not specified in UNCLOS but accepted as being the IMO), any channels customarily used for international navigation, the special characteristics of particular ships and channels, and the density of traffic. These provisions should be adhered to during the development of maritime spatial plans.

3.1.2   International Maritime Organization (IMO)

The IMO is the United Nations agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships. Essentially the IMO is the standard setting authority for the safety, security and environmental performance of international shipping. The regulatory framework set by the IMO must be accounted for within MSP and goes hand in hand with UNCLOS. The IMO operate within the legal context of UNCLOS. Guidelines and protocols established by the IMO must be included within all stages of the MSP process. The IMO is the only international body for developing guidelines, criteria and regulations at an international level for ships' routeing systems[23], therefore it is crucial that they are a key contributor to MSP design and implementation. Important IMO regulations and protocols that should be considered during the MSP process include, but are not limited to: General Provisions on Ship's Routeing (GPSR), the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREGS), Standards for Ships Manoeuvrability (Res. MSC. 137 (76)) and the UN Convention for Safety of Life at Sea (SOLAS), 1974, as amended.

The IMO has several conventions including the Convention for Safety at Life at Sea (SOLAS) (adopted 1974), the International Convention on Maritime Search and Rescue (SAR) (adopted 1979), and the International Convention for the Prevention of Pollution from Ships (MARPOL) (adopted 1973), all of these conventions are policy based and operate at regional and national levels. These important conventions and policy drivers have implications for MSP at international, regional (EU) and national levels. SOLAS is regarded as the most important of all international conventions dealing with maritime safety. It covers a wide range of measures designed to improve the safety of shipping. SOLAS deals with international requirements for the safety of navigation for all merchant vessels. Therefore, SOLAS is the key convention for this Case Study given the subject matter concerned.

3.1.3   Convention for Safety of Life at Sea (SOLAS) 1974

As of 2016, SOLAS has been ratified by 162 states. SOLAS contains fourteen chapters. Chapter 5 – Safety of navigation is the only chapter of SOLAS that applies to all sea going vessels, including leisure craft. In Ireland, the UK and France, Chapter V is legally binding and countries will have its provisions within their own maritime safety legislation. Anyone in breach of those provisions could be subject to legal proceedings. Therefore, within MSP in the Celtic Seas (similar to many regional seas), the basis for legally enforcing safety of navigation for all vessels is already in place. Chapter V of SOLAS highlights the responsibility of both the national government to ensure the safety of navigation (e.g. maintenance of meteorological services for ships, maintenance of SAR etc.) and the master to ensure that they are fully equipped and trained to man

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[23] The Nautical Institute (2013)

their vessels. Chapter V also makes the carriage of automatic ship identification systems (AIS) and voyage data recorders (VDRs) mandatory.[24]Contracting Governments must refer any ships' routeing systems to IMO for adoption and subsequently, those routeing systems must adhere to measures adopted by the IMO. As a matter of policy, ships should use mandatory routeing systems unless there is a compelling reason not to. Further details of IMO-adopted schemes are contained in Resolution A.572(14), as amended.

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[24] Only ships over 500 gross tonnage (GT) and passenger carrying vessels, regardless of size, are legally required under Chapter V of SOLAS to be fitted with AIS (SOLAS, 1974).

4   Offshore Renewable Energy

Offshore renewable energy in the context of this case study refers to offshore wind (inclusive of floating wind technologies), wave and tidal. Multiple factors have increased the drive and interest in offshore renewable energy development including: depletion of fossil fuel reserves and price oscillation; high competition for terrestrial space as well as differing levels of public acceptance and the need to mitigate for and adapt to climate change.[25] The EC's Communication on Blue Growth (COM/2012/494) states that the offshore renewable energy sector has significant potential to provide 4% of Europe's electricity demand by 2020 – 14% by 2030, creating 170,000 jobs by 2020, and up to 300,000 by 2030, as compared to 35,000 in 2013.

Offshore wind energy is the predominant ORE technology deployed in the Celtic Seas.[26] The majority of offshore wind developments in the Celtic Seas region are concentrated in the Irish Sea with 12 operational windfarms and an overall installed capacity of over 2 GW with about 5.3 GW at varying stages of development across the Celtic Seas.[26] The United Kingdom and France have committed to achieving 18 GW and 6000 MW of offshore wind capacity respectively by 2020 and in Ireland, 30 GW of offshore wind is predicted to be deployed by 2050. Various factors have contributed to this growth including a reduction in cost per megawatt hour, with a drop of about 50% attributable to the falling costs of turbine production and increases in turbine and generator size leading to more efficient generation.

Apart from offshore wind energy, the Celtic Seas have great resource potential for wave and tidal technologies.[27] It is estimated that ocean energy (wave and tidal) has the potential to create new and high quality jobs with 20,000 expected to be created by 2035 in UK alone and 18,000 in France by 2020.[28] Wave and tidal stream energy have the potential to deliver around 20% of the UK's current electricity needs equating to an installed capacity of around 30 – 50GW. By 2020 the deployment of 100 to 200 MW of devices is expected, with the majority of sites being located in the Celtic Seas.[29] France has also set an intermediate target of 100 MW of wave and tidal energy generation by 2023. In Ireland, the accessible wave energy resource is estimated to be 21TWh which would be sufficient to supply 75% of Ireland's 2006 electricity requirement while there is the potential for up to 3 GW of tidal energy.[30]

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[25] Rodríguez-Rodríguez (2016); Inger et al. (2009)
[26] McGowan et al. (2017)
[27] Lewis et al., (2015), Holt et al., (2001), Kwong et al., (1997)
[28] EC (2014)
[29] Renewable UK (2013)
[30] Cahill (2016)

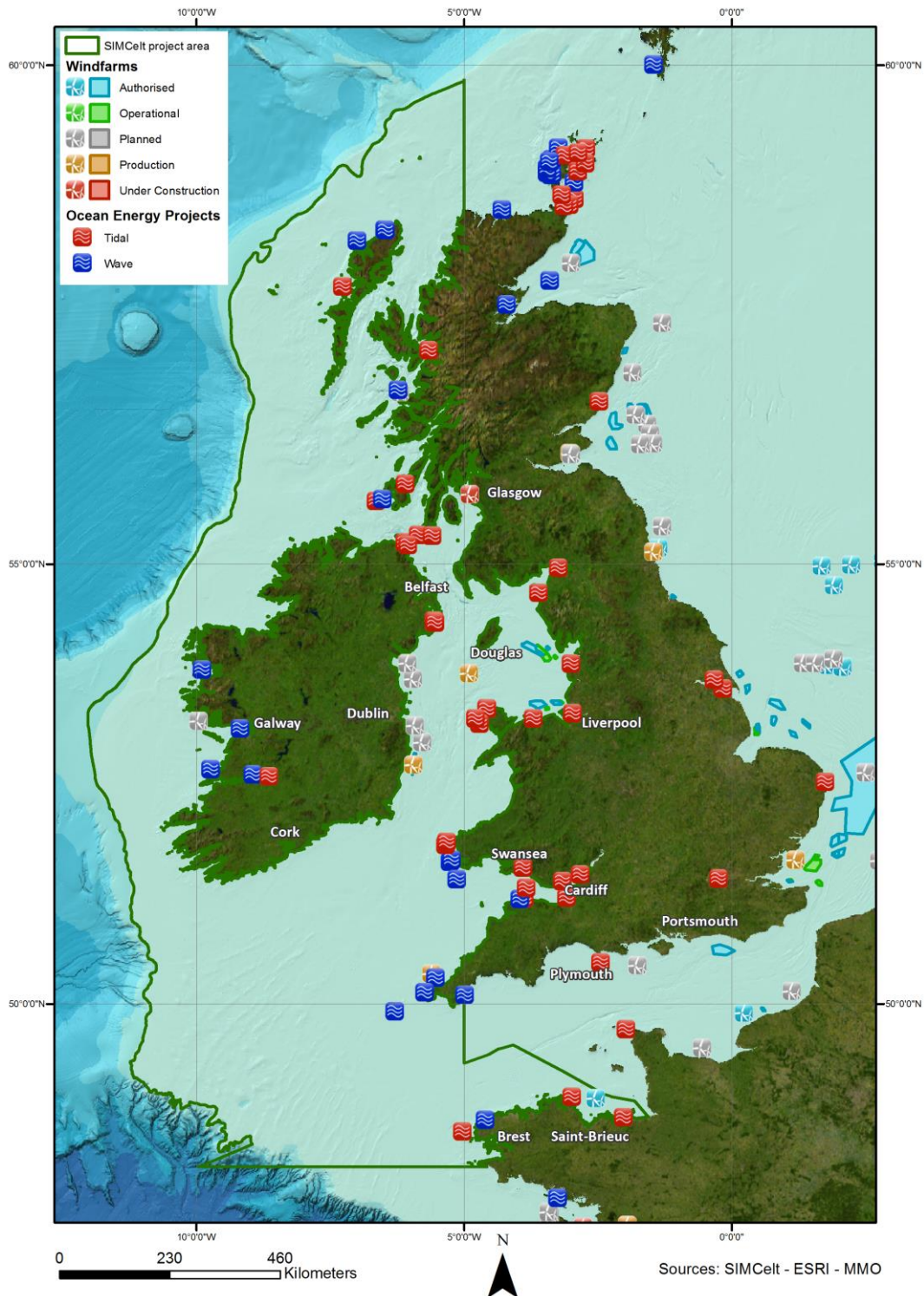Figure 4: Offshore Renewable Energy Infrastructure within the Celtic Seas

Baseline and future analysis shows that over the next 20 years, ORE has the potential to emerge as an important sector in the Celtic Seas, with growth expected across all technologies but most significantly in wind and tidal energy.[31] MSP is one of the tools advocated in the EU's Integrated Maritime Policy (IMP)

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[31] ABPmer (2016)

as helping to deliver integrated policy making and hence achievement of the Blue Growth objectives. The development of offshore wind was a strong driver in the design and implementation of MSP in Germany, the UK, Belgium and the Netherlands.[32] MSP must therefore be applied as a practical tool to coordinate various sectoral policies in the allocation and optimisation of space for human activities.

Offshore wind is one of the maritime uses with a large spatial footprint and competition for space with commercial fisheries, shipping and MPAs, especially in the Irish Sea and the Bristol Channel,[31] poses a challenge for cross border MSP in the Celtic Seas. The growth of traditional maritime sectors such as shipping (as discussed in section 3), the growth of the ORE sector and the number of fixed OREI's increase potential risks to the safety of navigation for the shipping sector. Competition with other traditional sectors such as fisheries can result in spatial restrictions and displacement effects on fishing vessels. Increased competition for sea space may lead to conflicts between sectors and to negative cumulative impacts on the environment.

Increasing demand for space by ORE technologies must be considered in the context of existing users so as to avoid conflicts and enhance the potential for synergies and co-existence. MSP helps bring stakeholders and authorities together to agree on sustainable spatial and temporal measures and policies to order human activities. Co-existence between maritime uses such as windfarms and aquaculture or other forms of ocean energy have been encouraged so as to optimize space utilisation.[33]Implementation of MSP should help to ensure that allocation of space for offshore renewable energy is done with consideration for other maritime uses, interests and stakeholders whilst fostering opportunities for co-existence and indicating possible maritime space for future development. Apart from these benefits, the MSP process also helps to reduce risk for ORE developers, boosts investment opportunities, and should facilitate a streamlined consenting process.[34] Cross-border cooperation aiming at sharing knowledge, skills development and experience is crucial for further development of offshore wind energy and can assist in delivering real cost reductions.[35]

4.1   Policy Drivers for Offshore Renewable Energy

At EU level, there is a drive to secure energy supply, to ensure that supply is both competitive and affordable and to encourage sustainable energy production through reducing greenhouse gas emissions. The 2020 Energy Strategy (COM/2010/639) sought to reduce greenhouse gases by at least 20%, increase the share of renewable energy in the EU's energy mix to at least 20% of consumption, and improve energy

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[32] Qiu and Jones (2013)
[33] Christie et al. (2014)
[34] Further information available online at: http://www.windpoweroffshore.com/article/1190757/growing-potential-maritime-spatial-planning
[35] Tonderski and Jedrzejewska (2013)

efficiency by at least 20%. This has a legal basis in the Renewable Energy Directive (2009/28/EU). The latest progress report on renewable energy (COM/2017/57) states that 25 EU Member States are expected to meet their 2015/2016 interim renewable energy targets. Whilst the progress report does not refer to wave or tidal energy it recognises that deployment of offshore wind has been slower to progress than expected and attributes this primarily to initially high costs (now substantially decreasing) and grid connection issues (COM/2017/57:7). Two additional strategies have been published to provide a longer-term policy framework. These act as drivers for the development of offshore renewable energy.

2030 Energy Strategy (COM/2014/15) sets outs the climate change and energy targets for achieving the EU's decarbonisation objectives. The targets are a 40% cut in greenhouse gas emissions compared to 1990 levels, at least a 27% share of renewable energy consumption and at least 27% energy savings compared with the business-as-usual scenario.

Energy Roadmap 2050 (COM/2011/885) sets out the goals for transitioning to a low carbon energy system and challenges in delivering the EU's decarbonisation objective while at the same time ensuring security of energy supply and competitiveness. The EU is committed to reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050 and accordingly the roadmap explores the various options available to achieve this target. The Roadmap recognises that a pre-requisite for a more sustainable and secure energy system is a higher share of renewable energy.

The 'Clean Energy for All Europeans' Package (COM/2016/860) has achieving global leadership in renewable energies as one of its three main goals. The package presents an opportunity to speed both the clean energy transition and growth and job creation by mobilising up to an additional €177 billion of public and private investment per year from 2021, and it is expected to generate up to 1% increase in GDP over the next decade and create 900,000 new jobs.[36]

The Renewable Energy Directive (2009/28/EC) requires Member States to achieve binding individual targets for the total share of renewable in final energy consumption. The differentiated Member State targets reflect differences in starting points, resource bases and capacity to invest. All Member States have developed National Renewable Energy Action Plans (NREAPs) detailing how they plan to achieve their target, including trajectories per sector and technology. The Renewable Energy Directive does not oblige Member States to include ORE in their targets, though many have done so, particularly in relation to offshore wind.

Although the Renewable Energy Directive does not explicitly mention MSP, it does require that Member States indicate geographical locations suitable for exploitation of energy from renewable sources.

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[36] Impact Assessment for the amendment of the Energy Efficiency Directive, SWD (2016) 405

It also allows for cooperation on joint projects relating to production of electricity from renewable energy between two or more Member States[37] or between Members States and third countries[38]. It also states that due to differences in the administrative structures and organisation of Member States, the respective responsibilities of national, regional and local administrative bodies for spatial planning should be clearly coordinated and defined, with transparent timetables for determining planning and building applications.[39]

It is important that MSP facilitates the achievement of ORE policy objectives and targets and assists in site selection. The MSP process should also recognise the interactions between sectors to allow for effective consenting and cooperation between administrative bodies and across borders. Implementation of MSP should assist in delivering a consenting and administrative system that is objective, transparent and proportionate in line with the Renewable Energy Directive requirements.

4.2　Offshore Renewable Energy Authorities, Zoning and Planning

ORE projects and MSP are relatively new to many planning and regulatory bodies and institutional and legal arrangements are still evolving in many Member States. The objectives, remits of agencies, planning approaches and regulatory frameworks for ORE in Member States varies across the Celtic Seas. The remits of authorities involved in planning and consenting of offshore renewable energy are outlined below. This section also reviews the approach to ORE planning and site selection in SIMCelt partner countries.

4.2.1　United Kingdom

In the UK, the Marine Management Organisation (MMO) as well as the devolved authorities of Marine Scotland, Natural Resources Wales and Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland have both MSP and certain consenting responsibilities for offshore renewable energy. The table below outlines the remits and roles of authorities responsible for ORE planning and consenting.

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[37] Article 7
[38] Article 9
[39] Article 13a

Table 2: Authorities and agencies responsible for certain aspects of ORE planning and consenting in the UK

Country	Authority	MSP Remit/ORE Planning	Consenting Remit
UK	Department for Business, Energy & Industrial Strategy (DBEIS) (formerly Department of Energy & Climate Change)	Conducts the Offshore Energy Strategic Environmental Assessment	Regulates the decommissioning of OREI and responsible for approving safety zone consents in or adjacent to territorial waters of England, Scotland and Wales and waters in the UK Renewable Energy Zone but not the territorial waters of Northern Ireland[40]
	The Crown Estate (TCE)	In England, Wales and NI only: manager of just under half of the foreshore, seabed (to 12NM) and rights to generate electricity from wind, waves and tides on the continental shelf under the Energy Act 2004	Leasing of the seabed to 12 nautical mile territorial sea limit and sovereign rights to explore and make use of ORE resources of the continental shelf. Responsible for granting seabed agreements to developers.
England	Marine Management Organisation (MMO)	Under the Marine and Coastal Access Act, the MMO have been delegated marine planning functions for England marine plans by the Secretary of State who remains the competent authority for MSP[41]	MMO also grants development consent for offshore renewable projects under 100MW. MMO is responsible for granting marine licences in both English inshore (territorial) and offshore waters and approving Environmental Impact Statements and Habitats Regulation Assessment
	Planning Inspectorate	An executive agency responsible for national infrastructure planning applications	The Planning Inspectorate is the centralised licensing authority for ORE projects above 100MW[42]
Wales	Welsh Government	Competent authority for MSP in Wales (inshore and offshore waters to median line with Ireland)	
	Marine Management Organisation(MMO)	Delivers some non-devolved functions in Welsh inshore regions	The MMO is responsible for section 36A consents and safety zones in Welsh offshore waters

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[40] More information on the Energy Act 2004 available at:http://www.legislation.gov.uk/ukpga/2004/20/pdfs/ukpga_20040020_en.pdf
[41] More information on the Marine and Coastal Access Act 2009 available at: http://www.legislation.gov.uk/ukpga/2009/23/pdfs/ukpga_20090023_en.pdf
[42] More information on the Planning Act 2008 available at: http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf

Country	Authority	MSP Remit/ORE Planning	Consenting Remit
	Natural Resources Wales	Marine Licensing Team (MLT) in Natural Resources Wales administers marine licenses on behalf of the Welsh Government	Natural Resources Wales (NRW) is responsible for marine licences in Welsh inshore waters. Also responsible for EPS licences. Decommissioning, whilst a responsibility of DECC, is discussed with NRW
	Planning Inspectorate	Responsible for nationally significant infrastructure projects	Licensing authority for ORE projects above 100MW in Wales
Scotland	Marine Scotland	Marine Scotland is the competent authority for MSP in Scotland (inshore and offshore waters).	Marine Scotland Licensing Operations Team (MS LOT) is the "one stop shop" consenting authority for Scottish waters
	Crown Estate Scotland	Manages most of the seabed and around half of the foreshore	The Crown Estate Scotland, created under the Scotland Act 2016, manages leasing of the seabed to 12M and holds the rights to ORE to 200M. Within 12M it awards and manage leases for telecommunication and electricity cables, oil and gas pipelines, ORE projects, fish farms and ports & harbours
Northern Ireland	Department of Agriculture, Environment and Rural Affairs (DAERA)	DAERA is the marine planning authority for Northern Ireland (inshore and offshore waters)	DAERA Marine Strategy and Licensing team is responsible for ORE consenting and enforcement functions in Northern Ireland territorial waters
	Marine Management Organisation (MMO)		The MMO is responsible for section 36A consents and safety zones in Northern Ireland offshore waters

4.2.1.1   Marine and ORE planning in UK

Scotland adopted its National Marine Plan (NMP) in 2015, the NMP is entering its first reporting period. Regional marine planning in each of Scotland's 11 marine region is now underway in a staggered approach. Shetland Islands and the Clyde are the first Regions to receive Direction by Scottish Ministers to produce Regional Marine Plans (inshore only). In England, the East Inshore and East Offshore marine plans were adopted by the UK Secretary of State for the Environment in April 2014. The South Inshore and

Offshore marine plans have been through the consultation phase and that feedback is currently being analysed. Marine plans for the remaining areas are under development and due by 2021. The draft Welsh National Marine Plan is awaiting consultation. In Northern Ireland, a draft marine plan has also been prepared but cannot be adopted until such times as a government is formed, following the last election. Sectoral plans for specific activities such as ORE have been produced by various authorities in the devolved administrations.

National/Strategic Planning

       Department of Energy & Climate Change (DECC) (now the Department for Business, Energy & Industrial Strategy) undertook a Strategic Environmental Assessment (SEA) to assess the suitability of UK offshore waters and territorial waters of England and Wales for the development of offshore wind in 2009 and offshore wind, wave and tidal devices in 2011 and 2016. The Department of Enterprise, Trade and Investment (DETI) (now Department of Economy) also conducted an SEA for offshore wind, wave and tidal devices in 2009 as part of the Offshore Renewable Energy Strategic Action Plan in Northern Ireland territorial waters.

       The Crown Estate was responsible for the Round 3 Plan/Zones for offshore wind farm development covering the UK Renewable Energy Zone and English and Welsh Territorial Waters. Unlike previous offshore wind leasing rounds where individual project sites were awarded to developers, the Round 3 zone-based approach for offshore wind leasing process was designed to enable developers to identify project locations within zones by addressing as many of the environmental and planning constraints as possible at a zone level giving more flexibility to choose the most appropriate project site.[43] Wind farm zones were decided before the adoption of marine spatial plans; it is a requirement that the plans in development will take notice of the Round 3 zones. In areas where maritime spatial plans exist, consent decisions for OREIs will be made by the relevant consenting authority with consideration to these maritime spatial plans.

       Marine Scotland produced an Offshore Renewable Energy Sectoral Plan for Scottish Territorial waters, covering offshore wind, wave and tidal energy to support renewable energy development. This sectoral plan is intended to complement both the national and regional marine plans through the provision of relevant information and assessment for specific areas of marine planning. These plans were subject to SEA, Habitats Regulations Assessment, socio-economic assessment and consultations.

Zone/Project Planning

       Planning at this level is undertaken by offshore renewable energy developers (or development consortia). Developers may undertake more detailed desk study and survey work to assess the nature of the physical, biological and human environment and therefore provides more information about the zone to make more informed decisions wind farms in the zone.[43]

Box 1. Approaches to ORE planning in the UK

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[43] The Crown Estate (2013)

4.2.2   Ireland

The enactment of the Maritime Area and Foreshore (Amendment) Bill is expected to bring changes to the remits of authorities whilst streamlining the consenting and planning process, reducing duplication in the consent process and facilitating a single Environmental Impact Assessment.[44] The Department of Housing, Planning and Local Government (DHPLG), which is the competent authority for MSP, also has a consenting remit for ORE currently with respect to the foreshore (HWM to 12NM limit). Other entities with a role in the process are shown in Table 3.

Table 3: Authorities and agencies responsible for ORE planning and consenting in Ireland

Country	Authority	MSP / ORE Planning Remit	Consenting Remit
Ireland	Department of Communications, Climate Action and Environment (DCCAE, formerly DCENR)	Energy policy remit	Prepared and oversees the implementation of the Offshore Renewable Energy Development Plan (OREDP) along with the Strategic Environmental Assessment
	Department of Housing, Planning and Local Government (DHPLG)	The DHPLG is the competent authority for MSP in Ireland.	DHPLG is responsible for regulating the use of the foreshore through granting of Foreshore leases and licences under the Foreshore Acts, as amended
	Marine Institute (MI)	The Marine Institute will provide the necessary technical and scientific advice for the implementation of MSP	MI provides technical and scientific advice to the DHPLG during the licensing process for proposed developments on the foreshore
	Commission for Regulation of Utilities (CRU) (formerly the Commission for Energy Regulation (CER))	Independent energy regulator in Ireland. Has powers in relation to the all-island Single Electricity Market (SEM)	Entity responsible for granting the Licence to Generate and Licence to Construct renewable energy projects
	An Bord Pleanála	Statutory and independent body responsible for the determination of appeals resulting from planning decisions of local authorities and determination of applications for strategic infrastructure development	With the enactment of the Maritime Area and Foreshore (Amendment) Bill, An Bord Pleanála is likely to become the consenting authority for ORE projects deemed 'Strategic Infrastructure Project' or where an EIA or AA is required[44]

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[44] Le Lievre and O'Hagan (2015)

4.2.2.1   Marine and ORE planning in Ireland

The provisions of the MSP Directive have been transposed into Irish law through the European Union (Framework for Maritime Spatial Planning) Regulations 2016.[45] It is anticipated that there will be one national marine plan initially, perhaps supported by more regional level plans at a later date if necessary.[46] In 2012, the government published Harnessing Our Ocean Wealth – an Integrated Marine Plan for Ireland which sets out key high level objectives and potential growth areas.[47] This recognises the need for an integrated governance framework and reform of consenting processes. In 2014, the [then] Department of Communications, Energy and Natural Resources published the Offshore Renewable Energy Development Plan (OREDP) which sets out key principles, policy actions and enablers for delivery of Ireland's significant ORE potential. This was accompanied by a Strategic Environmental Assessment, based on a spectrum of development scenarios ranging from low to high. Whilst the latter was not intended to endorse any particular area for development, its constraint maps have been useful in identifying less suitable areas for development. Approaches to ORE planning in Ireland are shown in Box 2.

National Planning

The Department of Communications, Climate Action and Environment, with input from SEAI, oversee the implementation of the Offshore Renewable Energy Development Plan (OREDP) which describes the policy context for development of offshore wind, wave and tidal stream energy in Irish waters to 2030. A Strategic Environmental Assessment was conducted to evaluate the likely significant environmental effects of implementing the plans to develop offshore renewable (offshore wind, wave and tidal) energy in Irish waters at low, medium and high scenarios so that areas could be prioritised for development up to 2030.**Error! Bookmark not defined.**

Separately, the Marine Renewables Industry Association (MRIA), the trade association for marine renewables on the island of Ireland, published a non-statutory White Paper on Initial Development Zones which proposed four Initial Development Zones (IDZs) for Ocean Energy to be prioritised with significant co-operation and support from all Government agencies and from industry. The White Paper also sets out the assumptions underlying the IDZs and indicates that a consenting Round to provide for initial exploration and exploitation of the IDZs is critical.

Project Site Selection

Site selection is a matter for project developers in the first instance, subject to the relevant consent processes. Through the OREDP, work has continued on mapping opportunities and constraints to inform future development.

Box 2. Approaches to ORE planning in Ireland

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[45] Available at: http://www.housing.gov.ie/sites/default/files/public-consultation/files/2016_07_06_pdf_352_of_2016_0.pdf

[46] DHPLG (2017)

[47] Government of Ireland (2012)

4.2.3   France

In France, the Regional Prefectures in charge of the coordination of Maritime Facades are the authorities with major MSP, ORE planning and consenting remits. However, the Préfet of the Department acts as the single licensing authority for ORE consenting in territorial seas. The following represents the authorities with other remits for MSP, ORE planning and consenting in France.

Table 4: Authorities and agencies responsible for ORE planning and consenting in France

Country	Authority	MSP/ORE Planning Remit	Consenting Remit
France	Direction Générale de l'énergie et du Climat (DGEC)	Gives direction and oversees technical and economic studies for ORE	
	Regional Prefectures in charge of the coordination of Maritime Facades (Préfet Maritime & Préfet de Région)	Both Prefêts are the competent authorities for MSP for each Maritime Front. For the French part of the Celtic Sea, the Préfet Maritime de l'Atlantique and the Direction interrégionale de la mer Nord Atlantique-Manche Ouest (DIRM NAMO) are responsible for maritime spatial plan development. The Prefêts of the region are also responsible for the determination of favourable zones/sites for ORE development and related consultation processes.	The Préfet Maritime & Préfet de Région are consultees during the consenting process for ORE in the territorial sea. The Préfet Maritime evaluates and approves concession applications for ORE in the EEZ
	Préfet of the Département		Single licensing authority for ORE development and associated EIA in territorial sea
	Réseau de Transport d'Électricité (RTE)	Undertook feasibility studies for electricity network connection associated with the favourable ORE zones (étude Réseau de transport d'électricité (RTE))	
	Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement (CEREMA)	Undertakes technical and economic studies for ORE zone and site planning	
	Conseil maritime de façade (CMF)	The CMF serves as the platform to consult State agencies, local authorities, maritime industry, trade unions. NGOs and other stakeholders and users on the	

Country	Authority	MSP/ORE Planning Remit	Consenting Remit
		development of MSP. The CMF have already been consulted on the draft methodology for the implementation of MSP in the NAMO. The CMF is also a platform for consultation of stakeholders during the ORE planning process.	
	Commission administrative de façade (CAF) - Façade Administrative Commission	The Administrative Commission for the North Atlantic West-Channel Facade (CAF NAMO). CAF NAMO coordinates the representatives of the State and the public institutions in the NAMO to ensure that the development of the façade strategic document (DSF) and its revision compliments the National Strategy for the Sea. The DSF is the document implementing the MSP Directive in France.	

4.2.3.1   Marine and ORE Planning in France

In France, the National Maritime and Coastal Strategy was adopted in February 2017. The pairs of Préfets in charge of the coordination of each French Maritime Front, under the coordination of the Maritime Front Administrative Commission, are developing the Maritime Front Strategy Documents with a section on the implementation of MSP by 2018. In addition to these policy developments and MSP efforts, other relevant approaches to ORE planning are shown in Box 3.

National/Sectoral Study

CEREMA under the authority of the **Directorate-General for Energy and Climate (DGEC))** undertook a multi criteria study and consultations to identify suitable (technical and economically favourable) areas for offshore wind farms as part of the road map for offshore and floating wind in France.[48] As part of the process, Réseau de Transport d'Électricité (RTE) carried out the studies on the connection associated with the favourable zones (Transmission System of Electricity (TEN) study). The study covered a distance of up to 50 km from the coastline or 200m depth in the maritime façades of France (the Mediterranean, Atlantic and Channel - North Sea). The study formed the basis of planning documents that are not legally enforceable but are the result of an integrated analysis conducted locally and contributes to the definition of the state of the marine environment and planning of uses and activities.

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[48] DIRM NAMO (2015)

Maritime Façade Consultation and Zoning

The Coordinating Préfets of the Maritime Façade at the request of the Minister for Ecology, Sustainable Development and Energy, undertook a public consultation on the results of the studies and reports produced by CEREMA and RTE to identify zones for commercial offshore wind farms and pilot zones for floating wind turbines in each of the Maritime Façades.

Site Selection/Project Planning

Each project will then have to go through the administrative/regulatory process in place (including impact assessment).

Box 3. Approaches to ORE planning in France

5   Case Study Results and Discussion

The following are the remits of the agencies and authorities that were contacted and interviewed as part of the case study.

Commissioners of Irish Lights (Ireland – ROI and NI):

The Commissioners of Irish Lights (Irish Lights) is the General Lighthouse Authority (GLA) for the island of Ireland, its adjacent seas and islands. Irish Lights carry out the obligations of the British and Irish Governments in relation to the provision of marine Aids to Navigation (AtoN) around the coast of Ireland commensurate with the volume of traffic and degree of risk as specified under the Safety of Life at Sea Convention (SOLAS). Irish Lights is vested under the Merchant Shipping Acts, 1894-2014 in Ireland; the UK Merchant Shipping Act 1995 and the Merchant Shipping and Maritime Security Act 1997 in Northern Ireland. Irish Lights has the responsibility for the superintendence and management of all aids to navigation. Irish Lights' mission statement is 'to provide aids to navigation and allied services for the safety of persons at sea, to protect the marine environment and to support the marine industry and coastal communities'.

Sustainable Energy Authority of Ireland (SEAI) (Ireland):

The Sustainable Energy Authority of Ireland (SEAI) was established as Ireland's national energy authority under the Sustainable Energy Act, 2002. SEAI's mission is to play a leading role in transforming Ireland into a society based on sustainable energy technologies and practices. To fulfil this mission SEAI aims to provide well-timed and informed advice to Government, and deliver a range of programmes efficiently and effectively, while engaging and motivating a wide range of stakeholders and showing continuing flexibility and innovation in all activities. SEAI's actions help progress Ireland to the vanguard of the global green technology movement, so that Ireland is recognised as a pioneer in the move to decarbonised energy systems.

Maritime and Coastguard Agency (MCA) (UK):

The Maritime and Coastguard Agency (MCA) is an Executive Agency of the Department for Transport (DfT) and is responsible for implementing and developing the UK Government's maritime safety and environmental protection policy throughout the UK. This includes co-ordinating Search and Rescue (SAR) at sea through Her Majesty's Coastguard 24 hours a day, and checking that ships meet UK and international safety rules. The MCA works to prevent the loss of life at the coast and at sea, to ensure that vessels are safe, and to prevent coastal pollution. The MCA provides a full range of search and rescue, counter pollution, survey, inspection and enforcement activities and has 12 major business activities:

- Survey
- Inspection
- Enforcement
- Ship Registration
- Navigation Services
- Strategic Prevention Design/Development

- Seafarers Services
- Search & Rescue
- Pollution Response & Salvage
- Stakeholder Communication
- Ministerial Services
- Regulatory Process

Department of Agriculture, Environment and Rural Affairs (Northern Ireland):

The Department of Agriculture, Environment and Rural Affairs (DAERA) is the competent authority for marine planning in Northern Ireland (inshore and offshore region) and the marine licensing authority for Northern Ireland inshore region, under the UK Marine and Coastal Access Act, 2009 and Marine Act (Northern Ireland) 2013. The Department is also the statutory nature conservation authority for both terrestrial and marine environments, and fisheries fall under DAERA's remit.

The Crown Estate (England, Wales and Northern Ireland) and Crown Estate Scotland:

The Crown Estate's responsibility in the marine environment comprises management of virtually the entire seabed out to the 12 nautical mile territorial limit in England, Wales and Northern Ireland, in addition to the sovereign rights to explore and make use of the natural resources of the continental shelf, with the exception of coal, oil and gas and the rights to generate electricity from wind, waves and the tides. Crown Estate Scotland has the same role and responsibilities as The Crown Estate but for the Scottish seabed. The activities of The Crown Estate's Energy, Minerals and Infrastructure portfolio are diverse and cover a number of business sectors. These include offshore wind developments, wave and tidal energy developments, aggregate dredging, cables and pipelines and other infrastructure. Its coastal activities are wide ranging and mainly comprise the leasing and licensing of land and coastal management, outfalls, aquaculture, moorings, jetties and other infrastructure.

Marine Scotland (Scotland):

Marine Scotland is the marine planning and consenting authority for the Scottish marine area, defined in the Marine (Scotland) Act 2010 as the territorial seas to 12 nautical miles. Marine Scotland is a Directorate of the Scottish Government and its purpose is to manage Scotland's seas for prosperity and environmental sustainability, working closely with other key delivery partners including UK institutions. The National Marine Plan covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). It also applies to the exercise of both reserved and devolved functions. Marine Scotland's key responsibilities include:

- Working towards achieving good environmental status through marine planning, licensing and other functions, to help ensure a healthy and sustainable environment;

- Promoting sustainable economic growth from the marine renewables industry and other marine and maritime industries through integrated planning and, where appropriate, streamlined regulatory frameworks;

- Promoting sustainable, profitable and well-managed fisheries and aquaculture industries in Scotland;

- Ensuring sustainably-managed freshwater fish and fisheries resources;

- Ensuring a sound evidence base to inform the development and delivery of marine policy, planning and services;

- Ensuring effective compliance and enforcement arrangements;

- Continuing to integrate their functions and resources, and to develop organisational skills, competencies and capacity to ensure effective and efficient marine management arrangements in Scotland.

Marine Management Organisation

The Marine Management Organisation licence, regulate and plan marine activities in the seas around England. Other key responsibilities include:

- Managing and monitoring fishing fleet sizes and quotas for catches;

- Ensuring compliance with fisheries regulations, such as fishing vessel licences, time at sea and quotas for fish and seafood;

- Managing funding programmes for fisheries activities;

- Planning and licensing for marine construction, deposits and dredging that may have an environmental, economic or social impact;

- Making marine nature conservation byelaws;

- Dealing with marine pollution emergencies, including oil spills;

- Helping to prevent illegal, unregulated and unreported fishing worldwide;

- Producing marine plans to include all marine activities, including those we don't directly regulate;

- Enforcing wildlife legislation and issuing wildlife licences.

Préfecture Maritime de l'Atlantique (France) :

The Préfecture Maritime de l'Atlantique has the following remit:

- Safety of life at sea, with around 3500 call outs and 5000 people rescued per year;

- Marine pollution prevention and control;

- Protection of the marine environment;

- Law enforcement at sea;

- Assessment of areas for potential development of ORE is done by the Maritime Préfet and the Préfet of Region with technical support by the Centre of Studies and Expertise On Risks, Environment, Mobility and Development (CEREMA).

Involvement with Maritime Spatial Planning to date

Experience in, and involvement with, Maritime Spatial Planning (MSP) to date varies across the authorities and agencies that were consulted as part of this case study and indeed the countries as a whole. In Ireland the MSP Directive was transposed into Irish law in 2016. The competent authority for MSP in Ireland is the Department of Housing, Planning and Local Government (DHPLG). The UK Marine Policy Statement (MPS) 2011, jointly prepared by the UK, Scottish, Welsh and Northern Ireland governments, provides the policy framework for MSP which has since been supported by legislation (MCAA and individual devolved administrations legislation). In England, the MMO are developing the first set of marine plans. The first plans, the East Marine Plans comprising of inshore and offshore waters, were developed in 2014. The South Marine Plan, North West, North East, South East and South West Marine Plans will all be in place by 2021. In Northern Ireland, the Department of Agriculture, Environment and Rural Affairs (DAERA), are currently developing a single marine plan for the inshore and offshore region. In Scotland, Marine Scotland have developed Scotland's National Marine Plan (2015). That national marine plan will be supplemented by 11 regional marine plans prepared by marine planning partnerships. In Wales, the Welsh Government is developing a plan that will include both inshore and offshore waters. In France, after the adoption of the National Maritime and Coastal Strategy in February 2017, the Maritime Préfets responsible for the coordination of each French Maritime Front, through the Maritime Front Administrative Commission, are required to develop the Maritime Front Strategy Documents by 2018. The Maritime Front Strategy document will contain a section on the implementation of MSP and also define local level management objectives, the spatial organisation of maritime uses and plans for achieving Good Environmental Status (GES) under the MSFD.

While experience is varied across each country in the Celtic Seas, their level of previous engagement with MSP is reflective of the stage that each country is at in the process (legislation transposed or not, MSP authority identified, plans under development, plans in place). In Ireland, the Commissioners of Irish Lights (Irish Lights), have largely been engaged in the principles of MSP in-house, especially through their navigation review which is conducted every 5 years in consultation with the other two General Lighthouse Authorities (GLA) (Trinity House and the Northern Lighthouse Board (NLB)). The navigation review process naturally includes the principles of MSP as Irish Lights consider the various impacts that

could impact on navigation. Irish Lights have also developed a guiding document for shipping & navigational safety and MSP. With regard to their engagement with other related EU Directives, Irish Lights are part of the Marine Strategy Framework Directive (MSFD) sub-working group for Ireland on Hydrological Changes & Noise. Similarly, within the Sustainable Energy Authority of Ireland (SEAI), in-house involvement in MSP have so far related to Natura 2000, shipping and ports. Again, while this is more focused on the environment, SEAI note that this work is cross-cutting. As such, both agencies recognise the importance and value of linking various EU Directives, such as the MSFD, with the MSP Directive in order to enhance the environmental quality and effective planning of Ireland's marine environment. Irish Lights noted that to date there is no MSP working group within Ireland.[49]

In the UK, The Crown Estate has been heavily involved in the development of the Welsh National Marine Plan and also in the development of the various English Marine Plans in each of the regions. The Crown Estate also provides a response during the formal consultation process for marine plans, given their responsibilities over the seabed. The Maritime and Coast Guard Agency (MCA), through the Navigational Safety Branch, is a statutory consultee and primary adviser to the devolved administration authorities: the Marine Management Organisation (MMO), Natural Resources Wales, Marine Scotland and the Department of Agriculture, Environment and Rural Affairs (DAERA, Northern Ireland). Each administration has consulted the MCA on their proposals for Marine Plan Areas. As part of the development of Scotland's National Marine Plan, Marine Scotland conducted a Strategic Environmental Assessment (SEA), Social and Economic Assessment and the Business and Regulatory Impact Assessment (BRIA) as well as numerous phases of consultation. The Marine Plan for Northern Ireland is under development but lack of a government is delaying this currently. In England, the East Inshore and East Offshore marine plans were adopted by the UK Secretary of State for the Environment in April 2014. The South Inshore and Offshore Marine Plans have been through the consultation phase and that feedback is currently being analysed. Marine plans for the remaining areas are under development and due by 2021.

In France, the Préfet Maritime Atlantique is one of the competent authorities for MSP along with the Interregional Directorate of the Sea North Atlantic and West Channel (DIR-NAMO). The two coordinating Préfets as part of the preparation of the Maritime Front Strategy Document for the North Atlantic -Western Channel have held initial consultation with the public, actors and stakeholders to collect their vision and expectations based on an initial assessment of maritime activities and environment.

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[49] The MSP scene in Ireland is evolving. Since the time the interviews for this study were conducted, the DHPLG has published a roadmap for MSP in Ireland, created an Inter-Agency MSP Group and a MSP Advisory Group.

Data for Maritime Spatial Planning

With regard to data sharing for MSP, competent authorities, such as the MMO and Marine Scotland in the UK, publicly share their data via their websites and other national sources. Marine Scotland has provided data to various stakeholders across the Scottish, UK and European marine sectors. Data from Marine Scotland is also available on the National Marine Plan Interactive website.[50] All of the data that is owned by the MMO is made publically available through the open data initiative of the UK Government.[51] The MCA has provided AIS data to the MMO for the ports and shipping chapters of the various marine plans. The Crown Estate has also provided data to the MMO and Welsh Government for their marine plans.

In Ireland, Irish Lights have not been asked to supply data to any organisation/s for its specific use in MSP (to date). However, Irish Lights do provide met-ocean data and AtoN (Aid to Navigation) locations to the Marine Institute (MI) for Ireland's Marine Atlas and in turn to the Dublin Bay Dashboard. The latter provides citizens, public sector workers and companies with real-time information, time-series indicator data, and interactive maps about all aspects of Dublin city. Similar to Irish Lights, SEAI has not been asked to supply data to any organisation for MSP but it provides data to the Marine Institute from their ocean energy test sites. The Marine Institute will support the MSP process in Ireland by providing the necessary technical and scientific advice[52] and, as such, data will be required from agencies such as Irish Lights and SEAI. In France, the Maritime Prefectures do not provide data but instead rely on data provided by CEREMA.

The Agencies stated that the major challenge for data harmonisation were the multiple sources, each with different requirements. However, The Crown Estate, MMO and Marine Scotland were of the view that efforts should not be duplicated and there should be an initial and shared understanding of the user requirements and needs before developing a harmonised data portal for the Celtic Seas.

The MMO also stated that harmonising multiple data sources (such as in the case of AIS) could lead to more efficient processing of data. The Crown Estate stated that it is important to be able to revert back to the original data and any additional information/reports that may be associated with it, which has been one of the criticisms of the MEDIN Data Archive Centre; originally designed to provide secure long-term storage of and access to marine data. SEAI and Irish Lights noted that host requirements would also need to be looked at in more detail.

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[50] See http://marinescotland.atkinsgeospatial.com/nmpi/
[51] See http://data.gov.uk/
[52] DHPLG (2017)

The Use of AIS Data in Maritime Spatial Planning

To adequately represent the density and volume of maritime traffic during the MSP process, AIS (Automatic Identification System) data must be collected, harmonised and utilised. The International Maritime Organization (IMO) under Chapter V of SOLAS legally require that all vessels over 300gt (gross tonnage) on an international voyage, all cargo vessels over 500gt, and all passenger vessels *regardless of size* be fitted with an AIS. The AIS automatically records and transmits information on the vessel identity (Maritime Mobile Service Identity [MMSI] number), position, speed, course, vessel type and dimensions. As AIS data is recorded and stored on servers at intervals of 5-10 seconds it is a good method of depicting the volume of traffic in a certain region. The maps created with the collated AIS data can form a 'risk map', highlighting the densest areas of maritime traffic. This method has been used to represent the volume of maritime traffic in Maritime Spatial Plans across Europe (e.g. Shetland Island's Marine Spatial Plan, 2014).

Within Ireland the lead authority for the collection of AIS data is the Irish Coast Guard. Irish Lights have additional AIS base stations alongside the Irish Coast Guard base station network to meet Irish Lights need for monitoring AtoN using AIS. In order to adequately represent UK vessels in Irish waters, the MCA (UK) share their AIS data with Irish Lights, this assists Irish Lights' in doing navigational risk assessments and consultations for offshore developments. This link between the MCA and Irish Lights also helps to establish transboundary communication, which will be important for MSP in the Celtic Seas. Irish Lights stressed that government data (e.g. AIS data from the Coast Guard or MCA) should be used over commercial or non-expert data, especially in relation to AIS, stating: "Government data is more reliable and provides more confidence" (Irish Lights, 2017). Many leisure and recreational vessels are not required to carry AIS due to their size (less than 300gt). As such, it is important that they are accounted for in traffic surveys. Physical counting of vessels is required during the planning of offshore developments. It is important that vessel types as well as numbers are recorded during this process. Surveys must be carried out for two weeks in summer and two weeks in winter. Irish Lights also stressed the importance of local knowledge and stakeholder engagement, as did the MCA. The MCA also require the use of radar when carrying out traffic density surveys. Early engagement and local knowledge will help to account for all users in maritime spatial planning.

It is important to note that AIS jamming by GPS blockers is still a concern. AIS is vulnerable as it can be 'jammed' by GPS blockers, thus a ship's location is not then recorded. AIS data can also be 'spoofed', which can be more dangerous as instead of plotting the ship's location, the spoofing inputs a false location for the ship. This can only be achieved locally through base station transmissions or can be done cheaply through a Software Defined Radio (SDR). In some vessel traffic websites, spoofing can be done entirely through software and false data fed into their systems. In terms of data channels for AIS, VDES (VHF Data Exchange Systems) is freeing up more channels although this is at an early stage, and it will be about 5-10

years before the full benefit of VDES for AIS is realised according to Irish Lights. The use of radar and satellite images can help to mitigate false ship locations.

The collection of AIS data is relatively standardised. One issue that can appear frequently is related to the lack of receiver's time stamping the AIS messages. As there is a time delay (seconds) in getting the AIS data from the receiver to the database, if no time stamp is recorded at the receiver the actual time may be inaccurate and thus the data is not necessarily 'live' data.

Navigational Risks from the Development of Offshore Renewable Energy

With regards to navigational safety and offshore renewable energy sites, Irish Lights state that the initial concern is the creation of choke points. A choke point is a natural point of congestion between two navigable channels. Maritime chokepoints exist around the world and can be extremely congested. Thus, offshore developments should not increase the level of traffic in these already heavily congested areas, nor should they create new choke points. One of the areas in the Celtic Seas that was indicated by the Maritime Préfet for the Atlantic as a major concern for choke points is the English Channel. The planning and development of OREIs in English Channel will have to make specific consideration for shipping safety and distance from the coast and port entrance. A case example is the Dunkirk offshore wind farm along the Flanders coast of France and streches out to the Belgian border (see Figure 5). Due to the traffic separation which is the busiest traffic separation in the world, in terms of traffic density, the offshore wind zone (40km long) has to be located only 5km from the coast, instead of the required 10 km and makes the area close to the entrance of the port of Dunkirk.[53] There is a 5 nm exclusion zone to the traffic separation scheme but only 2.5 nm to the port access channel. The planning of such an ORE zone close to the coast calls for early and continous stakeholder consultations and various mitigation approaches with the responsible agency such as the Maritime Préfet during the stages of ORE devlepoment.

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[53] See further at: https://www.hauts-de-france.developpement-durable.gouv.fr/IMG/pdf/diaporama_reunion_publique.pdf
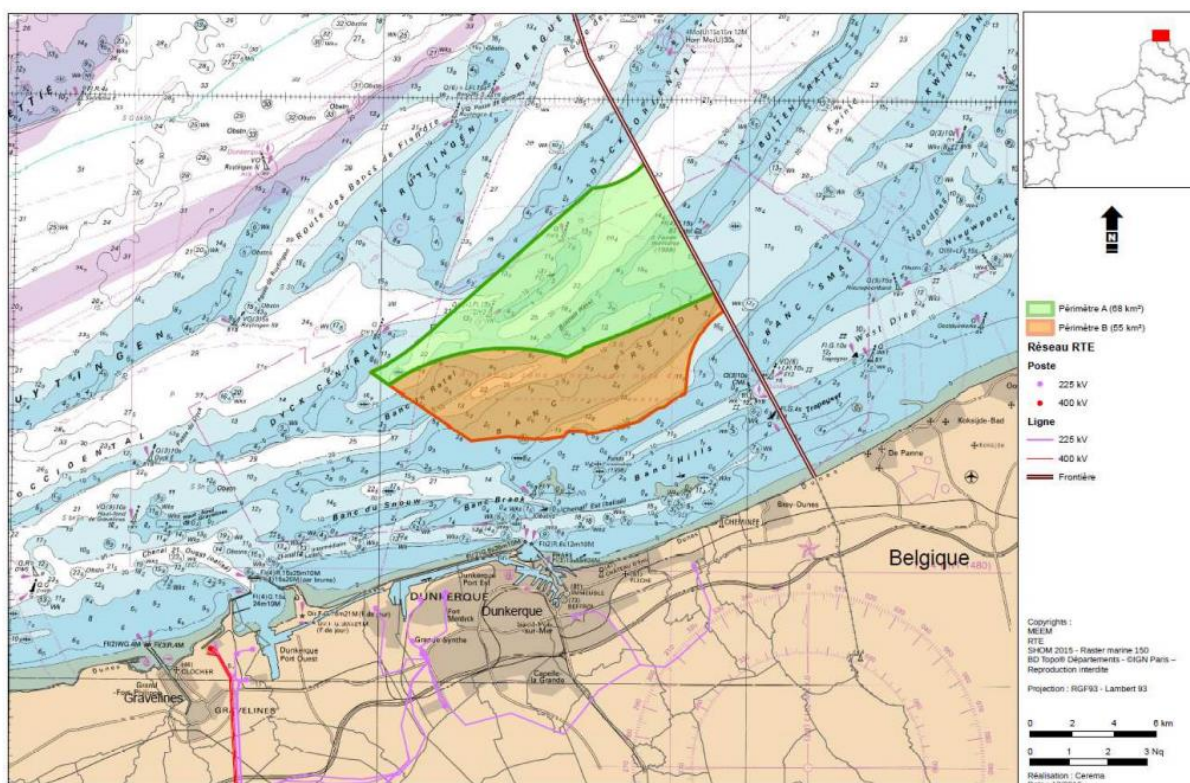
Figure 5: Dunkirk Offshore wind zone and Navigation issues [54]

Irish Lights stated this to be a significant risk, as choke points may substantially increase the risk of additional hazards such as collisions and groundings. The mitigation of choke points is crucial and can be achieved through effective AtoN strategies, as per IALA recommendations and endorsed by the GLAs (Ireland and UK) and Direction des Affaires Maritimes (France). Effective AtoN strategies were also noted as important by SEAI as their test sites do not have exclusion zones, nor do they think that future OREI will have exclusion zones. This is also the case in the UK, where OREIs are not treated as an 'exclusion zone' by default, unless a safety zone has been applied for by the developer and granted under the Energy Act 2004. The MCA also stressed the importance of AtoN strategies and the need for awareness of the mariner. For offshore wind farms, developing the sites on banks or in areas of shallow water can limit the amount of traffic near the site, thus acting as a natural deterrent for shipping. The Maritime Préfet for the Atlantic stated that in France, all vessels less than 25m are allowed to transit through wind farms. Cross border consultations, such as the strong links between the MCA and GLAs and groups such as NOREL (discussed in Chapter 6) are of critical importance in mitigating risk.

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[54] CEREMA (2016)

From the point of view of shipping and navigational safety, the MCA stated that the following were the most significant risks/issues associated with the co-use of an area for shipping and offshore renewable energy (these risks were also raised by Irish Lights):

- Collision risk
- Visual intrusion and noise
- Marking and lighting of the site
- Information to mariners
- Effect on navigational safety and communication equipment
- The likely squeeze of small craft into the routes of larger commercial vessels
- Emergency risk response
- Changes to charted depths
- Cumulative impacts

For offshore renewable energy a major concern is the risk of collisions between vessels and OREI, this was noted by SEAI and The Crown Estate. A future concern for navigational safety raised by Irish Lights is the development of floating wind farms. Floating wind farms are now being realised, with the first in the world currently under development off the North East of Scotland. SEAI and the Préfet Maritime Atlantique also noted that with floating wind farms, exclusion zones for fishing may be required as there is a risk of entanglement between the moorings and fishing nets.

Co-location of Activities Within Marine Plans

SEAI noted that the co-location of activities such as ORE and aquaculture will be important in the future. The Welsh Government is investigating co-location of aquaculture biomass and oyster nursery grounds with OREI. The Crown Estate stated that dual technologies will also be important, e.g. wind turbines and wave energy.

Cross Sectoral Working Groups

The importance of sectoral and cross sectoral working groups was pointed out by the MCA, The Crown Estate, SEAI (OREDP) and Irish Lights (MSFD). In the UK, the Nautical and Offshore Renewables Energy Liaison (NOREL) group was created in 2008 to ensure that the commercial and recreational shipping and ports industries "can successfully co-exist with the offshore renewable energy industry and that the needs of both are taken into account in Government policies on shipping and offshore renewable energy" (NOREL, undated). During the regular NOREL meetings, technical and consenting issues are discussed, and

if necessary referred to the Technical Working Group. The MCA stressed the importance of this group during the case study interview: "The NOREL group is extremely effective in helping to manage the co-existence of OREI and shipping, NOREL is the primary form of contact between the two sectors (navigational safety and offshore renewable energy). The MCA stated that consultation is done through NOREL during the development of navigational guidance and requirements. Irish Lights also attend NOREL meetings to discuss topics such as diversion of traffic, spacing of OREI and channel widths. Thus, the NOREL group also facilitates transboundary cooperation with regard to navigational safety and offshore renewable energy.

The Maritime Préfet for the Atlantic also highlighted the UK NOREL group as an effective and important mechanism for consultation between shipping & navigational safety and offshore renewable energy. Although the Maritime Préfet for the Atlantic is the authority for both offshore renewable energy and shipping & navigation, they noted that it would be a good to have a group similar to NOREL at national level in order to exchange experiences from the different maritime regions. However, informal contact is still in place between the two sectors and between the maritime regions.

The Role of MSP in Addressing Current Challenges

Irish Lights believe that MSP could help to provide better and more coherent offshore site planning across all maritime sectors. A top down approach to governance would be beneficial, as would a MSP server/portal where all relevant MSP-related information including consultation documents, data, governance structures etc. could be housed. Regarding consultation documents and information collected during consultation processes, Irish Lights would like to see this stored in one place that can be easily accessed. Such a mechanism is in place in the UK (Planning authority websites, Planning Inspectorate website and the MMO public register) as noted by The Crown Estate. Irish Lights also foresee a role for MSP in helping to alleviate conflicts and consequently increase safety at sea.

SEAI believe that MSP could help to improve:

- Planning of vital coastal areas;
- Interactions between users;
- Bringing stakeholders together;
- Determining where users can 'fit' into the marine plan;
- Help the consenting process;
- Increase stakeholder engagement – maps of who to contact in the related sectors.

SEAI also believe that MSP could make OREI more cost effective. Project information is getting lost; MSP could help collate this information (SEAI). Similar to the point raised by Irish Lights, SEAI noted that consultation data should be stored centrally and open access. The MCA stated that it is essential that MSP is flexible and noted that planning on a regional level is preferable and would allow for more flexibility (especially for trafficking as traffic pattern changes from one area to another and over time). The Crown Estate noted that survey data in the UK is available but not always accessible. MSP could perhaps help to reduce the time required to search for data, while also working with the data providers to improve accessibility. In relation to the MSP process in Wales and England, the MMO marine plans show that MSP is an evolving process. The experience gained in developing the East Marine plans can assist in the creation of newer plans by creating 'lessons learned'. The next English Marine Plans (South Plans) will be in interactive online formats.

The Welsh National Marine Plan builds on experiences and lessons learned from the MMO marine planning experience. MSP can give an indication about the best resource locations. It can also highlight areas where difficulties/constraints may be encountered without making them 'no go' areas. The Welsh National Marine Plan includes strategic resource areas for some sectors to highlight areas of high suitability. There are general policies and also sector-specific policies, which have supportive and safeguarding principles. In general, MSP should lead to better management of the seabed. The MMO also noted that creating a holistic view of transboundary marine areas, could help prevent an area becoming saturated with a particular energy type as currently most maps of the marine area in the UK show only infrastructure in the UK marine area and do not show anything on the other side of a boundary. DAERA stated that MSP should help in all discussions on legitimate uses of the sea and conflicts.

The Maritime Préfet for the Atlantic also noted that MSP should be flexible and adaptable to changes in maritime activities and the various ORE technologies that will develop in future.

Recommended Time Scales for the Review of Marine Plans

In terms of the time scale for updating maritime spatial plans, Irish Lights recommended a review and evaluation of the plans every five years. SEAI recommended that the plan cover a 10-year time period (underpinned with a SEA), with a significant review every five years. The Maritime Préfet for the Atlantic recommended a review of maritime spatial plans every six years in line with the MSFD. Marine Scotland stated that the review should be based on the realisation of predicated significant issues/changes and whether these need to be addressed through MSP. The MMO stated that English marine plans are reviewed every three years and progress on marine planning is reported every six years, which The Crown Estate agreed was sufficient time to allow the plan time to bed in and realise the need for any potential changes. The MCA did not suggest a recommended time for reviewing marine plans. The preceding responses show that there are differing views on how often maritime spatial plans should be reviewed. The marine

environment is an ever changing and dynamic environment, therefore more frequent reviews were recommended by Irish Lights. Conversely SEAI was of the opinion that a longer time frame for review was necessary so as to facilitate development in line with the outcomes of the SEA.

Main factors to be considered during planning and consenting of OREI as identified by respondents

Traffic analysis/ Navigational Safety	• Traffic density - smaller vessels that are not required to carry AIS are included through direct consultation with local communities. Local knowledge is invaluable to this process. • The types and speed of vessels in the area • The correct AtoN in the area • Whether service vessels will be required, and at what stage of development • SAR requirements
Existing Human activities	• Military activities • Fishing areas • Natura and protected sites • Shipping routes - is there a TSS in the area? • Sub-sea cables and pipelines • Anchorage points in the proposed development area
Ancillary services	• Connection to grid network • Harbour access
Aesthetic	• Distance from the coast– wind farms should be at least 10km off the coast in France

6   Recommendations

The following recommendations are the result of the interviews conducted with sectoral agencies and authorities who were involved in this case study. The review of pertinent sectoral reports and guidelines in relation to MSP also informed these recommendations. These practice and policy based recommendations are intended for use by marine planners and sectoral agencies in addition to other guidelines to support the implementation of MSP at national level and facilitate transboundary approaches to MSP. The recommendations recognise that Member States are at different stages of MSP development and implementation. Consequently, some of the recommendations are better suited to those starting MSP whilst others are more general and can be applied regardless of the stage of implementation. The recommendations are discussed under themes that relate to the issues identified during the interviews with the sectoral agencies and authorities.

Policy and Practice Based Recommendations	Relevant Actors
General Recommendations for the MSP process	
1. Marine planning authorities should enhance cooperation between national and transnational sectoral agencies such as IALA, IMO, General Light House Authorities	Competent Authorities for MSP
Early engagement and cooperation allows for the creation of synergies/colocation and assists in resolving any opposition/conflicts before the consenting process progresses. It is important that both sectors cooperate on a regular basis and learn from each other in order to be aware of what is required when planning offshore site developments.	
2. The MSP process should be adaptable and flexible enough to inculcate changes in maritime activities and advancements in technology	
Discussion with the sectors shows that maritime activities, trends and technologies are evolving. Planning measures and policies should be adaptive and consider regional and case-based issues such as differences in regional traffic patterns.	
3. Data and information collated and used during the MSP process should be provided in an easily accessible way and format, particularly for national and sectoral agencies working in a transboundary context	
Data and reports from consultation processes should be collated into a central source and publicly available for national and transboundary sectoral agencies. Any data portals utilised should show both new and original data including any additional reports.	
Involvement of sectors in MSP	
4. Member States that are beginning to develop Maritime Spatial Plans should harness the experience of sectoral agencies and build upon this in the implementation of MSP	Competent Authorities & Sectoral Agencies
Agencies which have not yet been heavily involved in MSP, such as Irish Lights and SEAI have previous and relevant experience from MSFD and other sectoral planning and management approaches which could be instructive for MSP. Their institutional	

Policy and Practice Based Recommendations	Relevant Actors
knowledge is also intrinsic to ensuring accurate reflection of sectoral concerns in the Plan produced.	
5. Competent authorities for MSP should consult sectoral agencies early. To simplify the process of consultation, Competent Authorities for MSP should identify existing lines of communication and data exchange between national and transboundary agencies	
Existing cross agency networks and collaboration identified through this case study, such as between the Marine Institute, Irish Lights and SEAI in Ireland, between the MCA and Irish Lights in UK and Ireland respectively and between the MCA and GLAs, should be used more in the future to facilitate the necessary consultations and agreements. It is also important that these agencies and authorities understand what is required of them and their role in the MSP process nationally and in a transboundary context.	National and transboundary agencies

Planning Evidence, AIS Data and MSP	
6. Planning authorities, shipping and navigational safety agencies should be mindful that small vessels do not have AIS or VMS data during traffic analysis and the implications this might have for adequate representation of traffic density in a particular area	
Best practices by the agencies contacted in the case study shows that stakeholder engagement and local knowledge is important to determine vessels routes and to account for vessels not carrying AIS. Radar is also used with AIS to fill the data gaps. **Example:** Consultation carried out by the Commissioners of Irish Lights (Irish Lights) in relation to Stork Rock Beacon highlighted the importance of local knowledge when carrying out navigational risk consultations. While AIS and similar data are an initial data source, local knowledge and the physical counting of vessels in an area are critical for navigational assessments during the pre-planning and development stage of OREIs.	Shipping and navigational safety agencies, Sectoral Agencies & Planning Authorities
7. Planning authorities and sectoral agencies should ensure that mapping and analysis of the marine area and development proposals consider and indicate uses/infrastructure (existing, approved and proposed) within the bounds of their marine area and that of neighbouring countries	
This could help ensure that planning of infrastructure is representative of needs on both sides of a border and shared infrastructure are considered.	

Cross Sectoral Working Groups	
8. Cross Sectoral Working Groups at national level should be encouraged and used as platforms for facilitating transboundary and cross-sectoral engagement for MSP in the Celtic Seas	
Cross sectoral working groups and platforms in the Member States such as Cross-Departmental/Inter Agency MSP Group (Ireland), Maritime Council of Façade (CMF) amongst other inter-sector groups such as the Nautical and Offshore Renewables Energy Liaison (NOREL) Group (UK) can be used in the Member States. These groups should be	Sectoral Agencies

Policy and Practice Based Recommendations	Relevant Actors
used as platforms to engage sectoral agencies and discuss sectoral issues such as mitigating risks and conflicts.	
9. Cross sectoral recommendations from these Working Groups should consider operational transboundary MSP issues	
Discussions and outputs developed by these groups should consider transboundary issues (such as risk from offshore development both within and close to transnational boundaries) and possible synergies with neighbouring countries.	
Navigational Risk from the Development of ORE	
10. MSP and ORE authorities should be aware of the navigational risks and issues from the development of ORE through consultation with the MCA, GLAs and Direction des Affaires Maritimes and jointly discuss policy measures to address them	Planning authorities &
The risks and issues discussed in Chapter 5 are transnational and could occur regardless of the location of an activity. Mitigation of these risks should be achieved through continuous consultation with the relevant authorities.	
11. The AtoN strategy and IALA guidelines on MSP[55] must be applied during the pre-planning and development stage of OREIs to mitigate risks such as choke points and foster cross border coherency	Shipping and Navigational Safety Authorities
Sectoral agencies should be familiar with the guidelines other agencies have in place so as to better understand how they approach MSP. For example the IALA guidelines on MSP can be found at the link below: http://www.iala-aism.org/product/g1121-navigational-safety-within-marine-spatial-planning/	
Co-location within MSP	
12. Member State's sectoral and planning policies should support co-existence and co-location	Planning Authorities and Policy Makers
Existing policies and practices by Member States in the Celtic Seas show that a case-by-case approach to planning, safety zones and mitigation measures are largely applied to enable co-location. Vessels in the UK are allowed to transit OREI sites, all vessels less than 25m are allowed to transit through wind farms in France and OREI test sites in Ireland do not have exclusion zones.	
13. Planning authorities can support co-location by ensuring that planning and design layouts of ORE, especially offshore wind, considers orientation and space to facilitate coexistence with shipping lanes for recreational users, fishing vessels and aquaculture installations	Planning Authorities and Policy Makers
Experience from the UK (MCA) shows that planning wind farms in straight lines (lines of orientation) is the most preferable form and at least a two-line orientation is preferred. Search and Rescue (SAR) is a key issue for wind farm layouts, therefore the marking of such sites is carried out by the relevant GLA as per IALA recommendations with sequential numbering of the turbines.	

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[55] IALA Guideline G1121 – Navigational Safety within Marine Spatial Planning. Edition 1.0 June 2017

7   Conclusion

Although MSP is relatively new, the sectoral and regulatory agencies have experience in other marine and sectoral planning processes which has both relevance and importance to future MSP design, implementation and enforcement. The case study has provided an opportunity for willing regulatory and sectoral agencies to share their experience on MSP, navigation and shipping issues, ORE planning and identify recommendations for ensuring co-existence between these sectors.

Legislation, policies, structures and approaches to ORE planning and MSP are different and this has implications for fostering a more coordinated approach in future. In France, the remit for both ORE and shipping/navigation at the regional level falls under the Préfet Maritime which also co-leads on MSP and might offer a basis for coordination and drawing synergies in planning processes between the two sectors and to ensure navigational safety during the development of ORE.

In the UK, the planning remit for ORE is split between the Crown Estate, Crown Estate Scotland and the various planning authorities. Some of the planning authorities such as the MMO and Marine Scotland are also competent authorities for MSP whilst the MCA is the lead agency for shipping and navigation issues together with the GLAs. However, cross sector groups such as the Nautical and Offshore Renewables Energy Liaison (NOREL) and the Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) are used to coordinate activities and synergies between these two sectors. As MSP has multiple objectives, it will necessitate involvement of multiple stakeholder groups. Mechanisms for formal communication therefore need to be encouraged not only between MSP competent authorities and sectoral groups but also for cross-sectoral engagement which is likely to be the most contentious going forward.

Ireland's ORE policy and planning remit lies with the Department of Communications, Climate Action and Environment (DCCAE) with technical support from SEAI whilst the Department of Housing, Planning and Local Government (DHPLG) is responsible for MSP. Shipping and Navigation remits lies with the Department of Transport, Tourism and Sports (Maritime Safety Directorate) and the Irish Lights. A cross sector working group in this case will be necessary to create synergies and coordination between both sectors and consider possible implications for MSP. This could be achieved through using the Cross Departmental/ Agency Steering Group on MSP and other inter sector groups to discuss operational issues such as navigational risk during ORE development and other transboundary issues. With the different structures and approaches to sectoral planning and MSP in the Member States, it is important that cross sector working groups are used to discuss operational and transboundary marine/ORE planning issues to foster cross border cooperation, as distinct and in addition to what will

be in place at a strategic level. Shipping, on the other hand, is more international and having a harmonised and coordinated approach to safety and marking of offshore wind farms should be ensured by applying international guidelines from IALA. A criteria-based approach to ORE planning seems to be the approach taken by Member States which can foster coexistence between fishing vessels, recreational user, aquaculture installations and ORE.

Planning for ORE in congested sea spaces such as the English Channel presents new challenges on how to prevent the creation of choke points and finding a favourable site for ORE development especially for floating wind farms whilst considering the activities of other users. Early, continuous studies and consultations with the responsible agencies and community have proven to be ways of identifying issues and finding mitigation measures for such situations. MSP offers the opportunity to engage with stakeholders, whilst considering other maritime uses and interests such as shipping and ORE in the allocation of space. MSP policies and engagement approaches should therefore be sufficiently flexible to involve all sectors and stakeholders early, based on their capacities, and consider ways of addressing the needs of new and developing sectors such as ORE.

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Shipping & Navigational Safety – UCC Case Study Questions

Organisation Name:

Contact details:

*Please include as much detail as possible.

1. Please explain the remit of your organisation and the geographical area in which you operate.

2. Describe any involvement you/your organisation has had with MSP to date. Please refer to any preparatory studies and meeting as well as operational projects in your response.

3. Has your organisation already been asked to supply data to anyone for MSP / offshore planning purposes? How do you think your data could be used for MSP and what role do you foresee your organisation having in MSP?

4. Where do you work in a transboundary context (geographically e.g. Ireland and UK cooperation / UK and France cooperation)? Respond with reference to <u>any element</u> of your work.

Consultation and Cooperation

5. What is your organisations procedure for consultations relating to the development of shipping & navigation and offshore renewable energy sites?

6. What government departments and State agencies?

7. What cross border agencies and departments do you consult with (e.g. UK Department of Transport)? And what in what form/mechanism e.g. Fora, MOU, legislation, etc.

Issues/Conflicts

8. Identify the most significant issues/conflicts with co-use of an area (shipping and OREI) - e.g. collision risk, radar interference, deviation from course, creation of choke points.

9. Do you think the above risks will differ for floating wind farms?

10. What are the current solutions to potential issues/conflicts between shipping & navigation and offshore renewable energy site planning? E.g. Consultation procedures, analysis of existing conflicts e.g. conflict mapping.

11. Cooperation between national agencies with remits for offshore renewable energy and shipping & navigation will be important for the enforcement of offshore site plans (e.g. wind farms), are

there any existing mechanisms (legally binding and/or best practice) in place to help assist this 'enforcement'?

12. Do you think there is any legislation mismatch/gaps in relation to shipping & navigational safety existing with offshore renewable energy in the same marine space? Please give examples on a National and transnational level.

13. Environmental impacts of deviating from course to avoid an exclusion zone (e.g. an OREI site). Can ships transect them if a buffer zone is included? Are there insurance issues with this? Does the amount of fuel burned by deviating from course outweigh the benefits of installing a wind farm in the first place?

Data

14. AIS - sharing data with Ireland, the UK and France – are there mechanisms in place? Are these processes/mechanisms legally binding? Do you work with other countries in collecting data? Do you currently work with other countries in collecting data or providing data currently?

15. What is the formal procedure and process for access to AIS in the marine sector? - does this vary according to the type of stakeholder asking for the data e.g. open for regulators, not available to public etc.?

16. VMS data? Should this be included in addition to AIS?

17. The probability or need for a 'Celtic Seas' data portal (with open access AIS information) - could e-navigation see this happen?

18. E - Navigation and MSP – Could this improving coherence and cross-border planning?

19. Identify the most significant issues associated with AIS data e.g. data harmonisation, large volumes of data etc.

20. Do you have any recommendations on establishing unified and harmonized processed data for the Celtic Seas?

21. How often do you think marine plans should be updated?

22. What are the predicted solutions to current issues that (what do you believe MSP could help resolve) (from the shipping and navigation sector's point of view)?

23. Are there any other agencies you feel we should be contacting?

24. Do you have anything else to add or any information you feel should be represented in this case study?

Annex 2

Offshore Renewable Energy – UCC Case Study Questions

Organisation:

Contact details:

*Please add as much information as possible

1. Please explain the remit of your organisation?

2. Where do you work in a transboundary context (geographical locations e.g. France and Ireland, France and UK)? Respond with reference to <u>any element</u> of your work.

3. Describe any involvement you/your organisation has had with MSP or MSP related activities to date. Please refer to any preparatory studies, operational projects, consultations etc.

4. Has your organisation already been asked to supply data to anyone for MSP / planning purposes? How do you think your data could be used for MSP and what role do you foresee your organisation having in MSP?

Consultation/Cooperation

5. Please describe your organisations procedure for consultations relating to the development of offshore renewable energy sites/plans?

6. Have you had previous experience with planning an offshore renewable energy site that spans 2 jurisdictions or extremely close to a maritime border?

7. What agencies (national and cross border) do you consult during the planning of an offshore renewable energy site and/or strategy planning for offshore renewable energy? Is this done on a best practice basis or legally binding?

8. Are there any mismatches in terms of the consultation procedures for offshore renewable energy sites and shipping & navigation (e.g. timing issues, lack of preplanning)?

9. Cooperation between national agencies with remits for offshore renewable energy and shipping & navigation will be important for the enforcement of offshore site plans, are there any existing mechanisms (legally binding and/or best practice) in place to help assist this 'enforcement'?

10. Are there any interstate cooperation mechanisms between the MS in the Celtic Seas on Offshore Renewable Energy? Could be in the form of agreements (e.g. for offshore grid), leasing rights, MOU and forums for Offshore Renewable Energy?

Issues/Conflict

11. Identify the most significant issues/conflicts with co-use of an area (shipping and OREI) - e.g. collision risk, creation of choke points, deviation from course, radar interference etc.

12. What synergies do you think could exist between ORE and shipping?

13. Do you think the above risks will differ for floating wind farms?

14. Do you think there is any legislation mismatch/gaps in relation to offshore renewable energy and shipping & navigational safety existing within the same marine space? Please give examples on a National and transnational level.

15. What are the current solutions to potential issues/conflicts between offshore renewable energy site planning and shipping & navigation? E.g. Consultation procedures, analysis of existing conflicts e.g. conflict mapping.

16. Environmental and economic impacts of deviating from course to avoid an exclusion zone (e.g. an OREI site). Can ships transect them if a buffer zone is included? Are there insurance issues with this? What is the recommended corridor width? Does this differ from IMO recommendations?

Data

17. Do you use AIS data when planning offshore renewable energy sites? Is there data sharing mechanisms in place between your organisation, developers and state agencies? Do you use VMS data?

18. Are the data collected by the individual developers or state agency?

19. Would a 'Celtic Sea Server' help the planning process (e.g. a portal where all relevant information such as consultation documents, open access data (AIS, VMS) etc. can be found?

20. Do you have any recommendations on establishing unified and harmonized processed data for the Celtic Seas?

21. What are the predicted solutions to current issues that you encounter (what do you believe MSP could help resolve) (from the offshore renewable energy sector's point of view)?

22. How often do you think marine plans should be updated?

23. Are there any other agencies you feel we should be contacting?

24. Do you have anything else to add or any information you feel should be represented in this case study?