Chapter 7

Consenting ocean energy projects

Issues, challenges and opportunities

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1 Introduction

Most jurisdictions have not yet implemented specific consenting processes for O, and instead rely on a patchwork of existing instruments to consent various aspects of OE projects. The inefficient and ad hoc consenting frameworks that result have been consistently recognised as a major barrier to the progress of OE. Policymakers are, however, beginning to modernise regulatory frameworks in order to better facilitate and manage OE projects. In particular, some jurisdictions have started streamlining their regulatory frameworks, for example through the establishment of a one-stop shop (OSS) for consenting[1] and the development of targeted legislation and regulatory processes.

In this chapter, we first highlight the various key elements of consenting processes for OE projects before discussing in more detail the issues and challenges that unreformed consenting processes present. In Sections 4 and 5, we consider the opportunities and options for improving consenting processes. Section 6 presents a more detailed case study of the UK, a jurisdiction that has made considerable efforts to reform its regulatory framework to better support the sustainable development of OE projects (the following chapter provides shorter summaries of consenting processes in selected other jurisdictions). Finally, in Section 7 we offer some closing remarks.

2 Elements of consenting for ocean energy projects

A range of issues may be relevant in the permitting process. These include environmental impact assessment (EIA) and strategic environmental assessment (SEA); the rules regarding the use of ocean space, including compliance with any marine (MSP) processes; mediation of conflicts of interest, such as with fishers and surfers; and competing uses, like fossil fuel extraction. There are also likely to be rules regarding the extraction of energy itself or the extraction of water, requirements regarding construction, deployment and decommissioning, and established frameworks for the onshore components.

2.1 Occupation of marine space

OE developers will require sea space in order to develop projects and will need to obtain some form of rights for exclusive occupation as the basis for securely occupying the marine space, using the marine resources, and deploying OE devices. This may be in the form of exclusive rights over both the resources and the physical marine space in which those resources are contained.[2] Even if such rights are not explicitly sought, the needs and modalities of many OE technologies will nonetheless exclude other users, establishing a rights-like occupation of the marine space.[3] The OE industry therefore has the potential to present a major challenge to traditional conceptions of rights and "may play an important role in the redistribution of ownership rights in the marine environment" (see Chapter 7).[4] Furthermore, the physical space available for the deployment of OE devices is limited, with interest in developing projects coalescing on discrete areas of high suitability. This convergence of new industrial occupation and competition requires governments and policymakers to take difficult decisions regarding the allocation of rights to marine space and resources.

2.2 Exploitation of marine resources

As the oceans become increasingly industrialised, it is likely that there will be a concomitant increase in competition for access to resources. OE is particularly susceptible to such competition as the most viable resources are concentrated in specific locations. Consenting regimes will be at the front line in addressing a range of questions relating to resource management. Who has rights to access and use the resource? How are such rights determined? Who is in charge of making such decisions? Who is granted access to the resource and under what conditions? These questions are not abstractions but important issues that will affect the development of the OE industry, its impact on other marine users, and the value ultimately delivered to the public and to the environment.

2.3 Environmental impacts

Consenting processes are inextricably linked with environmental regulations. Almost all countries have EIA regulations in place, and the EIA process is often linked to consenting, either by being a precondition to or by being part of an integrated regulatory process. In EU countries, for example, there are a number of overarching legal instruments that implicate environmental considerations in consenting, such as the Habitats Directive,[5] the EIA Directives[6] and Strategic Environmental Assessment (SEA) Directive, the latter being relevant to public plans and programmes that cover the energy as well as other sectors.[7]

2.4 Terrestrial planning

While OE is a marine technology, devices will require auxiliary infrastructure on land. Cables and pipelines will make landfall on the coast, whilst substations and

supporting infrastructure are necessary to transport the energy generated. This presents a challenge for consenting systems, which generally deal with terrestrial and marine activities on a separate basis according to separate legal frameworks and norms. Efficient and effective consenting regimes for projects that cross the land-sea divide will need to consider how the two separate systems might be integrated.

2.4.1 Electrical connection

OE requires infrastructure to connect projects to the electricity network. At the project level, grid connections tend to be governed by distinct legal and administrative processes and obtained from the national energy ministry or agency under an electricity act or equivalent. In practice, a range of other conditions must be complied with (including planning permission, EIA, a connection offer from the relevant operator and a power purchase agreement (PPA)[8] before consent to construct or generate electricity can be acquired. In addition, separate permissions are often required to lay cables. Beyond site-level considerations, the provision of electricity infrastructure presents strategic challenges in general,[9] and there is, therefore, a need to strategically consider long-term grid infrastructure needs and planning along with site-level connections during project development and consenting.

The variety of permits, licenses and permissions involved in consenting the electrical elements of a project are complex, time-consuming and often difficult to integrate into a single project license. Only a handful of jurisdictions operate a single permit system for all renewable energy projects.[10] This issue has been repeatedly raised in the EU, where the Directive on Renewable Energy requires streamlining of these processes.[11]

2.4.2 Insurance and liability

There are important practical questions regarding insurance and liability, which are increasingly relevant as projects develop. Indeed, as early as 1976, commentators expressed concern over the "thorny question of who bears the burden of responsibility for damage to or by [OE] devices".[12] The unfortunate case of Australian device developer Oceanlinx highlights these issues. Its flagship device sunk during transportation, resulting in a lengthy insurance dispute,[13] the company went into receivership, leaving it unclear who would take responsibility for the decommissioning of a second device that had been abandoned some four years earlier.[14]

2.4.3 Decommissioning

An improperly decommissioned device can become a significant environmental burden, and the failure to decommission in itself may be considered dumping.[15] The UN Convention on the Law of the Sea (UNCLOS) requires that

any installations or structures that are abandoned or disused must be removed to ensure safety of navigation, taking into account any relevant international standards and with due regard to fishing activities, protection of the marine environment and the rights and duties of other states.[16] According to the relevant International Maritime Organization (IMO) Guidelines and Standards,[17] any installations or structures that are abandoned or disused in the exclusive economic zone (EEZ) must be removed to ensure safety of navigation in accordance with any accepted international standards,[18] except where non-removal or partial removal is consistent with the IMO Guidelines and Standards. Decisions should be made on the basis of a case-by-case evaluation, taking into account the following matters: potential effect on safety of navigation or other uses; deterioration of material and future effects; potential effect on the marine environment including living resources;[19] risk of shift from position; costs, technical feasibility and risk of injury to personnel; and determination of new use or other reasonable justification.[20] A coastal state may decide that the installation or structure does not need to be removed or that a decommissioned device can remain in situ if it would serve a new use such as an enhancement of a living resource.[21]

2.4.4 Health and safety

There are legal considerations surrounding health and safety regarding any industrial development, though such considerations are particularly pronounced in the offshore environment, which presents a range of potential risks to those tasked with working on marine projects. A range of international legal instruments contain specific provisions on various aspects of health and safety.[22] The provisions of these conventions are transposed into national legislation, and this will specify the responsible authority and necessary requirements and permits. Coastal states may have supplementary health and safety legislation seeking to address common activities and hazards, but in most cases this has not specifically been designed with the offshore environment or OE development in mind. To date the approach to health and safety for OE projects has been to extend the provisions of existing legislation, although some jurisdictions are adopting voluntary codes of conduct in an effort to ensure that OE is subject to the same or similar practices as land-based workplaces.[23]

2.4.5 Navigation

Responsibility for navigational safety in the marine environment rests with the IMO and national governments. A navigational impact assessment is usually conducted as part of project planning or for EIA purposes. This identifies where problems may arise as well as determining appropriate mitigation measures, such as marking the site with navigation aids.[24]

In the territorial sea, UNCLOS provides that coastal states have a right to adopt laws and regulations for the safety of navigation and, in particular, may

adopt sea lanes, routeing systems and traffic separation schemes in order to ensure the safety of vessels and avoid collision.[25] As OE installations become more prevalent, it is likely that they will be increasingly sited within or near existing shipping lanes. The UK's Wave Hub,[26] for example, is situated close to a busy shipping area. During development of that project, radar and automatic identification system (AIS) surveys were carried out to better understand the shipping routes used in the area,[27] and the UK Government, in conjunction with the IMO, extended an existing Traffic Separation Scheme to ensure that traffic is kept away from the area.[28]

Coastal states also have the discretion to establish reasonable safety zones around structures and installations and to adopt appropriate measures therein in the interests of safety both of navigation and of the structures themselves. The IMO recommends that governments consider the establishment of such safety zones around offshore installations, as well as the establishment and charting of fairways or routeing systems through exploration areas.[29] OE devices are generally less visible than offshore wind turbines and will have mooring cables and anchor points that will need to be reflected in the dimensions of any operational safety zone.

3 Issues, challenges and opportunities

In most jurisdictions, the regulatory framework for OE projects is based on a range of legal instruments that are not tailored to the marine environment or to OE. The default position in most jurisdictions is therefore that the "legal planning framework has not been fully developed yet, forcing the authorities to create such a legal framework during the development of the project".[30] The result is that consenting frameworks are often a patchwork of procedures and permits (see Chapter 9) and are "the major threat to efficient implementation of this renewable energy source".[31]

In some jurisdictions, authorities have begun to mould this array of instruments into a more rational and consistent framework for consenting OE projects, while the most advanced have begun to more fully reform consenting frameworks with the marine or OE projects in mind. Nonetheless, considerable regulatory uncertainty remains in many jurisdictions, and consenting processes are generally poor because:[32]

- Regulators frequently rely on ad hoc consenting processes that are liable to change from one project to the next;
- Information regarding the relevant process is often difficult to obtain;
- There is often no clearly identifiable licensing authority;
- Statutorily defined timelines (whereby a regulatory authority must make its decision and communicate it to a developer within a specific time) are uncommon;
- Regulators often lack the requisite knowledge regarding the technology or legal context;

- The process can be unduly onerous; and
- Small-scale test deployments often face the full gamut of existing regulatory processes.[33]

Such permitting processes are not fit for purpose and give proponents little continuity or certainty. In many cases, the permitting process for a project, particularly one at large- or commercial-scale, can take several years, causing substantial delay and producing an undesirable level of uncertainty relative to the large level of investment required.[34]

From a regulator's perspective, burdensome and complex administrative procedures can prevent translation of high-level policy measures, such as government commitments to renewable energy deployment, into concrete action, such as assisting developers get approvals. Regulators are generally risk averse and are unlikely to assume responsibility for permitting projects they perceive as risky or to give priority to new technologies.[35]

In addition, different legal frameworks exist within individual countries at the regional or local level, e.g. in the UK, while consenting and planning rules vary significantly across jurisdictions, such as within the EU. Even once appropriate regulations have been developed, a lack of harmonisation among different jurisdictions, whether intra- or interstate or international, could hinder development of the industry.

3.1 Legal basis

While the UNCLOS provides a solid legal foundation for states to exploit OE resources within their national jurisdiction,[36] a large number of existing domestic legal instruments have the potential to impact the development of OE. As OE incorporates a range of regulated activities covered by differing pieces of legislation and administrative authorities, it is somewhat inevitable that the consenting system is convoluted and ad hoc in many places. The assortment of consents, licenses, leases, permits, authorisations and permissions involved in consenting are complex and time-consuming individually and consequently are often difficult to integrate into a single project license.

In the absence of specific legislation designed to rationalise the system and provide an institution with an appropriate mandate, there is unlikely to be an appropriate legal basis for an existing institution or agency to undertake this task. Evidence from jurisdictions that are making progress in streamlining consenting processes suggests that this can be challenging, often requiring substantial legal amendment as well as high levels of investment and political commitment,[37] which can sometimes be scarce for new and developing sectors. The implementation of a so-called one-stop shop for consenting has emerged as the front-runner response to these issues and is discussed in more detail later in the chapter. The OSS approach is generally viewed favourably by developers, but, depending on

the model adopted, they can also have significant resource implications and may require formal legal amendments.

In the EU context, the Renewable Energy Directive explicitly provides that "administrative procedures are streamlined and expedited at the appropriate administrative level" and that such procedures be "clearly coordinated and defined, with transparent timetables for determining planning and building applications".[38] The Directive also envisages the application of "simplified and less burdensome authorisation procedures" to smaller projects and for decentralised devices producing renewable energy.[39] In theory, this should provide a legal basis for Member States and competent national authorities to develop more appropriate regulation, but progress has been slow. A majority of Member States recognise the need for more improvements in their respective administrative systems as they apply to renewable energy,[40] but to date only Denmark, Italy and the Netherlands have a single permit system for all renewable energy projects.[41]

Overall, the legal basis for consenting of OE is well established, but the procedures involved in its administration remain multifaceted and difficult. This could change as the number of operational OE deployments increase and problematic issues become increasingly apparent. Whilst progress has been made in some domestic legal systems, an interconnected and consistent framework is an aspiration for many countries and developers alike.

3.2 Environmental impacts and assessment

EIA has become almost a prerequisite for consent in most countries. The integrity and protection of the marine environment is of paramount concern to competent authorities that sanction development in that area and can also trigger very strong legal obligations. While there is concern that regulatory and governance processes will be relaxed so as to pursue and achieve a reduction in greenhouse gases, thereby causing "paradoxical harm" to local ecosystems,[42] OE can also result in positive environmental effects.

EIA is a site-specific assessment, so the parameters to be measured and included with the EIA itself are heavily influenced by the proposed location of the project. This is potentially problematic as there is little or no consistency in the methodologies applied to the study of specific parameters or questions posed in relation to them. This, in turn, limits the ability to draw inferences, identify trends and increase knowledge on the environmental effects of device deployments as different methodologies may produce different results and hinder comparison.[43] The ability of scientists to compare data and results across deployment sites is one way in which knowledge and expertise can be increased, hence advancing learning about these new technologies.

Environmental monitoring at test centres has increased data and information on the environmental effects of devices. This, coupled with international efforts to disseminate information on environmental effects,[44] is continuously

adding evidence and generating knowledge; however, fundamental environmental research questions for wave and tidal energy remain. These are difficult to address at site level by developers and will require more concerted national and regional action, particularly in relation to migratory marine species, for example.

In the EU, an amended EIA Directive[45] aims to address the identified shortcomings in the EIA process, to reflect changing environmental and socio-economic priorities and challenges, and to align the EIA Directive and process with the principles of smart regulation. One of the changes that could impact consenting of OE projects is the provision enabling coordinated and/or joint procedures where a number of assessments have to be completed (i.e. EIA and "Appropriate Assessment" under the Birds and Habitats Directives). The effect of this is that a single assessment will be possible once the amended Directive applies. A revised screening procedure is introduced where Member States can set thresholds or criteria to decide when a project does not need to be screened or subject to an EIA. If a competent authority decides that an EIA is not needed, it must make this decision available to the public, along with the reasons why it is not required, as well as mitigation measures proposed by the developer to avoid or prevent significant adverse effects on the environment. The competent authority in the Member State is required to make its determination (on screening) within 90 days from the date on which the developer submitted the required information.[46] In an effort to ensure the quality and completeness of submitted EIAs, the developer must ensure that the EIA report is prepared by "competent experts", and the competent authority must ensure it has, or has access as necessary to, "sufficient expertise" to examine the EIA report.[47]

In terms of strategic environmental assessment (SEA), there appears to be limited application of SEA to OE development (see Chapter 10 for further discussion). This is a missed opportunity, as the documentation compiled for the SEA can become the first source of environmental information that developers consult during site selection and project planning stages. SEA can therefore inform site selection through the provision of relevant information, constraints mapping and the identification of low-sensitivity sites.

3.3. Public consultation and acceptance

Public acceptance is becoming more and more influential in the outcomes of decisions relating to the various consents needed to operate a marine or OE project. This has been colloquially termed a 'social license to operate'. Responsibility for engaging with the public and communities potentially impacted by a proposed development primarily falls to the developer or project proponent. Acceptance is neither automatic nor unconditional, and significant effort on how best to engage the public and allay any concerns they might have is required. Habitually, in past projects, the involvement of the public was almost entirely limited to the consultation phase of the EIA process or at the behest of the individual site developer if a specific issue arose. This routinely resulted in stakeholders

expressing frustration with how they were involved in project planning, either by being consulted too late in the process or having limited influence on the decision made. A social license to operate is based on a multitude of principles including legitimacy, credibility and trust, which take time to foster and cannot be neatly slotted into a time-bound consenting process. A concerted effort to promote and understand OE technologies and their associated infrastructural requirements could help mitigate objection, thereby increasing the likelihood of social acceptance.

Generally marine renewable energy is viewed positively, but often there is a lack of familiarity and understanding of wave and tidal energy technologies in particular at local level given there have been relatively few deployments to date.[48]

There are also deeper questions in this context that go to the core of rights and ownership issues. Governments or their agencies are responsible for decision making in the marine space. Some domestic legal instruments provide that such decisions must be made in the public interest or for the common good, but it is not always acceptable that governments decide on the use or activity that can take place in what is considered by many to be a common resource. Through the implementation of MSP, questions regarding the allocation of marine space and its resources are likely to become more prominent, and, depending on the approach taken to MSP at the country level, plans developed at the regional or local level could be more reflective of the needs and desires of the public in that area for their adjoining marine space, including any future activities that might occur therein.

3.4 Marine spatial planning and new management approaches

The full implementation of MSP could provide an opportunity to improve consenting for many marine developments, including OE, through increasing transparency and providing greater certainty for both developers and their investors. MSP seeks to reflect environmental, social and economic interests in an inclusive way. As such, it has the potential to balance precaution and risk so as to provide flexibility but within a framework that is predicable, consistent and transparent to those involved.

The adaptive nature of the MSP process can react to changing circumstances, which is important for developing industrial sectors such as OE. It could promote coherence between terrestrial planning systems and those that operate in the marine, but this very much depends on how it will be implemented and enforced in each country. It is not yet clear how different competing activities will be accommodated in MSP or how decisions on 'trade-offs' will be made. Coexistence may be advocated as a preferred option, but this is not always technically or legally possible. Realities of health and safety concerns, insurance and liability could stymie coexistence before it even happens.

Apart from Scotland and, to a limited extent, maritime spatial plans applicable to certain waters around specific US states, many existing maritime spatial plans include only existing uses with little or no consideration or inclusion of new or innovative marine activities that could occur in future (see Chapter 6 for further discussion). As a relatively new approach to planning marine activities, it is vital that MSP and plans developed as part of that process promote the coexistence of relevant activities and uses and engage everyone in the process.

4 Options for reforming ocean energy consenting processes

Though poor regulatory frameworks for OE are common, they are nonetheless evolving in some jurisdictions. Offshore wind has triggered the formation of a more appropriate consenting system in many countries. To harness the available OE resource, investors and project developers look towards countries with low levels of 'regulatory risk', namely those with a stable, transparent and predictable regulatory system. This suggests that governments and their agencies need to be more proactive in how they deal with OE proposals. Consenting processes must aim to be both principled and practical, ensuring:

- **Economic efficiency.** As the rights being allocated are for the exploitation of a finite[49] and valuable resource, they should be allocated in a manner that ensures that the resource will be sustainably developed in a manner that maximises public benefit. This may involve a competitive allocation process (see later in the chapter).
- **Equity.** Ensuring that the resource is allocated equitably amongst legitimate proponents.
- **Sustainability.** It is crucial that regulatory processes ensure sustainable deployment of OE devices.
- **Financial return.** Where government opts to permit a private use of a shared/common marine space, it should ensure an appropriate level of financial return.
- **A simple and user-friendly consenting process.** The process should not add regulatory burden and risk and therefore time and cost to an OE project should be provided.

In addition to these points of principle, several important questions should be considered in the course of reforming OE consenting processes:[50]

1 How best to modify consenting processes so that they reflect the scale of development and the level of risk posed, in particular by imposing more permissive procedures for small-scale, time-limited deployments in areas of low environmental sensitivity.

2 How to facilitate the transition towards integration of the various competent regulatory bodies in consenting processes. In particular, whether it may be possible to extend the OSS approach further to also integrate grid connection, electricity licensing requirements and other incidental approvals. In this regard, it is important to facilitate and improve communication among regulatory bodies and to clarify their respective responsibilities regarding enforcement conditions.
3 Development of simple alternatives to OSS systems for jurisdictions where political will is insufficient to allow for more wide-ranging reforms.
4 Development and mainstreaming of effective consultation/participation processes in the marine context.
5 There are also deeper questions that go to the heart of the rights and ownership issues discussed in Chapter 7. Should decisions regarding marine resource allocation and OE development consents be made at a more local or regional level rather than at a national level? Where does the balance of power currently lie with regard to taking such decisions, and where should it lie?

In most jurisdictions, the processes for allocating site tenure and the processes for consenting a project are separate and involve different considerations. Allocation of tenure provides security that a project can use the desired resource (and therefore provides investment security for proponents and investment), while the relevant consenting processes and regulatory approvals determine whether a project can proceed in that location in accordance with existing environmental and other laws. We therefore discuss these two issues separately, though ideally the two aspects would be dealt with in an integrated manner in any eventual regulatory mechanism.

4.1 Allocation of site tenure

Several possible mechanisms or combination of mechanisms can be used to make decisions in relation to tenure allocation:

- **Developer-led permitting.** A first come/first served approach whereby developers apply for permits as and when they require them. Each project then proceeds through the relevant consenting processes in the order of application. This approach is the default position in jurisdictions that have not developed specific permitting processes for OE projects or other marine activities.
- **Qualitative assessment.** Allocation of tenure and approvals are based on a qualitative assessment of the proposals received. This will require the regulator to conduct a detailed assessment and comparison of the expected performance of a number of projects and allocating tenure on the basis of which project best fulfils set criteria.

- **Competitive processes.** Ranges from simple tenders to more sophisticated processes, such as online auctions and leasing rounds. Selection occurs with reference to bids that are assessed against key criteria (both qualitative, as previously discussed, and quantitative).

Developer-led permitting is perhaps the most problematic model. Such a process risks allocating development rights too early, shutting out project proponents that may be more suited to developing the resource but not yet in a position to make an application. Early movers may gain rights over the best sites, but the number of potentially interested proponents may be too small to enable efficient and effective competition. Developer-led permitting is not well suited to maximising the policy objectives previously identified: it is unlikely to be economically efficient as it provides no basis for assessing the strength of particular projects; it is unlikely to be equitable or provide a good financial return as it could be open to exploitation or could favour poorly prepared proposals; and while the environmental impact of these proposals would be covered by EIA legislation, projects put forward by well prepared and experienced proponents will likely be better optimised for positive environmental outcomes. Despite the inadequacies of this form of permitting, the model persists in jurisdictions where legal reform has not yet been forthcoming.

Qualitative assessment will place a greater burden on regulators, as an informed decision requires understanding and assessment of a range of factors, but the additional layer of assessment will better ensure that projects that proceed to the consenting phase are strategically selected to result in the best outcomes. This assessment could still take place on a first come/first served basis, or a window for applications could be opened to ensure a range of applications.

A competitive process seems most likely to provide a solid structure for the approvals process that can ensure that a range of suitable proposals are considered and that the principles previously mentioned are reflected. Nonetheless, there are also risks with a competitive process. Competition usually relies on having a sufficient number of well prepared competitors. In a fledgling sector such as OE, the competitive process may result in unrealistic or untested proposals. In addition, it may generate competitive sentiment between developers where it may be advantageous for them to work together to overcome common hurdles and develop a strong foundation for the sector, before they begin to compete for preferred sites.

Finally, there is the overarching issue of timing of tenure allocation, that is at what point should the tenure be awarded, relative to the other elements of the regulatory process, such as EIA and planning consents. In all jurisdictions, a range of legislative requirements are associated with an OE proposal. An important consideration is how to ensure that the tenure allocation process is structured and timed so as to create a logical regulatory sequence between allocation of tenure and regulatory approvals.

The basic choice is whether allocation of the rights to occupy the marine space should be allocated prior to the completion of all legislative requirements

or afterwards. If tenure is allocated before all legislative requirements have been met, security of tenure will exist, but there is no guarantee that the project will meet all legislative requirements. This would leave the lease stranded. If tenure is only allocated after all legislative requirements are met, money and time may be spent obtaining the legislative requirements only for the preferred site to no longer be available, particularly as the industry grows and if there is no other undertaking or guarantee from government to reserve the preferred sites. This may also cause a 'lockout' effect: if a large number of developers apply for tenure options but do not make use of them immediately, this precludes the area from being used at all, potentially resulting in a large number of potential sites being effectively closed to other proponents.

4.2 Consenting processes

The main response to the problems with poor consenting processes has been to create an OSS for permitting applications. This essentially means concentrating the process in one regulatory body or authority. This authority can then liaise with the developer and work with the other relevant government departments and authorities to obtain the necessary consents. In this way, the developer has to face only one body rather than many, while the various licensing processes can be consolidated, coordinated and streamlined. In theory, this can reduce the burden on applicants by providing a single point of contact for developers, reducing the pressures on the licensing process by providing a more efficient use of available regulatory and human resources, enabling coordinated consultation with interested parties, and allowing for a more holistic assessment of projects.

The OSS approach has garnered much praise from developers and proponents of the OE industry.[51] The OSS idea has a history of being a preferred reform for developing offshore energy industries (having been implemented in the United States as part of early OTEC (ocean thermal energy conversion) efforts[52] and in relation to wind energy)[53] and is generally seen in a favourable light by developers.[54]

The development of a successful OSS takes political will. This is needed not only to ensure that the OSS is amply resourced but also to dismantle existing regulatory structures and overcome resistance from existing regulatory bodies that may perceive this streamlining as an unwelcome "centralisation and de-democratisation of decision-making".[55] The success or failure of an OSS and of OE policy in general is likely to turn on how highly OE is prioritised by government. In addition, despite the prevalence of discussion of OSS in the literature, recent research suggests that the actual level of implementation and likely benefits may have been overstated.[56] The implementation of the OSS approach might merely shift the burden from developers to administrators, thus resulting in the need for extra resources.[57] This suggests that any effort to implement OSS must be based on strong political will, adequate financing and support, and cooperation and collaboration among all parties.

There are also possible alternatives to the OSS approach. One option is to develop parallel consenting procedures that enable different issues to be evaluated simultaneously by existing regulators and expert groups. The coordination of such parallel processes in the absence of an OSS clearly creates additional administrative demands but may prove an attractive alternative for countries facing constraints in developing a single licensing authority.[58] A further alternative is the lead agency approach,[59] which could be regarded as a weak OSS approach. This is where an existing agency takes on the responsibility for coordination of parallel consenting procedures. The identification of a lead agency therefore eliminates the burden of dealing individually with a number of bodies in much the same way as an OSS; however, the lead agency will not be invested with additional powers or authority in the way that an OSS would be. The lead agency will also retain its existing statutory mandate, roles and functions, which will mean that it will not align as closely to the OE industry (or other relevant industries) as an OSS. Nonetheless, this approach could be effective where there is insufficient momentum for a devoted OSS or where there are state/federal issues.[60] Finally, an unexplored option, as yet, would be to establish an inter-agency task force or commission, whose members would be representatives of all potentially involved regulatory bodies. This could be used as a process for granting approvals in its own right or as a model for consultation and coordination among departments that could feed into departmental decision making.

5 Case study: the UK

In this section, we discuss the efforts made by the UK, in particular England and Scotland, to reform its consenting processes for OE projects.

5.1 Seabed tenure

The Crown Estate (TCE) manages the UK seabed and is responsible for allocating seabed tenure for OE projects in the UK (out to the 12-nm territorial sea limit). TCE is a statutory body tasked by Parliament with achieving particular goals in line with the principles for good consenting previously discussed,[61] and it has made an express commitment to work with all stakeholders to develop the OE industry. TCE has already provided leases for test and demonstration facilities,[62] as well as for other test and demonstration projects, and has held two commercial leasing rounds.[63] Its efforts to provide for OE are therefore not a reluctant regulatory response to an emerging problem, but a concerted effort to assist the industry and lead a balanced process to allocate resources.[64]

5.1.1 Pentland Firth and Orkney waters leasing round

The Pentland Firth and Orkney waters (PFOW) area was the first in the UK to be opened up for commercial-scale development of OE projects. This entailed a competitive leasing round for demonstration- and commercial-scale project sites,

which received considerable interest from industry. TCE announced plans to hold a leasing competition in September 2008. Initial proposals for projects were invited from developers in November 2008, with an initial nominal target capacity of a total of 700 MW. Thirty-eight pre-qualified proponents were invited to apply for leases: 20 bidders applied with a total of 42 applications. These ranged from small development companies to multinational energy companies, with projects from 10-MW demonstration schemes to hundreds of megawatts.

TCE's process has been broadly successful in that it has attracted a range of developers to apply for leases. Pre-approval of bidders ensured that proposals were not received from ill prepared companies, and the process appears to have been a truly competitive one, thereby maximising adherence to the principles previously discussed. As the first process of its kind, it was always expected that it would generate institutional learning, which could be applied in future processes and other jurisdictions. Indeed, a number of important lessons can be learned.

While a competitive approach may work well for an established industry, it may have been disadvantageous in the present context for four reasons. Firstly, TCE's process appears to have limited site availability because, during the leasing process, TCE was not open to other applications. This led to the assertion that the process "seems too rigid to accommodate the fast moving nature of the growing marine energy industry" and that a number of developers who were developing projects outside of TCE's leasing rounds were disadvantaged by TCE's restriction on sites.[65] Likewise, another commentator said that TCE's approach should be one of "keeping constraints to a minimum and providing as much flexibility for deployment as possible".[66]

Secondly, TCE's process appears to have forced developers to compete at a time when they would have benefited more from cooperation. As one developer noted, "[A]t this early stage, collaboration may be more appropriate if we are to overcome the substantial common hurdles and risks".[67]

Thirdly, in aiming to kick-start commercial-scale development, TCE may have inadvertently "shut out" the demonstration-scale proposals that remain crucial to the industry's overall development. TCE developed its process in the context of offshore wind; however, OE is at a much earlier developmental phase, which means that a full-scale commercial leasing round may not have been the most effective option. The process also assumed that wave and tidal energy were at the same level of maturity – a view that is not shared across the sector. An OE project proponent must have a lease granted by TCE to commence a project, and there are two ways to obtain this: either apply for a demonstrator lease (at 10 MW or 20 devices) or bid in the competitive leasing process previously discussed. However, once an area is under competitive tender, TCE is unlikely to approve any demonstration leases within this area,[68] thereby effectively excluding demonstration projects from some of the best resources. This issue could easily be fixed by zoning an area for demonstration deployments within the larger leasing area.

The leasing process also highlighted the need for collaboration and cooperation between different bodies, particularly as MSP becomes more widespread.[69] A potential tension exists between MSP, leasing and consenting that must be

managed. In the case of the PFOW leasing round, the TCE process proceeded in advance of MSP, and the local population were not included in the decision to move ahead with this. Ultimately, there was a strong public backlash against TCE process, which was perceived as giving a green light to projects and drawing lines on maps akin to zoning, before any consultation or EIA processes had taken place.

The British Wind Energy Association & Scottish Renewables note that uncertainty about future leasing rounds created difficulty for business planning, and asserted that:

> there is strong support within our wave and tidal membership for further leasing rounds to be open on a rolling basis, following SEA completion and market support, and for these to be set out in a planned programme so that industry can plan ahead.[70]

These difficulties could be described as inevitable teething problems, though at their root is the broader question of how a body like TCE can best balance the need to ensure that a sustainable industry emerges in the long term, while also meeting the shorter-term requirements of innovative developers keen to deploy their devices.

5.2 Permitting process

5.2.1 England

The Marine and Coastal Access Act 2009 (MCAA)[71] reformed marine licensing in England by consolidating and replacing some previous statutory controls. The Act provided for the creation of the Marine Management Organisation (MMO), now responsible for most marine licensing in English inshore and offshore waters and for Welsh (and Northern Ireland) offshore waters.[72] A marine license granted by the MMO is required for many activities involving a deposit or removal of a substance or object from the sea or a tidal river[73] and therefore incorporates OE projects.

There are two separate regimes for projects in English waters: one for renewable energy projects over 100-MW capacity, processed by the Planning Inspectorate,[74] and one for projects under 100-MW capacity, which are the responsibility of the MMO. However, while the MMO licenses marine elements of a project, other components of the project are licensed under different regulations, including:

- Section 36 consent (required under the Electricity Act 1989) to build and operate an energy generation site;
- Safety zone consent (required under Section 95 of the Energy Act 2004);
- European Protected Species license;

- The Department of Energy and Climate Change, responsible for project decommissioning under the Energy Act 2004; and
- The local Planning Authority, responsible for onshore planning.

5.2.2 Scotland

Consenting procedures for OE in Scotland are broadly similar to those of England and Wales but involve a distinct administrative system. Under the Marine (Scotland) Act 2010,[75] the Scottish Government, through Marine Scotland, is responsible for the new marine licensing system for activities carried out in the Scottish waters out to 12 nm.[76] Proponents will still require a Section 36 license under the Electricity Act, a European Protected Species license,[77] and decommissioning approval, each issued by separate bodies. Consent under the Town and Country Planning Act 1990 is also required.[78]

It is intended that the new system will enable consistent decision making about what activities are allowed to take place at sea. Through the process of marine licensing and the conditions placed on licenses, economically and socially beneficial activities are promoted while minimising adverse effects on the environment, human health and users of the sea.

In contrast with other parts of the UK, however, Marine Scotland has adopted an OSS system to provide a single contact for advice, enquiries and applications to simplify consenting and reduce the burden on applicants, regulators and other parties. The system is also intended to facilitate coordinated consultation with nature conservation bodies and other parties so as to promote interaction and more holistic assessment of proposed projects. Marine Scotland in its role as regulator is also tasked with ensuring compliance with the conditions of Section 36 license under the Electricity Act and the marine license.

5.2.3 A preliminary assessment

The consenting system in England continues to involve a number of authorities granting different licenses, and the resulting sequential process can still be fairly arduous for project proponents.[79] The MMO and TCE have agreed on a Memorandum of Understanding, which may in time lead to a more coordinated approach. In addition, the Senior Licensing Manager of the MMO has suggested some ways in which consenting procedures could evolve to become more effective, including:[80]

- Early engagement of key actors in order to streamline regulatory processes;
- All parties agreeing on regulators taking the lead to streamline consultation (this may be difficult where competence is spread across departments that may wish to retain their control over certain aspects of the process);

- Implementing MSP with the aim of increasing the likelihood of OE projects receiving consent (these still need to comply with relevant legislation); and
- Increasing regulator knowledge through a range of mechanisms.

Scotland's OSS has been well received and is generally perceived as providing developers with the greatest confidence in the regulatory process.[81] Some industry participants with real-life experience using the OSS have found that it is not always a truly integrated process[82] and that Marine Scotland must ensure that as the industry develops, it keeps a hold on the process. The Section Leader of the Licensing and Operations Team at Marine Scotland therefore also identifies early strategic engagement with all parties as key in improving consenting regimes. He additionally notes that there is a need to "stop re-inventing the wheel for every project",[83] suggesting that processes have not yet been standardised.

There is the question of whether the OSS concept can be replicated effectively in other jurisdictions, and there has so far been little discussion of how well OSS processes will fare once the industry has grown to its full potential, though at least one commentator has identified that OSS "may come under greater scrutiny as the sector continues to develop and larger, more contentious developments are proposed".[84] Large-scale developments are likely to put considerable strain on a single authority, and it is yet to be seen whether an OSS can cope with the range of issues that such developments will likely bring.

6 Conclusion

This chapter has highlighted that OE projects will have to go through a range of consenting processes before devices make it into the water. OE projects will need approvals for many aspects of their operation, including for the occupation of marine space, the exploitation of marine resources, the generation of environmental impacts, and decommissioning. To date, few jurisdictions have attempted to reform these regulatory frameworks in order to facilitate good governance of OE projects. As unwieldy consenting processes are commonly cited as one the major non-technical barriers to the development of OE, such reforms will likely be crucial, yet it is clear that this is not a simple task and that considerable political will is required. In the UK and Scotland, where substantial reforms have been implemented, there are early signs of success, and other jurisdictions seeking to develop an OE industry may be able to build on this experience.

Notes

1 O'Hagan, A. M. (2012) A Review of International Consenting Regimes for Marine Renewables: Are We Moving Towards Better Practice? *Fourth International Conference on Ocean Energy*, Dublin; Simas, T., et al. (2015) Review of Consenting Processes for Ocean Energy in Selected European Union Member States. *International Journal of Marine Energy*, 9, pp. 41–59.

2 Though not all jurisdictions necessarily allow for private or even State rights over the sea and seabed. See e.g. the discussion of New Zealand in the following chapter.
3 For example, a wave energy device sitting on the sea surface will require rights to occupy the surface but would likely also preclude use of the area below and around the devices.
4 Kerr, S., et al. (2014) Establishing an Agenda for Social Studies Research in Marine Renewable Energy. *Energy Policy*, 67, pp. 694–702.
5 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
6 Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC; codified in Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment and subsequently amended in 2014 by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Note that under Annex I of the EIA Directive an EIA for wave and tidal projects is not mandatory. Rather they appear to fall under Annex II where the necessity to conduct an EIA is left to the discretion of the Member States. In practice, an EIA process will usually be in place.
7 See, e.g., Faber Maunsell and Metoc PLC. (2007) *Scottish Marine Renewables Strategic Environmental Assessment (SEA) Non-Technical Summary*. Edinburgh: The Scottish Executive. Available at: https://tethys.pnnl.gov/sites/default/files/publications/Scottish_Marine_Renewables_SEA_Summary.pdf; Doelle, M. (2009) The Role of Strategic Environmental Assessments (SEAs) in Energy Governance: A Case Study of Tidal Energy in Nova Scotia. *Journal of Energy and Natural Resources Law*, 27, pp. 112–144.
8 This is a contractual agreement between an electricity generator and a licensed supplier obliging the latter to purchase the output from a new renewable energy powered electricity generation plant.
9 Offshore energy resources are often located in remote coastal areas where there is only a weak distribution network available (if any), such that the costly grid reinforcements would likely raise project costs to a prohibitive level. There are often weak connections between States (e.g. EU Member States), power markets are generally inflexible and fragmented, and there is a lack of offshore electricity grids. See Van Hulle, F., et al. (2009) *Integrating Wind: Developing Europe's Power Market for the Large Scale Integration of Wind Power*. Brussels: European Wind Energy Association (EWEA). Available at: http://orbit.dtu.dk/files/3628704/Summary.pdf; Soerensen, H. C., and Korpås, M. (2010) Integration of Wave and Offshore Wind Energy in a European Offshore Grid. In: *Twentieth International Offshore and Polar Engineering Conference*. Beijing: International Society of Offshore & Polar Engineers, pp. 926–933.
10 Renewable energy progress report COM (2013) 175 final.
11 Directive 2009/28/EC provides that "administrative procedures are streamlined and expedited at the appropriate administrative level" and that such procedures are "clearly coordinated and defined, with transparent timetables for determining planning and building applications" (Article 13(1)(a) and (c)). The European Commission has recognized that progress in removing administrative barriers remains limited and slow, can raise the costs of renewable energy generally and will require further efforts if the 2020 targets are to be achieved (ibid.).
12 Knight, H. (1976) Legal, Political, and Environmental Aspects of Ocean Thermal Energy Conversion: A Report on an ASIL/ERDA Study. In: Kohl, J., *Energy from the Oceans: Fact or Fantasy*. Raleigh: Center for Marine and Coastal Studies, North Carolina State University, p. 45.

13 See Victoria Harbor Times (2014) *Oceanlinx Energy Generator at Carrickalinga Is Still Considered Unsafe*. Available at: www.victorharbortimes.com.au/story/2469811/oceanlinx-energy-generator-at-carrickalinga-is-still-considered-unsafe/
14 See Victoria Harbor *Times* (2014) *Carrickalinga Prohibited Zone Around Oceanlinx Wave Energy Device Attracts Big Fines*. Available at: www.victorharbortimes.com.au/story/2597306/carrickalinga-prohibited-zone-around-oceanlinx-wave-energy-device-attracts-big-fines/
15 Abandonment of human-made structures at sea potentially comes within the definition of "dumping" under relevant international law (1996 Protocol to the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972), however abandonment must be for the "sole purpose of deliberate disposal" (Article 1.4.1.4) and does not include "abandonment in the sea of matter (e.g. cables, pipelines and marine research devices) placed for a purpose other than the mere disposal thereof" (Article 1.4.2.3).
16 Article 60(3), UNCLOS.
17 International Maritime Organization (IMO) (2008) *Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the EEZ*. IMO Resolution A.672(16). London: IMO.
18 Article 60, UNCLOS.
19 The Guidelines state that consideration of environmental factors should be based upon scientific evidence taking into account the effect on water quality, geological and hydrographic characteristics, the presence of endangered or threatened species, existing habitat types, local fishery resources, and the potential for pollution or contamination of the site (section 2, paras.2.1.1–2.1.6).
20 The Guidelines outline the factors that should be considered in determining each of the preceding matters (section 2.3).
21 Section 3, para. 3.4.1. E.g.: OE devices may alleviate fishing pressure and potentially allow fish to breed and grow (Witt, M. J., et al. (2012) Assessing Wave Energy Effects on Biodiversity: The Wave Hub Experience. *Philosophical Transactions Series A. Math Physical and Engineering Sciences*, 370(1959), p. 502); introduce new hard substrate that may have artificial reef effects (Linley, E. A. S., et al. (2007) *Review of the Reef Effects of Offshore Wind Farm Structures and Their Potential for Enhancement and Mitigation*. London: Department for Business, Enterprise and Regulatory Reform (BERR), p. 132); or act as fish aggregating devices (Wilhelmsson, D., Malm, T., and Öhman, M. C. (2006) The Influence of Offshore Wind Power on Demersal Fish. *ICES Journal of Marine Science*, 63(5), p. 775).
22 These include the International Convention for the Safety of Life at Sea (SOLAS); Convention on the International Regulations for Preventing Collisions at Sea (COLREGS); the International Load Line Convention; the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW); and the International Convention for the Prevention of Pollution from Ships (MARPOL).
23 GL Garrad Hassan Canada (2012) *International Overview of Marine Renewable Energy Regulatory Frameworks*. Ottawa: GL Garrad Hassan.
24 The International Association of Lighthouse Authorities (IALA) previously issued recommendations on the marking of a single offshore wind turbine (Recommendation O-114 in 1998), offshore wind farms (Recommendation O-117 in 2004) and wave and tidal devices (Recommendation O-131 in 2005). These have now been consolidated by IALA Recommendation O-139 on the Marking of Man-Made Offshore Structures (2008).
25 Articles 20 and 21. The IMO's General Provisions on Ships' Routeing (IMO Resolution A.572 (14), adopted on 20 November 1985) further expands on these provisions.
26 An undersea connection point for device testing.

27 Wave Hub. Available at: www.wavehub.co.uk/
28 The amendments were adopted by IMO's Sub-committee on Safety of Navigation at its 54th session, 30 June–4 July 2008 and approved by IMO's Maritime Safety Committee at its 85th session, 26 November–5 December 2008. The amendments entered into force on 1 July 2009. IMO (2008) Routeing of Ships, Ship Reporting and Related Matters. Amendments to the Traffic Separation Scheme 'Off Land's End, Between Longships and Seven Stones'. Submitted by the UK. Sub-Committee on Safety of Navigation, 54th session. IMO Doc. NAV 54/3/5, 28 March 2008. London: IMO.
29 Resolution A.671(16).
30 Wavenet (2003) *Results from the Work of the European Thematic Network on Wave Energy*. European Community ERK5-CT-1999-20001, 2000–2003.
31 Neumann, F. (2009) *Non-technological Barriers to Wave Energy Implementation*. Waveplam. Available at: http://www.youblisher.com/p/1276753-Non-technological-barriers-to-wave-energy-implementtion-Waveplam/
32 O'Hagan, A. M. (2012) n. 1; Kolliastas, C., et al. (2012) *Offshore Renewable Energy: Accelerating the Development of Offshore Wind, Tidal and Wave Technologies*. Abingdon: Earthscan; Leary, D., and Esteban, M. (2009) Climate Change and Renewable Energy from the Ocean and Tides: Calming the Sea of Regulatory Uncertainty. *International Journal of Marine and Coastal Law*, 24(4), pp. 617–651; Appiott, J., Dhanju, A., and Cicin-Sain, B. (2014) Encouraging Renewable Energy in the Offshore Environment. *Ocean & Coastal Management*, 90, pp. 58–64; Muñoz Arjona, E., et al. (2012) *Navigating the Wave Energy Consenting Procedure: Sharing Knowledge and Implementation of Regulatory Measures*. SOWFIA Project Third Workshop Report. Dublin: SOWFIA.
33 However, several OE test centres are "pre-consented", such that developers do not usually have to undertake the full consenting process.
34 Neumann, F. (2009) n. 31.
35 Ibid.
36 Subject to certain conditions and the right of innocent passage. At present, all OE projects are located close to shore, within the territorial seas of states (12 nm). OE projects could theoretically be developed in the exclusive economic zone (EEZ – 200 nm) and even areas beyond national jurisdiction (ABNJ), though this is not currently economically feasible. This may be more likely for certain technologies such as OTEC and submarine geothermal energy. A number of offshore wind projects are located in the EEZ, and projects are moving further offshore (e.g. in Belgium, Denmark and Germany). This should be considered in the context of international ocean governance processes that may affect future OE developments in ABNJ, see Abad Castelos, M. (2014) Marine Renewable Energies: Opportunities, Law, and Management. *Ocean Development & International Law*, 45(2), pp. 221–237.
37 See e.g. Nova Scotia and the UK, discussed in the following chapter; see also Wright, G. (2014) Regulating Marine Renewable Energy Development: A Preliminary Assessment of UK Permitting Processes. *Underwater Technology: The International Journal of the Society for Underwater*, 32(1), pp. 1–12.
38 Article 13(1)(c) and (a).
39 Article 13(1)(f).
40 Renewable Energy Progress Report COM (2013) 175 final.
41 Ibid.
42 White, R. (2012) Climate Change and Paradoxical Harm. In: Farrell, S., Ahmed, T., and French, D. (eds) *Legal and Criminological Consequences of Climate Change*. London: Hart Publishing.
43 For further discussion, see e.g. Sarmento, A. (2007) *Large Scale Environmental Impact Assessment of Wave Energy Devices – A Guidance Document*. Wavetrain; Leeney, R. H., et al. (2014) Environmental Impact Assessments for Wave Energy

Developments – Learning from Existing Activities and Informing Future Research Priorities. *Ocean & Coastal Management*, 99, pp. 14–22.

44 See Annex IV (Environmental Effects of Marine Renewable Energy) work and Tethys database. Available at: http://tethys.pnnl.gov/

45 EIA Directive (2014/52/EU), which entered into force in May 2014. Member States had until 16 May 2017 to transpose its provisions into their domestic legislation.

46 Article 4(6).

47 Articles 5(3)(a) and (b), respectively. No definition of what constitutes a "competent expert" is included in the text of the Directive.

48 Bailey, I., West, J., and Whitehead, I. (2011) Out of Sight but Not out of Mind? Public Perceptions of Wave Energy and the Cornish Wave Hub. *Journal of Environmental Policy and Planning*, 13(2), pp. 139–158; Chozas, J. F., Stefanovich, M. A., and Sørensen, H. C. (2010). *Toward Best Practices for Public Acceptability in Wave Energy: Whom, When and How to Address*. Third International Conference on Ocean Energy, Bilbao, Spain.

49 In the sense that, while OE resources are renewable, the number of optimal locations for OE deployment is limited.

50 Wright, G., et al. (2016) Establishing a Legal Research Agenda for Ocean Energy. *Marine Policy*, 63, pp. 126–134.

51 See e.g. HM Government (2010) *Marine Energy Action Plan 2010: Executive Summary & Recommendations*. London: DECC, p. 52. Available at: http://regensw.s3.amazonaws.com/1275819743_963.pdf; Freds Marine Energy Group (2009) *Marine Energy Road Map*. Edinburgh: Scottish Government, p. 61. Available at: www.gov.scot/Resource/Doc/281865/0085187.pdf; Jeffrey, H., and Sedgwick, J. (2011) *ORECCA European Offshore Renewable Energy Roadmap*. Edinburgh: University of Edinburgh on behalf of the ORECCA project, p. 101. Available at: www.orecca.eu/c/document_library/get_file?uuid=1e696618-9425-4265-aaff-b15d72100862&groupId=10129; Soerensen, H. C., and Rousseau, N. (2009) *Waveplam: Best Practice*. Bilbao: EVE, p. 47. Available at: www.youblisher.com/p/1276756-Best-practice-Waveplam/; Muñoz Arjona, E., et al. (2012) n. 32.

52 See Krueger, R. and Yarema, G. (1981) New Institutions for New Technology: The Case of Ocean Thermal Energy Conversion. *Southern California Law Review*, 54, p. 767.

53 Particularly in Denmark, where OSS is generally considered to have been a key driver of strong wind energy development. See Soerensen, H. C., and Naef, S. (2008) *Report on Technical Specification of Reference Technologies (Wave and Tidal Power Plant)*. NEEDS Integrated Project Report, p. 59. Available at: www.needs-project.org/2009/Deliverables/RS1a%20D16.1%20Final%20report%20on%20Wave%20and%20Tidal.pdf; Neumann, F. (2009) n. 31.

54 Muñoz Arjona, E., et al. (2012) n. 32.

55 Enrique, M. A., et al. (2012) *Navigating the Wave Energy Consenting Procedure: Sharing Knowledge and Implementation of Regulatory Measures*. Dublin: SOWFIA.

56 Scarff, G., Fitzsimmons, C., and Gray, T. (2015) The New Mode of Marine Planning in the UK: Aspirations and Challenges. *Marine Policy*, 51, pp. 96–102.

57 Simas, T., et al. (2015) n. 1.

58 Enrique, M. A., et al. (2012) n. 55.

59 See n. 52. The authors draw on earlier discussion of the concept by Humphreys in 1973. Humphreys, D. L. (1973) NEPA and Multi-Agency Actions – Is the 'Lead Agency' Concept Valid? *Natural Resources Lawyer*, 6(2), pp. 257–264.

60 E.g. the US Federal Energy Regulatory Commission offers an "integrated licensing process" that resembles the lead agency model.

61 Specifically, the Crown Estate Act 1961 states that TCE's duty in relation to the seabed is to "maintain and enhance its value and the return obtained from it, but

with due regard to the requirements of good management". Crown Estate Act 1961, section 1(3).

62 Such as the European Marine Energy Centre, Orkney and the WaveHub, Cornwall.
63 One in the Pentland Firth and Orkney waters strategic area (north of Scotland) and the other in the Rathlin Island and Torr Head strategic area (Northern Ireland).
64 In addition to the leasing process described here, TCE has initiated 40 technical studies in order to de-risk project development, published a study on MRE resources and conducted an industry engagement exercise on the future of the leasing process.
65 House of Commons Treasury Committee (2009) *The Management of the Crown Estate*.
66 Ibid.
67 Ibid.
68 Ibid.
69 Ibid.
70 Ibid.
71 In force since 6 April 2011.
72 The Secretary of State is the licensing authority for oil and gas–related activities and administers marine licences through the Department of Energy and Climate Change.
73 Section 66, Marine and Coastal Access Act 2009. In some cases, a marine licence is required for activities outside UK waters, e.g. where the activity takes place from a British vessel or where the vessel was loaded in UK waters.
74 Nationally Significant Infrastructure Projects, processed by the Planning Inspectorate, which makes recommendations to the Secretary of State to decide whether to grant consent (Section 15, Planning Act 2008). The MMO is a key consultee and remains responsible for monitoring compliance and enforcement of licence conditions under a Deemed Marine Licence.
75 Also entered into force on 6 April 2011.
76 Under the Marine and Coastal Access Act 2009, they are also the licensing and enforcement authority for the Scottish offshore region from 12 to 200 nm (other than reserved matters).
77 The Conservation (Natural Habitats) Regulations 1994. These were amended only for Scotland, while the Conservation of Habitats and Species Regulations 2010 applies across the remainder of the UK.
78 Marine Scotland aims to include this in their portfolio, allowing for consideration of onshore works.
79 Enrique, M. A., et al. (2012) n. 55.
80 Ibid.
81 Ibid.
82 Domingez Quiroga, J. A., et al. (2013) *Report on Analysis of Existing Available Data of Wave Energy Experiences*. Seville: Abengoa Seapower on behalf of the SOWFIA project, p. 41.
83 Enrique, M. A., et al. (2012) n. 55.
84 Ibid.