Issue Paper

Accommodating Ocean Energy in Marine Spatial Planning Processes

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1. Context

A new industrial revolution is taking place in the oceans, challenging existing legal and regulatory frameworks and changing the way we think about marine governance [1–5]. Growing demand for marine space and resources, coupled with declining ocean health, necessitate the evolution of marine governance frameworks that can facilitate innovation and economic development, while also preserving the marine environment.

At the same time, the environmental imperative to decarbonise the energy system has driven interest in marine renewable energy (MRE) resources, particularly offshore wind, and wave and tidal energy.[1] MRE technologies have been identified by the EU as one of the five key activities that can advance the 'Blue Economy' agenda, delivering sustainable growth and creating new jobs [6].

Wave and tidal energy technologies, collectively known as 'ocean energy', are now attracting considerable interest and investment [7]. The UK, and Scotland in particular, finds itself at the vanguard of this new industry, as ocean energy enjoys a combination of political support, significant resources and technical expertise [8,9].

Ocean energy is attracting the attention of international energy governance institutions, including the International Energy Agency (IEA),[2] and the International Renewable Energy Agency (IRENA) [10]. The European Commission has recently developed an action plan to support the ocean energy sector, convening an Ocean Energy Forum to bring together stakeholders and develop solutions. This will feed into a strategic roadmap, providing an agreed blueprint for action. There is potential for a European Industrial Initiative to be developed during a second phase (2017-2020).[3] Ocean Energy Europe, an industry association, has concurrently convened a Technology and Innovation Platform for Ocean Energy, the primary focus of which is to foster a broad consensus on priorities for technological innovation.[4]

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[1] Other technologies exist, such as ocean thermal energy conversion (OTEC) and salinity gradient technology, but these have not been the subject of significant research and development in recent years.

[2] The IEA has established the Ocean Energy Systems Implementing Agreement (IEA-OES) to "advance research, development and demonstration". This is an intergovernmental collaboration between countries, under a framework established by the IEA. See http://www.ocean-energy-systems.org/about-oes/.

[3] "European industrial initiatives are public-private partnerships that bring together industry, researchers, Member States and the Commission to set out and implement clear and shared objectives over a specific timeframe. They enhance the impact of innovative research and development and provide a platform for sharing investment risk." See http://ec.europa.eu/maritimeaffairs/policy/ocean_energy/forum/index_en.htm.

[4] See http://www.oceanenergy-europe.eu/index.php/en/tpocean/tpocean.

As with other novel offshore activities, ocean energy is bringing its own unique challenges to marine governance frameworks [5,9]. Kerr et al. (2014) note that ocean energy is [9]:

> *More than a technically challenging extension of onshore renewable energy development. The policy environment, governance, patterns of resource use, conservation values, and distribution of ownership rights are all substantively different from the situation onshore.*

2. Marine Spatial Planning and ocean energy

Demand for exclusive use of space and increasingly private rights in the marine environment, coupled with growing environmental concerns, necessitate a paradigm shift towards a more strategic model of marine governance. There is an established need for a plan-led and integrated approach, and Marine Spatial Planning (MSP) has emerged as the frontrunner concept for meeting this need [12].

MSP is intended to help reconcile potential conflicts between different uses of ocean space, while achieving sustainability. However, in its nascent stages, MSP can be 'all things to all people': for some, MSP is a broad planning instrument with little direct legal significance, while for others it is seen as comprising, among other elements, a legally binding zone in a marine area where a specific activity is permissible.

In Belgium, Germany, the Netherlands and the UK, the promotion of offshore wind energy has been a strong driving force behind the development of national MSP frameworks [13]. However, ocean energy has not yet been one of the primary drivers of MSP processes [14], and few existing MSP processes have considered ocean energy in depth, though this is changing.

Despite an extensive literature concerning MSP generally, discussion of ocean energy's role and place in MSP processes has generally been limited. Usually this discussion either merely asserts that MSP is crucial for the development of the ocean energy industry [14,15], or considers how MSP applies to MRE in practice [16,17].

2.1. Case study: Scotland

Scotland has undertaken an extensive and ambitious program of MSP driven in large part by ocean energy [16,18,19]. Marine Scotland's[5] approach has been inclusive, developing separate policies for each existing activity in order to make considered trade-offs between users. Specific plans are under development for offshore wind, wave, and tidal, to assist these technologies in meeting Scotland's target of generating the equivalent of 100% of electricity demand from renewable sources. Marine Scotland has also developed a strategic environmental assessment (SEA) to identify key environmental parameters, and a provisional locational guidance document to assist ocean energy developers to site their projects in areas where the fewest environmental and user conflicts are likely to occur.

2.2. Case study: Oregon

Oregon has amended its Territorial Sea Plan (TSP) to guide the siting of ocean renewable energy facilities. The relevant agencies conducted a spatial analysis of ocean

[5] The authority responsible for marine planning in Scotland.

uses and ecological resources through a public process to identify and allocate areas within the territorial sea that are appropriate for renewable energy development. In contrast to the Scottish MSP process, Oregon's Plan zones different uses, ultimately designating 74% of Oregon's Territorial Sea as incompatible with ocean energy and roughly 2% as "Renewable Energy Facility Suitability Study Areas".[6] The industry has expressed concern at what it sees as a 'negative approach' to MSP, excluding ocean energy deployment where existing uses exist and focussing on constraints rather than opportunities. Indeed, excluding areas from consideration for MRE development undermines one of the core benefits of MSP, which is that it allows for strategic planning and explicit trade-offs between uses, whether new or pre-existing [20].

2.3.Potential benefits for ocean energy

One of the problems MSP potentially tackles is the fragmentation of ocean governance. In order to combat fragmentation, integration would have to take place on several different levels such as between legal instruments, different branches of government and different sectoral interests [12]. MSP thus goes to the heart of various issues concerning ocean energy, including consenting [21,22] and environmental impact assessment (EIA) [23–25]. MSP could function as an umbrella under which different instruments of governance can be organised, thereby contributing to achievement of a more streamlined consenting process for ocean energy and other activities.

MSP may also be able to alleviate some of the issues relating to EIA and consenting by taking a future-oriented and strategic approach to balancing precaution and risk, thereby providing flexibility [26,27], and lending a level of predictability and consistency to the overall governance framework [28]. The geographical proximity of ocean energy devices and the attendant onshore infrastructure raises the possibility that MSP may be an appropriate mechanism to link emerging marine governance systems with terrestrial planning [11,29]. This will be increasingly important as ocean energy projects begin to drive the development of additional harbour and port infrastructure, onshore facilities, and grid extensions.[7]

Assuming that an MSP process is holistic and inclusive, allowing trade-offs to be made between different ocean users, MSP has the potential to facilitate the integration of new industries, such as ocean energy, into a crowded marine environment. At the same time, a sustainability-oriented process can ensure that ocean energy development is done in a manner sensitive to the environment, while also acknowledging the environmental benefits of increased renewable energy deployment.

3. Key issues

Prioritisation of uses

The key concern is how different activities will be prioritised as against each other. In the ocean energy context this has been achieved either, as seen above, through an exclusionary/zoning approach or a policy-based approach. Further research is needed to develop good practice for MSP, particularly in relation to new and emerging

[6] http://oceana.org/press-center/press-releases/state-oregon-adopt-marine-spatial-plan-wave-energy-development

[7] There is already some literature that uses terrestrial planning as a basis for understanding MSP [33], and proposes using experience with novel marine governance mechanisms to inform and improve terrestrial planning [34].

industries. Regardless of the approach taken, issues regarding conflict resolution, coexistence and compensation will also arise.

Coexistence, MSP vs. zoning

The potential for the coexistence of ocean energy and other marine uses has been much discussed.[8] There is some suggestion that co-location of marine activities is feasible, but this is likely to be site-specific [30]. On the other hand, ocean energy technologies generally require exclusive occupation of a specific marine space with particular resources, thus ocean energy devices densely sited in nearshore areas are unlikely to be amenable to coexistence. It may instead be preferable to 'zone' such uses, either within MSP processes,[9] or outside of them.[10] There has already been some debate as to the relationship between zoning and MSP that may be relevant to the ocean energy sector and other industrial users [31]. Nonetheless, exclusivity over resources is one of the problems that MSP is aiming to solve, whereas zoning may entrench these issues and exacerbate them.

Resource allocation

There may be some difficulties in allocating resource access under a MSP as developments may affect the availability of resources downstream. Unfortunately, the physics of wave/tidal resources and their interactions with devices are not sufficiently well enough understood at present to factor this into MSP processes. This highlights that flexibility will be needed to integrate additional knowledge as our understanding advances.

Data

To enable appropriate trade-offs to be made, and to establish effective MSP, accurate and comprehensive data on the existing uses of the marine areas, their interactions and condition of the environment are required. Prior to establishing priorities between uses one has to have a clear view how and to what extent different marine interests do collide and whether these problems can be alleviated by temporal and spatial allocation [12].

Sustainability

It is crucial that the sustainability dimension of MSP is not lost in a rush to develop new resources. Sustainability criteria for MSP could be developed, possibly using similar criteria from other environmental governance instruments as a model [32]. This could be a step toward recognising the environmental benefits of renewable energies within legal processes and 'levelling the playing field' with established marine activities.

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[8] Particularly regarding offshore wind and the potential for *de facto* marine protected areas [30,35–38], and the fishing industry [39,40].

[9] Zoning itself can be regarded as one element of MSP.

[10] In Europe, pursuant to the MSP directive, states are obliged to pass MSP legislation and draft plans, though there are no strict substantive requirements. In other jurisdictions, there may remain substantial latitude to implement specific measures for ocean energy where appropriate.

References

[1] Salcido RE. Offshore Federalism and Ocean Industrialization. Tullane Law Rev 2008:1355–445.

[2] Osherenko G. New Discourses on Ocean Governance: Understanding Property Rights and the Public Trust. J Envtl L Litig 2006;21:317–81.

[3] Charter R. Life on the Edge: the Industrialization of Our Oceans. Proc. Coast. Zo. 07, 2007.

[4] Smith HD. The industrialisation of the world ocean. Ocean Coast Manag 2000;43:11–28.

[5] Wright G. Marine governance in an industrialised ocean: A case study of the emerging marine renewable energy industry. Mar Policy 2015;52:77–84.

[6] European Commission Maritime Affairs. Blue Growth: Opportunities for marine and maritime sustainable growth. 2012.

[7] REN21. Renewables 2013 Global Status Report. Paris: 2013.

[8] Johnson K, Kerr S, Side J. Marine renewables and coastal communities—Experiences from the offshore oil industry in the 1970s and their relevance to marine renewables in the 2010s. Mar Policy 2013;38:491–9.

[9] Kerr S, Watts L, Colton J, Conway F, Hull A, Johnson K, et al. Establishing an agenda for social studies research in marine renewable energy. Energy Policy 2014;67:694–702.

[10] IRENA. Ocean Energy: technology readiness, patents, deployment status and outlook. 2014.

[11] Kerr S, Johnson K, Side JC. Planning at the edge: Integrating across the land sea divide. Mar Policy 2014;47:118–25.

[12] Douvere F, Ehler CN. New perspectives on sea use management: initial findings from European experience with marine spatial planning. J Environ Manage 2009;90:77–88.

[13] Qiu W, Jones PJS. The emerging policy landscape for marine spatial planning in Europe. Mar Policy 2013;39:182–90.

[14] Ehler C. Marine Spatial Planning - An Idea Whose Time Has Come. Annu. Rep. Implement. Agreem. Ocean Energy Syst., Paris: International Energy Agency; 2011, p. 96–100.

[15] Thoroughfood, Carolyn A. Marine Spatial Planning: A Call for Action. Oceanography 2010;23:9–10.

[16] O'Hagan AM. Marine Spatial Planning (MSP) in the European Union and its Application to Marine Renewable Energy. Int Energy Agency Ocean Energy Syst Implement Agreem Website 2012.

[17] Wagner A. Report defining the criteria for assessing national MSP practices affecting the deployment of marine renewable energy sources. Seanergy 2020; 2010.

[18] Marine Scotland. Pentland Firth and Orkney Waters Marine Spatial Plan Framework Regional Locational Guidance for Marine Energy: Final Report. 2010.

[19] Kelly C, Gray L, Shucksmith R, Tweddle JF. Review and evaluation of marine spatial planning in the Shetland Islands. Mar Policy 2014;46:152–60.

[20] Geerlofs S, Sherman R, Hanna L, Battey H. Siting wave energy on the Oregon coast. OES In-Depth Artic Ser n.d.

[21] O'Hagan A-M. A review of international consenting regimes for marine renewables: are we moving towards better practice ? 4th Int. Conf. Ocean Energy, Dubline: 2012.

[22] Wright G. Regulating marine renewable energy development: a preliminary assessment of UK permitting processes. Underw Technol Int J Soc Underw 2014;32:1–12.

[23] Huertas-Olivares C, Norris J. Environmental Impact Assessment. Ocean Wave Energy Curr. Status Futur. Perspect., 2008, p. 397–423.

[24] Merry S. Marine renewable energy: could environmental concerns kill off an environmentally friendly industry? Underw Technol 2014;32:1–2.

[25] Wright G. Strengthening the role of science in marine governance through environmental impact assessment: a case study of the marine renewable energy industry. Ocean Coast Manag 2014;99:23–30.

[26] Day J. The need and practice of monitoring , evaluating and adapting marine planning and management — lessons from the Great Barrier Reef. Mar Policy 2008;32:823–31.

[27] Agardy T. Ocean Zoning: Making Marine Management More Effective. Earthscan; 2010.

[28] Soininen N. Planning the Marine Area Spatially – A Reconciliation of Competing Interests? Int. Environ. Law-making Dipl. Rev. 2012, 2013, p. 85–118.

[29] Smith HD, Maes F, Stojanovic TA, Ballinger RC. The integration of land and marine spatial planning. J Coast Conserv 2011;15:291–303.

[30] Christie N, Smyth K, Barnes R, Elliott M. Co-location of activities and designations: A means of solving or creating problems in marine spatial planning? Mar Policy 2014;43:254–61.

[31] Ehler C, Agardy T. Online Debate: Does marine spatial planning need to involve ocean zoning to be effective? Open Channels 2013.

[32] Bosselmann K. Governance for Sustainability Governance for Sustainability. n.d.

[33] Kidd S, Ellis G. From the Land to Sea and Back Again? Using Terrestrial Planning to Understand the Process of Marine Spatial Planning. J Environ Policy Plan 2012;14:49–66.

[34] Sutherland M, Nichols S. Issues in the Governance of Marine Spaces. Adm. Mar. Spaces Int. issues, Copenhagen: International Federation of Surveyors; 2006, p. 6–20.

[35] Fayram AH, de Risi A. The potential compatibility of offshore wind power and fisheries: An example using bluefin tuna in the Adriatic Sea. Ocean Coast Manag 2007;50:597–605.

[36] Michler-Cieluch T, Krause G. Perceived concerns and possible management strategies for governing "wind farm–mariculture integration." Mar Policy 2008;32:1013–22.

[37] Punt MJ, Groeneveld R a., van Ierland EC, Stel JH. Spatial planning of offshore wind farms: A windfall to marine environmental protection? Ecol Econ 2009;69:93–103.

[38] Hooper T, Austen M. The co-location of offshore windfarms and decapod fisheries in the UK: Constraints and opportunities. Mar Policy 2014;43:295–300.

[39] Rodwell LD, Campbell M, de Groot J, Ashley M. Fisheries and marine renewable energy interactions: A summary report on a scoping workshop for the Marine Renewable Energy Knowledge Exchange Programme (MREKEP). 2012.

[40] De Groot J, Campbell M, Ashley M, Rodwell L. Investigating the co-existence of fisheries and offshore renewable energy in the UK: Identification of a mitigation agenda for fishing effort displacement. Ocean Coast Manag 2014;102:7–18.