

Renewable Ocean Energy and the International Law and Policy Seascape: Global Currents, Regional Surges

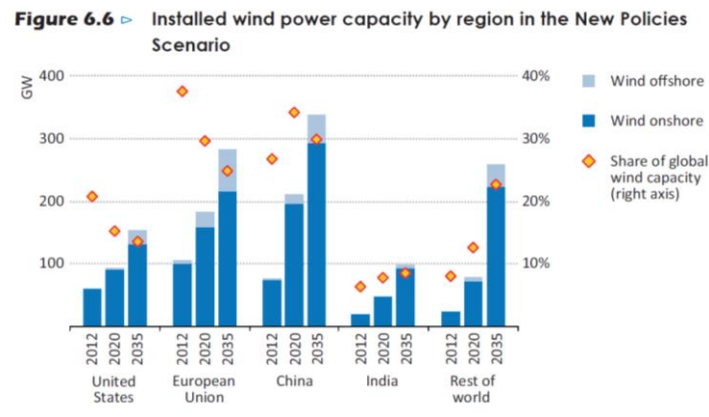
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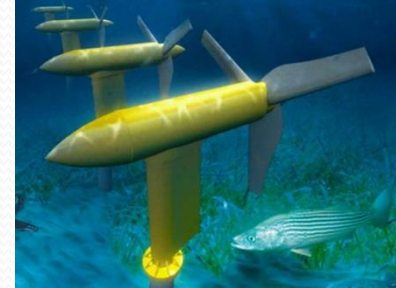


Introduction

- In light of the need to mitigate CO₂ emissions to counter climate change and ocean acidification, ocean renewable energy projects are bound to increase
- + The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) suggests the need for substantial cuts in anthropogenic greenhouse gas emissions
 - 40 to 70% lower globally by 2050 than in 2010
 - Near zero by 2100
- + The World Energy Outlook (2013) predicts electricity generations from wind (onshore and offshore) will increase at an annual average rate of 6% between 2011 and 2035



- Offshore wind farms have been developing most swiftly with tidal and wave energy still mostly in the testing phases (James 2013)
- + As of February 2013, over 1,000 offshore wind farms estimated to be at various stages of development covering an area of over 130,000 square kilometers
- + Over 60 tidal energy sites undergoing testing or generating commercially
- + Wave energy development sites stood at about 60

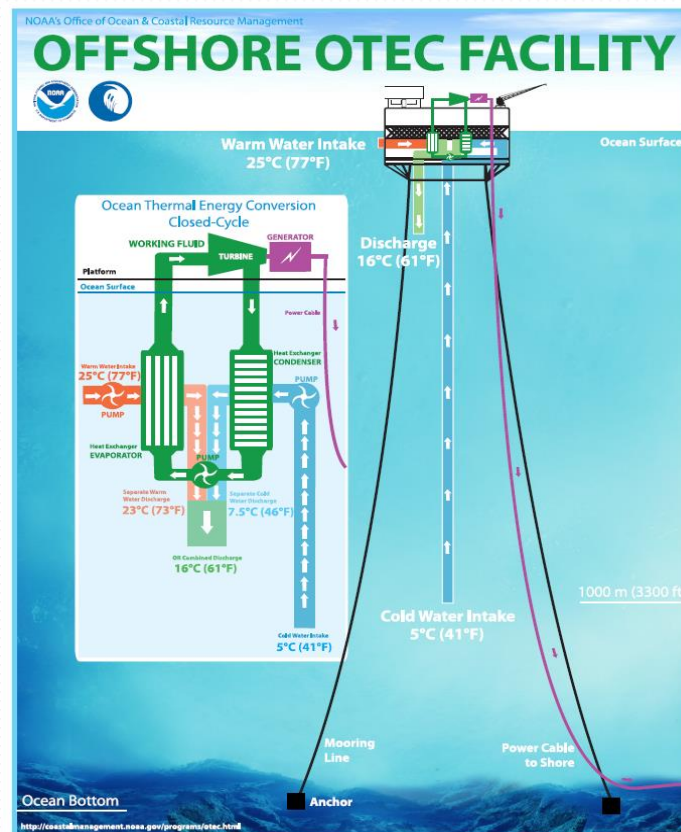


- Other potential ocean energy sources include

- + Ocean currents

- + Salinity gradients

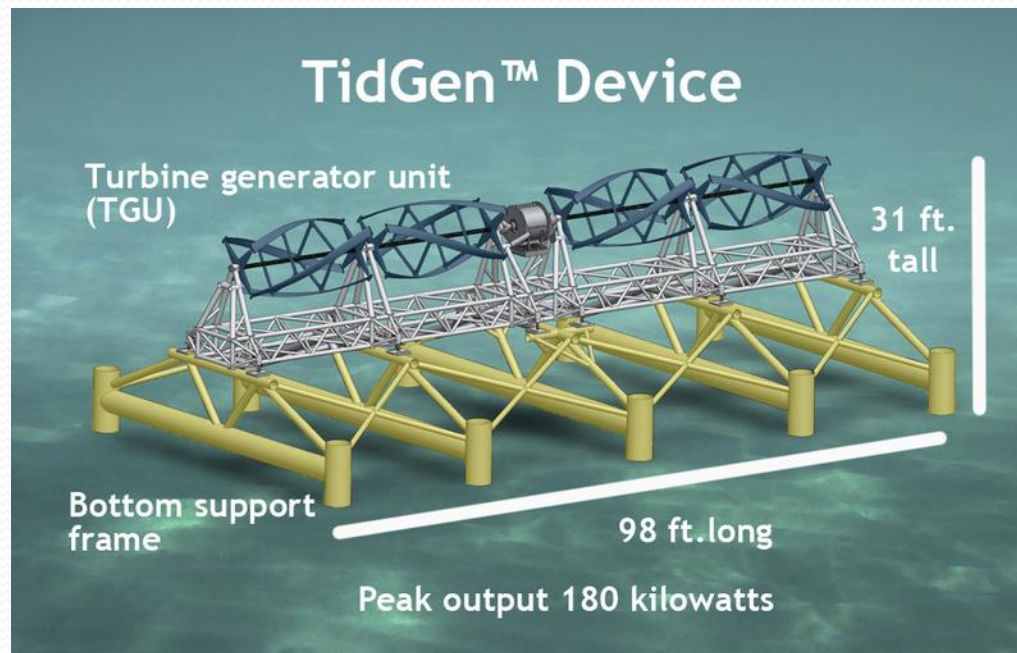
- + Ocean thermal energy conversion



- Various environmental concerns surround marine renewable energy developments (MREDs) such as
 - + Noise during construction (e.g. pile driving) and operations (e.g. vibrations from windmills and shipping support activities)
 - + Reduction of visual amenities
 - + Loss of access to space
 - + Collision of wildlife with structures and turbines
 - + Interference with migratory pathways
 - + Electromagnetic fields
 - + Changes in water quality and currents



- Getting a fix on environmental impacts is difficult due to
- + The highly variable nature of technologies available, e.g.
 - Close to 50 different wave energy devices have been proposed (Lewis et al. 2011)
 - Tidal energy harvesting can involve barrages, floating turbines, and structures placed on the seabed



- This presentation provides a two-part “speed cruise” through the international law and policy seascape that has emerged to address the environmental and other threats posed by MREDs



1. Global Currents

- **“Central gyre” – UN Law of the Sea Convention (LOSC)**
- **“Upwellings” – Key multilateral environmental agreements**
 - + Convention on Biological Diversity (CBD) (1992)
 - + International Convention on the Conservation of Migratory Species of Wild Animals (CMS) (1979)
 - + Convention on Wetlands of International Importance (1971)
 - + International Whaling Convention (IWC) (1946)
- **“Ripples” – International Maritime Organization (IMO) roles**

2. Regional Surges

A selected survey of how ocean renewable energy has been addressed at the regional level

- **Regional sub-agreements under the Convention on Migratory Species**
- **Regional sea initiatives and provisions**

- + Northeast Atlantic
- + Mediterranean



1. Global Currents

- **Central gyre - LOSC**



LOSC provides the overall governance framework for offshore renewable energy developments by establishing both State rights and responsibilities

- + **Rights**

- Coastal States clearly have exclusive rights to exploit and regulate renewable energy sources in their offshore waters
 - * Internal waters and territorial sea as part of State sovereignty
 - * Exclusive economic zone with Art. 56 of the Convention explicitly recognizing Coastal State sovereign rights to exploit and manage production of energy from the water, currents and winds
 - * Continental shelf as Art. 80 establishes the exclusive right of coastal States to construct and regulate the use of installations and structures on the continental shelf relating to production of offshore renewable energy
- All States have rights to develop renewable ocean energy sources in the high seas
 - * Freedom to construct installations permitted under international law (Art. 87(d))
 - * Freedom to lay submarine cables (Art. 87(c))

+ Responsibilities

LOSC also sets out State responsibilities relating to marine environmental protection, navigation and other ocean uses

– Marine environmental protection

- * States have the general obligation to preserve and protect the marine environment (Art. 192)
- * States have various pollution prevention/control responsibilities, e.g.
 - > Take all necessary measures to prevent, reduce and control pollution from any source using best practicable means and in accord with their capabilities (Art. 194(1))
 - > Ensure that activities under their jurisdiction or control do not cause damage by pollution to other States or their environment (Art. 194(2))
 - > Ensure that pollution from activities under their jurisdiction or control does not spread beyond areas where they exercise sovereign rights (Art. 194(2))
 - > Take necessary measures to protect and preserve rare or fragile ecosystems and the habitat of depleted, threatened or endangered species (Art. 194(5))
 - > Carry out environmental impact assessments where planned activities under their jurisdiction or control may cause substantial pollution or significant and harmful changes to the marine environment (Art. 206)



– Responsibilities towards international navigation

LOSC allows coastal States to regulate shipping in the vicinity of offshore renewable energy installations subject to some restrictions



- * Territorial sea
 - > Coastal States granted broad regulatory powers to protect their offshore facilities, installations and cables (Art. 21)
 - > Coastal State may require foreign ships exercising their right to innocent passage through the territorial sea to use such sea lanes and traffic separation schemes as may be prescribed to ensure the safety of navigation (Art. 22(1))
 - > Coastal State in taking such measures must consider
 - † Recommendations of the competent international organization
 - † Any channels customarily used for international navigation (Art. 22(3))
 - > Coastal States must clearly indicate such sea lanes and traffic separation schemes on navigational charts (Art. 22(4))

- * EEZ and continental shelf (Art. 60 and 80)
 - > Coastal States must give due notice of the construction of offshore installations and structures and a permanent means for giving warning of their presence must be maintained
 - > Coastal States may establish reasonable safety zones around offshore installations and structures
 - † Must not exceed a distance of 500 metres around them
 - ~ Except as authorized by generally accepted international standards or
 - ~ Recommended by the competent international organization
 - † Due notice must be given of the safety zones
 - > Offshore installations and structures and safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation



- Responsibilities towards other marine uses on the high seas
 - * Any ocean renewable energy activities on the high seas would have to have
 - > Due regard for the interests of other States in the exercise of their freedoms and
 - > Due regard for the rights other States might have in exploring for or exploiting minerals in the deep seabed (Art. 87(2))
 - * Every State has the obligation to make it an offence under its national law for the breaking or injury of a high seas submarine cable by its flagged ships or persons under its jurisdiction (Art. 113)



- **Upwellings – Key multilateral environmental agreements**

- + Convention on Biological Diversity (CBD)



The CBD does not specifically address ocean renewable energy but the Convention and subsequent decisions and initiatives have relevance in three main areas

- Environmental impact assessment and strategic environmental assessment
 - * Article 14 of the CBD requires Parties to introduce
 - > Appropriate environmental impact procedures for proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects
 - > Appropriate arrangements to ensure the environmental consequences of programmes and policies that are likely to have significant adverse effects on biological diversity are duly taken into account

- * Further guidelines on how to tailor national EIA and SEA processes to address biodiversity in marine and coastal areas (including in areas beyond national jurisdiction) were issued in 2012

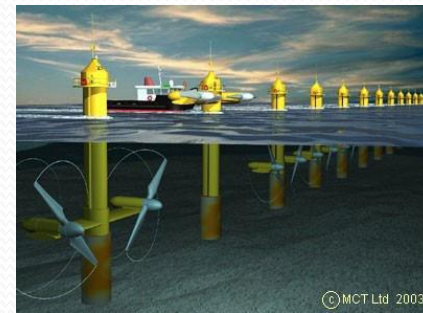


- > Revised Voluntary Guidelines for the Consideration of Biodiversity in Environmental Impact Assessments and Strategic Environmental Assessments in Marine and Coastal Areas (UNEP/CBD/COP/11/23)
- > Revised guidelines consist of annotations to previous voluntary guidelines on biodiversity-inclusive impact assessment endorsed in decision VIII/28 (2006)
- > Revised guidelines do not specifically mention offshore renewable energy projects, they do have some relevant provisions, e.g.
 - † EIA guidelines
 - ~ Urge application of the precautionary approach in decision-making in cases of scientific uncertainty where there is a risk of significant harm to biodiversity
 - ~ Suggest screening criteria for determining the need for and level of EIA should include noise emissions and activities in ecological corridors
 - † SEA guidelines suggest the need to
 - ~ Apply SEA where a proposed policy, plan or programme substantially effects occupation of water areas
 - ~ Ensure public participation and transparency in decision-making

- Ocean noise (a second CBD relevant initiative area)
 - * Conference of the Parties has recognized ocean noise as an emerging issue requiring increased attention (decision X/13 (2010))
 - * A Scientific Synthesis Report on the Impacts of Underwater Noise on Marine and Coastal Biodiversity and Habitats was prepared under the auspices of the CBD Secretariat in 2012 (UNEP/CBD/SBSTTA/16/INF/12)
 - > Reviews the multiple sources, including offshore wind farms, of ocean noise and the state of scientific information on impacts on marine biodiversity
 - > Provides an overview of the complex array of global and regional efforts to understand the effect of ocean noise
 - > Summarizes possible mitigation measures
 - * In February 2014, at the request of the Conference of the Parties (decision XI/18A (2012))
 - * The Executive Secretary convened an expert workshop at IMO headquarters in London
 - > To further share knowledge on underwater noise and its impacts on marine and coastal biodiversity
 - > To develop practical guidance on how best to minimize and mitigate the significant adverse impacts of anthropogenic underwater noise
 - > Reference for report is UNEP/CBD/MCB/EM/2014/1/2



- Marine spatial planning (a third relevant CBD initiative)
 - * Decision X/29 (2010) on coastal and marine biodiversity
 - > Invited Parties and other Governments to increase efforts to apply marine spatial planning tools (para. 78)
 - > Requests the Executive Secretary to synthesize information on national and international experiences with MSP (synthesis report subsequently published in 2012, UNEP/CBD/DSBTTA/16/INF/18)
 - * Decision XI/18 (2012) has further placed marine spatial planning on the CBD radar screen calling for
 - > Development of a web-based information sharing system on MSP
 - > Convening of an expert workshop to provide consolidated practical guidance and a toolkit for MSP
 - > Organizing training workshops on MSP, especially for developing country Parties



+ Convention on Migratory Species (CMS)



The CMS is relevant to MREDs in three main ways – through Convention commitments, resolutions and regional sub-agreements (latter to be discussed in the second part of this “speed cruise”)

– Convention commitments

- * For endangered migratory species listed in Appendix I, Parties that are Range States must endeavor
 - > To conserve and restore important habitats
 - > To prevent, remove, compensate for or minimize the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species (Art. III)
- * For Appendix II listed migratory species, those having an unfavourable conservation status or those which would significantly benefit from international cooperation, Range States are urged to conclude further conservation and management agreements (Art. IV)
- * Numerous marine species have been listed under the Convention, including over a dozen cetaceans under Appendix I and over 20 cetaceans under Appendix II, which may be especially sensitive to MREDs



– CMS resolutions

Various resolutions relevant to offshore renewable energy developments have been adopted by the Conference of Parties, with key ones being

- * Resolution 7.5 on Wind Turbines and Migratory Species (2002)
 - > Notes the special potential risk of marine wind installations
 - † May number several hundred in an offshore wind farm with heights up to 150 metres
 - † May present obstacles to flyways besides many other adverse effects on migratory species
 - > Calls on Parties to, among other things
 - † ID areas where migratory species are vulnerable to wind turbines
 - † To apply comprehensive strategic environmental protection procedures, where major developments of wind turbines are proposed, in order to identify appropriate construction sites
 - † Assess to cumulative environmental impacts of installed wind turbines on migratory species
 - † Take full account of the precautionary principle in the development of wind turbine plants



- * Resolution 9.19 on Adverse Anthropogenic Marine/Ocean Noise Impacts on Cetaceans and Other Biota (2008)
 - > Urges Parties
 - † To control the impact of noise emissions in habitats of vulnerable species and in areas where marine mammals or other endangered species may be concentrated
 - † To consult with marine renewable energy companies and scientific researchers and to recommend best practices for noise pollution avoidance or mitigation



- * Resolution 10.19, Migratory Species Conservation in the Light of Climate Change (2011)
 - > Urges Parties to develop environmental sensitivity and zoning maps that include critical sites for migratory species, as an essential tool for selecting sites for climate change mitigation projects
 - > Calls on Parties and the energy sector to undertake post-construction monitoring of environmental impacts of climate change mitigation projects, especially wind power
 - > Encourages the minimization of mortality of migratory species from renewable energy structures, for example, through short-term shutdowns or modification of turbine speeds



- * Resolution 10.24, Further Steps to Abate Underwater Noise Pollution for the Protection of Cetaceans and Other Migratory Species (2011)
 - > Reaffirms the need for further internationally coordinated research on the impacts of underwater noise
 - > Urges Parties to develop an appropriate regulatory framework or implement relevant measures to ensure a reduction or mitigation of man-made underwater noise
 - > Recommends that Parties use noise reduction techniques for offshore activities such as
 - † Air-filled coffer dams
 - † Bubble curtains
 - † Different foundation types such as
 - ~ Floating platforms
 - ~ Gravity foundations
 - ~ Pile drilling instead of pile driving



- * A further resolution on Renewable Energy and Migratory Species appears likely to be adopted at the 11th CMS COP in November 2014 which may endorse new guidelines
 - > Renewable Energy Technologies and Migratory Species: Guidelines for Sustainable Deployment
 - > Would encourage the application of SEA and EIA to ocean energy projects



+ Convention on Wetlands of International Importance (1971)

Has emphasized the need to consider the protection of wetland ecosystems in the march towards increased renewable energy projects

- Resolution XI.10 on Wetlands and Energy Issues (2012) provides guidance for addressing energy sector impacts on wetlands, including for tidal and wave energy projects, e.g.
 - * Recommending the rigorous application of SEA and EIA processes to proposed renewable energy projects that may alter the ecological character of wetlands
 - * Urging the adoption of a precautionary approach when energy proposals may seriously or irreversibly impact wetlands of international importance





- + International Convention on Whaling (IWC) (1946)
 - The Scientific Committee of the IWC has discussed and studied issues of noise associated with renewable ocean energy projects since 2003
 - The Scientific Committee endorsed the conclusions and recommendations of a 2012 IWC Workshop on Interactions between Marine Renewable Projects and Cetaceans Worldwide, e.g.
 - * A strategic planning approach is required to MREDs taking into account the transboundary nature of cetaceans
 - * A staged approach to developments is also necessary in light of impact uncertainties and in order to be adequately precautionary
 - * An overall noise tolerance for each region and time should be determined that cannot be exceeded with noise limits based on the best available cetacean science



3. Ripples from the IMO

- The IMO is relevant to offshore renewable energy developments in two main ways



- + Countries that wish to route international shipping away from ocean energy structures in the EEZ must work through the IMO for routing measures, e.g. an area to be avoided
- + Countries need to consider IMO's Guidelines for Safety Zones and Safety of Navigation around Offshore Installations and Structures (SN.1/Circ. 295 (2010)) which, among other things,
 - Urge States to show all permanent offshore installations and structures on all appropriate navigational charts
 - Request Governments to depict designated safety zones around offshore structures or installations on navigational charts using the symbols/notes recommended by the International Hydrographic Organization

- The IMO has minimally addressed the issue of noise from ships including those that service MREDs
- + Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life were issued in April 2014 (MEPC.1/Circ. 833) which
 - Emphasize the need for designing the propellers, hulls and onboard machinery of new ships to minimize noise
 - Urge propeller polishing and underwater hull surface cleaning to help reduce noise emanating from existing ships
 - Suggest speed reductions and routing decisions to avoid sensitive marine areas including well-known habitats or migratory pathways of marine life



2. Selected Regional Surgings

• Regional sub-agreements under the CMS

Offshore renewable energy developments, especially wind farms, have also been addressed under four CMS sub-agreements

+ Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)



Besides issuing various resolutions on anthropogenic noise, ACCOBAMS Parties in 2010 adopted Guidelines to Address the Impact of Anthropogenic Noise on Cetaceans in the ACCOBAMS Area

- Through Resolution 4.17
- Guidelines include provisions for coastal and offshore construction works, for example, urging
 - * Scheduling noisy activities to avoid critical periods of cetacean concentrations and migrations
 - * Considering alternative construction technologies
 - * Using noise reduction measures, e.g. bubble curtains
 - * Establishing exclusion zones where noise producing activities would have to ensure the absence of cetaceans before beginning operations

- Guidelines include one paragraph for offshore platforms which is very general in relation to wind farms
 - * Calls for wind farms to be designed and operated to produce the lowest possible noise in all activity phases
- + Agreement on the Conservation of Small Cetaceans of the Baltic and North Sea (ASCOBANS)



- Has also adopted various resolutions on noise and other disturbances to cetaceans
- Most recent resolution on the topic, Adverse Effects of Underwater Noise on Marine Mammals during Offshore Construction Activities for Renewable Energy Production (Res. No. 2, 6th Meeting of the Parties, 2009)

- * Recommends Parties and Range States to undertake SEAs and EIAs prior to authorizing MREDs
- * Requests Parties and Range States to issue precautionary guidelines for renewable ocean energy developments, e.g.
 - > Avoiding construction during high density periods of small cetaceans
 - > Ceasing high noise work when cetaceans are in the vicinity
 - > Alerting small cetaceans to the onset of potentially harmful construction noise
 - > Adopting noise reduction techniques



+ Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)

Parties have issued a key resolution and guidelines relating to renewable energy

- Resolution 5.16 on Renewable Energy and Migratory Waterbirds (2012) urges Parties to undertake various measures to protect migratory waterbirds, such as
 - * Subjecting new renewable energy installation proposals to SEA and EIA
 - * Avoiding sites located in the marine migration corridors of migratory waterbirds which have high bird densities, such as wetlands
 - * Minimizing bird mortalities at marine wind farms, for example by introducing short-term shutdowns during peak migration and minimizing lighting in wind farms
 - * Encouraging the dismantling of wind turbines in existing installations should waterbird mortality have an effect on the population status of a species and mitigation measures have proven to be insufficient

- Guidelines on How to Avoid, Minimize or Mitigate Impact of Infrastructural Development and Related Disturbance Affecting Waterbirds (AEWA Conservation Guidelines No. 11, 2008)

Set out detailed guidance on how to address migratory waterbird concerns in SEA and EIA processes, e.g.

- * Key publications on the bird census techniques and monitoring approaches are referenced
- * Websites relating to waterbird flyways and important habitat sites are provided



+ Agreement on the Conservation of Populations of European Bats (EUROBATS)



Both resolutions and guidelines relevant to offshore wind farms have been developed under the EUROBATS Agreement

- Resolution 6.11 on Wind Turbines and Bat Populations (2010) is the most recent resolution
 - * Emphasizes the reality that several bat species forage offshore and as a result offshore wind farms may negatively affect bat populations
 - * Encourages the use of blade feathering to mitigate bat mortality
 - > Preventing freewheeling
 - > Allowing spinning at very low rpms, generally less than 1 rpm
- Guidelines for Consideration of Bats in Wind Farms Projects (2008) which highlights the need to survey and consider bat migration routes in siting offshore wind turbines
- A draft Resolution 7.4 on Wind Turbines and Bat Populations to be considered at the 7th Meeting of the Parties in September 2014 promises to broaden the mitigation measures to prevent bat mortalities to include
 - * Higher turbine cut-in wind speeds
 - * Shutting down turbines

- **Regional sea initiatives and provisions**

- + Northeast Atlantic



OSPAR Commission has published both guidelines and various impact assessments relevant to MREDs

- Guidelines

- * OSPAR Guidance on Environmental Considerations for Offshore Wind Farm Development (2008) provides general directions for addressing environmental and conflict of use issues in the five main stages of offshore wind farms
 - > Location
 - > Licensing
 - > Construction and operation
 - > Monitoring
 - > Removal/decommissioning

- * Guidelines on Best Environmental Practice (BEP) in Cable Laying and Operation (2012)
 - > Highlight the risk of electromagnetic fields generated by power cables especially to elasmobranchs (sharks and rays)
 - > Recommends the application of the precautionary principle and appropriate mitigation measures such as
 - † Burying cables to avoid impairment of marine species by electromagnetic fields
 - † Routing of cables away from protected or sensitive marine areas
- Key OSPAR assessments include
 - * Assessment of the Environmental Impact of Offshore Wind Farms (2008)
 - * Assessment of the Environmental Impacts of Cables (2009)
 - * Assessment of the Environmental Impact of Underwater Noise (2009)



+ Mediterranean

The revised Barcelona Convention (1995) and the Protocol on Integrated Coastal Zone Management (2008) set overarching legal frameworks for addressing MREDs

- Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean sets out various obligations of Contracting Parties including
 - * Applying the precautionary principle to prevent environmental degradation
 - * Undertaking EIAs for proposed activities that are likely to cause a significant adverse impacts on the marine environment
 - * Promoting cooperation between/among States in EIA procedures relating to activities that may have significant transboundary impacts
 - * Committing to promote integrated management of coastal zones
 - * Taking all appropriate measures to protect and preserve marine biodiversity



- ICZM Protocol calls on Parties to
 - * Take an ecosystems approach to coastal planning and management
 - * Subject proposed infrastructure and energy facilities to authorizations where negative impacts are minimized or, where appropriate compensated by non-financial measures



Conclusion

Two nautical images help capture the present state of international law and policy developments relating to MREDs and future directions



- **Tangled currents**

A fragmented array of international agreements, resolutions and guidelines has emerged relevant to ocean renewable energy development and management

- **Unfinished voyages**

- + With MREDs expected to substantially increase in the future, global and regional law and policy responses will continue to evolve
- + National implementations of global and regional commitments will be a continuing challenge
- + A looming issue is the possible migration of offshore ocean renewable energy projects to areas beyond national jurisdiction, e.g. to exploit major ocean currents

- Whether a freedom of the seas regime will continue to apply to such developments remains to be seen
- Discussions are continuing within the United Nations over the need for a further agreement on the conservation and sustainable use of marine biodiversity beyond national jurisdiction
 - * The Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction has been convening meetings since 2006 with possibly a final one in January 2015
 - * To date the major issues subject to debate have been
 - > Access and benefit sharing of marine genetic resources of the high seas
 - > Marine protected area designations on the high seas
 - > Environmental impact assessment responsibilities and procedures in areas beyond national jurisdiction
 - > Whether a further implementation agreement on marine biodiversity beyond national jurisdiction will be adopted remains uncertain and if so, whether future ocean renewable energy developments will be specifically addressed remains doubtful



- The international law and policy seascape governing ocean renewable energy activities is far from settled!



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- * The research assistance of Sarah McDonald, JD candidate, Schulich School of Law, is greatly acknowledged.