Theme session Report

Co-existence of sustainable fisheries and offshore wind energy development – lessons learned

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In parts of Europe, wind energy projects have been in place for 20 years and new developments continue to be proposed, planned, and constructed. In other countries, wind energy development is just starting with multiple areas proposed for leasing and construction. Therefore, a better understanding of the interactions between wind development and other ocean uses as well as broader ocean ecosystems services is necessary. Offshore wind development activities in Europe and the United States have been challenged to effectively address fisheries considerations, cumulative impacts, and establishment of regional ecosystem-scale monitoring and research enterprises to understand key interactions. Further, potential opportunities such as co-locating opportunities of offshore wind farms with other activities should be considered and further investigated in light of minimizing overall environmental impacts and maximizing benefits. The co-existence of renewable energy with sustainable fisheries and aquaculture is critical, not for the future of offshore energy, because this is a political decision that has already been made, but for the future of food production and cultural traditions.

This session aimed to collate the current knowledge of risks or benefits of offshore wind farms on sustaining existing fisheries and the potential use of, or interactions with, any newly available marine resources through fisheries and aquaculture. We further acknowledged the complexity of social-ecological systems' interconnections and made progress towards the assessment of trade-offs around the exploitation of marine resources within offshore wind farms. The session attracted a great variety authors, covering all topics from the field of siting and monitoring up to the question of co-location or multi-use of offshore wind farms. We had 20 authors from the US, Uk, Norway, Germany and Denmark and nearly the half of them were Early Career Scientists.

Content

We have subdivided our session into three sections: i) Siting & Monitoring, ii) Management, participation, and fisheries impacts, and iii) Future benefits and trade-offs.

i) Siting and Monitoring

The first part of the session addressed topics in siting and monitoring of wind energy development, including best practices for location, construction, operations, and decommissioning, mitigation, and monitoring. Many interesting research projects

demonstrated progression in this field of study in recent years, although issues remain vast. It is clear that initial project siting is very important in mitigating fisheries impacts, but participants did not identify any examples of countries with effective processes for incorporating diverse perspectives into the siting process. Withouk et al., Roach et al., and RODA referenced the need for siting of arrays and their orientation of turbines and cables to be discussed with wider stakeholders but predominantly the main users of the proposed area. This engagement is difficult to attain and more importantly maintain throughout the life of a project and needs to be included from the very start of a project. Differences were noted between regions in the sense that projects in Europe are often viewed as de facto marine protected areas, while that is not the case in the US or UK, and it is important to be clear about project design and regulations when comparing study results across regions.

Several studies in the session contributed to specific knowledge gaps around offshore wind effects. Roach et al. highlighted interesting results where a suspected negative effect on a lobster fishery was expected but not observed. Frey et al. discussed innovative ongoing data collection to characterize cod spawning in planned offshore wind areas, while Gimpel et al. suggested increased diversity of food sources for cod associated with turbine bases. Providing broader context, Secor et al. and Methratta discussed that the current methods used to monitor offshore wind effects do not necessarily capture the information required to understand the wider effects of its continuous expansion, an effect referred to by Methratta and others as “data rich, information poor.” This may be because monitoring projects are only commissioned when a potential issue is highlighted in impact assessments or other permitting processes, leading to individual, localized studies that may be of high caliber but do not consider the wider ecosystem or cumulative effects due to limitations around funding. The need for a more information-rich approach applies beyond ecological effects to socioeconomic ones as well. Fishermen’s ecological knowledge is a necessary contribution to the information needed to inform siting, as exemplified with the Roach et al. study that was conducted in collaboration with the fishing industry.

ii) Management, participation, and fisheries impacts

The second topic of the session aimed at summarising the current knowledge on the effects of offshore development on marine species and habitats and therefor the impacts on fishing communities, including commercial and recreational fisheries. The contributions revealed that understanding fishery behaviour is one of the key challenges in the prediction of reallocation of fishing efforts or economic impacts. Agent-based models provide the means to understand the levers for fishing effort allocation (Scheld et al.). Advanced spatial explicit analysis of trade-offs between economic, ecological and socio-cultural values (Bates et al) can further provide the means to communicate planning options and the related trade-offs. Further, in contrast to the classical before-after-control monitoring design studies (Secor et al.) have shown that before-after gradient design (BAG) advanced the understanding of

coastal wind farm impacts to migratory and sedentary fishes. Next to the choice of monitoring design the choice of spatial data is key for a sound impact assessment (Galuardi et al.). Hence, fishery dependent data were seen as a key component to monitoring present and future effects on the fishing industry of offshore wind development. Once projects are constructed, the nature of data received from fishing vessels changes. It was noted there should be added focus on integrating current fishery dependent data streams with those that are specifically geared towards monitoring, such as study fleets and wind developer-funded surveys and data collection initiatives.

In terms of participation and best practice guidance, analogies of finding conflict resolution between for instance the Norwegian petroleum industry and fisheries should be accounted for (Aarbakke et al.). While in some countries such as Portugal financial compensation has been offered to the fishing industry (Braga et al.), in the US participatory approaches in developing conflict solutions have been initiated by the fishing sector (e.g. RODA; Bachmann et al., Hogan et al.). The need to align a robust science base with a participatory management process is also reflected in initiatives such as Responsible Offshore Science Alliance (ROSA) which aims to establish regional research and monitoring for offshore wind and fisheries in the US (Dunton et al.). Such regional initiatives need to feed in fora for mutual learning such as ICES where international expertise in drawn together (Lipsky et al).

iii) Future benefits and trade-offs

The last part of this session highlighted the opportunities to benefit from marine resources from offshore wind farms, associated with economic and marketing aspects of those “new resources”. It further covered the topic of „Tradeoffs“ in between those benefits and the respective fisheries management issues related to it. Co-locating offshore wind farms with passive (static) fishing techniques or aquaculture as described by Ivana Lukic can allow for co-existence of both sectors. However, such concepts are implemented differently in European regions. In the UK example presented by Mike Roach, fisheries are not excluded from offshore wind farms apart from the construction or maintenance periods. The opportunities of new fisheries such as the brown crab fishery discussed by Vanessa Stelzenmuller can also be seen as an opportunity for co-existence between sectors providing the legislative framework allows for such and the fishery is economically viable. Both authors presented results related to small-scaled effects, which have already positive impact on local fisheries who adapted to new conditions and the co-existence of the sectors. Obviously there is a desire to co-locate aquaculture, fisheries or offshore wind in other regions as well, as described by Anoek Meijer for Norway, to address some of the socio-cultural concerns of the coastal communities that can be affected by the developments.

Conclusions

We invited case studies, practical experience and approaches on how to inform trade-offs to summarise the lessons learned on how to balance Blue Growth, fisheries and wind energy activities, and marine conservation. We experienced wide international interest both inside (especially WGOWDF and WGSOCIAL) and outside the ICES community with interests in the design, collection and processing of wind farm monitoring data, wind farm effects, aquaculture, fisheries management and fisheries/aquaculture economics.

Many of the presented studies referred to bottom-up initiatives – in terms of monitoring approaches or stakeholder engagement processes. While the science and approaches are advancing at rapid pace there seems to be a general lack of management capabilities to guide the development of co-existence solutions.

Maritime spatial planning or ocean planning are the leading marine governance processes that aim to address spatial use conflicts and to support an ecosystem-based management through the orchestrated regulation of human activities. There is a clear role for ICES and expert groups such as WGOWDF to bring the scientific progresses in relation to varied impacts and interactions across locations, species, and user groups to the attention of decision-makers. This requires also further standardisation of tools and case studies to deliver best practice guidance that can be taken up by prevailing management processes. Such best practice guidance needs to be applicable at various geographical scales and socio-ecological setting since co-existence solutions are context dependent.