Wildlife and Countryside LINK

Technological Innovations and Climate Change: Tidal Power

Evidence for the Environmental Audit Committee: December 2020

Wildlife and Countryside Link (Link) is the largest environment and wildlife coalition in England, bringing together 58 organisations to use their strong joint voice for the protection of nature.

Introduction

1. We welcome the Committee's consideration of the potential effects of a significant number of tidal power generation plants in UK waters, including the impact this could have on the environment.

2. The Link Marine Mammals Group works to ensure better protection of marine mammals. Our response answers the question posed in the Committee's Call to Evidence on the environmental impacts of tidal power, looking at marine mammals specifically. The impact of tidal power on marine mammals can be overlooked and we hope that the provision of evidence on this specific point will help the Committee build up a fuller picture of the environmental impacts of tidal power.

3. Consideration of these impacts should be prefaced by an understanding of the vulnerability of marine mammals in UK waters. Populations are already under severe pressure from fishing bycatch, with recent estimates suggesting that over 1,500 harbour porpoises and common dolphins and 400 seals fall victim to bycatch each year[1], and from pollution; for example one of the UK's orca populations has not reproduced in 25 years due to chemical pollution affecting their reproductive system[2]. There is a very limited capacity for these species to absorb further detrimental impacts from further human activity at sea and Link members would also be concerned about any possible welfare effects.

4. If we are to avoid negative impacts, tidal power must be shown to be benign for marine mammals before major expansion can take place. We note that there is currently very little information upon which to make such judgements. Would, for example, the development of an underwater turbine energy generation plant near to a seal breeding area cause mortality or displacement or otherwise damage the suitability of the habitat to support these animals? Similarly, what is the collision or displacement risk to cetaceans from such developments?

5. Until these and similar questions can be answered with confidence, the precautionary principle should be applied, with developments not being consented within important habitats or protected areas. We are hopeful that an improved knowledge base will allow for marine mammal impacts from tidal power to be addressed and enable tidal power to expand.

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[1] https://www.wcl.org.uk/docs/Link_bycatch_parliamentary_briefing_Feb2020.pdf

[2] https://www.wcl.org.uk/assets/uploads/img/files/Wildlife_and_Countryside_Link_Ocean_Recovery_Manifesto.pdf

Climate change is a key contributor to marine mammal species decline and a shift to cleaner energy is vital to reducing this pressure on vulnerable populations[3].

What are the environmental impacts of tidal schemes and how can these be minimised?

6. Emerging evidence suggests at least three significant negative consequences from tidal power for marine mammals – increased risk of collisions, reductions in listening space and other issues relating to noise and disturbance, such as displacement from important habitats.

7. A 2017 study published in the International Journal of Marine Energy[4] suggested that collisions with tidal power elements, although rarely observed, could represent a risk for marine mammals, with underwater moving parts posing a direct danger to mammals in transit. Displacement, the energy required to avoid collisions, represents a further detrimental effect. Direct observation and close monitoring of collisions and displacement is very challenging due to tidal conditions and often turbid waters around tidal power projects. We can expect negative impacts to change as the scale of developments increase, from single and a few devices, to arrays of tens or hundreds of devices as increasingly proposed. Monitoring must continue to capture these changes.

8. Operational noise impacts are more measurable. A 2019 study, published in Renewable and Sustainable Energy Reviews[5], concluded that underwater noise from tidal turbines interfere with important marine mammal biological signals, reducing their 'listening space' and potentially preventing communication and foraging. The study found that, for harbour seals, listening space reduced by over 80% within 60 metres of a tidal turbine.

9. Further detrimental aspects of tidal energy generation relate to the powerful noises that might be associated with construction, for example if pile driving is used, and the chronic noises and other disturbances associated with operation of energy plants, including the operation of maintenance craft in the area of the turbines. These issues were highlighted in the journal Wildlife Research in 2010[6].

10. The combination of collision risks and noise impacts appear to lead to a reduction in marine mammal abundance in the vicinity of tidal power sites. A 2019 study, published in the Journal of Ocean Technology[7], found that there was significant decrease in harbour porpoise activity when a tidal turbine in the Bay of Fundy (Nova Scotia) was operational.

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[3] http://www.mccip.org.uk/media/2022/19_marine_mammals_2020.pdf
[4] https://www.sciencedirect.com/science/article/abs/pii/S2214166917300590?via%3Dihub
[5] https://www.sciencedirect.com/science/article/abs/pii/S1364032118308190?casa_token=LMHi2isy6voAAAAA:ejMYsnv3-23UrqddNX-6uH3p_aR2TmAZXV2uuu47lkloQbvtxXBtfW479H0wyzsSj9kYvQ62mAI
[6] M. Simmonds and V. Brown (2010) Is there a conflict between cetacean conservation and marine renewable-energy developments?, Wildlife Research 37: 688-694
[7] https://www.researchgate.net/publication/335404942_BASELINE_PRESENCE_OF_AND_EFFECTS_OF_TIDAL_TURBINE_INSTALLATION_AND_OPERATIONS_ON_HARBOUR_PORPOISE_IN_MINAS_PASSAGE_BAY_OF_FUNDY_CANADA

11. The emerging evidence strongly suggests that extensive further research is needed to better understand the impacts of tidal power on marine mammals. As observed in the 2020 State of the Science report, an international research summary on marine renewable energy (MRE) impacts, *''the interaction of marine animals with tidal and river turbines remains the least understood aspect of potential MRE effects and has been hampered by the inability to observe these interactions''*[8]. It is for this reason that ORJIP Ocean Energy, a UK-wide collaborative programme of environmental research on wave and tidal energy, proposed ten separate research streams on marine species impacts in its 2020 list of critical evidence needs for the industry[9].

12. ORJIP Ocean published a further paper in 2020[10], setting out how some research could be co-ordinated to lead to better outcomes. Highlighting the *''differentiating aims between the monitoring being completed by technology developers/project developers and the fundamental research for the sector being conducted by academic institutions''*, the paper proposes industry and academic agreement to share raw data on the impact of tidal power on marine species, supported by the adoption of central templates and guidance to assist with the comparison and collation of such data.

13. More aligned and more accessible monitoring data will increase our understanding of the impact of tidal power on marine mammals. Research, to be published in the Journal of Environmental Management in January 2021[11], suggests that simulation-based modelling could be of helpful in clarifying collision risks, with simulations allowing for more accurate modelling of how complex mammal movements can interact with tidal energy devices, although such modelling is itself dependent on the accuracy of our understanding of interactions between marine mammals and devices.

14. We do not have good understanding of the population status or Good Environmental Status of many coastal cetacean populations. An increase in baseline monitoring is critical to fully understand population status in decision making around tidal developments and should be delivered alongside tidal power specific research.

15. Both baseline monitoring data and tidal power specific research should inform strategic marine planning decisions. Link has proposed that the marine planning system be overhauled to operate at a strategic level, rather than on a project-by-project basis[12]. This change would enable more evidence-based decision making, and the alignment of competing needs behind the twin goals of meeting carbon budgets and supporting healthy and wildlife-rich seas.

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[8] https://tethys.pnnl.gov/publications/state-of-the-science-2020

[9] http://www.orjip.org.uk/sites/default/files/ORJIP%20Ocean%20Energy%20critical%20evidence%20needs%20document_V2.pdf

[10] http://www.orjip.org.uk/sites/default/files/ORJIP%20Ocean%20Energy%20%20Sharing%20Environmental%20Monitoring%20Data%20V2.pdf

[11] https://www.sciencedirect.com/science/article/pii/S0301479720314092

[12] https://www.wcl.org.uk/docs/Dear%20Prime%20Minister%20-%20marine%20renewables_13%20November.pdf

Marine energy infrastructure, including tidal power, can be designed sensitively for nature if a transparent and evidence driven system of strategic and spatial planning of marine energy and associated grid infrastructure is in place.

Conclusions

16. Emerging evidence suggests that tidal power can have negative impacts on marine mammals. This necessitates extensive further research to understand those impacts. We note the ORJIP Ocean Energy paper on sharing environmental data, which suggests that an alignment of industry and academic studies could help to provide this research.

17. It is essential that greater understanding of impacts is embedded in strategic marine decision making, with any proposed tidal power projects being planned using high-quality data on species impacts, and with evidence-led mitigation delivered where possible.

18. Greater understanding of tidal power impacts on marine mammals, and the embedding of this knowledge into marine planning frameworks, is a crucial pre-condition for the expansion of tidal power in the UK. If this condition can be met, the UK could generate significant tidal power whilst protecting marine mammals. Conversely if the UK proceeds without a proper understanding of impacts, the reputation of the industry could be tarnished, and marine mammal conservation and welfare adversely affected.

19. The high energy zones which may be attractive for the development of tidal energy generation plants may also be very important for marine wildlife, for example as key feeding or breeding areas, so very careful consideration needs to be given to location.

20. Given the role marine mammals play in marine ecosystems and our developing appreciation of their role in carbon storage[13], and the impact that climate change is having on marine mammal populations, an evidence-driven and strategic approach to marine planning for tidal power could deliver significant co-benefits for climate and nature alike.

For questions or further information please contact:

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[13] https://www.wcl.org.uk/assets/uploads/img/files/Link_OR_briefing_restoring_carbon_sinks.pdf