The Institute of Acoustics
Response to the Offshore wind energy – draft updated Sectoral Marine Plan 2025

Introduction

The Institute of Acoustics (IOA) is the UK's professional body for those working in acoustics, sound, noise and vibration. The IOA has some 3000 members from diverse backgrounds, with engineers, scientists, educators, lawyers, occupational hygienists, architects and environmental health practitioners among their number. This multidisciplinary culture provides a productive environment for cross-fertilisation of ideas and initiatives. The range of interests of members within the world of acoustics is equally wide, embracing such aspects as aerodynamics, architectural acoustics, building acoustics, electroacoustics, engineering dynamics, noise and vibration, hearing, speech, underwater acoustics, together with a variety of environmental aspects.

Many members of the IOA regularly carry out noise impact assessments that contribute to the planning process in Scotland. Therefore, any proposed changes to the Sectoral Marine Plan could directly affect the work of our membership both as consultants assisting developers with their planning applications and as regulators evaluating proposals.

Background

The assessment of both airborne and underwater noise from offshore wind developments is an essential part of the planning process, one where our understanding of the potential effects has significantly increased in recent years but is still evolving. It is vital though to ensure that processes are in place to bring forward renewable energy schemes without significant impacts and are consistent with Government objectives.

The IOA is delighted to provide comments on the proposed changes where it is covered by the expertise and experience of our membership.

Response to Specific Proposed Reforms

5. Do you have any comments on how environmental impacts could be mitigated?

The IOA consider the draft SEA allows for suitable provision for the mitigation of airborne and underwater noise.

6. Do you think the monitoring of environmental impacts of the draft Plan should be overseen by existing expert groups, or should a new expert advisory group be established for this purpose?

Regarding noise impacts, the IOA consider existing practices for monitoring and regulating noise impacts are considered to be sufficient.

8. Do you have any suggestions for how evidence should be shared and/or fed into strategic research programmes?

The IOA would recommend that a dual-aspect repository is set up to store:

i) All measured noise data associated with offshore projects (such as pile installation, etc.) Data and metadata should be standardised. This would be an invaluable resource for further studies and to further knowledge

ii) A maintained store of current relevant research to align practices in environmental impact assessment and to support practitioners and regulators.

10. If you have any further comments or points that you think should be taken into account in the plan, please provide those below.

Throughout the Draft Updated Sectoral Marine Plan for Offshore Wind Energy, a number of similar statements are made relating to the potential for effects on marine mammals due to displacement or barrier effects as a result of underwater noise. The potential effects on marine mammals from underwater noise are not limited to displacement and barrier effects. The IOA recommends that broader terminology is adopted to account for the range of potential effects that marine mammals could be subject to.

The IOA is aware of a number of best practice, national and international standards and guidance which are of relevance to the assessment of underwater noise. These are listed below for completeness.

Good Practice Guides

Good Practice Guide for Underwater Noise Measurement, National Measurement Office, Marine Scotland, The Crown Estate, Robinson, S.P., Lepper, P. A. and Hazelwood, R.A., NPL Good Practice Guide No. 133, ISSN: 1368-6550, 2014.

Best Practice Guide for Underwater Particle Motion Measurement for Biological Applications (Nedelec et al 2021) Technical report by the University of Exeter for the IOGP Marine Sound and Life Joint Industry Programme.

Published ISO standards:

ISO 17208-1:2016 Measurement of ship noise – Part 1: Requirements for deep water measurements used for comparison purposes

ISO 17208-2:2019 Measurement of ship noise – Part 2: Determination of source levels in deep water

ISO 18405:2017 Underwater acoustics – terminology

ISO 18406:2017 Measurement of radiated underwater sound from percussive pile driving

ISO 7447:2024 In-situ determination of the insertion loss of barrier control measures for underwater pile driving

The following will be published in a few months' time.

ISO 17208-3:2025 Quantities and procedures for description and measurement of underwater sound from ships — Part 3: Requirements for measurements in shallow water

ISO 7605:2025 Measurement of underwater ambient sound

The following are ongoing projects (publication within 3 years).

ISO 23990 Underwater acoustics — bio acoustical terminology (in preparation)

ISO 25796 Measurement of sound particle motion and seabed vibration for biological applications (in preparation)

IEC NWIP Measurement of radiated underwater sound from underwater explosions (planned new work item)

The following are IEC standards, mainly on instrument calibration:

IEC60050-8-1-32: International Electrotechnical Vocabulary Part 32 (Underwater acoustics) (published April 2021)

IEC 60565:2020 Calibration of hydrophones Part 1: Procedures for free-field calibration

IEC 60565:2019 Calibration of hydrophones Part 2: Procedures for low frequency pressure calibration

IEC 63305:2024 Calibration of acoustic wave vector receivers in the frequency range 5 Hz to 10 kHz

New work items planned:

IEC NWIP Calibration of underwater acoustic recorders and digital hydrophones (planned new work item)

14. Do you have any comments on the Strategic Environmental Assessment Environmental Report?

- Pg 179 reads "Implementation of noise abatement measures at source, where feasible and effective to do so, to reduce the input of anthropogenic noise into the environment and potential displacement effects". We suggest that the word 'displacement' is changed to 'negative'.
- Pg 324 reads "*It is likely that piling noise during construction will affect local populations, and as such temporal restrictions on piling activity to avoid antisocial hours could be considered.*" Other mitigations might be available, and a more general description may be appropriate here. We would suggest "*It is possible that piling noise during construction will affect local populations. As such, mitigation, which could take the form of physical mitigation systems, or temporal restrictions to avoid more sensitive periods, could be considered."*
- Pg 324 reads *"In addition different turbine designs will require different degrees of piling, and therefore consideration of foundation design has the potential to reduce airborne noise."* Typically, it is the turbine foundation design which impacts the piling methodology. It is recommended that this section is amended to read: "*In addition different foundation designs will require different degrees techniques for piling, and therefore consideration of foundation design has the potential to reduce airborne noise.*"
- Pg 324 discusses Population and Human Health relating to N4. The IOA recommend in relation to the mitigation and residual effects column that:
    - Modelling of airborne sound should account for the propagation of sound over water.
    - The current text doesn't sufficiently acknowledge that operational noise may also require mitigation. At 5 km, the operational noise levels will need, as a minimum, to be predicted appropriately and assessed. Should significant effects be found, mitigation should be implemented.
    - The Standard Marking Schedule for Offshore Installations[1] requires that offshore installations are installed with an audible fog signal. These fog signals are required to have a "usual range" of two nautical miles, calculated in accordance with IALA Guidance R0109[2]. This range relates to audibility on a vessel, with vessels being louder than the shore. As a result, commercially available systems can result in levels of around 50 dB $L_{Aeq,T}$ at 5 km during downwind conditions[3]. The SEA should also clarify that the impact of fog signals is also required to be assessed.

[1] Department of Energy and Climate Change (2011), Standard Marking Schedule for Offshore Installations, DECC 04/11.
[2] IALA (1998), The Calculation of the Range of a Sound Signal, R0109 (E-109), Edition 1.1.
[3] Leiper, A (2024), Bang, Bang, Beep – Non-operational Airborne Sound from Offshore Windfarms, Proceedings of the Institute of Acoustics.

15. Do you have any comments on the Habitats Regulations Appraisal Appropriate Assessment Information Report?

Section 7.2.23 states: *"Cumulative SEL is calculated from the energy in a representative single pile strike and the number of strikes over a 24- hour period. This measure assumes that all strikes have the same received single strike SEL value, which is rarely the case since the animal (or source) is likely to be moving relative to each other. It also assumes that the animal is stationary within the zone of potential effect for a 24-hour period which is highly unlikely*".

Cumulative SEL is typically calculated with the assumption that the receiver is fleeing from the source (EIAs to demonstrate this available on request). For example, assessments in support of EIAs do not typically consider a marine mammal receiver is stationary during the installation of a pile. Additionally, the predicted levels typically account for the variation in source level throughout the installation campaign and are therefore not the same SEL value for each strike (EIAs to demonstrate this available on request, note that this approach is consistent with the Scottish Government recommendations[4]).

Conclusion

In summary, the proposed changes to the Sectoral Marine Plan look to promote good practice in the assessment of offshore noise and vibration, with the additions making a clear contribution where additional source specific requirements are provided.

If officials would like to explore further any of the points raised, relevant members of the Institute would be delighted to meet with them.

This response has been prepared by members of the Institute who are experienced practitioners in this area. The response has been approved by the Institute's Governing Council.

Institute of Acoustics,
Silbury Court,
406 Silbury Boulevard,
Milton Keynes,
MK9 2AF
United Kingdom

Tel: +44 (0) 300 999 9675
Email: ioa@ioa.org.uk

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[4] Wood, M.A., M.A. Ainslie, and R.D.J. Burns (2023). Energy Conversion Factors in Underwater Radiated Sound from Marine Piling: Review of the method and recommendations. Document 03008, Version 1.2. Technical report by JASCO Applied Sciences for Marine Scotland.