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Response to the DESNZ consultation on ETSU-R-97 2025

1. The Renewable Energy Foundation (REF) is a UK charity that publishes data and analysis on the renewable energy sector. For many years we have been concerned that the standards of wind farm noise guidance have been so inadequate that they have resulted in the unnecessary sacrifice of the tranquillity of the countryside and the amenity of nearby residents. Our reports, based on analyses of real-world wind farm noise data, provide clear evidence of this problem and include:

- A critique of the IoA treatment of background noise (https://www.ref.org.uk/publications/255-ioa-critique)
- A test of the efficacy of the RUK AM condition (https://www.ref.org.uk/publications/310-the-efficacy-of-the-ruk-am-condition)
- REF consultation response to IoA on ETSU-R-97 (https://www.ref.org.uk/publications/274-ref-consultation-response-to-ioa-on-etsu-r-97)
- The Den Brook Amplitude Modulation Noise Condition (https://www.ref.org.uk/publications/242-the-den-brook-amplitude-modulation-noise-condition)

2. We have observed that acousticians representing the wind industry have repeatedly denied the existence of noise problems. For instance, amplitude modulation (AM) was routinely dismissed at public inquiries, and proposals for AM noise conditions were rejected on the grounds that complainants could instead pursue statutory nuisance cases. At one inquiry, when asked whether the increasingly byzantine noise conditions put forward by the industry had ever been tested and shown to capture actual breaches, the wind farm's acoustician declined to answer.

3. It is no surprise that the public's perception of wind farm noise guidance is wholly negative and the expectation that it will protect them from a very significant loss of amenity should a wind farm be built near their houses is non-existent.

4. This new incarnation of ETSU-R-97 appears to concentrate on licensing a nuisance rather than regulating it and represents another missed opportunity which should be a matter of serious concern for the Government. Without the public's confidence that they will be treated fairly and with respect, the net zero project will continue to struggle.

Question 1. Do you agree with our proposed approach of using a single 'limit', which takes the minimum of the day and night limit at each wind speed and applies at all times? Please explain your answer and provide supporting evidence.

5. The existing ETSU-R-97 guidance whereby wind farms are permitted to make more noise at night time than during the day is so egregious that it is understandable that the authors have been embarrassed into recommending replacing it with a single limit. However, the problem is that the single limit now proposed is an increase on the previous daytime limit, thus permitting even more noise at neighbouring properties.

6. Furthermore, the suggested limit is based on the IoA methodology which we demonstrated was statistically illiterate and flawed in https://www.ref.org.uk/publications/255-ioa-critique. We showed that use of the so-called 'standardised' wind speed uses a mathematical transformation to convert wind speeds at turbine hub height to 10m assuming an arbitrary wind shear which rarely occurs in reality. This results in significantly higher noise condition limits for neighbours than the original ETSU-R-97 specified. During periods of high wind shear which are common in the evening and at night, we show using actual data that turbine noise can routinely be 10dB and more above background noise yet still meet the IoA noise condition predicated on a 'standardised' wind speed.

7. A 10dB increase above background represents a very large adverse impact that inevitably would trigger complaints from neighbours. However, when assessed using the 'standardised' wind speed approach, such an increase does not constitute a breach of the IoA noise condition.

Question 2. Do you agree with our proposal to raise the lower value for the day-time noise limit range to 37 dB? Please explain your answer and provide supporting evidence.

8. No. The existing ETSU-R-97 has a lower limit of 35 dB (LA90) which was claimed erroneously in that document to be derived from the level recommended by WHO and other organisations for the restorative process of sleep. In fact, the WHO level is 35 dB (LAeq) which means the original ETSU-R-97 level should have been 33 dB (LA90) using the LA90 metric. The new recommendation of 37 dB (LA90) is, thus, an increase of 4 dB more than the original benchmark which was the based on the restorative process of sleep.

9. Furthermore, measurements of background noise in quiet rural areas routinely fall to 20 dB and lower. A lower limit of 37 dB could result in an increase in background noise of 17dB which represents a very substantial and unjust loss of amenity for such currently tranquil areas.

Question 3. If you do not agree with the proposed approach of using a single 'limit', what would you suggest as an alternative approach and why? Please include discussion of the appropriate dB noise criteria for your suggested approach and provide supporting evidence.

10. BS4142 already exists and provides readily quantifiable, reasonable criteria for protection of amenity. Using the classification of impacts in that guidance, if the wind farm noise levels should be 10dB or more above the measured background at the neighbouring property, it is classified as "*significant adverse*" and if 5 dB above it is an "*adverse impact*". The previous iteration of BS4142 classified these two situations as "*complaints likely*" and "*complaints marginal*".

11. We suggest that wind farm noise 'limit' should be 5 dB over background levels at neighbouring properties and that BS4142 be the mechanism for establishing compliance.

12. There are many clear advantages to this alternative. It is straightforward, relatively easy and comparatively economical to test compliance, taking less than a day whereas the ETSU-R-97 alternative can take months for testing. It is not complicated and is readily understandable by the public and non-acousticians. Consequently, it would be perceived as fairer than the ETSU-R-97 methodology which is so complex, opaque and over-engineered that a reasonable person would be justified in being suspicious that it is tailored to achieve an outcome in the wind farm's favour.

13. The BS4142 method removes all the controversial difficulties inherent in the ETSU-R-97 methodology by not needing to measure wind speeds at the turbine site, wind shear at the turbine site, and the statistically-incorrect, manipulated background levels attributed to the neighbouring property. Given that much of this data is in the control of the wind farm operators and not available to the complainant, neighbours might reasonably conclude that the ETSU-R-97 allows the wind farm to mark its own homework in the event of noise complaints.

Question 4. Do you think the updated guidance provides adequate advice for assessing and controlling the impact of Amplitude Modulation? Please explain your answer and provide supporting evidence.

14. The guidance fails utterly to provide adequate advice on assessing and controlling AM. There is no detailed guidance on how to measure AM in the revised ETSU-R-97 document – instead it cross-refers to a separate, 76 page report (Reference 6 in the document) which describes an overly complex methodology requiring bespoke software to be written or purchased commercially.

15. The methodology described in Reference 6 is a second iteration of the methodology which the Renewable Energy Foundation tested in the report at https://www.ref.org.uk/publications/310-the-efficacy-of-the-ruk-am-condition. In our report we used real world data for two wind farm sites at Swaffham and Askam.

16. The Askam data formed part of a Government-sponsored study into wind turbine noise carried out by the Hayes Mackenzie Partnership (HMP) and released following a Freedom of Information request. The study by HMP reported that the audibility of the high levels of AM, with peak-to-trough levels of up to 5-6dB inside dwellings, caused sleep problems at night for the Askam neighbours. This resulted in a recommendation that overall wind farm noise levels should be

reduced at night with additional penalties where noise contained high levels of AM. The complaints about and measurements of AM at Askam were the trigger for subsequent Government and industry work on the impacts of AM and thus it is obvious that a reasonable test of a proposed AM noise condition is whether it is breached by the Askam noise data collected for the 2006 Government report. In other words, if the Askam data does not breach the condition, the condition can hardly be expected to offer any significant degree of protection to residents.

17. We found that neither the Swaffham data which had peak-to-trough AM variations of 10 dB, nor Askam with the 5-6 dB peak-to-trough variation measured indoors by the Hayes McKenzie Partnership resulted in a breach of the proposed AM condition.

18. We concluded that that AM methodology does not offer to wind farm neighbours any realistic or significant protection against AM disturbance.

19. One would have expected that the next iteration of AM methodology proposed by the noise working group members would be tested against well-known, real-world sites with AM problems such as Askam or Deeping St Nicholas or Cotton Farm. Although the report claims to have tested the methodology against "various wind turbine developments" and synthesized stimuli, it does not name any specific real-world sites in the main text so this claim cannot be independently verified.

20. It would be wholly unreasonable to enshrine in wind turbine guidance an absurdly complex methodology requiring expert measurement and interpretation of bespoke software that has not been independently demonstrated to achieve its aim using publicly available real world data.

21. The existence of problematic AM noise from wind farms has been common knowledge for decades (Askam wind farm was commissioned more than 25 years ago) and yet the acousticians tasked with assessing and controlling this noise are still no nearer a simple, straightforward, workable test.

22. There is an obvious solution and that is to use BS4142 which is already designed and used for controlling noise having specific acoustic features such as AM.

Question 5. Do you agree with the other technical updates to the 'Draft Assessment and Rating of Wind Turbine Noise Guidance'? Please explain your answer and provide supporting evidence.

23. We are particularly concerned that the guidance endorses the use of the so-called 'standardised' wind speed. Our study (https://www.ref.org.uk/publications/255-ioa-critique) using real world data showed that using these hypothetical wind speeds results in significantly higher noise limits at neighbouring properties particularly during times when wind shear is higher than that mandated in the new guidance. During periods of high wind shear which are common, especially in the evening and at night, we show that turbine noise can routinely be 10dB and more above

background noise yet still meet the IoA noise condition predicated on a 'standardised' wind speed.

24. The justification of using this atypical wind shear factor to set background noise levels because it is used in another standard for another purpose altogether makes no sense.

25. This change to ETSU-R-97 means that more noise is permitted under the new proposed guidance than was permitted under the old version of ETSU-R-97 before taking into account the increase in the lower limit from 35dB to 37dB.

Question 6. Do you have any further comments on the proposed updates to the 'Draft Assessment and Rating of Wind Turbine Noise Guidance' that you wish to make Government aware of? Please explain your answer and provide supporting evidence.

26. The guidance fails to comply with a requirement for sustainable development where sustainability is the standard definition of environmentally responsible, socially inclusive, and economically viable.

27. "*Environmentally responsible*" would require developers to identify and assess the main effects which a specific wind farm is likely to have on the environment and to describe the likely impacts of the noise in the context of the existing soundscape. This guidance does not do that.

28. Paragraph 1.16 concedes that compliance with this guidance will result in "*adverse but not significant* [noise] *effects*" but states explicitly that there is no requirement to attempt to minimise these adverse effects. This is contrary to the definition of sustainable development.

29. The noise guidance should explicitly require developers to demonstrate that noise emissions have been effectively reduced through the iterative design of turbine layout and the use of appropriate setbacks. The assertion in paragraph 1.16 that this is already done as a matter of routine is not supported by evidence. In practice, there are many woefully designed wind farms where lines of turbines are oriented towards nearby dwellings, with prevailing winds carrying noise directly onto properties.

30. By recommending higher permissible noise levels for individual isolated dwellings while imposing lower limits where multiple dwellings are affected (see paragraph 2.21), the guidance fails the '*socially inclusive*' requirement of sustainable development. This approach risks inviting future nuisance claims. Such guidance would be likely to fail the general principles of reasonableness that underpin nuisance law.

31. Although the guidance acknowledges that both the *duration* and *level of exposure* are critical to assessing impacts, it does not provide a method for quantifying these factors. Paragraph 2.22 refers to considering "*the proportion of time and extent to which the wind turbine noise may be above existing background sound levels*," but it does not specify the data required for this assessment. We believe the guidance should make clear that at least one year of

anemometry data from the turbine site, alongside one month of background noise measurements at the nearest noise-sensitive receptors, must be gathered and published to enable robust evaluation.

32. It is wholly inappropriate for noise guidelines to include ill-informed requirements to consider non-acoustic issues. For example, paragraph 2.18 states that in determining permitted noise impacts "*the largest weight should be given to the overall generating potential of the wind farm, with the number of dwellings and the duration and level of [noise] exposure being secondary and tertiary considerations*". This is an extraordinarily bizarre and ill-judged provision. How are acousticians supposed to evaluate accurately the generating potential of a wind farm? The Viking wind farm provides a clear example where the planners were told output would be three times higher than what is actually being generated.[https://www.ref.org.uk/ref-blog/382-newly-opened-viking-wind-farm-taking-nearly-three-times-its-cfd-price-in-august-2024] Developers frequently make exaggerated and unjustified claims about output, but real world generation depends on a complex interplay of grid availability, competing renewable generators, grid stability and interconnector demands – matters far outside the expertise of acousticians. This confusion is underscored by paragraph 2.20 which erroneously equates energy generation with installed capacity. This guidance should confine itself to quantifying the noise impacts leaving the balancing of wider project benefits and disadvantages to suitably qualified experts and the planning decision makers.

33. Among the technical errors in the guidance is the claim that "*the LA90 is assumed to be 2dB lower than the equivalent LAeq*". This is incorrect when a turbine exhibits pronounced AM. In such cases, the LA90 will tend to track the troughs in the noise more closely, resulting in a wider difference between LAeq and LA90. In effect, the LA90 metric understates the impact of the environmental noise. LAeq provides a more representative and reliable metric for measuring noise impacts.

34. The guidance appears to exclude "*unusually sheltered (such as enclosed spaces)*" (paragraph 2.3) from protection. These are precisely the spaces residents use for relaxation and where a quiet environment is most valued. For example, the garden area behind the Davies' home in Deeping St Nicholas, enclosed by a conifer wind break, was particularly affected by wind farm noise. Under this guidance such areas could be denied protection. Courtyards associated with dwellings also appear to be excluded from protection which is clearly unjust.

35. Paragraph 3.1 states that developers are not obliged to demonstrate that noise condition can be met, with testing only being triggered by a "*justified complaint*". Who decides what constitutes a justified complaint? Experience across the country shows that existing conditions fail to protect amenity and that residents face immense obstacles – including financial hardship - when trying to obtain fair noise enforcement. The guidance should require developers to demonstrate, once a wind farm is built, that it can comply with the noise conditions imposed.

36. References to BS4142 – the competing, more straight-forward noise guidance - are conspicuously absent. The original ETSU-R-97 referred to BS4142 no fewer than 62 times; this version mentions it just twice, both in a single footnote and in doing so misrepresents it.

37. The condition in the guidance is plainly unfit for purpose. It is not standalone but instead amounts to a confusing 'paper-chase'. For example, paragraph 4.9 in the condition refers to paragraph 2.5 which is not in the condition but is buried in the guidance. That paragraph in turn refers to a footnote, a different standard and to section 3 - which again is not in the condition. Multiple references are made to documents named Assessment and Rating of Wind Turbine Noise 2025 Guidance Notes and ARWTN Technical Guidance Notes which appear to be the consultation document but are not clearly identified and lack page or paragraph references. Similarly, the section on amplitude modulation refers to section 3 (not in the condition) and to methodology apparently contained in an Institute of Acoustics document listed in reference 6. This does not constitute a workable noise condition.

38. The proposal to allow for increased noise exposure for dwellings with a financial involvement in the wind farm is untenable. Some wind farms have been in existence for approaching 4 decades, especially when re-powered. It cannot reasonably be assumed that all current and future occupants of such dwellings will have consented to, or be compensated for, a permanent loss of amenity for the lifetime of the windfarm.