NOISE ASSESSMENTS FOR WIND ENERGY DEVELOPMENTS

Shane Carr – Irwin Carr Consulting

Introductions

Shane Carr:

Director in Irwin Carr with over 20 years experience in Environmental Protection.

Worked closely with a number of County Councils in ROI to assist in their technical review of wind farm noise impact assessments

Responsible for dozens of wind farm noise assessments in the UK and ROI many of which were tested before An Bord Pleanála/Planning Appeal Commission, requiring the provision of expert evidence.

Regulations

Regulations – Ireland

Wind Energy Development Guidelines 2006, lays down the requirements for wind energy proposals to offer a protection to properties located within proximity to the proposed development.

Separate noise limits apply for daytime and night-time with the emphasis on the protection of external amenity during the daytime and the prevention of sleep disturbance during the night-time

Regulations

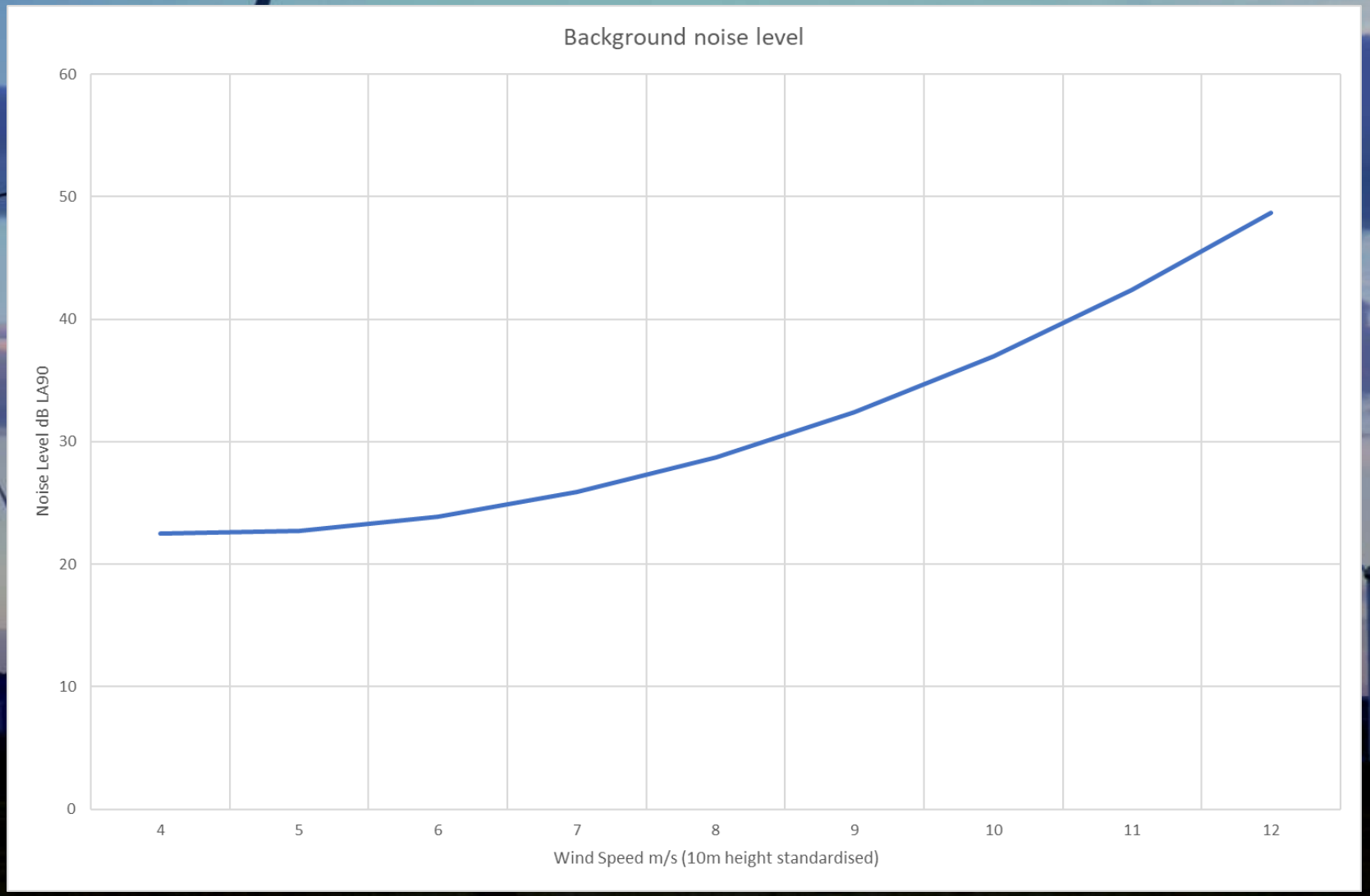
Existing Regulations – Ireland

The noise limits are as follows:

- **In general, a lower fixed limit of 45 dB L_{A90} or a maximum increase of 5 dB L_{A90} above background noise at nearby noise sensitive locations is considered appropriate to provide protection to wind energy development neighbours**
- **A fixed limit of 43 dB L_{A90} will protect sleep inside properties during the night**

Regulations

Regulations – Ireland



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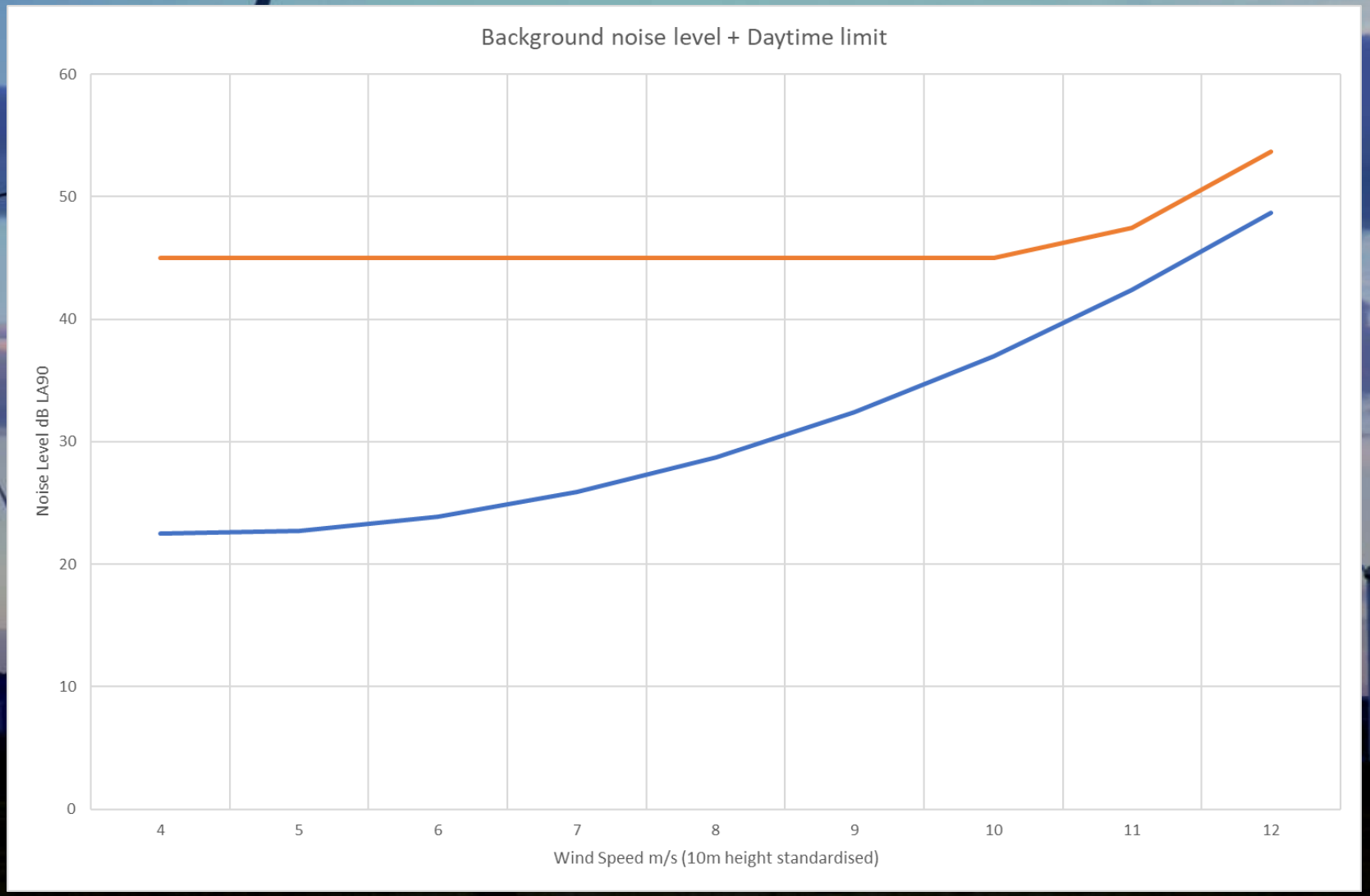

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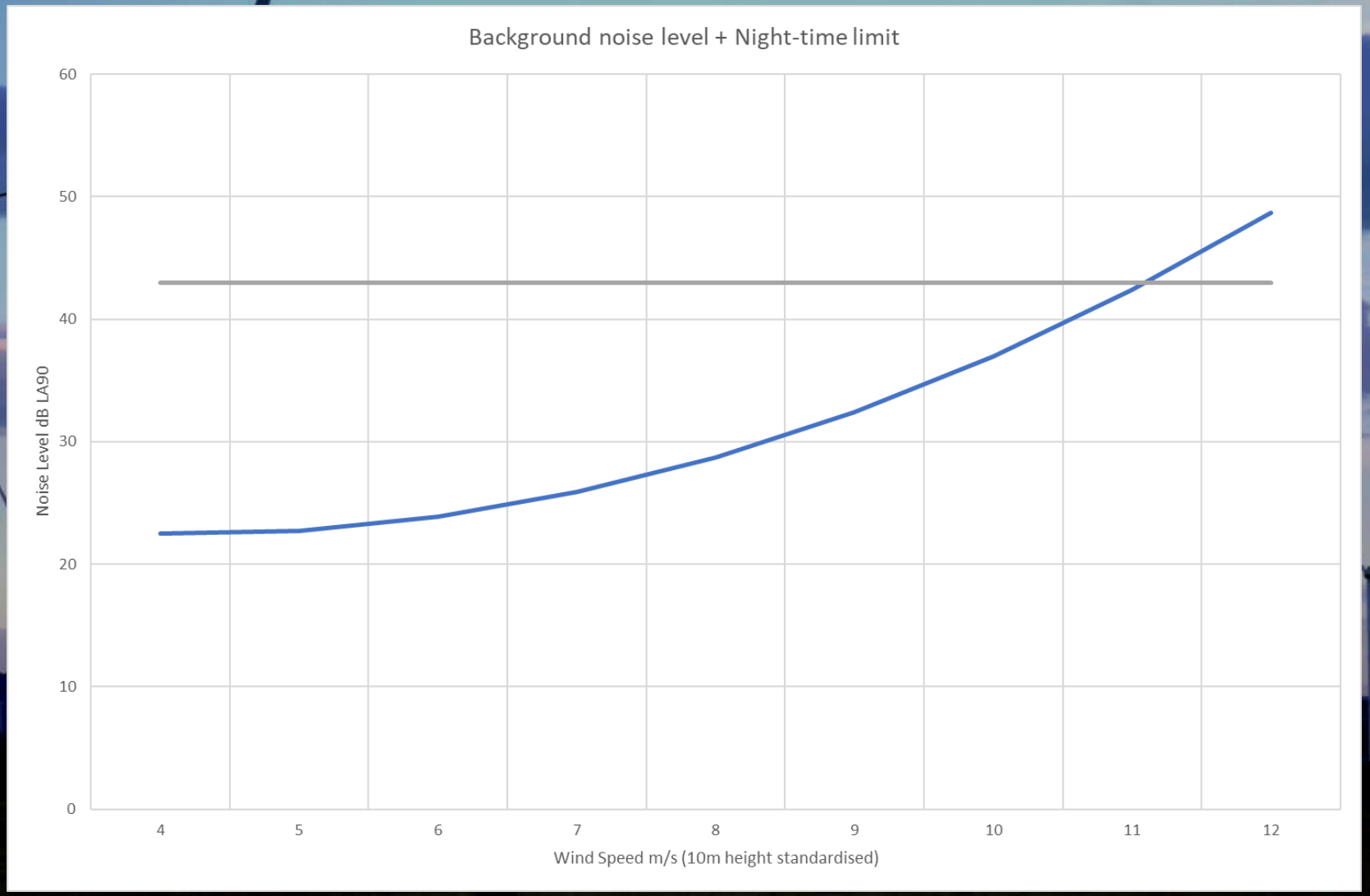

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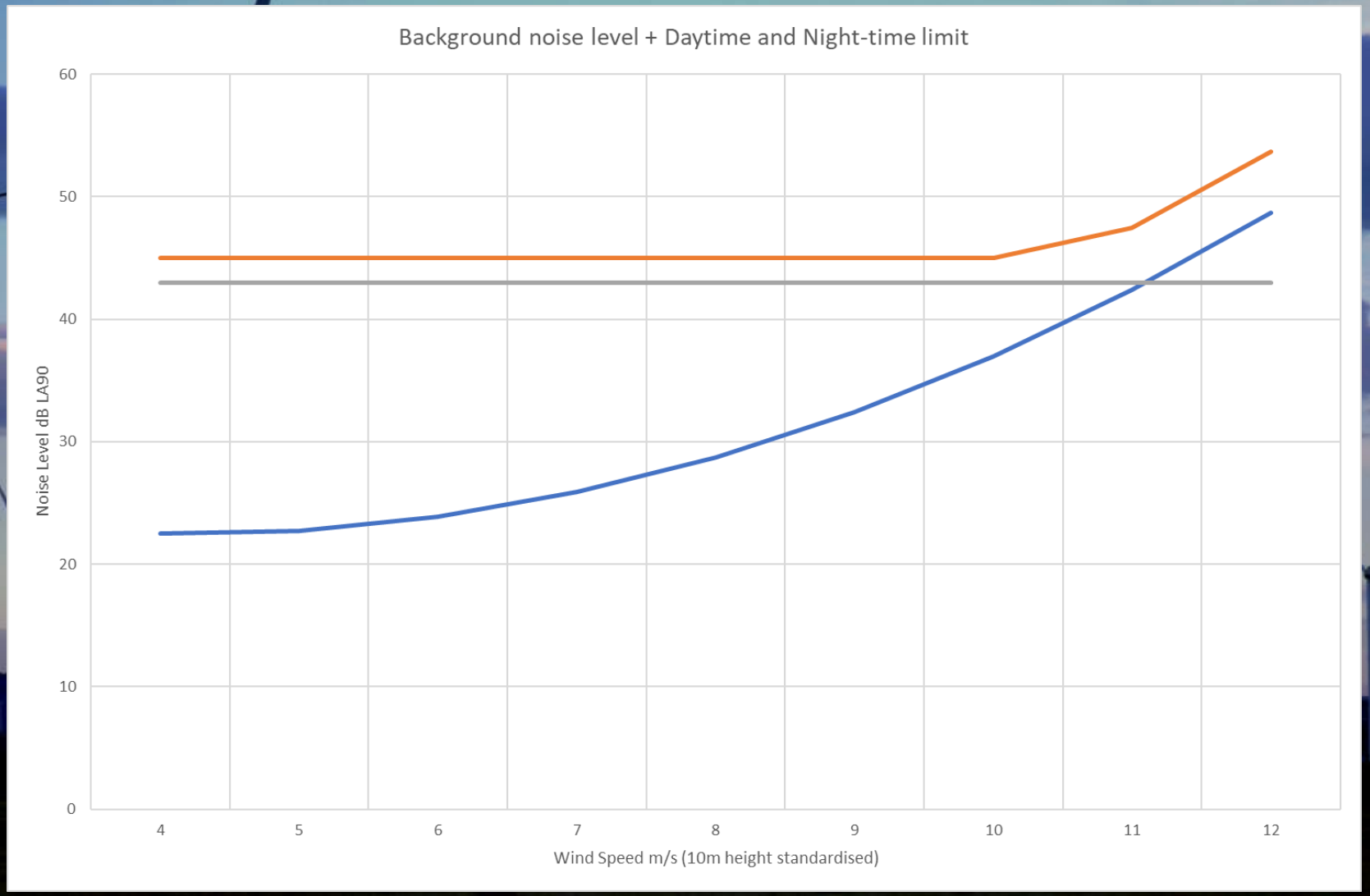


Regulations

Regulations – Ireland – Preferred Draft Approach

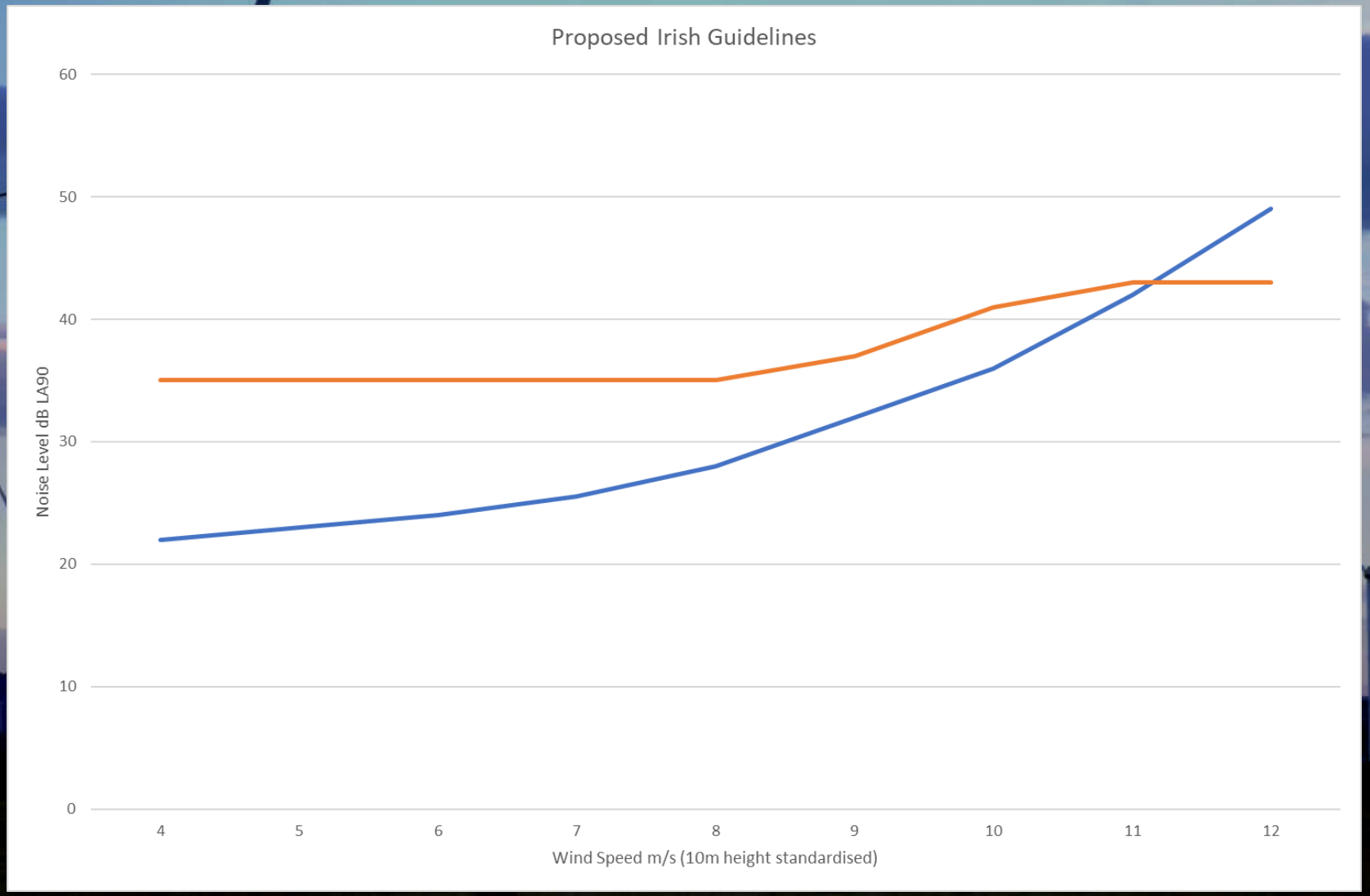
The proposed noise limits are as follows:

- **a relative rated noise limit of 5dB(A) above existing background noise within the range of 35 to 43dB(A) for both day and night, with 43dB(A) being the maximum noise limit permitted. The rated limit will take account of certain noise characteristics specific to wind turbines (e.g. tonal, low frequency and amplitude modulation) and, where identified, the noise limit permitted will be further reduced to mitigate for these noise characteristics. A fixed limit of 43 dB L_{A90} will protect sleep inside properties during the night.**

13 June 2017 – Minister Coveney and Minister Naughten

Regulations

Regulations – Ireland – Preferred Draft Approach



Regulations

Consequences

Lowering of the noise limit will inevitably result in separation distances increasing between proposed wind farms and residential receptors.

With respect to cumulative impacts, if existing wind farms are marginally compliant with 2006 guidelines, then noise impact from proposed wind farm will be required to be 10dB under that of the existing wind farm.

May rule out neighbouring proposed wind farms.

WHO Guidelines 2018

Environmental Noise Guidelines for the European Region (2018)

"For average noise exposure, the GDG conditionally recommends reducing noise levels produced by wind turbines below 45 dB L_{den}, as wind turbine noise above this level is associated with adverse health effects.

To reduce health effects, the GDG conditionally recommends that policymakers implement suitable measures to reduce noise exposure from wind turbines in the population exposed to levels above the guideline values for average noise exposure. No evidence is available, however, to facilitate the recommendation of one particular type of intervention over another."

Wind Speed (m/s)

Special Audible Characteristics

There are three categories of special audible characteristics that may arise from wind turbines:

- **Tonal Noise**
- **Amplitude Modulation**
- **Low Frequency Noise**

A penalty will be applied for each special audible characteristic.

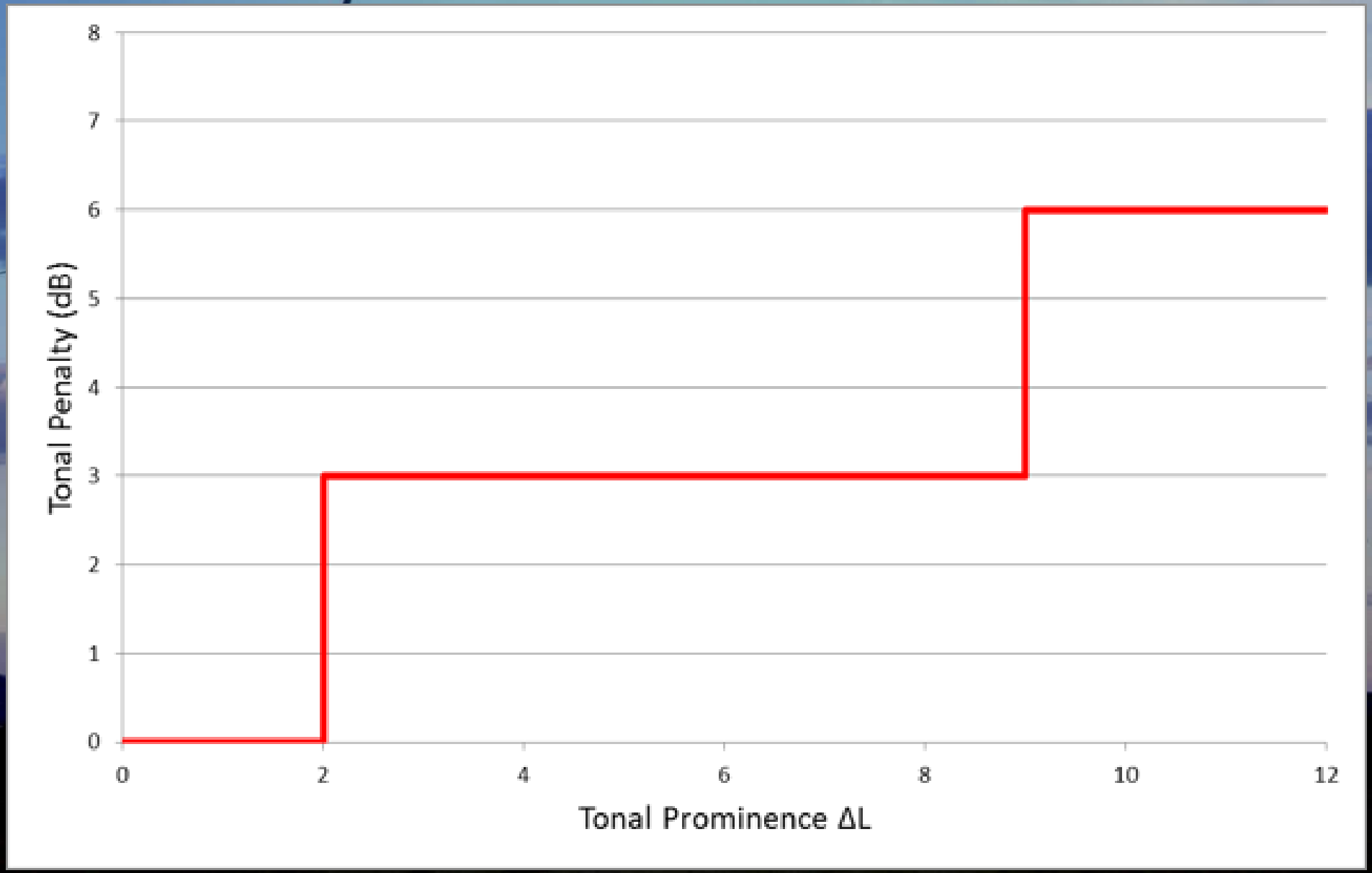
Tonal Noise

Tonal wind turbine noise can generally be attributed to gearbox related noise. Improvements in turbine design have greatly reduced potential tonal noise.

ISO 1996-2 Third Edition 2017 – Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels – Annex J – Objective method for assessing the audibility of tones in noise.

The method aims to assess the audibility of a tone as perceived by the average listener. Based on the level of tonal audibility a tonal penalty is applied.

Tonal Noise



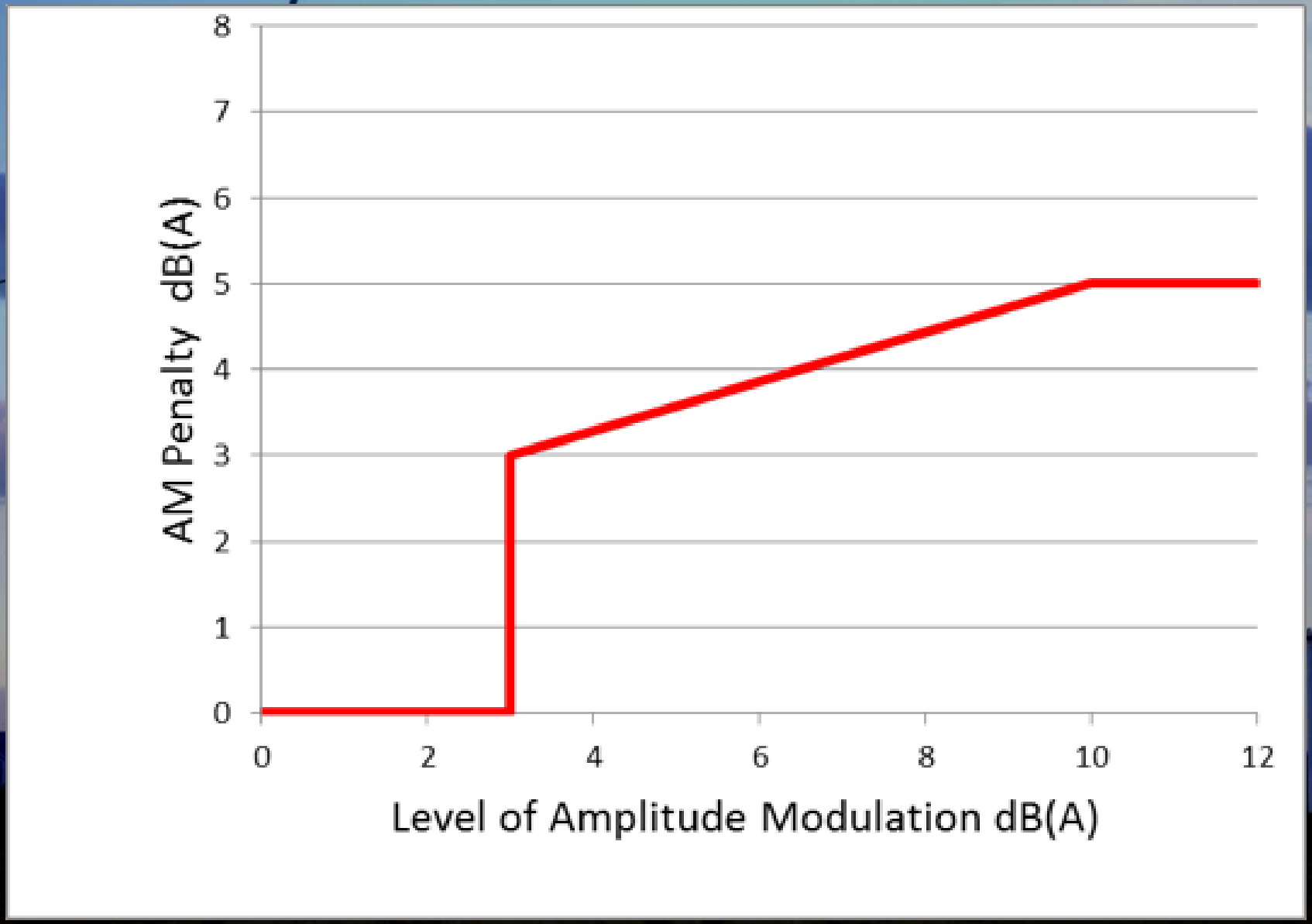
Amplitude Modulation

The UK Department of Energy and Climate Change commissioned a report on an appropriate measurement method and penalty scheme for amplitude modulation.

It would be unreasonable to penalise operators when periods of amplitude modulation are not cause for complaint, thus the condition is targeted only to periods that give rise to valid/justified complaints.

In order to isolate wind farm noise from other potential noise sources assessment for amplitude modulation penalties will only be carried out on night time noise measurements processed in accordance with the Institute of Acoustics Assessment Methodology

Amplitude Modulation



Low Frequency Noise

Low frequency noise shall be measured as $L_{90,10min}$ during the night period in one third octave bands and compared against a table of thresholds.

Standard Limit $dB_{unweighted}$	Frequency Hz												
	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Wind turbine noise limits (outdoors)	92	87	83	74	64	56	49	43	42	40	38	36	34

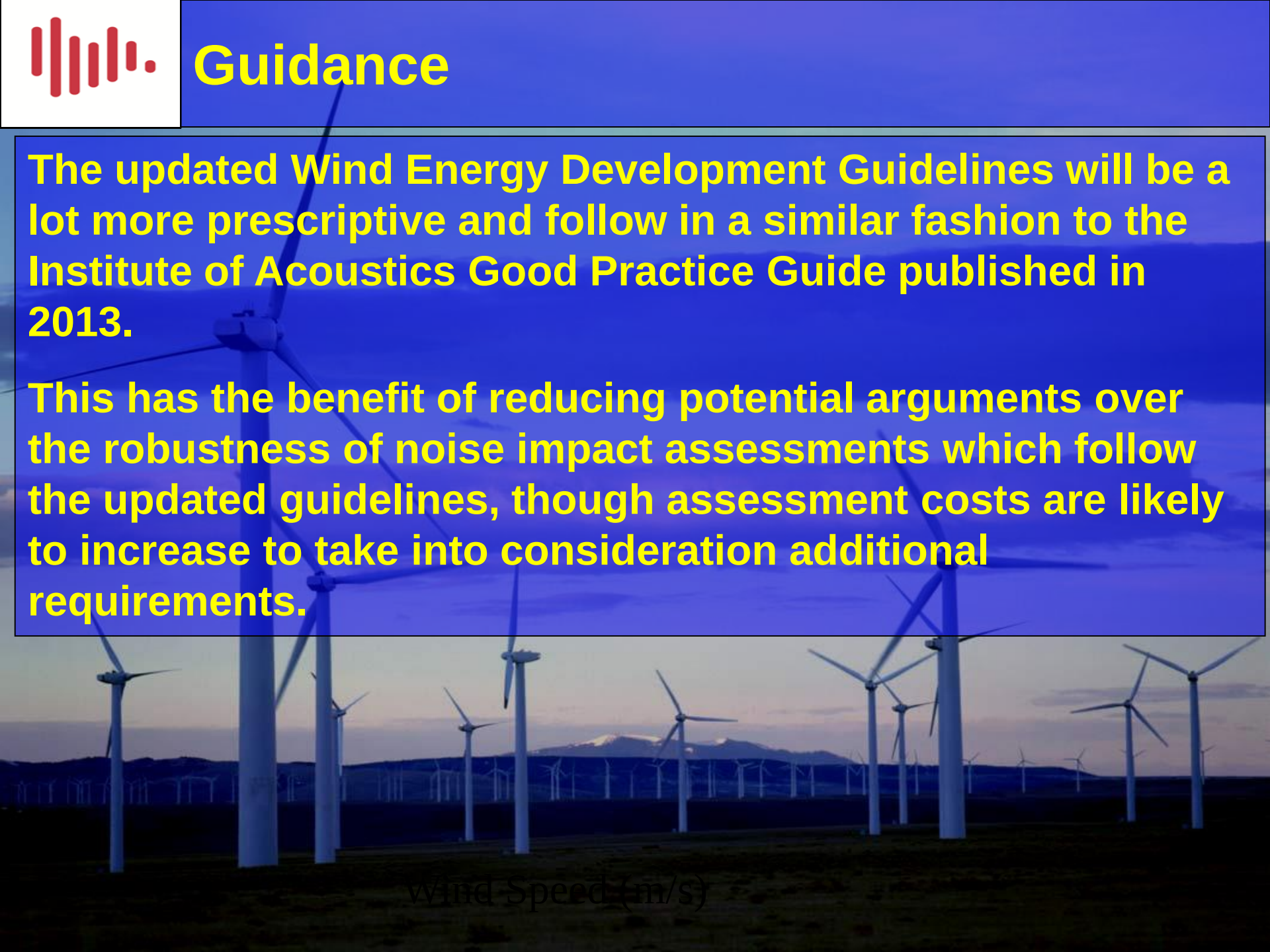
No penalty, if above table thresholds then relevant wind turbine(s) must be taken out of operation.

Wind Speed (m/s)

Guidance

The updated Wind Energy Development Guidelines will be a lot more prescriptive and follow in a similar fashion to the Institute of Acoustics Good Practice Guide published in 2013.

This has the benefit of reducing potential arguments over the robustness of noise impact assessments which follow the updated guidelines, though assessment costs are likely to increase to take into consideration additional requirements.



Questions