Response to Dick Bowdler from Sabine von Hunerbein

This response to comments by Dick Bowdler (DB) is part of a much wider debate on the adequacy of ETSU-R-97. Bowdler (2002) proposed an alternative assessment method based mostly on BS4142 but including

- additional guidance on the background noise assessment including a lower limit than currently used under ETSU-R-97,
- an assessment matrix to rate loss of amenity that is based on exceedance of background noise levels.

Our comments on these recommendations in (von Hünerbein *et al.* 2013) whose scope was a review of DB's proposal and not a full-blown review of ETSU-R-97 prompted a reply from DB to which the current statement is the response.

DB states that we misunderstood his main intention and clarifies that his main concern about ETSU-R-97 is that it does not transparently describe the impact of noise on people which would be possible with his proposed method. His proposal centres on a new method of specifying noise limits relative to background noise. In our comment we argued that the main reason for missing transparency is not so much the setting of noise limits but the uncertainties related to the background noise measurements. This is why we pointed out that both methods share this problem and that therefore even if the proposed procedure was adopted the discussion on transparency would not cease.

Specifically, DB writes: "*First of all the authors have misunderstood my concern regarding ETSU-R-97. It is not that it is complicated as they suggest in paragraph 2 but that it does not fulfil the requirements of an environmental assessment in that it does not describe the impact of noise on people. The process of using ETSU-R-97 is therefore not transparent.*" Following the same logic, equally DB's method does not "describe the impact of noise on people" as it rates the impact on amenity, that is one aspect of impact, as follows:

A difference of 1dB or less – insignificant
A difference of 2 to 4dB – marginal loss of amenity
A difference of 5 to 7dB – significant loss of amenity
A difference of 8dB or more – major loss of amenity

None- of the above identifies if a significant effect is being caused – the EIA regulations and directive requite that "*likely significant effects*" are identified, not that the significance of impact is rated. ETSU-R-97 identifies if a significant effect is likely by having a simple pass or fail i.e. is the turbine noise more than 5 dBA above the relevant background noise level at the same wind speed; if yes it is a significant effect, if no it is not. It couldn't be more transparent.

DB poses the question: "*How can it possibly be right in applying the planning balance to permit the same noise levels from a single 15kW turbine as those from a 100MW wind farm – which is what is happening all over Scotland right now*"

Scottish Planning Policy values all contributions to producing renewable energy e.g. Scottish planning policy at Paragraph 128 states "*Production of heat and electricity from renewable sources will also make an important contribution both at a domestic scale*" and at Paragraph 184 it states that "*Planning authorities should support the development of a diverse range of renewable energy technologies*" and "*Development plans should support all scales of development associated with the generation of energy and heat from renewable sources, ensuring that an area's renewable energy potential is realised and optimised*" also "*Development plans should support the wider application of*

medium and smaller scale renewable technologies such as decentralised energy supply systems, community and household projects". i.e. there is no presumption that large schemes are more valuable than small schemes; and all scales of schemes are promoted.
DB's logic seems to suggest a sliding scale of limits with the stringency of the control weakening as the power output of the turbine increases. This would encourage developers to install the biggest and noisiest machines they can as the noise limits get weaker, whereas the current system encourages better noise control as turbines get bigger and produce more power, as the noise limits remain the same.

We also pointed out that DB's method is problematic in its technical realisation. Background noise levels in quiet locations are often between 20 and 30dB(A) and the relevant limits are close to 35 dB(A) However, BS4142 states: *"The method is not suitable for assessing … when the background and rating noise levels are both very low. … For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low."* BS4142 makes these statements with good reason in the light of technical difficulties which we have pointed out in our comments and which have been dismissed in DB's reply without a good explanation.

DB comments on bullet points 1 and 3: *"It says there is no scientific basis for my proposals. At least it has some basis – the likelihood of complaints in BS4142. ETSU-R-97 (pp62 and 63) on the other hand sets a day time lower limit up to 40dB on the basis that "There is no evidence for or against the assertion that wind farm noise with no audible tones is acceptable up to and including LA90,10min levels of 40dB(A) even when background noise levels are 30dB or less." There is no scientific basis to this at all.*

This bullet point ends with a criticism that I take no account of "established thresholds of acceptability". I refer you to my answer to bullet point 1. The ETSU-R-97 lower limits are only established thresholds because they have been used for 17 years – they are not based on any scientific evidence ."

This last statement ignores the root of the derivation of the lower limits in ETSU –R-97 which are BS 4142 and the WHO guidelines. Additionally, various governments have repeatedly approved those limits.

In the original report we commented: *"The matrix appears to be fixed i.e. the same semantic descriptor applies to the same range of change in noise levels no matter how low the existing prevailing background noise level is or how high the final turbine noise level is. Whereas the subjective rate of response to turbine noise at low levels is low, therefore an apparently large change from very low existing background levels to a higher value is less likely to have as significant an effect as the same change in circumstances where the existing background levels are moderate or high."* To this DB replied *"The last four lines are a very broad statement without any scientific justification as far as I am aware ."*

The point in the last 4 lines of our paper was that a large change in noise level in a low background noise level is unlikely to result in benchmarks for health effects being exceeded; whereas a large change from moderate background noise levels is likely to result in benchmarks for health effects being exceeded; and in high background noise level locations benchmarks for health effects are already likely to be exceeded and therefore a large change in noise level is going to further add to those health effects.

DB queries: *"I would ask why, if the authors consider that fixed lower limits better describe impact on people, all other renewable energy projects – hydro or biomass for example – as well as nearly all industrial projects do not have such lower limits but rely on margin above background. If fixed lower limits were to describe impact of turbine*

noise better that would suggest turbine noise was less annoying than other noise – whilst all the evidence suggests that the reverse is true."

Very few industrial developments take place in isolated rural environments with low background noise levels; consequently lower limits do not normally apply. That said BS 4142 sets lower limits for both the existing background noise levels and the specific noise from the scheme. Those biomass and hydro schemes that do occur in low noise environments often use fixed lower limits - typically derived from the WHO guidelines which are also the basis of ETSU-97.

Finally, it should be mentioned that a lot of the argument centres around the issue of whether the main objective of regulations should be to protect amenity or health. In the past governments have prioritised the latter.
