Report on the Health Impacts of Wind Farms Shetland 2013
Summary

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SUMMARY

This report is written to respond to a request from the Shetland Charitable Trust, to provide a report on the “health effects (if any) of wind farms”.

METHOD:

There are a large number of reviews of the evidence of the health impacts of wind farms and literature reviews of varying range and depth, available from government bodies internationally, from independent scientific bodies or expert panels, and from supporters and opposers to wind farm developments including the industry itself.

There is a limited amount of original scientific research, epidemiological field studies, observational and measurement studies, and a large number of case studies both from the formal scientific literature and in informal public media.

There are a number of Health Impact Assessments done on individual wind farm developments that apply the findings of research to the local context.

This report draws on the evidence and literature published to date as found, and the summary and conclusions attempt to bring it together in a form that is accessible and understandable to the lay reader. Any omissions / errors are unintentional and mine alone.

The potential impacts of wind farms in relation to the health of local populations can be summarised under the following headings: construction and operational safety; flicker, electromagnetic radiation, and noise including low frequency sound. The report is divided into sections under each of these headings. Some Health and Environmental Impact Assessments also include features of social and economic impact that might be considered to have an indirect impact on health, but these are not covered in this report.

CONSTRUCTION AND OPERATIONAL SAFETY:

The risks of construction work of wind farms on health are non-specific as for many large, industrial scale constructions with a well rehearsed range of health and safety issues in relation to workplace injuries; inappropriate access by the public to the construction site; road traffic accidents from industrial traffic due to increased traffic volumes in the construction phase; and the potential for traffic delays and road blockage causing delays to emergency services access.

In the operational phase, safety issues with potential health consequences consist of structural failure of part or whole blades being thrown, turbine collapse, or ice fragment throw from icing of the blades in wintry conditions. These risks are minimised by setback limits and operational guidance.

FLICKER:

Shadows caused by wind turbine blade rotation can cause flickering that contributes to the annoyance perceived by some people. Shadow flicker can cause epileptic fits in some people with epilepsy, though this is unlikely at the normal rotational speed of wind turbines.
ELECTROMAGNETIC RADIATION:

While many studies indicate that exposure to electric and magnetic fields at the levels normally found in homes does not cause health effects, there is some uncertainty regarding the risk of childhood leukaemia in households living very close to overhead power lines.

Magnetic fields are not considered to have sufficient energy to damage cells, so there is no known mechanism or clear experimental evidence to explain how these effects might happen. The general view is that there is no evidence of any link between health effects and the electromagnetic radiation generated around wind turbines, though some authors dispute this.

NOISE:

Noise at much higher levels than generated by wind farms (usually industrial) can cause hearing impairment, and effects on performance. There is some evidence from community studies that environmental noise at levels experienced from road traffic and aircraft is related to hypertension and may be a minor risk factor for Coronary Heart Disease. There are well established links between noise and sleep disturbance, and there is increased sensitivity to noise at night leading to annoyance and sleep disturbance.

It is generally accepted that the primary effect of low frequency noise on people is annoyance. Annoyance is recognised as a critical health effect, and is associated in some people with stress, sleep disturbance, and interference with daily living.

There is an increasing body of evidence that noise levels associated with wind farms cause annoyance, in a dose-related response. The higher the sound level, the more likely people are to hear noise, and though a small % of people who hear sound are annoyed by it, that % increases with increasing sound levels.

A range of symptoms are attributed to the noise of wind turbines in people living close to them, which are those associated with general environmental noise exposure, and are often also described as stress symptoms. They include headache, irritability, difficulty concentrating, fatigue, dizziness, anxiety, and sleep disturbance, and are often described in relation to annoyance.

There are some particular features of the noise associated with wind turbines that contributes to the annoyance perceived by some people, including visual and environmental factors, and it is recognised that low level noise from wind turbines is more often found to cause annoyance than similar levels from other sources.

Some consider that the common cause of complaints from wind farms is not associated with low frequency noise but with the audible modulation of the aerodynamic noise, especially at night. There is also evidence that some people perceive the low frequency noise components of wind turbine noise, and that these are more significant at night and with large wind turbines.
There are mitigating factors that reduce the impact of noise from wind farms on local people, including some features of the landscape, and environmental and attitudinal perceptions to wind turbines.

There is no reliable evidence to say that infrasound at the levels produced by wind farms causes either physiological or psychological effects, but more recent theories of the potential perception of infrasound might lend support to reports of effects not previously measured or understood.

Regardless of whether the perceived impacts of noise from wind farms are physiological or psychological in nature, they are considered to cause adverse health effects through sleep disturbance, reducing the quality of life and as a source of annoyance which sometimes leads to stress related symptoms.

“Any new technology brings questions and concerns regarding health and safety implications that must be assessed, and the impact of such, publicly acknowledged and research into the relationship between wind turbine noise and health effects continues.”

VIBROACOUSTIC DISEASE AND WIND TURBINE SYNDROME:

Vibroacoustic Disease (VAD) is a condition associated with very high exposures to low frequency noise in some occupational settings.

Wind Turbine Syndrome (WTS) is not a recognized medical diagnosis, but is used by some to describe a set of symptoms that some people associate with living near to wind farms. The general view from the scientific community is that the collective symptoms labelled as WTS in some people exposed to wind turbines are likely to be associated with annoyance.

MITIGATIONS

This report does not cover the literature on mitigations in any detail, but there is a range of published literature on legislative and best practice guidelines and mitigations to minimise the potential negative impacts of wind farms. These are usually framed as setback limits and operational guidelines which include advice to minimise the potential impacts of blade throw, flicker and noise. A number of reviews of the health impacts of wind farms propose more sensitive limits to deal with specific features that cause annoyance.

CONCLUSIONS

Wind turbines are known to cause a number of effects that have an impact on health: risks from ice throw and structural failures that are minimised by appropriate setback distances; noise and shadow flicker that are sources of annoyance, sleep disturbance and symptoms of stress in some people.

Current mitigations do not entirely deal with the annoyance caused by wind farms, the results of which are a cause of distress and related ill health for a number of people living in the vicinity.
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