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Mr William Powell
Chair
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National Assembly for Wales
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15 August 2011

Dear Mr Powell,

Thank you for your letter dated 29 June to Chris Huhne, about a petition on TAN8 which your committee is considering. I am replying as this matter falls within my portfolio, and I apologise for the lengthy delay in doing so.

As you rightly point out in your letter, the Welsh Assembly Government is responsible for the TAN8 policy. Therefore, it would be inappropriate for me to comment on the merits or otherwise of this policy. In view of this, my comments are limited to some of the generic points made in supporting information regarding onshore wind and Grid reinforcement.

Electromagnetic Fields (EMF)

You raise questions about health issues surrounding windfarms, high voltage transmission lines and substations. The main measure to protect the public health relating Electric and Magnetic Fields (EMFs) is compliance with independent exposure limits. The exposure limits in the UK are set by an international body called ICNIRP (International Commission on Non-Ionizing Radiation Protection) and the UK has adopted these 1998 guidelines in terms of the 1999 EU Recommendation. These guidelines prevent all established health effects of EMFs on the public, with a safety margin. The topic of high voltage power lines and EMFs was addressed by the Stakeholder Advisory Group on ELF (Extremely low Frequency). EMF (SAGE) in their First Interim Assessment. A key proposal in the first SAGE Interim Assessment was whether planning "corridors", i.e. restrictions on buildings close to power lines, should be introduced (see: http://www.emfs.info/Related+Issues/property/UK/).

However, SAGE's own cost benefit analysis of the proposal did not support the high cost option of creating corridors around power lines on health grounds. The Government therefore considered that option to be disproportionate in the light of the scientific evidence base on the potential health risks arising from exposure to extremely low frequency electromagnetic fields and decided not to take forward this action. The Government did develop with industry however, two voluntary codes of practice requiring the industry to optimal phase dual circuit high voltage overhead lines wherever reasonable and possible. This is a technical matter related to the design of power lines that can help reduce the magnetic fields produced. These were published in February 2011 on DECC's website (see: http://www.decc.gov.uk/en/content/cms/meeting_energy/consents_planning/codes/codes.aspx).

There has been some scientific research into health effects and the proximity of overhead power lines including the SAGE first Assessment and more recently the SAGE second Assessment that addresses lower voltage lines and substations. The Government response to this second Assessment is expected in the Autumn.

Available scientific research could imply an effect on health at levels lower than the current guideline levels, including childhood leukaemia as you have mentioned, neurodegenerative diseases, miscarriages and depression. The Department of Health are advised by Health Protection Agency (HPA) who state that the balance of scientific evidence to date suggests that exposure to electromagnetic fields below international guideline levels is not harmful to the health of the general population and the link with childhood leukaemia is weak and unproven. However both the Department of Health and Health Protection Agency support international research in this area and keep emerging science under review and maintains a precautionary approach.

With regard to your concerns about corona discharges and high voltage power lines. You have already highlighted the National Radiological Protection Board's (a predecessor organisation to the Health Protection Agency) report from 2004 on Particle Deposition in the Vicinity of Power Lines and Possible Effects on Health: Report of an independent Advisory Group on Non-ionising Radiation and its Ad Hoc Group on Corona Ions in 2004. Documents of the NRPB: Volume 15, No. 1
http://www.hpa.org.uk/Publications/Radiation/NPRBArchive/DocumentsOfTheNRPB/Absd1501/.

That report concluded that the potential impact of corona ions on health will depend on the extent to which they increase the dose of relevant pollutants to target tissues in the body. It is not possible to estimate the impact precisely, because of uncertainties about:

(a) the extent to which corona effects increase the charge on particles of different sizes, particularly within buildings;

(b) the exact impact of this charging on the deposition of particles in the lungs and other parts of the respiratory tract;

(c) the dose-response relation for adverse health outcomes in relation to different size fractions of particle.

However, it seems unlikely that corona ions would have more than a small effect on the long-term health risks associated with particulate air pollutants, even in the individuals who are most affected. In public health terms, the proportionate impact will be even lower because only a small fraction of the general population live or work close to sources of corona ions.

Noise:

You highlight the issue of wind turbine noise and its alleged impact on health. It is the Government's view that wind farms do not have a direct effect on the public health. We are aware of the study commissioned by the American Wind Energy Association "Wind turbine Sound and health effects". The findings of this were that noise caused by wind farms can make some people ill however, in 2007 a Government-backed study carried out by the University of Salford found that only one wind farm in the UK was ever found to present a noise nuisance to residents and the issue has since been resolved.

The Government does however recognise that noise impacts are a contentious area and can be a cause of concern. We are committed to ensuring there is clear and informative guidance to planner and developers so that noise assessments are carried out effectively as part of the planning application process. On 23 June 2011 the UK Government published a report commissioned from consultants Hayes McKenzie on matters arising from the consideration of noise impacts when determining wind farm applications in England. This report, which was peer reviewed, recommended that best practice guidance is required to confirm, and where necessary, clarify the way ETSU-R-97 (Government guidance) should be implemented in practice. We are currently in discussions with the Institute of Acoustics who have offered to lead a working group on best practice guidance. My officials are working closely with their counterparts in the Welsh Assembly Government to ensure consistency across all parts of the UK.

A copy of the Hayes McKenzie report is available at: http://www.decc.gov.uk/en/content/cms/meeting_energy/wind/onshore/comms_planning/noise/noise.aspx.

Efficiency of onshore wind farms

You underlined concerns regarding the efficiency of wind turbines. For conventional generators, efficiency is the delivered energy expressed as a percentage of the fuel input to the generator. However, given that the fuel source for wind is limitless, and free, its efficiency does not have the same meaning as for conventional power stations.

The load factor provides a measure of the amount of electricity generated by wind turbines compared to the theoretical maximum output under ideal wind conditions. A 2009 paper published by the DECC *Load factors for wind technologies,* [1] suggests that the annual capacity factor for wind power in the UK (long term average of over 27%) compares favourably to that of Germany (around 20%).

Wind is low carbon at the point of generation, in that it does not emit any carbon dioxide at the same time as it generates. Wind generation can displace generation from fossil fuel plant. If it replaces coal generation, it can reduce emissions in the UK power sector by about 0.9 $kgCO_2/kWh$ of generation; if it replaces gas generation it can reduce emissions by about 0.4 $kgCO_2/kWh$; grid average emissions were about 0.45 $kgCO_2/kWh$ in 2009.

Intermittency of Wind Energy

Wind is an intermittent, or variable, source of energy, although turbines individually generate around 70-80% of the time and variations are predictable on the whole.

Moreover, due to the UK's excellent wind profile and the geographical dispersion of wind farms, the chance of the wind not blowing across any of our wind farm sites at a given time is unlikely to occur for more than a few days a year. Winds offshore are generally stronger and more consistent than onshore, so the development of a larger, more geographically dispersed offshore wind fleet will add diversity and mean that we capture wind output where the wind is blowing.

Increasing amounts of intermittent electricity generation are likely to have implications for the way supply and demand are balanced in future. Beyond 2020 it is possible that tools and technologies such as demand side management, electricity storage and interconnection as well as more conventional forms of flexible generation will play a greater role. The Government will explore how electricity supply and demand can most efficiently be managed in future through the Electricity Systems Policy set out in the Electricity Market Reform White Paper.

Carbon Footprint of Wind Turbines

In response to your point on C02 emissions I would point out that electricity generated from wind power has one of the lowest carbon footprints, compared with other forms of electricity generation. As with other low carbon technologies, nearly all the emissions occur during the manufacturing and construction phases, arising from the production of steel for the tower, concrete for the foundations and epoxy/fibreglass for the rotor blades. These account for 98% of the total life cycle CO2 emissions. Wind turbines typically generate for 20-25 years.Emissions generated during the operation of wind turbines are, relatively, extremely small and arise from routine maintenance inspection trips. They include the use of lubricants and transport to and from the site[2].

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[1] http://www.decc.gov.uk/assets/decc/Statistics/publications/trends/articles_issue/564-trendssep10-renewable-electricity-article.pdf.

[2] Parliamentary Office of Science and Technology Note (Postnote) 268 which is available for downloading at: http://www.parliament.uk/documents/upload/postpn268.pdf.

The Parliamentary Office of Science and Technology has compared the carbon footprint of different electricity generating technologies. This is the total amount of CO2 and other greenhouse gases emitted over the full life cycle of generating plants. This footprint is expressed in terms of grams of CO2 equivalent per kilowatt hour of generation (gCO2eq/kWh). Whereas the carbon footprint of fossil fuel generation range from around 500 - 1000gCO2eq/kWh, wind power's carbon footprint is just 4.5gCO2eq/kWh.

Actions to decarbonise our energy supply must be complemented by measures to reduce demand and increase energy efficiency. The supporting information enclosed with your letter highlights two recommendations in the Committee on Climate Change 'The Renewable Energy Review' report which could lead to significant benefit. I am pleased to say that we are taking forward ambitions actions in both of the areas identified.

On 10 March, we announced details of the Renewable Heat Incentive (RHI) to provide long-term financial support to encourage the uptake of renewable heat. For commercial, industrial and community heating we have RHI tariffs starting this year. For household heating we have an RHI premium payment for this year and next, until the Green Deal comes in October 2012, at which point RHI tariffs begin for domestic too, with a ring fenced amount of over £10m dedicated to the household sector. More details are available on our website at www.decc.gov.uk/rhi.

Our Green Deal will revolutionise energy efficiency in British properties by establishing a framework to enable private firms to offer consumers energy efficiency improvements to their homes, community spaces and businesses at no upfront cost, and recoup payments through a charge in instalments on the energy bill. Further information on the Green Deal can be found at: http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx.

We are also working with other EU Member States and the European Commission to reduce the energy consumption of products, through the introduction of both EU-wide Ecodesign and Energy Labelling measures[3]. One particular aspect of these policies is to encourage the improvement of, or if that fails, the removal of the worst performing products from the market. Ecodesign and Energy Labelling together provide a framework for achieving this aim via a series of evidence based individual regulatory or voluntary implementing measures which are targeted at individual energy using and energy related products.

Ecodesign sets minimum product standards, aimed at reducing the environmental impact of products, including the energy consumption, throughout their entire life cycle. Energy Labels provide clear and easily recognisable information for consumers on the performance of a product, raising awareness on the real energy use of the product, in order to influence their buying decisions.

EU measures have been agreed for 11 product categories so far, in addition to cross cutting measures on the "wasteful" standby mode. Taken together, the energy labelling and Ecodesign measures are expected to deliver annual savings of over 7 million tonnes of CO_2 by 2020, with annual average savings of £850m over that period in the UK alone.

Finally in setting out the Government's approach to renewable energy including development of windfarms, it is important to recognize the scale of the challenge to our energy security that we face over the medium and longer-term.

As indigenous resources decline, the UK is increasingly dependent on fossil fuel imports, leaving us more exposed to risks from rising global demand, limitations on production, supply constraints and price volatility. At the same time, we will lose around a quarter (around 20GW) of our existing electricity generation capacity as old or more polluting generation plant close.

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[3] Ecodesign for Energy Using Products Directive, see: http://ec.europa.eu/energy/efficiency/ecodesign/eco_design_en.htm.

To ensure security of supply, create jobs, keep the cost to consumers manageable and realise the large carbon savings compared to fossil fuel generation, we will need new low-carbon generating plant to replace this. This is likely to be located in more peripheral areas of the country compared to current conventional fossil fuel plant. We therefore cannot escape the fact that this will need to be connected through expansion and reinforcement of the transmission network in those areas where infrastructure is currently less developed, and this will be needed for all new generation not just onshore wind.

Yours sincerely,

pp Stephen Burke

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