



Update briefing on Powerline Electric and Magnetic fields (EMFs) and ill health

- Public health was not a routing consideration for Scottish & Southern Energy and Scottish Power in the Beaully to Denny 400kV proposal. The proposed High Voltage Overhead Transmission Line (HVOTL) passes close to many homes, schools, halls of residence, care homes etc bringing several thousand people within 600m of the proposed route and some considerably closer.
- This is a new line that will stand for generations – to deny a precautionary approach is foolhardy, particularly when the scientific evidence increasingly points to HVOTLs posing a serious health hazard.
- There is currently no meaningful protection for the public from HVOTLs within the UK, which subscribes to the International Commission on Non-ionizing Radiation Protection (ICNIRP) limit of 100 microtesla (**European Parliament Resolution 2/4/2009 to review**). Yet there is an internationally acknowledged doubled risk of childhood leukaemia at exposure levels above 0.4 microtesla (a factor of 250 below the ICNIRP guideline). The International Agency for Research on Cancer (IARC) classified ELF EMFs as possibly carcinogenic (2B) in 2001. Ironically far better protection is afforded to bird flight paths, nesting sites, SSSIs etc than to our own species.

Scottish Context

- The Scottish public is extremely concerned about the potential adverse health effects of living close to HVOTLs - 14,000 objections to the Beaully to Denny 400kV application specifically raised health concerns as a prime reason for rejecting the proposal. There have been debates, motions (S3M – 800), questions, a Cross-Party Group (2005 – 2007) and Petition PE812 (ongoing) in the Scottish Parliament.
- Petition PE 812 submitted in Dec 2004 with unprecedented cross-party support to the Public Petitions Committee. It is the second longest running petition and is regularly reviewed. The Scottish Parliament asked probing questions of the Health Protection Agency (HPA) on the scientific basis for their advice and contact with countries which have adopted precautions – but no response was forthcoming.
- Although powerline EMFs have been under investigation for over a quarter of a century, many critical scientific developments have been made in the last five years.
- 2004: In response to numerous international studies, the World Health Organisation and the National Radiological Protection Board NRPB (now within the HPA) acknowledged the association between powerline EMFs and increased risk of childhood leukaemia. They called on government to consider the need for further precautionary measures. SAGE (The Stakeholders Advisory Group on Extremely Low Frequency EMFs) was established in collaboration with the National Grid & Children With Leukaemia.
- June 2005 The government funded Draper report was published (BMJ 330 (7503):1290). This massive study (investigating the records of 30,000 children with cancer), recorded a **doubled risk of childhood leukaemia** for those born within 100m of HVOTL. The risk diminished with distance from HVOTL, but there was still a **70% increased risk of childhood leukaemia within 200m**, with a statistically significant risk recorded up to 600m.
- April 2007 (SAGE) published its First Interim Assessment (www.rkpartnership.co.uk/sage/). As SAGE stakeholder I observed that it was industry dominated (chief editor an employee of the National Grid), ill-informed and out-of-date (refusal to investigate the much reduced undergrounding costings



using XLPE technology as a mitigating option). Extremely limited discussion of the California Health Department Services Report (2002) which examined associated adult conditions (various cancers, motor neurone disease and miscarriage) in addition to childhood leukaemia was allowed. These more commonplace conditions significantly alter any appraisal based on cost benefit analysis. However, the SAGE Report did acknowledge that “the best available option for obtaining significant exposure reduction” would be a building moratorium within 60m of HVOTL, but its actual recommendations for government were limited to providing public information and optimal phasing, which would not result in any significant exposure reduction. Several dissatisfied stakeholders have left the process.

- April 2007 The Royal Institution of Chartered Surveyors (RICS) called on government to legislate to restrict the building of new homes and schools next to existing power lines (George Wimpey Homes already respected a voluntary 200m moratorium).
- June 2007 Lowenthal study (Journal of Internal Medicine) reveals a five-fold increase in certain leukaemias and lymphomas for those who as young children (aged 0-5) lived within 300m of HVOTL.
- July 2007 Westminster Cross-Party Inquiry Report published (www.epolitix.com/forum/cpielfemf). This publication by a group of Westminster MPs calls on the government to adopt precautionary measures for HVOTLs. Its key recommendation is for “**a moratorium on the building of new HVOTL within 60m of existing homes and schools**”, with the further recommendation that “**government consider the case for extending this distance to 200m for the highest voltage lines**” (such as the 400kV Beaulieu to Denny proposal). The Beaulieu to Denny proposals would not comply.
- August 2007 The BioInitiative Working Group launched its report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF) (www.bioinitiative.org). The Report investigates the long term biological effects of exposure to ELF EMFs – including a range of cancers, motor neurone disease etc. It dissents from existing ICNIRP and WHO guidelines, and recommends an interim planning limit of 0.1 microtesla for homes near new lines, which in practical terms would equate with a building moratorium of at least 200metres for HVOTLs.
- November 2007 Letter of advice from the HPA to the Minister. Our critique of the HPA advice focuses on the absence of references to any scientific studies published since 2004 – the epidemiological evidence is being denied, together with plausible biological mechanisms (melatonin theory) which would help to explain the evidence. **Once a mechanism is proven, the time for precaution has long since passed.** Early warning signs for ELF EMFs were present decades ago, NOW is the last chance for precautions with regard to Beaulieu to Denny, which will set a precedent for other new HVOTLs.
- Alzheimer’s linked to HVOTLs in two new studies (Garcia et al 2008; Huss et al 2008), with the latter massive study (entire Swiss population over the age of 30) showing a clear and quantifiable association - living within 50m of a HVOTL for 15 years or more shows a doubled risk of the disease. Furthermore, melatonin is lacking in Alzheimer’s sufferers, adding further weight to the melatonin theory (Henshaw & Reiter 2005) as a plausible mechanism.
- 2008 Yang et al study identifies a clear mechanistic connection between powerline EMFs and childhood cancers for genetically susceptible children, who are 4.3 times more likely to develop leukaemia if living within 100m of a powerline.



European Context

- Positive response to the Bio-Initiative Report. Jacqui McGlade, Executive Director of the European Environment Agency described it as “*a compilation of individual contributions from different EMF experts, each of whom summarises the relevant and largely peer reviewed science in their own areas of expertise. It is not a review of the overall evidence on EMF but a collection of separate contributions from experts who feel that aspects of the relevant science are not receiving the attention that they merit*”. In Scotland we had to fight a media campaign, helped by a local MSP to just have the report admitted as evidence for the Beaulieu to Denny Public Inquiry (initially refused).
- 10th Feb 2009: The European Commission’s Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) published an updated opinion on EMFs, which confirmed its 2007 opinion that ELF EMFs might contribute to childhood leukaemia, and called for further investigation of the two new epidemiological studies linked to Alzheimer’s disease.
- 17th March 2009: Danish government to pay compensation to night-shift workers after IARC acknowledges increased cancer rates resulting from the suppression of melatonin production. The suppression of melatonin production is also induced by magnetic fields, and is a plausible biological mechanism for the range of serious illnesses associated with powerline EMFs. The WHO and HPA continue to deny the existence of such peer reviewed studies.
- 2nd April 2009: The European Parliament adopted a resolution (559 in favour, 22 against) calling for stricter regulation and protection of residents from the potential risks posed by EMFs, including a review of the scientific basis and adequacy of the EMF limits as laid down in the 1999 ICNIRP (International Commission on Non-Ionizing Radiation Protection) guidelines, to which the UK currently subscribes http://www.next-up.org/parlement_europeen.php#1. Ten EU member states have already adopted serious precautions, including Switzerland, the Netherlands, Denmark, Sweden, some Italian regions and Germany, with Austria expected to follow shortly.
- 7th May 2009: German EnLAG (Energieleitungsausbaugesetz) legislation was adopted by a majority in the German Parliament (<http://www.iwr.de/news.php?id=14215>). This is an attempt to speed up the expansion of the German grid to accommodate new Renewable Energy projects. It recognises the adverse health effects of high-voltage powerlines and requires that undergrounding be considered where 380kV powerlines are proposed within 200m of individual homes, or 400m of communities. There will be four underground cable pilot projects for high-voltage cables in Lower Saxony and Thuringen, where up to 250km (half) is expected to be undergrounded.
- Sept 2009: publication by De-Kun Li in *Reproductive Toxicology Journal* on “Exposure to magnetic fields and the risk of poor sperm quality” showed a clear adverse effect occurring at exposure levels above just 0.16 microtesla.
- 16th Oct 2009: The Scottish Government responded to the SAGE Report of April 2007 http://www.dh.gov.uk/en/PublicHealth/Healthprotection/DH_4089500. This response reflects the failure of the HPA to address the last five years of scientific evidence in this field. The joint governmental response has been condemned by various bodies, including charity co-funders of SAGE, *Children With Leukaemia*. SAGE is likely to now disband. This failure to address the scientific evidence and refusal to

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adopt meaningful precautions is at odds not only with the European Resolution (April 2009), but also with the 10 EU member states which have already adopted meaningful precautions.

- 14th Nov 2009: A study by the Japanese National Research Institute for Child Health and Development in the Journal of Epidemiology found an association between power line magnetic fields above 0.4 microtesla and an increased risk of brain tumour, equating to an eleven-fold increased risk for children.

President Barack Obama: *“Science is about ensuring that facts and evidence are never twisted or obscured by politics or ideology. It’s about listening to what our scientists have to say, even when it’s inconvenient – especially when it’s inconvenient”*. Mr Obama has already set up an independent panel to investigate electromagnetic radiation. He is aware of the emerging science and lack of public confidence in health review bodies.

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