

Dear Forum,

I'd like to infuse some scientific content into Phil's statements on what could be an extremely critical issue for the energy revolution. Hopefully this summary will give cause **not to trivialise critical risks posed by EMF/ radiation of various kinds.** (EMF=Electro-Magnetic Field)

I was driven to investigate this late last year by a reported sensitivity of some people to windmills (a friend I met then can sometimes detect them at a distance of kilometers), which **I found essential to investigate considering the necessary power revolution**, being a climate change activist and sustainability consultant. While I am aware EMF can be designed out of power systems if necessary, (wireless communications would be harder) I did not think the energy revolution should be put at risk merely by a possible oversight of EM shielding and power filtering, to save a few pennies for Siemens, Vestas and you & me.

**With questions relating to wind turbines**, I first contacted [Kalle Hellberg](#), who I found was setting up a specific measurement exercise for wind turbine radiation but had not yet started (awaiting access to the windmills for power quality measurements). Then I contacted [Olle Johansson](#) of the Karolinska Institutet, a long term radiation researcher, who was specific about biological research yet had no scientific comment on wind turbine-specific "radiation".

I then back-read into various EMF (electro magnetic field) influences, acquired measurement devices<sup>1</sup> -I am a scientist and engineer after all-, read a large amount of scientific work<sup>2</sup>, and ended up with more knowledge and still many gaps. Like Climate Science, it's complicated, yet many risks are both clear and substantial.

It is important to clarify the focus of the discussion. Whether we are looking at dirty-electricity, direct or indirect radiation from LF/MF sources (power lines, inverters, hairdriers), or direct HF sources (my domestic solar in Aberdeen has a powerful WiFi data controller connected to the inverter) is extremely complicated, and since individual and biological sensitivities vary, all must be taken into account.

During this research effort I also noted a serious **discrepancy between the scientific point of view** ("the largest experiment ever conceived") and the contrasting "public" view ("all is well, surely"). Again similarities with Climate Change abound, one of which is the huge capitalisation of some EMF dependent companies. *[If you're interested, see also the film/book [Merchants Of Doubt](#), for a fascinating look into the mechanisms which in my opinion are at play in this. I've shown the film in Climate Change context only. Interestingly, with EMF there is a further tool used in changing the scientific balance: the sheer number of -low quality- studies financed by the industry now substantially exceeds the number of independent studies, and conclusions are significantly different - industry studies tend to find nothing but do drag down the technical reputation of all the research.]*

**Two important data "sets"** exist, with substantial additional studies available:

The partially industry funded "[Interphone](#)" study released in 2010 (data up to 2000), which had many fatal and since then well documented design flaws and an extremely checkered history, was widely quoted in the press even though the scientific community at the time of publication was highly critical and even dismissive. However, (through repetition?

underwriting by the WHO?) the flawed and inexplicit conclusions became the "common understanding". It is still widely quoted even though it has been scientifically wholly discredited since, as some aspects of the study appear designed **not** to uncover negative impact.

By contrast there is the [Bioinitiative report 2012](#)<sup>3</sup> which supported the WHO to re-categorize HF radiation as a possible carcinogen (in 2011), based on all published scientific research published between 1990 and 2012, the majority of which show clear biochemical impact from very low levels of various types of EM radiation. It should be noted that the while the EU started to take on the findings of this study, they appeared to lose interest shortly after to the surprise of researchers and journalists alike. Allowable limits between countries range over 2 orders of magnitude(!).

Whether or not EM radiation is carcinogenic is under debate (for Wifi/mobile the evidence is growing: <sup>4</sup>), but there is reviewed and replicated evidence it negatively influences the correct duplication of DNA in cell-division ([REFLEX 2004](#), [others](#).). What is no longer under debate is that EM radiation at extremely low levels influences many organisms (including human brain development). *Some propaganda*<sup>5</sup>.

**Western regulatory limits** have been set based only on acute and thermal effects of EM radiation, and (for WiFi frequencies) are for example [100x higher](#) than in Russia, China and some other countries. . The thermal basis was the opinion when microwaves became commercially available, and ignoring a mass of more recent scientific evidence that there are well established non-thermal effects, the regulatory limits have never been substantially updated to this scientific basis. In Russia substantial research on electromagnetic radiation effects on humans has been done, the country has a lower regulatory limit, and separately routinely uses it therapeutically for enhanced wound healing - this is likely related to the radiation-induced stress-immune-response which is well documented.

It is worth noting that modern mobile phones typically exceed the regulatory limits if held close to an adult head(!) (see the instructions of your phone, or [here](#)), and children's heads have a 75% higher absorption rate of the EM energy.

**Smart Meters:** It is known that smart meters (especially in clusters) cause difficulty for some people, especially triggering hypersensitivity. Whether this may be attributed to dirty power, to wifi, or to both is so far unclear. There are also big differences between types of smart meters. There is an enlightening (if slow) [TED talk](#) about this from someone who developed WiFi equipment for a living, and went hypersensitive due to smart meters. My hypersensitive friend ended up suddenly being unable to sleep about 2 months ago, tired, stressed etc only to find that smart meters had been installed on the outside of the building, well away from her room. Disconnection of all electric power cables in her room resolved the problems - this must have been dirty power as her room has no external windows and no wifi or mobile phone signal.

#### **Some personal anecdotes:**

I currently live on a yacht in the Canaries, with 2 solar panels, each with their [own MPPT inverter](#) (to a 24V battery system, all equipment 12-24V DC). Having developed headaches in my workshop area months earlier, following my new insights (and arrival of my EM meter), I found that the solar inverters (close overhead and in plastic housing), unlike my wind and water inverters (not functioning in port) and main battery charger emitted a particularly large amount of EM energy. No conclusive proof, but since disconnecting the

solar panels and therefore the inverters (I'm currently on shore power via a metal-housed inverter) things greatly improved. Subsequently turning off the overhead fluorescent light made another step change improvement.

Note that I have long been able to tell whether my old nokia mobile phone was on or off without looking, (I can't tell with the current phone but get a dull ache when holding it near my head). When I use my induction cooker I need to leave the area because it causes a dull headache which can last for several hours.

### **Some more information:**

This week [Jolie Jones](#) (daughter of Quincy Jones) came live with her site about her hypersensitivity which has some **excellent information links and is easy to navigate.**

Insurance companies have all - as far as I know- (including Lloyds in 2015) explicitly excluded RF induced risks from their coverage.

The Swedish Radiation Safety Authority issues a regular research update analysis ([here's a recent one](#)). While the organisation is reputedly (in Sweden) biased towards the mobile phone industry, in my opinion the document reads like propaganda rather than analysis. While admittedly much research done in any field is either trivial, irrelevant, or badly set up, I cannot manage to read this as a critical analysis, merely a negative extreme hole-picking exercise.

[Scientific "blog"](#) on radiation by Dariusz Leszczynski, a scientist

[ICEMS Monograph](#): "Non-Thermal Effects and Mechanisms of Interaction Between Electromagnetic Fields and Living Matter"

Movie: "[Take Back Your Power](#)—Investigating the Smart Grid" covers a few more aspects of smart meters than just radiation...

[Scientists call for Protection from Non-ionizing Electromagnetic Field Exposure](#) Public statement by a group of scientists

Telegraph 2015, reposted May 2017 - [Wi-Fi is not harming our children - here's the evidence](#) - which makes no scientific or factual points at all, but a great headline

[Full Signal](#) - Documentary - free to view.

Opening of the blood brain barrier, by very small amounts of mobile phone radiation. as described by [Dr Leif Salford](#), neurosurgeon and long term researcher of radiation effects on living creatures. Youtube, 20 minutes, 2012.

The main reference from the "New Scientist" article mentioned by Herbert is [here](#), and is a list of 17 separate analyses of the same data (!), which of course has the same technical value as a single analysis of the same data. The problem is with the data. The statement is a propaganda - technically correct but of no relevance.

### **What is clear and proven:**

Radiation from dirty power, smart meters, solar inverters, wifi data sticks, transformers, active detectors, all impact humans.

A small number of people can feel these things (proven, repeated, clinical trials) and these people are called EM hyper-sensitive.

Whether this radiation is harmful to those who do not feel it is open for discussion, though evidence is mounting that at least some of it is likely to cause harm.

The discussion is essential, with a scientific basis, with the precautionary principle underlying any conclusions. Big things are changing in the world, and historically very few innovations which were considered safe ended up being just that. Also historically, the greater the financial interests in an outcome, the more likely that preferred outcome will initially be "accepted". At some point enough creatures are harmed to reconsider.

**It is the task of the SGR and any responsible scientist or engineer to withstand the pressure to support what is convenient, and find the truth. EM radiation can be engineered out of most things, including wind turbines and solar inverters, likely with little residual cost; but it will not happen unless there is accepted evidence to drive regulation to drive the necessary change.**

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[www.AberdeenClimateAction.org](http://www.AberdeenClimateAction.org)

[www.OceanValley.co.uk](http://www.OceanValley.co.uk)

### **References**

1. meters: [ME3830B for Low/Med](#), and the [Cornet ED78S](#) for HF.
2. including text and references from the excellent book on the EMF radiation issue from a biological/scientific point of view - [Overpowered, by Martin Blank](#). This is an excellent summary, understandable and relevant for both scientists and laypeople and has a tremendous list of references.
3. (...) sets of abstracts (data-based to be searchable) covering the RFR scientific literature, as well as collections of scientific abstracts on free radical damage (from both RFR and ELF) and a set specific to electrosensitivity. They cover the research published between 1990-2012.
4. Preliminary results of the US NTP (national toxicology program) [study](#) indicate an increased risk of cancer in rats. [Study](#) to be completed end 2017 - if Trump hasn't disbanded the National Institute for Environmental Health Sciences by then..
5. This does not stop e.g. Forbes from printing in 2015 an article titled "[Why Scientists Say WiFi Signals Won't Give Your Kids Cancer](#)" which cites "the physical impossibility of changing DNA with RF" using standard obfuscating techniques of an emeritus professor in the wrong discipline making sweeping statements without factual support, which in this case have already been proven to be false.

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