Dear Forum,

##@'s interesting and technical -yet so highly unscientific as to be almost populist- response begs some explanation and some clarification.

"Dirty electricity" exists.
It was around when I did my physics masters 30+ years ago, and it's around now. The phrase is commonly used for an electrical parameter (typically an alternating voltage) with a superimposed noise signal. In practice the frequency of the noise signals is different, typically much greater, than the frequency of the power (50-60Hz). Audio-technicians are typically experts in the field, as are radio experts to a lesser extent.

Note: these "dirty" signals can also be superimposed on earth-conductors in some domestic situations, depending on the setup. I understand, though have not yet unverified, that Sweden and Albania have a domestic electric system which tends to have more noise on the earth conductor.

Dirty Electricity produces different biological effects from "clean" electricity.
As everyone with a basic understanding of physics knows, changing electric fields create magnetic fields.
(Wikipedia: "The electric field is produced by stationary charges, and the magnetic field by moving charges (currents); these two are often described as the sources of the field. ")

The original signal (~50Hz) and the superimposed "noise signal" (often in the kHz - MHz range) will generate different EM fields, with different frequencies, different strengths, and a different biological effect.

The evidence of the biological effects is a scientific area all by itself, and if you've spare time a good place to start is the Bioinitiative Report. Though this focuses on the low GHz range (mobile phone), not all the research covered (well over 1000 peer reviewed publications, updated every 5 years or so) is RF. The effects are frequency and strength dependent, and by no means linear. (Biological systems often aren't).

Fruitloopery, scams and hoaxes.
What devices are sold, to limit these effects, is up to the free market, and up to "what an idiot is prepared to spend" as the Dutch saying goes. However, just like with snake oil, the solutions may be bogus, but the disease may still be the disease. To pull together existence of cause and the functioning of marketed devices is not science, is not technically justified, and is not helpful.

Inlet filters exist. Dirty Electricity filters therefore exist.
##@ describes inlet filters. The whole principle of an inlet filter is to "clean" dirty electricity. What is "dirty" depends of what your equipment is sensitive to.
A simple "device" to clean electricity, commonly used in sensitive equipment such as monitors, radars and even microwaves is a ferrite core. You'll have several in your home I imagine, and also on your yacht, ##@. They are frequency specific, typically used to remove steep switching spikes (what non-technical people refer to as square waves). They also, as you suggest, need to dissipate the energy they "filter" which limits their use in high power situations. I have 2 on the shore power line of my yacht. When they get warm I disconnect.

Of course selling a filter without first knowing which noise you're trying to filter out is a bit silly, yet that is what internet companies do: they either focus on the most common noise signals (hopefully) or choose whichever device they can sell at the best markup ("free market" spirited). Whether they work or not depends on ***the combination of the design and the noise you're trying to filter out***. So ##@, before adding some quasi science "to put the final nail in this nonsense" as you say by looking at the filters, make sure you measure a statistically relevant selection of dirty power first to understand what the filter is intended for, which requires a good oscilloscope, a lot of patience and a lot of measurements. It would be a very useful thing to do, while checking the filter is of little use until the "noise" is analysed.

Solar panels and EM radiation
##@ correctly states solar does not generate EM because it is DC. However, he also states that this is typically converted to AC, or even when converted to DC (as on my yacht, ##@, as per my earlier post) that is usually done with a device which chops smooth voltages into more spikey ones. Domestic systems, as I already mentioned, must have an inverter and often also have Wifi data transmission. Therefore they could easily create electro-magnetic fields of substantial strength.

Meters.
EM field meters are disappointingly frequency specific. They also come in different sensitivities, and some are calibrated while others aren't. That is pretty much the same as voltmeters for sale in any hardware store. But to say that they cannot measure voltage because they're not calibrated is a bit steep. In principle measuring EM is a matter of an oriented aerial, and an accurate volt/current meter. Nothing magical; it is just that the sensitivity is rather more than the typical domestic volt meter can handle.

Regulations
Regulations exist, and the tremendous range of what one country considers "safe" compared to another country, and what is "safe" at one frequency compared with another, is a clear indication of the complete lack of scientific understanding of the government regulatory bodies.
To hide this, they use different units for different frequency ranges, like this:

50Hz range (which is presumed valid up to the lower MHz range)
US allows 1000nT, Austria allows 20nT,

RF (450MHz)
US allows 2W/m2, Austria allows 0.0000001 W/m2 (which is ***4.2x(10 to the power -13)nT***)

RF (900MHz)
US allows 4.5W/m2, Austria still allows 0.0000001 W/m2

Some questions one might ask are:
1) On what basis does the US accept twice the field strength for twice the frequency in the commercially important GHz range? (even though they base it exclusively on bodily heating as per 1950's "research").
2) What does Austria know that the US doesn't? (and Austria isn't alone. Russia, where there's historically more research on EM fields than in the US, has a 0.02W/m2 limit.
3) What happens in between the allowable 20nT at kHz/MHz and the limit of ***4.2x(10 to the power -13)nT*** which is the conversion of Austria's limit of 0.0000001W/m2 at the GHz range? At which point do these 14 orders of magnitude become concerning?

Science is cool and often relevant without rhetoric. Especially in the SGR, let's keep it scientific. EM fields are a huge potential health risk, and it should be up to scientists and engineers to prove, question or disprove this, not to share preconceptions, mix causes with effects or mistake snake oil sellers for the state of the art on health issues.

Regards,

Erik Dalhuijsen, MSc

Director, OceanValley. Ltd (www.oceanvalley.co.uk)
Director, AberdeenClimateAction CIC, (www.aberdeenclimateaction.org)

////////////////// some of what went before ///////////////

..

Following up the reference ***https://www.equilibrauk.com/dirty-electricity-filters/*** *quoted by ### and associated sites, of which I find there are very many, amply confirms my view that this is fruitloopery. The words "hoax" and "scam" feature quite prominently. Americans have a rather inelegant expression for this sort of thing. I forbear to use it but would paraphrase it as bovine scatology.*

(..)

What does emerge is that these "Dirty Electricity" meters only cover low frequencies. One model covers the band 10kHz to 120kHz and a more recent model 2kHz to 10MHz so all talk of GHz is irrelevant. Nevertheless the opening paragraph of the above quoted doc. says "DE occupies a part of the spectrum between the power line frequency fields created by power lines and substations and the microwaves produced by mobile phone masts and other modern wireless devices"' Well yes. That is a frequency range of over ten million to one, whilst the meters cover a range of about 60 to one. That is quite a difference.

(..)

More grievous is the assertion that Solar Panels produce "Dirty Electricity". They do not. They produce Direct Current (DC) which is absolutely clean. Of course if their power is to be fed into the grid it has to be converted to 50Hz Alternating Current (AC). This is generally done with a solid state invertor. Alas inverters are notorious generators of Radio Frequency (RF) interference. Obviously people aim for high efficiency of conversion. And that means the switching circuits have to switch very quickly and the quicker they switch the higher the frequency of the radio interference they produce. Elaborate screening and filtering is necessary if such inverters are to be used at radio receiving sites. [I know of what I speak as I am presently testing an inverter of my own rather unusual design for use on my small yacht. My yacht is certainly a radio receiving site with receivers working on 198kHz (BBC radio 4), 518kHz (Navtex), ~90···100MHz (FM radio), ~155.0MHz (Marine VHF Radio), 1575MHz (GPS).]

An electrical filter is generally understood to be a "two-port" device. That is to say there are two wires going in on the input side and two wires coming out at the output side. The "Electropulse DE filter" is only a one-port device. Its two wires connect to the mains Live and Neutral. There are fundamental limitations on what can be achieved with such a two terminal device because it presents a frequency dependent shunt impedance to the mains. If it is not to load the mains it must present a high impedance at low frequencies and it can tend to either a capacitance, an inductance or a resistance at high frequencies. If it has no loss at any frequency then it can consist only of capacitors and inductors and is constrained in its structure by what in Circuit Theory is known as Foster's Theorem. Actually ###'s reference, which discussed the "Electropulse DE filter" says it embodies a 15µF capacitor. I suspect that it doesn't contain much else. Possibly it also has a series resistor. At 50Hz such a capacitor has an impedance of about 212ohms and so will drawn more than one ampere of reactive current from the 230V rms mains supply. At 5kHz its impedance has dropped to about 2 ohms and so it will of course go some way to shorting out high frequencies on the mains. This is unremarkable and can be achieved at much more modest expense than the £44.50 quoted. This is simply a rip-off aimed at those easily seduced by the use of scientific sounding babble.

To put the final nail in this nonsense I would need to get my hands on one of these meters and on these "filters" and take them apart or at least make measurements on them in my lab.