

Submission to the Parliamentary Inquiry into Sleep Health Awareness in Australia

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Dear Committee Members

As the Committee will well know, there are many causes for the worrying incidence of sleep disorders in Australia. This was highlighted in the Sleep Health Survey of Australian Adults, conducted by the Adelaide Institute for Sleep Health in 2016.¹ Rather than going through the various causes for sleep problems identified in this report, and in other similar recent studies, I wish to bring to the Committee's attention a largely ignored factor that may turn out to be a significant cause of sleep disruption. This factor is night-time exposure to electromagnetic fields from sources in close proximity to bedroom areas. This includes power-frequency magnetic fields (extremely low frequency, ELF) and radio-frequency fields (RF).

D) Power-frequency magnetic fields

My interest in this issue came from my involvement in a 2001-2002 published study of 49 subjects who were diagnosed by a medical doctor as suffering from Chronic Fatigue Syndrome (CFS). Subjects were drawn from Hobart, Melbourne and Adelaide. The objective of the study was to see to what extent excessive² 50 Hertz power-frequency magnetic fields were encountered by the subjects, primarily at night. Radio-frequency fields were not part of this pilot study. What we found was that in the exposed group (those who had prolonged night-time magnetic fields over a benchmark level of 2 milliGauss), and where these exposures were eliminated as part of the study, there was a marked improvement in sleep patterns, possibly as a consequence of the elimination of night-time magnetic fields.³

To quote in part:

However, the majority of Group A subjects reported an improvement in symptoms and a marked improvement in sleep patterns, possibly due to the decrease in exposure. These results are discussed in the context of previous research showing disturbed sleep in the presence of magnetic fields. Such disturbances may come about through the effect of magnetic fields on melatonin secretion, a hormone involved in circadian functioning.

¹ Adams R., Appleton S., Taylor A., McEvoy D., Antic N., Report to the Sleep Health Foundation 2016 Sleep Health Survey of Australian Adults, The University of Adelaide, The Adelaide Institute for Sleep Health. <http://www.sleephealthfoundation.org.au/pdfs/surveys/SleepHealthFoundation-Survey.pdf>

² This was defined as prolonged night-time exposure to magnetic fields of 2 milliGauss or more.

³ Maisch D., Podd J., Rapley B., Changes in Health Status in a Group of CFS and CF Patients Following Removal of @ Excessive 50 Hz Magnetic Field Exposure, JACNEM, Vol. 21, No. 1; April 2002. https://www.emfacts.com/download/cfs_changes.pdf

These findings were also presented at the 2nd International Workshop on "Biological effects of Electromagnetic fields" in Rhodes, Greece, further exploring the effect on sleep from magnetic field exposures.⁴

As part of the literature search for the CFS study in order to determine a benchmark exposure level for the study⁵, we came across some intriguing research findings by Dr. Eric Hachulla and colleagues at a hospital in Lille France. They noticed a number of patients who had come from the same area, the small town of Coutiches, France. These patients were suffering from symptoms of chronic fatigue syndrome (CFS). A blood analysis of these patients showed an unusual blood condition, which was unknown in the medical literature. A subsequent investigation found that they all lived in close proximity to 400 kV transmission lines with magnetic field exposures ranging from 48 mG down to 2mG. Hachulla and his colleagues termed this condition Pseudo Iron Deficiency (PID) and hypothesised that power-frequency EMFs may modify iron metabolism in populations subjected to 0.2 microTeslas (2 mG) or more. Other symptoms reported in the affected people were those seen in Chronic Fatigue Syndrome (CFS). Of interest here is that one of the symptoms was insomnia. To quote from a summary of the research:

It was also noted that insomnia would disappear when the power was lower than usual, and return when the power got back to full level. The children often could not sleep at all, so often they were sent to grandparents' or relatives' homes, where they would sleep normally.

The conclusions of Hachulla and his colleagues were as follows:

We speculate that EMFs may modify iron metabolism in populations subjected to 0.2 microTesla (2 MilliGauss) and more, with a high bone marrow incorporation of the iron (that would explain the low iron level) and a rapid utilization for the metabolism of hemoglobin, sometimes with non-incorporation of (39) Fe in the liver.

In my discussions with Hachulla, he mentioned that the hospital had come under intense pressure from the French power industry and no follow up research could be conducted. To play the Devil's Advocate, from the power industry's perspective this is perhaps understandable for a replication of this research, finding adverse biological effects down to 2 mG, would throw into disarray the "safe" limit of 2000 mG set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP is a pro-industry body, which insists there are no proven adverse effects at levels below their guideline limits for magnetic fields in residential settings. A replicated finding that a mere 2 mG could be harmful would possibly expose the power industry to litigation.

⁴ Podd J., Maisch D., Reducing the level of 50 Hz Magnetic Fields Lessens Symptoms of Chronic Fatigue and Improves Sleep, 2nd International Workshop on "Biological effects of Electromagnetic fields", 7-11 October 2002, Rhodes, Greece. <https://www.emfacts.com/download/Reducing50.pdf>

⁵ Group A: over 2 milliGauss and Group B: under that level.

In early February 2002 I took the Hachulla PID paper to the Analytical Reference Laboratories in Melbourne and asked them if it was possible, from what was written, to test for PID. On 25 February the laboratory replied in the affirmative with a quote of \$29.90 per sample. Unfortunately due to a lack of funding to follow this up with another study, nothing further has been done, but it remains an intriguing line of inquiry for future research.

Implications

From the above, the possibility exists that prolonged night-time power-frequency magnetic field exposures, far below the ICNIRP Guideline limit set for exposure these fields,⁶ may have a detrimental effect on sleep. This is because ICNIRP's rationale for its guidelines is based on providing health protection only against immediate health hazards from high levels of exposure. They are not intended to provide protection against possible cancer induction or other health effects by continued exposure at lower field levels.⁷

Considering this significant limitation, the ICNIRP guidelines are irrelevant to the possibility that power-frequency magnetic fields may be a causative factor in some cases of insomnia. This possibility should be included in future investigations into the many factors in sleep problems in Australia, especially when no other reason for insomnia is apparent.

All too frequently, especially in older homes, the electrical meter box is placed externally on a bedroom wall, if the bedhead is situated against that wall and is within 1 metre of the meter box (analogue, not digital), the resultant magnetic field exposure may be a significant factor in sleep problems. Other possible sources of magnetic field exposure should be considered as well.⁸

II) Radio-frequency exposures

As for evidence that radio-frequency fields may also influence sleep quality a study conducted in Schwarzenburg Switzerland in the early 1990s is illustrative. Since the 1970s, up till its decommissioning, health complaints were being reported in the population in the area around a short wave transmitter in Schwarzenburg.

The ongoing complaints led to a group of citizens writing a petition to the Swiss Federal Department of Traffic and Energy asking that a scientific evaluation of their health complaints be carried out. A study was commissioned in October 1990 and published in August 1995. After an extensive evaluation of the health effects in relation to the power levels of the transmitter, the researchers concluded in part:

⁶ The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has set 2,000 milliGauss (200 microTesla:200 μ T) as their guideline limit for residential exposure to power frequency magnetic fields.

⁷ See for example: Lokan K., 'Risk Perception and Regulation-What Should the Regulator Do?' Radiation Protection in Australia, vol. 9, no.4, 1991, pp. 134-136.

⁸ Maisch D, unpublished, "EMFacts case histories that indicate prolonged exposure to environmental level powerline frequency electromagnetic fields can impair immune system function".
<https://www.emfacts.com/download/CaseHistoriesEMFacts.pdf>

Our results indicate a higher frequency of disorders of a neurovegetative nature among residents up to about 1000 meters from the transmitter, and are highly suggestive of a direct effect, of the radio shortwave transmitter on sleep quality. The other complaints appear to be mediated by the sleep disorder.⁹

Significance was added to the findings when the transmitter was unexpectedly turned off and the residents were not aware of this. Affected sleep patterns recovered until the transmitter was turned on again, when they deteriorated again. In a May 29, 1996, letter, an expert group at the Swiss Federal Office for Environment, Forests and Landscape admitted that the severe sleep disorders found in the study were correlated with RF/MW exposures.¹⁰

Advanced Metering Infrastructure (AMI) also called smart meters

As an essential part of its energy policy, in 2007 the Council of Australian Governments (COAG) in the *National Reform Agenda* recommended the gradual replacement of analogue electricity meters with advanced metering meters (smart meters) which have built-in wireless interconnectivity with a new smart electricity grid.

On December 1, 2017, the Australian Energy Market Commission's (AEMC) final rule determination, titled: "Expanding competition in metering and related services" came into force in Tasmania, SA, NSW, the ACT and QLD. The rule states that this is a framework which is designed to, "promote innovation and lead to investment in advanced meters that deliver services valued by consumers at a price they are willing to pay. Improved access to the services enabled by advanced meters will provide consumers with opportunities to better understand and take control of their electricity consumption and the costs associated with their usage decisions."¹¹

In 2006 the Victorian Government mandated the roll out of smart meters throughout the state and in late 2009 the rollout began, predominantly with a mesh network. Soon, newspaper articles started to appear in the Melbourne papers about people who were claiming that ever since a smart meter was installed on their home, they were having health problems, primarily insomnia and tinnitus, especially when the meter was located close to the person's bedroom. In reply to these claims, the proponents of the rollout pointed out that the smart meter's transmissions for power consumption were very brief, only 4-6 times a day, and therefore not capable of causing any health effects whatsoever. However, although the above was correct for measuring power usage, there can be thousands of other brief transmissions not related to electricity usage and this was not being mentioned in the

⁹ Altpeter, E.S., Krebs, Th., Pfluger, D.H., von Kanel, J., Blattmann, R., et al., 1995: "Study of health effects of Shortwave Transmitter Station of Schwarzenburg, Berne, Switzerland". University of Berne, Institute for Social and Preventative Medicine, August 1995.

¹⁰ Cherry N., "Swiss shortwave transmitter study sounds warning"
<https://www.emfacts.com/2012/12/swiss-shortwave-transmitter-study-and-its-relevance-to-smart-meter-exposure-levels/>

¹¹ AEMC, "Expanding competition in metering and related services"
<https://www.aemc.gov.au/rulechanges/expanding-competition-in-metering-and-related-serv>

reports and fact sheets extolling the many benefits of switching over to smart metering. The frequent nature of these transmissions was highlighted in a document from Pacific Gas and Electric Co. (USA) where, for a smart meter network, over a 24-hour period up to 190,000 transmission pulses can occur.¹² In order to verify if this was the case with the smart meters being rolled out throughout Victoria, detailed measurements were then undertaken of a typical Melbourne home that had a smart meter recently installed. It was found that there are many brief but very frequent RF transmissions.¹³ This contrasts with what you see with an analogue electricity meter, which has no RF transmissions. The characteristics of the smart meter emissions therefore appears to be a new and unique human exposure situation where no research has yet been done on the possible impacts on health with prolonged close proximity exposure.

A 92-case study report by Melbourne medical practitioner Dr. Federica Lamech was published in the Nov/Dec 2014 issue of the US clinical journal *Alternative Therapies in Health and Medicine*. The journal is a PubMed-listed, peer-reviewed publication. The Lamech paper, is titled "Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series." The paper reveals that the most commonly reported symptoms from exposure to wireless smart meters were, in this order: insomnia, headaches, tinnitus, fatigue, cognitive disturbances, dysesthesias (abnormal sensation), and dizziness. The case series also revealed that the effects of these symptoms on people's lives were significant.¹⁴

As part of an investigation into these reported symptoms, I conducted a number of interviews with people who claimed they were being affected by recently installed smart meters. Paramount in symptoms reported was insomnia.¹⁵ **(Appendix A)**

The irrelevance of the official Guidelines

Claims that the above mentioned RF exposures are below the official guidelines and therefore are 'safe' are disingenuous as this situation lies outside the parameters set in the guidelines recommended by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) for exposure to radio-frequency fields. In relation to radio-frequency exposure, ARPANSA follows ICNIRP's lead, and as such, their recommended limits are only designed to provide protection (from excessive tissue heating for RF) from

¹² Pacific Gas and Electric Co. http://emfsafetynetwork.org/wp-content/uploads/2011/11/PGERFDataOptoutalternatives_11-1-11-3pm.pdf

¹³ Maisch D., Comments on the CONSULTATION PAPER, National Electricity Amendment (Demand Management Incentive Scheme) Rule 2015

¹⁴ Lamech F., 'Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series', *Alternative Therapies in Health and Medicine*, Nov. 2014.

¹⁵ Maisch D., Ten case histories of people in Melbourne who are suffering health problems after a smart meter was installed near their bedroom (or in one case their workstation). Sept 11, 2013, https://www.emfacts.com/download/SM_case_studies.pdf

acute radio-frequency exposures and not against other biological effects not related to tissue heating.¹⁶

Conclusion

Considering the information examined in this report, an investigation of night-time exposure to both power-frequency magnetic fields and radio-frequency fields in cases of intractable sleep disorders is warranted. Failure to do so, based on false assurances of safety based on irrelevant ICNIRP and/or ARPANSA guideline limits should itself be considered a potential risk to public health in Australia.

My qualifications for commenting to this inquiry

In 2010 I completed my PhD through the University of Wollongong, NSW. My thesis, titled *The Procrustean Approach, Setting Exposure Standards for Telecommunications Frequency Electromagnetic Radiation*, examined the limitations and manipulation of telecommunications standards by vested interests at the expense of public health protection.

<https://ro.uow.edu.au/theses/3148/>

In 2017 I authored a book chapter published in “Corporate Ties That Bind”. This chapter, titled: *Spin in the Antipodes: A history of industry involvement in telecommunications health research in Australia* is available online:

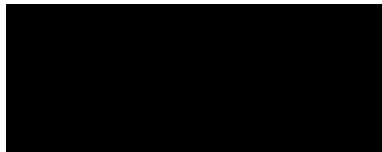
https://www.emfacts.com/download/Chap_16_updated_to_Aug_2018.pdf

A full list of my publications are available at:

<https://www.emfacts.com/papers/>

Any questions on the issues raised in this submission I am more than happy to address.

Sincerely,



Don Maisch

¹⁶ Maisch D., *A case study on ICNIRP harmonization and the Australian RF exposure standard*, Chapter 5 in *The Procrustean Approach*, 2010, <https://ro.uow.edu.au/theses/3148/>

Appendix A (Interviews - anecdotal)

Case 1

"My symptoms started the night the smart meter was installed (externally on the bedroom wall). Waking with heart palpitations and a racing heart and internal shakiness. A surging feeling that went right through my body now and then. Head pain and a burning pain on the left side of the head. Depleted immune system, leading to flu and cold. I am now getting nausea and maybe 2 -3 hours sleep a night."

Case 2

"Since installation, I wake up with headaches every single morning and go to bed with something very much like vertigo every night. I have had this ever since the smart meter was installed. It is also installed on my front porch which is right outside my bedroom, so I am very close to it."

Case 3

"Since my smart meter was installed, I have experienced shortness of breath, palpitations, and headaches mainly at the back of my head. Could it be because the position of the meter is on the other side of the wall where I sit every night while watching TV? What can I do about it? I have no room to change the position of the couch and my symptoms are getting worse by the day."

Case 4

"I experienced the same issues from my neighbour's two smart meters located three metres from my bedroom. After complaining to Powercor, I found that they must have reconfigured them as they are not communicating as much (confirmed with an EMF meter). My heart palpitations / pain in my chest has gone but I still am waking up with headaches (although they are not as intense as before the meter was reconfigured)."

Case 5

"I have developed ringing in my ears that would go away when I went to work. Now I have had two months off work, the ringing is constant. I have developed a thyroid problem since the smart meter was installed. I wake up aching. The meter is next to my bedroom wall."

Case 6

"Our smart meter was installed about two years ago. Our town in central Victoria was one of the earliest in the roll-out. Since its installation (outside my bedroom window), my health and the general health of my family has gone downhill rapidly...I suffer from severe headaches, memory loss, loss of motor skills. I feel as though I am walking around in a haze. I lie awake until daylight some nights, and others it is 1-2 pm when I wake up. There is also the high-pitched squeal that the smart meter emits constantly."

Case 7

"I came to Australia after a smart meter was fitted two metres below my bedroom window in NZ. I was not informed of the radiation danger. I subsequently experienced severe health problems and was at a loss to explain this. One of my students wrote a report about her own experiences

with smart meters and I had to mark it. I began to put two and two together. The report probably saved me serious health problems.”

Case 8

“A smart meter installed Aug 2012 unbeknownst to homeowner. A high-pitched sound started that night, kept him awake. His inspection the next day found the new smart meter in his meter box. Ongoing insomnia, tinnitus and overall deterioration in health since then. Shielding has helped, but ongoing difficulty in sleep and tinnitus continues.”

Case 9

“My son, aged 22, started work in a small graphic design studio in Fitzroy. After only being there a few weeks, he started to become quite unwell. He was getting severe dizziness, headaches, couldn't see straight or concentrate and was getting heart palpitations and extreme kidney pain, so much so that he had to take several days off to recover. On returning to work, the same thing happened again and by lunchtime he had to leave. As it was a Friday, he was able to have the weekend away and started to improve. The next week, his problems recurred yet again and it was then that he discovered that there was a smart meter situated inside a wooden box only about two metres from his head. (Just to rule out any other cause, he underwent medical tests – ECG, blood test and kidney scan – which all came back clear.) Finding that he was only getting worse at work, he felt he had no alternative but to resign. He is now ‘sensitised’ to EMR and gets quite dizzy when exposed to it.”

Case 10

“I’ve been trying to find the answers to the question of the nightmare of noise mostly at night emitting through the walls of my home, it all started when a smart meter was installed on the outside wall of our home in Sebastopol Victoria ...It has taken a tremendous toll on my health as the noise is ongoing. Many people I have spoken to have the same story to tell. We also have a neighbors' smart meter facing our bedroom window.”

For details of the above see the Powerpoint presentation: **Advanced Metering Infrastructure or The Smart Electricity Grid, Unintended consequences of smart meter placement**
https://www.emfacts.com/download/SM_case_studies.pdf