



STOP SMART METERS AUSTRALIA INC

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Jessica Curtis
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Standards Australia
By email: NSM@standards.org.au

Dear Ms Curtis

Standards and the Future of Distributed Electricity Discussion paper, 11 July 2016

Thank you for the opportunity to comment on the above discussion paper.

Stop Smart Meters Australia (SSMA) is a volunteer-based consumer advocacy group which incorporated as an Association in April 2013 in response to widespread community objection to the Victorian State Government mandated Advanced Metering Infrastructure (AMI) rollout. Paramount within our legal purposes is to provide support and assistance to people who are opposed to smart meters on the grounds of health, privacy, security, safety and/or costs.

Standards must ensure no harm to health

A number of our members and website followers have had their health adversely impacted in consequence of exposure to increasing levels of man-made electromagnetic fields (EMF). In some cases the impact on people's lives has been profound, resulting in high personal costs for these people and their families. Outcomes which SSMA has been advised of include cases where people have ceased employment as a direct result of exposure to wireless smart meters; undergone unnecessary medical procedures; been hospitalised; outlaid many thousands of dollars to partially shield their homes from smart meter emissions; no longer been able to access parts of their homes and gardens; and have relocated their families interstate to escape smart meter electro-smog.

SSMA considers it imperative that the development and revision of standards related to technology places overarching emphasis on the generation, distribution and consumption of electricity by means which ensure the safety of humans, as well as other living organisms.

To-date, our standards have failed to give sufficient consideration to either the potential for harm to health, or the severe consequences that may eventuate as a result of increased

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irradiation of the population, animals and plants. SSMA wishes to identify this issue as an area being in need of urgent work by Standards Australia.

Percentage of the population with EHS increasing

One of the key outcomes of the rollout of wireless smart meters, which emit pulsed radiofrequencies in the microwave range, has been an increase in the prevalence of people identifying as being electrically hypersensitive (EHS). According to the data analysed by Lamech (2014, p. 31) in *Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series*, only 8% of this cohort considered themselves to be suffering from EHS prior to exposure to smart meters. Individuals who already had the condition prior to the rollout have also reported a worsening in their sensitivities. This has resulted in people suffering debilitating symptoms, not only when in the proximity of smart meters, but also when exposed to radiofrequencies from other sources, such as WiFi, as well as, in some cases, extremely low frequencies from sources such as electrical devices.

The increased prevalence of poor electric power quality as a result of electromagnetic phenomena causing waveform distortion is also problematic; transients and harmonics riding along 50 Hz waves are not only capable of damaging electronic equipment but there is also preliminary evidence suggesting a correlation with common medical conditions such as asthma and diabetes (Genius 2007, p. 4). Sources of "dirty electricity" include solar PV inverters and digital meters (as a result of the switched-mode power supply). Emissions that are captured by building wiring and conducted around buildings may also radiate from outlets and along wiring, as well as leading to *increased* levels of radiation when in close proximity to conductive objects (Isotrope Wireless 2013, p. 9). The IEEE has stated that harmonic pollution "may also be related to environmental safety issues" (IEEE 2011).

The medical literature defines EHS as an *idiopathic environmental intolerance attributed to electromagnetic fields*. The World Health Organization's fact sheet on electromagnetic hypersensitivity states that "While some individuals report mild symptoms and react by avoiding the fields as best they can, others are so severely affected that they cease work and change their entire lifestyle" (World Health Organization 2005). According to the WHO, the symptoms most commonly experienced include "dermatological symptoms (redness, tingling, and burning sensations) as well as neurasthenic and vegetative symptoms (fatigue, tiredness, concentration difficulties, dizziness, nausea, heart palpitations, and digestive disturbances)."

Estimations of the prevalence of EHS within the community vary. A 2008 research article, based on a statistical Austrian cross-sample in regard to age, gender and Federal State, showed a prevalence rate of 3.5% (Schröttner and Leitgeb). UK-based *EM Radiation Research Trust* state that it is currently estimated that between 2.5% and 8% of the population could have this condition (EM Radiation Research Trust 2016). Research

conducted by Hallberg, an independent researcher, and Oberfeld, a medical doctor from the Austrian Department of Public Health, had previously indicated that up to 50% of the population will be electrically sensitive in the near future (Hallberg & Oberfeld 2006).

Stop Smart Meters Australia is in receipt of in excess of 400 (unsolicited) reports from the public alleging a variety of adverse symptoms, some of which have been life-threatening, as a result of exposure to smart meter emissions. It is expected that this represents a fraction of the number of people who have been impacted as many people will not have correlated their symptoms to the introduction of wireless smart meters and medical professionals in Australia (unlike in some countries), in the main, have no training in the diagnosis of EMF-related health problems and illnesses.

Other adverse health outcomes as a result of exposure to man-made EMF

The World Health Organization classified radiofrequency electromagnetic fields as being a Group 2B carcinogen, that is, as being possibly carcinogenic to humans, in 2011. It appears likely that this classification will be upgraded to a probable carcinogen (Group 2A), given mounting evidence from scientific studies.

For instance, a study commissioned by the German Federal Office for Radiation Protection concluded that carcinogen-induced tumour rates were significantly higher when the animals were exposed to electromagnetic fields which were significantly below existing exposure limits for users of mobile phones (Lerchl et al. 2015). Wireless smart meters and smart meter infrastructure fall into the same classification.

Other scientific studies show that adverse outcomes as a result of exposure to microwave radiation include DNA single strand and double strand breaks, breaching of the blood-brain barrier and increased production of heat-shock proteins (Maret 2012, p. 19). This may lead to an initiation of cancer or mutations that carry down generations (Johansson 2011). Such effects are a result of non-thermal levels of irradiation, and therefore are outside the scope of the protection intended by compliance with the Australian Radiation Protection and Nuclear Safety Agency's radiofrequency standard.

Exposure to lower electromagnetic frequencies, such as from distribution lines, may also be problematical. IARC classified extremely low frequencies (ELF) as a Group 2B possible human carcinogen in relation to childhood leukaemia in 2001 (World Health Organization, IARC 2002, p. 338). As noted by the World Health Organization in relation to the 2007 *Environmental Health Criteria* monograph, "The Task Group concluded that additional studies since then do not alter the status of this classification" (World Health Organization 2007).

According to the International Commission on Non-Ionizing Radiation Protection (ICNIRP), "epidemiological studies have consistently found that everyday chronic low-intensity (above

0.3–0.4 μT) power frequency magnetic field exposure is associated with an increased risk of childhood leukemia" (ICNIRP 2010).

The legal decision reached in *Energex Ltd v Logan City Council & Ors*, in relation to a proposed substation next to a predominantly residential area, reflects this concern. This decision stipulated a public protection limit not exceeding 4 mG (0.4 μT) where reasonably practicable in respect of existing feeder lines and, for other locations, this limit was not to be exceeded excepting for a declared state of emergency or; (for a maximum of 14 days per calendar year) a fault condition or [ordinary] emergency or; (for a maximum of 7 days per calendar year) maintenance work (Planning and Environment Court of Queensland 2002 pp. 19-20).

The limit arrived at in this court decision is a fraction of the limit which the Australian Radiation Protection and Nuclear Safety Authority (ARPANSA) regards as providing protection for exposure to time-varying electric and magnetic fields between 1 Hz to 100 kHz (ARPANSA 2016).

Standards Australia cannot rely on government agencies' risk assessment

ARPANSA's standard for radiofrequency exposure does not provide a high level of protection when compared with some of the other guidelines and standards in place elsewhere in the world. Forty percent of the world's population live in jurisdictions with significantly lower limits. Radiofrequency exposure limits in place in these jurisdictions are ten to hundreds (and even thousands) of times more rigorous than ARPANSA's standard, which is based on the International Commission on Non-Ionizing Radiation Protection's 1998 guidelines (Jamieson 2014).

There is also an absence of accountability in regards to investigating, monitoring or mediating adverse health outcomes as a result of exposure to man-made radiation across all levels of government in Australia. As it stands, the Australian Communications and Media Authority (ACMA), which is the body generally considered as having regulatory responsibility for making standards to protect public health from radiofrequency emissions (despite the fact that the legislative instrument under which it operates has not given it exclusive responsibility in this regards), has advised SSMA that it is not qualified to investigate the possible health effects of human exposure to electromagnetic energy and that it is not an expert body in health matters.

The ACMA summarised its position in its 2014 response to comments received on the remaking of the *Radiocommunications (Electromagnetic Radiation — Human Exposure) Standard*, stating that the ACMA instruments "regulate the technical performance and operation of equipment, not the use of equipment by consumers or other organisations" (ACMA 2014).

In order to fulfil this role, the ACMA has only partially (having dropped the precautionary aspects) adopted ARPANSA's standard, *Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz*. The ACMA's standard also does not take into account the general principles contained in ARPANSA's standard regarding simultaneous exposure to fields of different frequencies.

The Council of Europe's 2011 resolution on the potential dangers of electromagnetic fields recommended that all reasonable measures are taken to reduce exposure to electromagnetic fields (Council of Europe 2011). The Council also recommended that particular attention be given "to 'electrosensitive' people who suffer from a syndrome of intolerance to electromagnetic fields and introduce special measures to protect them, including the creation of wave-free areas not covered by the wireless network".

SSMA wishes to direct Standards Australia to an international appeal from scientists addressed to the Secretary-General of the United Nations and the Director-General of the World Health Organization which calls for more protective exposure guidelines for extremely low frequencies and radiofrequencies in the face of increasing evidence of risk.

"Numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plant and animal life" (International EMF Scientist Appeal 2016).

SSMA considers that it is incumbent on Standards Australia to ensure that technical committee members have informed themselves about the possible (unintended) effects of electromagnetic radiation on the population, animals and plants in respect of the standards for which they are responsible. As cautioned in a recent paper published in IEEE Power Electronics Magazine, titled *Some Effects of Weak Magnetic Fields on Biological Systems*, people designing wireless power-transfer systems may need to be concerned about possible effects of long-term exposures, *despite* meeting current safety standards (Barnes and Greenenbaum 2016).

In our estimation, this need for caution should be extended to all standards under Standards Australia's aegis which apply to technology capable of emitting EMF. This will ensure that standards acknowledge the true cost to the community of technology which is harmful to life, and places Standards Australia in a key position to support innovation which is protective of health and serves the public good.

An example of one solution that has been posited for transforming the grid, which has the dual benefit of reducing global energy consumption and reducing biological effects on living systems, is outlined in Appendix A.

It simply is not good enough, as raised on page 32 of the discussion paper, to ensure the ability of equipment or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to 'anything' in that environment; this needs to extend to ensuring that people, animals and plants are also not subjected to intolerable electromagnetic disturbances.

Increased wireless interconnectivity increases the vulnerability of energy supply

SSMA considers that security and emergency management standards need to take particular account of the increased vulnerability to supply that deployment of wireless technology entails as a result of either environmental or deliberate electromagnetic pulse interference. Although long-distance electricity transmission is also at risk, wireless advanced metering networks, which rely on a host of computer-controlled infrastructure, add another layer of vulnerability to solar electromagnetic pulse (EMP) events, man-made high altitude nuclear (HEMP) and non-nuclear EMP events.

The UK House of Commons' Defence Committee's 2010-12 report on *Developing Threats: Electro-Magnetic Pulses (EMP)* views space weather as a global threat as a direct consequence of our vastly increased reliance on technology, with the UK National Security Council classifying space weather as a Tier 1 risk (House of Commons 2012, p. 7). As Lloyd's risk analysis on space weather had already pointed out in 2010, space weather is not science fiction; it is an established fact (Lloyd's 2010, p. 2). A recent article published on Global Risk Insights' website concurs, stating that "Dangerous space weather is not a question of *if*, but rather when" (Luedi 2016). The article points out that regions closest to the poles face the greatest risk, and gives the example of a 92 second burst in solar activity in 1989 which resulted in costs of \$1.53 billion in Quebec alone, from grid damage and lost productivity.

Increased vulnerability of wireless networks to hacking

In addition, cyber experts have pointed out the high vulnerability of wireless networks to hacking, to the extent that an entire grid could be shut down or destroyed by hackers, terrorists, foreign powers or even a disgruntled employee. Prior to a 2012 hearing before the United States Senate to examine the *Status of action taken to ensure that the electric grid is protected from cyber attacks* the Director of National Intelligence testified "that there had been a dramatic increase in malicious cyber activity targeting U.S. computers and networks, including a more than tripling of the volume of malicious software since 2009" (US Government Accountability Office 2011).

Loss of privacy as a result of wireless connectivity to homes

The deployment of advanced metering has provided an unprecedented opportunity for information to be gathered about consumers. As a result of the granularity of the data, near real-time surveillance can occur, determining sleeping patterns, when a home is unoccupied, and what appliances are being used (Murrill et al. 2012, p. 4). This potential loss of privacy is of major concern to many people objecting to advanced meters.

Although this data is of potential financial benefit to distributors for data mining by interested parties such as marketers and law enforcers, deployment of advanced meters also exposes consumers to a major security risk.

It was reported in The Age on 25th September 2012 that "*detailed information about electricity customers' power usage, which gives insights into when a house is occupied, is being shared with third parties including mail houses, debt collectors, data processing analysts and government agencies*" (Chadwick et al. 2012).

Recommendations

- All standards pertaining to technology capable of emitting EMF must also address the potential for harm to humans, animals and plants.
SSMA requests that Standards Australia identifies this topic as an area in need of urgent work.
- Standards should robustly address the vulnerability of technology to space weather as well as cyber attack and loss of privacy.

SSMA hopes that our recommendations will be carefully considered. Improvement in these areas will benefit all Australians.

Yours sincerely



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Appendix A

Dr Paul Héroux, a medical scientist and Professor of Toxicology and Health Effects of Electromagnetism at McGill University's Faculty of Medicine, has a unique perspective on the electricity network industry as he commenced his career designing high-voltage power lines, prior to following his research interests into the effect of electromagnetic fields (EMF) on health. Dr Héroux posits that the solution to reducing adverse biological effects on humans, animals and plants is to migrate the electricity grid to one that is entirely configured for DC currents.

He asserts that a DC grid would accommodate our growing reliance on electronics, virtually all of which require DC, as well as accommodating renewables such as solar, which generate a DC waveform.

According to Dr Héroux's McGill University text, this could lead to an outcome where there is a reduction in global energy consumption of *twenty percent*.

"A dc grid deployment in the future may reduce global energy consumption by 20%. As dc sources are easily paralleled, a dc network would allow easier compatibility of electrical network of all sizes: between power utilities, eliminating *stability* problems, and between utilities and small distributed suppliers of wind and solar energy. This would make the power grid more democratic, reliable and green. It would allow people with electric cars to easily use them in case of grid power failures.

The capacity of present power lines would increase without cost by 30% due to the fact that voltage is maximum 100% of the time on a dc network and to the elimination of the *skin effect*.

Corrosion of metallic structures (pipelines, steel reinforced concrete) by induced currents would be eliminated.

It would allow signal cables to double as power cables, reducing the number of wiring connections."

Héroux 2015, *Health Effects of Electromagnetism*, McGill Course OCCH-605, Ch. 1, p. 24.

Dr Héroux asserts that significant biological effects are unlikely from a DC system (Héroux 2015, Ch. 4, p. 33).

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