

Submission to Energy Safe Victoria (ESV):

Safety of Advanced Metering Infrastructure in Victoria

Stop Smart Meters Australia

June 2012

Executive Summary

Stop Smart Meters Australia appreciates the opportunity to comment on the draft report prepared by Energy Safe Victoria (ESV) on the safety of advanced metering infrastructure (AMI) in Victoria. Stop Smart Meters Australia is pleased that ESV is addressing the concerns that the Victorian public have raised in regards to electrical safety as a result of the continued roll-out of AMI in Victoria.

In addition to the important matters which ESV already has under consideration, Stop Smart Meters Australia would be grateful if ESV would respond to the following areas of concern:

- What risks does AMI introduce to the security of supply of electricity in Victoria as a result of Electromagnetic Pulse (EMP) events?
- What risks does AMI introduce to the security of supply of electricity in Victoria as a result of man-made EMP events, such as High Altitude Nuclear EMP (HEMP) and non-nuclear EMP?
- What risks does AMI introduce to the security of supply of electricity in Victoria as a result of the potential to hack the grid?
- What risks does AMI introduce to buildings and appliances as a result of connection to building wiring?
- Are power distributors flouting the requirements of clause 5.7 (e) of ARPANSA's Radiation Protection Series No. 3 *Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz*?

Stop Smart Meters Australia also strongly believes that ESV has a responsibility, within the terms of the legislation under which it acts, to take a direct interest in the overarching health concerns which have been raised by Victorians in connection with AMI.

The specific questions which have been raised in this submission have been extracted and numbered in Appendix A, in order to facilitate a response from ESV.

Emerging Risks to AMI: Electromagnetic Pulse (EMP) Threat

Stop Smart Meters Australia notes that at the time of writing of ESV's draft report ESV was still waiting on further information regarding smart meter failures. However Stop Smart Meters Australia is highly concerned that ESV's investigations to-date appear to have only considered HV injection events as a result of localized geomagnetic activity (such as lightning), and disruption to powerlines (as a result of events such as car crashes and storms).

Stop Smart Meters Australia believes that possible future effects of electromagnetic pulses (EMP) as a result of solar super storms need to be considered. Dr Jamieson in *Smart Meters – Smarter Practices* contends that smart meters are more vulnerable to solar storms than accumulation meters *'as the chips for their integrated circuits are easily damaged by solar EMPs/geomagnetically induced currents (GICs)'* (Jamieson 2011, p. 149). He sees AMI technology as potentially introducing vulnerabilities into the grid, with 'fragile' grid infrastructures likely to be the most affected (Jamieson 2012, p. 1).

NASA expects the next solar maximum in the 2013-14 timeframe with James Russell of Hampton University stating that *'we're just emerging from a deep solar minimum.... the solar cycle is gaining strength with a maximum expected in 2013'* (NASA 2012). How might smart meter technology in Victoria cope with the expected increase in EMP events?

Given ESV's role in overseeing the design, construction and maintenance of electricity networks across the state, safety concerns regarding AMI also encompass security of supply. Section 7A of the *Electricity Safety Act 1998* specifies that ESV may have regard to the reliability and security of electrical supply in certain cases, with distributors' Electricity Safety Management Schemes, covered in Part 10 of the Act, being specifically noted (*Electricity Safety Act 1998*, s. 7A).

The UK National Security strategy has classified the potential impact from space weather as being a Tier 1 risk, identifying it in the highest of 'priority risks' facing the UK. Jamieson contends that as a result of a worst case space weather event *'large areas of the Earth could be without electricity for long periods, possibly months, with high loss of life'* (Jamieson 2012, p. 1).

The UK House of Commons' Defence Committee's recent report concluded that the consequences of EMP events must be specifically addressed, with space weather representing a global threat. Their report called for the Government to *'approach this matter with the seriousness it deserves'* (*House of Commons Defence Committee 2012*, p. 35). What role is ESV playing in assessing and mitigating possible adverse outcomes to AMI as a result of EMP events?

Written evidence to the UK government suggests that *'the likelihood of a severe space weather event is assessed to be moderate to high over the next five years, with the potential to cause damage to electrically conducting systems such as power grids, pipelines and signalling circuits'* (*House of Commons Defence Committee 2012*, p. 8). In the oral evidence presented to the UK government Avi Schnurr, Chairman and CEO of the Electronic Infrastructure Security Council stated that the threat was a result of *'not so much the EMP itself; it is more the rapidly escalating vulnerability of our increasingly complex computer-controlled infrastructures'* (*House of Commons Defence Committee*

2012, EV 5). To what extent might the migration from electro-mechanical meters to wirelessly communicating electronic meters magnify our exposure to EMP events?

UK's Met Office (UK's National weather service) also, in their written evidence to the Defence Committee, echoed other experts' conclusions that the potential impact of space weather is *'growing rapidly in proportion to our dependence on technology'*. Specifically they noted that of greatest concern are the impacts on satellite and radio communication... and potential damage/disruption of the power grid (*House of Commons Defence Committee 2012, EV 50*). Does ESV's role encompass consideration of metering infrastructure that might dampen adverse outcomes from EMP events, such as the use of fibre-optic for transmission of metering data in preference to wireless communications?

Emerging Risks to AMI: Man-Made High Altitude Nuclear EMP (HEMP) and Non-Nuclear EMP

Whilst the UK Defence Committee viewed High Altitude Nuclear EMP weapons (HEMP) as, potentially, even more lethal than EMP caused by space weather, they currently view it as of lesser threat than the Tier 1 risk identified by the UK National Security Council for space weather (*House of Commons Defence Committee pp. 13-18*). Similarly, threat of malicious non-nuclear EMP events is also considered to have a lower risk rating, although it was acknowledged that a number of countries are actively researching development of non-nuclear EMP weapons (*House of Commons Defence Committee, pp. 18-19*). However, given the probable future proliferation of such devices, should ESV be taking this emerging threat on board in its assessment of the safety of wireless AMI technology? For instance areas, such as Melbourne, which have dense populations that are readily accessible by sea may be at risk (*House of Commons Defence Committee, EV 5-6*). To what extent would the usage of fibre-optic technology for AMI alleviate this risk?

Emerging Risks to AMI: Hacking

Given ESV's role in taking into regard the reliability and security of electrical supply, what consideration has ESV given to the increased vulnerability to the grid which AMI introduces as a result of the potential for hacking? Cyber security expert David Chalk maintains *'there is not a power meter or device on the grid that is protected from hacking - if not already infected - with some sort of trojan horse that can cause the grid to be shut down or completely annihilated'* (*Take Back Your Power 2012*). Similarly, former CIA Director James Woolsey says smart meter grid security is inadequate and attacks on the grid are entirely possible (Assuras, 2011).

Creating a meshed network grid with smart meters has made our electrical supply systems and devices connected to them more vulnerable to sabotage/attacks by hackers, terrorists and/or foreign powers. Having encrypted communication may not be enough if the security key is known or compromised. The FBI warn that insiders and individuals with only a moderate level of computer knowledge are likely to be able to *'compromise meters with low-cost tools and software readily available on the internet'* (Krebs 2012).

The ability to remotely switch off smart meters also opens up security problems on a scale previously unheard of: *'from the viewpoint of a cyber attacker - whether a hostile government agency, a terrorist organisation or even a militant environmental group - the ideal attack on a target country is to interrupt its citizens' electricity supply. This is the cyber equivalent of a nuclear strike; when electricity stops, then pretty soon everything else does too'* (Anderson & Fuloria 2010, Abstract). As Jamieson points out, this risk does not exist with analogue meters (Jamieson, 2012, p. 21).

Risk of Smart Meter Fire or Explosions at Meter Box

Stop Smart Meters Australia acknowledges that, at the time of writing the draft report on the safety of AMI, ESV had not identified a risk of fire or explosion in association with the smart meters themselves. However, subsequent reports in the media continue to give cause for alarm. A report in the Northcote Leader on the 19th May reported a MFB officer, who refused to be named, as stating that *'this was the third serious fire he'd attended in the past six months that started at the smart meter'*. He claimed that the power companies were involved in *'a massive cover-up'*, denying responsibility (Gleeson 2012). Stop Smart Meters Australia trusts that ESV is continuing to use due diligence in examining power distributors' explanations as to the cause of adverse outcomes in association with smart meters.

Risk of Fire and Appliance Failure in Buildings connected to AMI

Stop Smart Meters Australia believes that ESV, in addition to monitoring the proficiency of installers, installation procedures, and examining adverse outcomes at the smart meter itself, needs to assess the potential dangers involved in connecting AMI to household, small business and school wiring. There are concerns that the high frequencies transmitted by wireless smart meters may couple on to wiring, given the close proximity to conductive wiring. Sage and Biergiel state that household wiring is simply not designed to carry the high frequency harmonics generated by *'very short, very high intensity wireless emissions'*. The higher frequency means higher energy, equating to higher heat, which could lead to a fire situation if there is compromised wiring at any point within a house (Sage & Biergiel 2010). The possibility arises that the fire could occur a substantial period of time *after* the smart meter is installed, and at some distance from the smart meter itself. What procedures does ESV have in place to establish whether or not a building fire may be linked to a smart meter?

The statement in the Northcote Leader by the unnamed MFB officer also appears to support Sage and Biergiel's findings: *'The problem is not with the meter itself but with connecting it to wiring in older houses'* (Gleeson 2012). Has ESV identified a problem in connecting AMI to older wiring? ESV has stated that *'one of the benefits of the smart meter rollout program has been that a number of power faults and wiring issues have been identified and rectified'* (Energy Safe Victoria, 2012, p. 18). If wiring issues are related to the age of the wiring, when does ESV consider wiring to be 'too old' to support AMI? Does 1970s wiring present a risk? Does 1980s wiring present a risk? And if so, is it reasonable to expect all households, small businesses and schools with 'older' wiring to bear the

cost of re-wiring their premises in order to support the aims of government and industry? How many fires might be averted if fibre-optic was used for data transmission rather than wireless RF?

In addition to the potential for harmonics to couple on to internal wiring as a result of the radiofrequency (RF) transmissions, there is also the possibility that the switching-mode power supply of smart meters may introduce additional harmonics into households, even before the smart meter begins communicating. Problems associated with switched-mode power supplies were discussed by a technical consultant at Computer Power & Consulting Corporation (Ramos, 1999), wherein he contended that the *'electrical distribution system of most sites or facilities was never designed to deal with an abundance of non-linear loads'*. Similarly, an electrical engineer's presentation at the Goldfields Electrical Industry Group stated that harmonic currents lead to *'over-heating of transformers, motors and cables, especially neutral conductors'* (Hamilton 2005).

Given that clause 4.4 of the *Electricity Distribution Code* (January 2011, Version 6) stipulates that a distributor must ensure that the harmonic levels in the voltage at the point of common coupling nearest to a customer's point of supply comply with specified levels, is this being independently verified following the installation of smart meters and again following the commencement of RF communications? Specifically, is total harmonic distortion being kept to a maximum of 5%? Subject to clause 4.4.1, are distributors complying with the *IEEE* Standard 519-1992 *'Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems'*? Would ESV please advise, in regards to any testing that is being carried out, what is the model and type of equipment being used to measure the harmonic distortion and up to what level are harmonics being tested? For instance, only testing up to the 50th harmonic (2.5 kHz) would appear to be wholly inadequate as some overseas' sites suggest high frequency voltage spikes on building wiring as a result of smart meters are likely to be found between 4 kHz and 60 kHz (ElectroSensitivity UK 2012).

Anecdotally, there have been a large number of reports of appliances, such as computers, dishwashers and ovens failing following the installation of smart meters, with power distributors encouraging consumers to submit claim forms in cases where they believe the smart meter to be the cause (Collier 2011). Appliance failure may also be related to the introduction of additional high frequency transients and harmonics. What actions is ESV taking to monitor the situation regarding appliance failures? Are statistics being provided by the distributors on such events? Are statistics being compiled on the age of the wiring in buildings where appliance failures may be occurring as a result of AMI?

Given that electricity companies have a duty, under section 98 (b) of the *Electricity Safety Act 1998*, to design, construct, operate and maintain their supply network as far as practicable to minimize *'hazards and risks of damage to the property of any person'*, would not the possible introduction of high frequencies on to building wiring, thereby possibly increasing damage to appliances as well as increasing the risk of a fire situation, be in direct contravention of this general duty?

Adverse Health Effects as a Result of Increased Electromagnetic Radiation (EMR)

ESV has stated that the potential health effects of smart meters is beyond the scope of this review (*Safety of Advanced Metering Infrastructure in Victoria*, p. 8), relying on the fact that this is subject to separate regulatory arrangements, as well as having been subject to a government review. However this ignores ESV's responsibilities under section 6 (a) of the *Electricity Safety Act 1998* which confers an objective of ensuring the '*electrical safety of electrical generation, transmission and distribution systems, electrical installations and electrical equipment*'. Moreover section 7 (a) includes, as one of the functions of ESV under the Act, the function of determining '*minimum safety standards for electrical equipment, electrical installations and electrical work*'.

The fact that AMI is introducing new sources of electromagnetic radiation into homes, schools and small businesses inevitably confers on ESV the responsibility of taking a direct interest, in order to assure the safety or otherwise of AMI.

Electricity companies also have a duty under section 98 (a) of the *Electricity Safety Act 1998* to design, construct, operate and maintain their networks to minimise as far as practicable hazards and risks to the safety of any person arising from the supply network. This duty of care appears to have been flagrantly ignored.

Specifically, clause 5.7 (e) of ARPANSA's Radiation Protection Series No. 3 *Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz* stipulates that '*measures for the protection of members of the general public who may be exposed to RF fields due to their proximity to antennas or other RF sources must include the following: (e) Minimising, as appropriate, RF exposure which is unnecessary or incidental to achievement of service objectives or process requirements, provided this can be readily achieved at reasonable expense*' (ARPANSA 2002). This basic requirement of the Act has seemingly been blatantly disregarded by power distributors as it appears that there has been a total lack of investigation into considering methods, other than the use of pulsating RF in the microwave range, for the transmission of data.

Precisely when, and to which authority, might power distributors have submitted evidence demonstrating that alternative methods of data transmission, which minimized exposure of the public to RF as a result of wireless AMI, were evaluated and costed? Certainly, a number of alternatives exist.

For instance, Dr Jamieson quotes two sources in stating 'the ruggedness of fibre-optic cables can provide tremendous benefits over their competitors. They are very secure, noncorroding, immune to water damage, electromagnetic and radiofrequency interference, difficult to damage (when in steel armoured cables or in underground conduit), and are more reliable than their competitors during poor weather and catastrophic events. They also have longer service lives – *fifty years plus* – and lower maintenance costs' (Jamieson 2011, p. 25).

Given that ultimately it is consumers who are paying for AMI (Houseman 2008, p. 112), why are consumers being hit with the double whammy of increased and unnecessary irradiation, plus, arguably, substantially higher long-term costs of transmission? Why don't power distributors appear

to have given any consideration to piggy-backing on to the Federal government's National Broadband Network, which potentially could provide cost-savings for both broadband consumers and electricity consumers? According to one of Jamieson's sources, sharing *'does not compromise either the smart grid operator's or participating broadband provider's competitive positions because smart grid services and broadband services address different market needs'* (Kennedy 2011). What role is ESV taking in seeking to ensure that electricity companies comply with clause 5.7 (e) of ARPANSA's Radiation Protection Series No. 3 *Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz*?

In reference to the independent testing commissioned by the Victorian Government which ESV refers to, one doctor publicly stated that *'the EMC Technologies study on which the Office of the Energy Minister claims to have based its decision that the meters are safe is of such poor quality (ie. it does not meet the relevant scientific criteria for a study to be valid) as to be a joke. Apart from the fact that it does not even address the health consequences of constant exposure to radio frequency fields, it uses a sample size of sixteen to assess the safety of a device that could potentially affect more than five million Victorians. Also, in most of the results tables, up to a third or more of data is missing and labelled "NM", ie. not measured.'*

'It is, moreover, unheard of, in the scientific world, to come to conclusions about anything that may affect the health of millions of people based on only one study. And it would be considered inadmissible to not have a post-roll-out surveillance study in place. It was only through this type of post-release surveillance that it was discovered that Vioxx could cause heart attacks and that drug was consequently removed from the market' (Lamech 2012, p. 3).

Quite apart from the highly dubious nature of this 'independent testing' which resulted in the claim that *'radio frequency electromagnetic exposures from single meters and groups of meters are well below the safe levels set by ARPANSA'* (Energy Safety Victoria 2012, p. 19), as well as the complete lack of monitoring of subsequent adverse health outcomes, ARPANSA's standards themselves are over ten years old, and viewed by many scientists as being obsolete. For instance, the Seletun Scientific Panel, comprised of an international group of scientists, found that ICNIRP standards (the initial basis for ARPANSA standards) were *'inadequate and obsolete with respect to prolonged, low-intensity exposures'* (Fragopoulou *et al.* 2010, p. 308). This finding is completely at odds with ESV's draft report which states that current Australian standards related to safety are *'robust and appropriate'* (Energy Safe Victoria 2012, p. 3). ARPANSA, even at the time of setting the standards ten years ago, was candid in admitting, *'there is currently a level of concern about RF exposure, which is not fully alleviated by existing scientific data'* (ARPANSA 2002, Foreword).

Standards for exposures to RF radiation vary wildly from country to country. For instance, Australian standards, in regards to SP AusNet's WiMax network, allow for exposure levels of up to 10 W/m² and, in the case of the wireless mesh network used by the other distributors, allow exposure levels of approximately 4.6 W/m² (ARPANSA 2002, p. 12). However other countries, such as Austria, have imposed precautionary limits that allow as little as 0.001 W/m² for pulsed RF (Aaronia AG). Why is it considered 'safe' to irradiate Victorians at levels that are many *thousands* of times higher than what is deemed acceptable elsewhere in the world?

Moreover, Australian standards call for RF exposure to be averaged over a six minute time span (ARPANSA, p.12). As the nature of wireless mesh networks is such that there is an ongoing series of high frequency pulses being transmitted 24/7, this means that the many 'spikes' (of varying power densities) that occur are averaged out, presenting a far rosier picture than is actually the case. To give an analogy, whilst some authorities might consider one standard drink per day over the period of a month as being healthy, *all* authorities would agree that consuming thirty standard drinks in one day is highly undesirable. But, in both cases, the average is 30 standard drinks per month. Similarly, every 'spike' that occurs from a wireless smart meter represents a much higher dose of radiation than what the lowered average suggests. Or, looking at it from another angle, soft ambient lighting might be perceived as being quite pleasant; however, consider the effect on one's body if that same light is amped up and, instead of being constantly on, is strobing.

Scientists point to the fact that radiofrequency radiation with different modulations and pulse characteristics produce entirely *different* biological effects, even though they may produce the same pattern of specific absorption rate (SAR) and tissue heating (Maret, 2011). Dr Maret goes on to state *'biologically-sensitive amplitude windows have been found at specific frequencies that lead to the selective release of calcium from cell membranes... pulses and square waves have the greatest biological impact because they produce rapid changes in voltage across biological membranes'*.

Furthermore, the claim by power distributors that smart meters transmit 4 to 6 times per day is deceptive, considering that within a meshed network smart meters communicate with each other constantly, resulting in continuous exposure to pulsed RFs 24 hours per day seven days a week.

Since the release of ARPANSA's standards over ten years ago, a considerable number of studies have been released giving evidence of potentially extremely serious adverse health outcomes as a result of chronic exposure to low-intensity wireless radiation such as that used by AMI. The authors of *Public health implications of wireless technologies* contend that *'there is credible evidence that RF exposures cause changes in cell membrane function, metabolism and cellular signal communication, as well as activation of proto-oncogenes and triggering of the production of stress proteins at exposure levels below current regulatory limits. There is also generation of reactive oxygen species, which cause DNA damage, chromosomal aberrations and nerve cell death. A number of different effects on the central nervous system have also been documented, including activation of the endogenous opioid systems, changes in brain function including memory loss, slowed learning, motor dysfunction and performance impairment in children, and increased frequency of headaches, fatigue and sleep disorders. Melatonin secretion is reduced, resulting in altered circadian rhythms and disruption of several physiological functions'* (Sage & Carpenter 2009, p. 234). Worryingly, the cellular DNA-damage as a result of RF irradiation may carry down generations (Johansson, 2011).

In addition to these effects on health, the World Health Organization on 31st May of 2011, whilst acknowledging that the evidence is still accumulating, classified *'radiofrequency electromagnetic fields (EMFs) as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use'* (IARC, 2011). These frequencies are in the *same* bandwidth as those employed by wireless smart meters.

Exposure of vulnerable segments of the population such as children to increasing levels of RF is especially problematical, with scientists such as Dr Devra Davis pointing out that children's heads can absorb *'double or more the radio frequency energy of adults' heads'* (Davis, 2011, p. 73).

The possibility that high frequency transients and harmonics from AMI may couple on to building wiring also gives rise to the potential for 'dirty' electricity (also referred to as dirty power), which has been shown to have serious implications for health. As dirty electricity has the potential to flow on all wires at a given property, this effectively means that *all* wiring may effectively act like an antenna and radiate high frequencies. Dr Samuel Milham's research in this area, such as at a California school, has revealed an unusually high correlation between cancer and exposure to high frequency voltage transients (Milham & Morgan 2008, p. 8). A number of other symptoms, resembling radio wave sickness, ranging from headaches, palpitations, asthma, deteriorating vision, and digestive problems through to high blood sugar levels and multiple sclerosis also may occur (Havas, 2006, pp. 259-268).

In light of these considerations, and the findings of many recent scientific studies that support a correlation between adverse health outcomes and RF such as that used in wireless AMI, how does ESV justify the claim in its draft report that *'there is no evidence to suggest that the safety risks associated with smart meters are any greater than older style electronic or electromechanical meters'*? (Energy Safe Victoria, 2012, p. 3).

Due to the numerous issues raised, in particular in regards to adverse health outcomes, PG&E consumers in California now have the right to have their smart meter removed and an accumulation meter re-installed (California Public Utilities Commission 2012). A provision to opt-out of AMI has also been announced in a number of other markets, such as Maine, where a legal precedent was set due to *'unresolved concerns relating to health, privacy, and cyber security resulting from the installation of wireless meters on their homes'* (Skelton, Taintor & Abbott, 2011), Vermont, Louisiana, Michigan, Connecticut and Quebec (Take Back Your Power, 2012). Due to health and privacy concerns the UK government is now planning to make the installation of smart meters voluntary (Mason 2012), following the lead of the Netherlands (metering.com, 2009).

The independent 'testing' conducted in Victoria also concluded, as noted in ESV's draft report, *'that radio frequency exposures from smart meters are lower than other household devices such as mobile phones, microwaves and baby monitors'* (Energy Safe Victoria 2012, p. 19). However this conclusion is completely nonsensical when looked at in the context of overall safety risks to health associated with AMI. Medical professionals are aware that radiation effects are cumulative; therefore it is the *total* amount of radiation which one has been exposed to, and is continuing to be exposed to, from *all* devices that needs to be considered.

As Dr Namkung of the Health Services Agency of the County of Santa Cruz stated *'Additionally, exposure is additive and consumers may have already increased their exposures to radiofrequency radiation in the home through the voluntary use of wireless devices such as cell and cordless phones, personal digital assistants (PDAs), routers for internet access, home security systems, wireless baby surveillance (baby monitors) and other emerging devices. It would be impossible to know how close a consumer might be to their limit, making safety a uncertainty with the installation of a mandatory*

SmartMeter' (Namkung, 2012, p. 3). In her concluding remarks she states *'there is no scientific data to determine if there is a safe RF exposure level regarding its non-thermal effects'* (Namkung, 2012, p. 5).

Introducing AMI into Victoria adds a new layer of involuntary electromagnetic radiation across the state. This additional blanket of electromagnetic pollution is already tipping some people over the edge in terms of their ability to work, shop and care for their family due to health effects from the additional EMR, even in cases where their own homes are not hosting a smart meter (Lamech, 2012). Statistically, there is an expectation that the number of people who are electrically sensitive is likely to rise significantly in the future (Hallberg & Oberfeld 2006).

Electromagnetic hypersensitivity (EHS) is already fully recognized in Sweden as a functional impairment, entitling sufferers to annual government disability subsidies (Johansson, 2011). Worryingly, *'over time, it appears that sensitivity is increased to smaller and smaller EMF/RF exposures'* (Sage, 2001). Genuis and Lipp echo this contention, adding *'it is instructive to consider, however, that just as some vulnerable individuals with peanut allergy can experience life-threatening anaphylaxis from exposure to miniscule amounts of everyday peanuts, some EHS persons can develop debilitating responses to everyday levels of EMR'* (Genuis & Lipp 2011, p. 8). What provisions are being made for people in Victoria who are hypersensitive to high frequency transients and harmonics as a result of the switch-mode power supply, and people who are hypersensitive to pulsed RF as a result of the wireless transmissions?

The recognition of the adverse health effects associated with the imposition of increased, and involuntary, RF, has profound implications for the future direction of AMI in Victoria. It is worth bearing in mind, as Genuis and Lipp state, *'in science and medicine as in other disciplines, there are those so closely allied to vested interests that they have seemingly been inoculated against truth, against credible research, and against observed fact.... Regardless of how compelling the evidence to the contrary, some unscrupulous or uninformed scientists continue to serve and represent the vested interests that fund them or the entrenched ideas and ideologies that propel them...'* (Genuis & Lipp 2011, p. 8).

In view of the considerable body of research showing evidence of increased risks associated with exposure to AMI technology, and the burgeoning evidence of adverse health outcomes linked to escalating levels of RF in Victoria as a result of the introduction of smart meters, can ESV continue to maintain that Australian standards related to the safety of smart meters are *'robust and appropriate'*?

Conclusion

The government's forcible introduction of increased near-field and far-field electromagnetic exposure violates a number of basic human rights including Sections 8, 9, 10, 12, 13, 17, 20 and 21 of Victoria's *Charter of Human Rights and Responsibilities Act 2006* in addition to other significant declarations of human rights to which Australia is a signatory. Stop Smart Meters Australia requests

that the concerns and questions delineated in this submission are not taken lightly and are addressed in ESV's final report on the *Safety of Advanced Metering Infrastructure in Victoria*.

The planned rollout of smart meters to approximately 2.6 million customers throughout Victoria without utilizing fibre-optic technology or providing the option for people to 'opt out' from accepting such wireless devices (as has occurred in numerous locations throughout the world) will have far reaching consequences.

We look forward to ESV's final report and trust that ESV will give the issues which we have raised the attention which they deserve. If any clarification or further assistance is required in the meantime, we would be pleased to be of assistance.

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Appendix A: Questions

Emerging Risks to AMI: Electromagnetic Pulse (EMP) Threat

1. How will smart meter technology in Victoria cope with the expected increase in EMP events?
2. What role is ESV playing in assessing and mitigating possible adverse outcomes to AMI as a result of EMP events?
3. To what extent might the migration from electro-mechanical meters to wirelessly communicating electronic meters magnify our exposure to EMP events?
4. Does ESV's role encompass consideration of metering infrastructure that might dampen adverse outcomes from EMP events, such as the use of fibre-optic for transmission of metering data in preference to wireless communications?

Emerging Risks to AMI: Man-Made High Altitude Nuclear EMP (HEMP) and Non-Nuclear EMP

1. Given the probable future proliferation of such devices, should ESV be taking this emerging threat on board in its assessment of the safety of wireless AMI technology?
2. To what extent would the usage of fibre-optic technology for AMI alleviate this risk?

Emerging Risks to AMI: Hacking

1. Given ESV's role in taking into regard the reliability and security of electrical supply, what consideration has ESV given to the increased vulnerability to the grid which AMI introduces as a result of the potential for hacking?

Risk of Fire and Appliance Failure in Buildings connected to AMI

1. What procedures does ESV have in place to establish whether or not a building fire may be linked to a smart meter?
2. Has ESV identified a problem in connecting AMI to older wiring?
3. If wiring issues are related to the age of the wiring, when does ESV consider wiring to be 'too old' to support AMI?
4. Does 1970s wiring present a risk?
5. Does 1980s wiring present a risk?
6. And if so, is it reasonable to expect all households, small businesses and schools with 'older' wiring to bear the cost of re-wiring their premises in order to support the aims of government and industry?
7. How many fires might be averted if fibre-optic was used for data transmission rather than wireless RF?
8. Given that clause 4.4 of the *Electricity Distribution Code* (January 2011, Version 6) stipulates that a distributor must ensure that the harmonic levels in the voltage at the point common coupling nearest to a customer's point of supply comply with specified levels, is this being independently verified following the installation of smart meters and again following the commencement of RF communications?
9. Specifically, is total harmonic distortion being kept to a maximum of 5%?

10. Subject to clause 4.4.1, are distributors complying with the *IEEE* Standard 519-1992 'Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems'?
11. Would ESV please advise, in regards to any testing that is being carried out, what is the model and type of equipment being used to measure the harmonic distortion and up to what level are harmonics being tested?
12. What actions is ESV taking to monitor the situation regarding appliance failures?
13. Are statistics being provided by the distributors on such events?
14. Are statistics being compiled on the age of the wiring in buildings where appliance failures may be occurring as a result of AMI?
15. Given that electricity companies have a duty, under section 98 (b) of the *Electricity Safety Act 1998*, to design, construct, operate and maintain their supply network as far as practicable to minimize 'hazards and risks of damage to the property of any person', would not the possible introduction of high frequencies on to building wiring, thereby possibly increasing damage to appliances as well as increasing the risk of a fire situation, be in direct contravention of this general duty?

Adverse Health Effects as a Result of Increased Electromagnetic Radiation

1. Precisely when, and to which authority, might power distributors have submitted evidence demonstrating that alternative methods of data transmission, which minimized exposure of the public to RF as a result of wireless AMI, were evaluated and costed?
2. Given that ultimately it is consumers who are paying for AMI (Houseman 2008, p. 112), why are consumers being hit with the double whammy of increased and unnecessary irradiation, plus, arguably, substantially higher long-term costs of transmission?
3. Why haven't power distributors appeared to have given any consideration to piggy-backing on to the Federal government's National Broadband Network, which potentially could provide cost-savings for both broadband consumers and electricity consumers?
4. What role is ESV taking in seeking to ensure that electricity companies comply with clause 5.7 (e) of ARPANSA's Radiation Protection Series No. 3 *Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz*?
5. Why is it considered 'safe' to irradiate Victorians at levels that are many *thousands* of times higher than what is deemed acceptable elsewhere in the world?
6. In light of these considerations, and the findings of many recent scientific studies that support a correlation between adverse health outcomes and RF such as that used in wireless AMI, how does ESV justify the claim in its draft report that '*there is no evidence to suggest that the safety risks associated with smart meters are any greater than older style electronic or electromechanical meters*'? (Energy Safe Victoria, 2012, p. 3).
7. What provisions are being made for people in Victoria who are hypersensitive to high frequency transients and harmonics as a result of the switch-mode power supply, and people who are hypersensitive to pulsed RF as a result of the wireless transmissions?
8. In view of the considerable body of research that does show evidence of increased risks associated with exposure to AMI technology, and the burgeoning evidence of adverse health outcomes linked to escalating levels of RF in Victoria as a result of the introduction of smart meters, can ESV continue to maintain that Australian standards related to the safety of smart meters are '*robust and appropriate*'?

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