Joint written evidence submitted by
Dr Isaac Jamieson and Dr Erica Mallery-Blythe (SME0003)

AREN'T SMART METERS ACTUALLY NON-COMPULSORY IN THE UK?

The claim made in the smart meters PDF (Parliament.uk 2016), which is accessible through the Commons Select Committee 'Smart meters' evidence check webpage, that "The Programme will replace 53 million meters with smart electricity and gas meters in all domestic properties, and smart or advanced meters in smaller non-domestic properties, by the end of 2020," appears incorrect?

"We have made it clear that we do not expect suppliers to seek an entry warrant simply to fit a smart meter and it will not be an offence for householders to refuse to accept a smart meter," The Right Honourable Charles Hendry, Minister of State of the Department of Energy and Climate Change (2010-2012) (Hansard 2011). DEFRA additionally confirmed in 2014 that smart water meters are not compulsory (StopSmart-Meters!UK 2014).

As smart meters appear to be non compulsory (StopSmartMeters!UK 2014, Which? 2015, Orlowski & Ray 2012, StopSmartMeters!UK 2012, Hansard 2011), the information on smart meters available online, and elsewhere, should be corrected to reflect this.

HUMAN RIGHTS ISSUES AS RELATED TO SMART METERS

All UK Government policies and practices are required to be Human Rights compliant. Some of the Human Rights issues related to smart meters are documented below.

THE HUMAN RIGHTS ACT 1998

ARTICLE 2 - RIGHT TO LIFE

1. "Everyone's right to life shall be protected by law."

As demonstrated in the case of LM & R v Switzerland (LMRS 1996), Article 2 is relevant in situations where health may be put at risk, and is not restricted to risk of death or actual death. There is growing evidence that individuals' health can be put at risk by smart meters (EMF Safety Network 2015, Lamech 2014, Conrad & Friedman 2013, Halteman 2011). There are even incidences where individuals have lost their lives in fires associated with smart meters (EMF Safety Network 2016, Thiesen 2015).

When authorities are aware (or should be aware) of real risk to life they are under obligation to take appropriate mitigative action to protect those at risk (Hoffman & Rowe 2010).

ARTICLE 3 - PROHIBITION OF TORTURE

"No one shall be subjected to torture or to inhuman or degrading treatment or punishment" (HRA 1998).

The European Court defines 'degrading treatment' as "... such as to arouse ... feelings of fear, anguish and inferiority, capable of humiliating and debasing... and possibly breaking ... physical or moral resistance," (IUK 1980).

ARTICLE 3 - AS RELATED TO HEALTH AND WELLBEING

The above definition appears very similar to descriptions provided by some electromagnetically hypersensitive (EHS) individuals (EMF Safety Network 2015), describing how their condition makes them feel when

exposed to electromagnetic fields (EMFs), including those created by smart meters.

“EHS frequently experience ridicule and eventual rejection or dismissal by their usual systems of support [including some government authorities – present authors’ comment]. This common outcome has a profound impact on many aspects of life including employment, accommodation, healthcare, finances as well as having a profound bearing on social, emotional and psychological dimensions of life,” Genuis & Lipp (2012). It is already well documented abroad that those with EHS, and many others, are having their health adversely affected by smart meters (EMF Safety Network 2015, Lamech 2014, Conrad & Friedman 2013, Halteman 2011).

Article 3 embodies a fundamental human right. “... the right to freedom from bodily harm is second only to the right to life, and is equally based on the right which all people have a level of basic respect and dignity as human beings,” Hoffman & Rowe (2010). The physical symptoms experienced by some of those with EHS, and some non-EHS individuals adversely affected by EMFs from smart meters, are a form of torture.

SMART METERS, ARTICLE 3 AND THE EQUALITY ACT 2010

It is proposed by the present authors that discriminating against such individuals through forcing them to be exposed against their wishes to smart meter radiation in their own homes, and in areas they frequent, may amount to harassment and victimisation.

Under Section 149 of the Equality Act 2010 (Legislation.gov.uk 2010) “A public authority must, in the exercise of its functions, have due regard to the need to … eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under this Act.”

SMART METERING INSTALLATION CODE OF PRACTICE

The Smart Metering Installation Code of Practice (SMICoP), which requires energy suppliers to meet the needs of vulnerable consumers, appears to completely ignore the needs of those who are electromagnetically sensitive, or may otherwise have their health negatively impacted by the electromagnetic fields emitted by smart meters.

BACKGROUND INFORMATION ON EHS

Between 3-6 % of the general public [approximately to 1.9 to 3.8 million UK citizens] may presently be affected by EHS, a number well in excess of the 1-2% of the population using wheelchairs (Jamieson 2014, Wheelchair 2015). It is predicted that such numbers will substantially grow (Hallberg & Oberfeld 2006).

Symptoms observed in those who are EHS include: Headaches; visual disturbance; hearing disturbance; sleep problems; dizziness; poor blood circulation; capillary fragility; cold hands & feet; fatigue; heart problems; irritability; dermatological symptoms; disorientation, reduced libido; altered liver enzymes; recurring infections; memory deficits; general malaise; muscle pain; nausea; nasal congestion; night sweats; increased need to urinate; restless legs; tinnitus; depression; anxiety.

A growing number of peer-reviewed studies (not directly investigating EHS) indicate increased occurrence of many of these symptoms in buildings and environments where raised EMF exposures exist. The rollout of smart meters greatly exacerbates this problem.

Under special test conditions, Rea et al. (1991), found that EHS is a real phenomenon in some environmentally sensitive patients (as they exhibited consistent reactions while none of the controls did). A similar deduction was reached by McCarty et al. (2011) who concluded, “EMF hypersensitivity can occur as a bona fide environmentally-inducible neurological syndrome.” It is officially recognised as a functional impairment in

Sweden. The Canadian Human Rights Commission also acknowledges environmental sensitivity attributed to EMFs (Lobb et al. 2015, Johansson 2010, Wilkie & Baker 2007).

Video presentations relating to EHS

On 18th May 2015, the 5th Paris Appeal Congress was held at the Royal Academy of Medicine in Belgium. Its theme was: 'Environmental idiopathic intolerance: what role for EMFs and multiple chemicals?' The expert presentations given at it can be viewed online at: http://appel-de-paris.com/?page_id=1667&lang=en They provide important insights for those wishing to become better educated on this topic. [This group has since issued a scientific declaration related to EHS to the UN (Belyaev et al. 2015)].

The video presentation by Dr Erica Mallery-Blythe (2014) discussing the effects of electromagnetic radiation on health and children, and the benefits of reduced exposure levels can be viewed at: https://www.youtube.com/watch?v=sNFdZVeXw7M

Also refer to the document 'Electromagnetic Hypersensitivity & Human Rights' by Dr Isaac Jamieson: http://www.radiationresearch.org/home/10-uncategorised/408-ehs-human-rights-dr-isaac-jamieson for further background information (Jamieson 2014a).

Many health symptoms of EHS are experienced by members of the general public exposed to raised field levels well below those presently considered acceptable by Public Health England. Such findings strongly indicate that current policy related to smart metering has to be seriously rethought. Safer alternatives are available.

"Electromagnetic hypersensitivity sufferers experience a serious deterioration in their quality of life, not only because of the physical symptoms it usually entails, but also because their lives are totally disrupted by the need to avoid exposure. In practice, it means that they not only have to avoid almost all public facilities such as transport, hospitals and libraries, but even their own homes, in order to escape adverse health effects, which is a breach of rights that are enshrined in the EU Charter of Fundamental Rights," (EESC 2014). Such matters have to be addressed through the creation of low EMF environments and biologically safe technologies.

Legal Actions and Rulings Relating to EHS

In 2011, the Labour Court in Madrid declared hypersensitivity, caused in part by RF exposure, can cause permanent disability. It's ruling set a precedent for future conditions related to EHS. [The verdict awarded the college professor, who has been permanently incapacitated, a permanent disability pension at 100% of base salary rate (WEEP News 2011)].

Additionally, the Australian government has been ordered to pay claims for damaging the health of an employee with EMF sensitivity (Administrative Appeals Tribunal of Australia 2013, GSMA 2013).

In 2015, a French woman was granted a disability allowance by a court in Toulouse after telling that she suffers from electromagnetic hypersensitivity (EHS) (BBC 2015). This caused a huge media turmoil. It appears only a matter of time before legal actions and lawsuits arise in the United Kingdom related to electromagnetic pollution.

Such cases seem likely to increase, particularly as a result of smart meter installations. Many individuals are reporting adverse health symptoms after the installation of smart meters and this number is increasing.

ARTICLE 3 - AS RELATED TO PRIVACY

Prohibiting individuals enjoying proper privacy in their own homes and premises through smart monitoring and surveillance of devices they use and personal timings they keep is potentially demeaning and degrading to both their self-respect and dignity and would constitute a serious breach of Article 3 for the whole population.

PRIVACY ISSUES RELATED TO SMART METERS

Unlike conventional meters that measure total energy use through day and night tariffs (which are normally read four times annually), smart meters allow energy use to be read with far finer granularity. The UK industry's draft technical specifications for smart meters state a requirement for real time information every 5 seconds for electricity and every 30 minutes for gas (SMDG 2011). The intended access to, and retention of, such data by the UK Government appears to be in direct contradiction to EU Privacy Law and Human Rights legislation (Anderson & Fuloria 2010).

Every electrical appliance has its own energy fingerprint readable by smart meters. Those accessing such information from smart meter data, either legally or illegally, have indications of the appliances individuals have and how often they use them.

"We ... have the technology to record ... (energy consumption) … more or less live... From that we can infer how many people are in the house, what they do, whether they're upstairs, downstairs, do you have a dog, when do you habitually get up, when did you get up this morning, when do you have a shower: masses of private data," Martin Pollock of Siemens Energy, quoted by Wynn (2010). The use of such technology is highly intrusive.

It was demonstrated at the 28th Chaos Computing Congress (28c3) hacker conference that hacking into a smart meter could in, addition to identifying activity patterns in homes (including whether they are occupied) and the types of equipment being used, even allow identification of the movies being played by occupants. They stated that the security encountered was poor and the data resolution the meters provided was too high (Wisniewski 2012) – as is the case with UK smart meters.

ARTICLE 8 - RIGHT TO RESPECT FOR PRIVATE AND FAMILY LIFE

1. "Everyone has the right to respect for his private and family life, his home and his correspondence," (HRA 1998).

There are numerous Human Rights privacy issues related to the UK Government's intended usage and retention of fine-grained data collected from smart meters and related smart appliances.

"… it [is] imperative that proper consideration is given to individuals' fundamental rights to privacy," EC (2011). Under EU Data Protection Law, consumers' rights to privacy "may not be overridden".

2. "There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others," (HRA 1998).

The argument that may be used by some that the use of smart meters, which are responsible for the breach of a number of human rights, can be defended by the above is addressed in the text below.

Article 8 may be violated through the potential weakening of "national security, public safety or the economic well-being of the country" by the introduction of smart meter technology.

As brief examples of how the use of smart meters, and smart technologies, may potentially weaken:

a) NATIONAL SECURITY

METER VULNERABILITY TO TERRESTRIAL SEVERE WEATHER EVENTS

It appears smart meters will have far lower resilience to severe terrestrial weather events than the analogue meters they were intended to replace (Jamieson 2012). In a worse case scenario, their widespread use could cause severe disruption and loss of life [as a result of sudden loss of power for heating or cooling during such events] due to their being designed to automatically disconnect when they fail.

In the UK, the Smart Metering Design Group (SMDG) has stipulated that smart meters "shall operate over a minimum temperature range of -10°C to +40°C [+14°F to +104°F]" within the Maximum Permissible Exposure (MPE) (SMDG 2011). Whilst that upper figure might at first glance appear reasonable as the maximum temperature recorded to date is 38.5°C [101.3°F], some scientists predict annual mean temperatures and temperature extremes will continue to rise even with policies being developed to help address this (Lewis 2015).

Under such a scenario, it appears temperature extremes in the United Kingdom may on occasion exceed the MPE of such technology. [There is also the possibility that some smart meter enclosures may have internal temperatures in excess of those registered outdoors during heat waves – the 'oven effect']. Last year was the warmest year on record. Heat waves are also becoming more frequent (Sachs 2015a,b). It is presently predicted by UK weather forecasters that 2016 will be the warmest year on record (Mogul 2015).

Additionally, colder winters are said to be arising as a result of climate change (Greene & Monger 2012). The minimum temperature recorded to date in the United Kingdom is -27.2°C [-17.0°F] (Met Office 2011). There are many instances where temperatures have dropped greatly below the -10°C MPE for smart meters. As an example, very low temperatures (and significant snowfalls) occurred in November and December 2010. "Temperatures widely fell below -10 °C [14°F] on several nights and on occasion [in some places] below -20 °C [-4°F]... " Met Office (2012). Recently it has been predicted that Britain may be facing its most savage winter in over 50 years (Rao 2015).

METER VULNERABILITY TO ELECTROMAGNETIC PULSE (EMP) EVENTS

Smart meters are more vulnerable to damage from natural and manmade electromagnetic pulse (EMP) events than the analogue meters they are intended to replace.

1). SPACE WEATHER: Space weather is a recognised Tier 1 risk (House of Commons Defence Committee 2012). The Royal Academy of Engineering (2013) states that: "In the UK, for planning purposes … any system with a design lifetime of more than 8.25 years needs to consider the risk from severe space weather events …" The design of UK smart meters does not address this very serious threat and actually makes the grid more vulnerable to space weather.

2). EMP ATTACKS: EMP attacks from terrorists and rogue nations that can knock out electronics and power supplies also present a real risk. It is highly likely that by 2025 a major cyber attack will have caused widespread harm to a nation's security and ability to defend itself and its people (Rainie et al. 2014).

"The [UK] Government cannot … be complacent about this threat … It is therefore vitally important that the work of hardening UK infrastructure is begun now and carried out as a matter of urgency," House of Commons Defence Committee (2012). The design of meters should also be reconsidered to take this into account. Analogue meters have far greater resilience than smart meters that can be easily compromised by such events. They also cannot be hacked.

CYBER THREATS

Cyber threats are recognised as a Tier 1 threat (Gov.UK 2015a).

In 2014, 1,642 Internet experts answered the question: “By 2025, will a major cyber attack have caused widespread harm to a nation's security and capacity to defend itself and its people? (By "widespread harm," we mean significant loss of life or property losses/damage/theft at the levels of tens of billions of dollars.)” 61% of those experts considered a major cyber attack likely (Rainie et al. 2014).

“The current attack surface for [smart] cities is huge and wide open to attack. This is a real and immediate danger. The more technology a city uses, the more vulnerable to cyber attacks it is, so the smartest cities have the highest risks” (Cerrudo 2015). Most cities are poorly protected against cyber attacks, and are at risk of high financial loss through lack of adequate contingency planning. Such cities are less attractive to investors.

Former Director of the CIA, Robert James Woolsey, Jr., who is a US national security and energy specialist, is on record as calling the smart grid “really stupid” because of the security risks it creates (Woolsey 2011).

THREATS TO SMART METERS

“The smarter … meters become, the easier they’re getting to hack. Like many things in electronics, … meters become easier for hackers to break into and misuse when they are upgraded to include wireless and computer technology” (Takahashi 2011). “In the near future, smart power or water meters could become targets, to black out an area of a city and demand a ransom …” (Flanagan 2015). [As an alternative, the intelligent provision of low-tech metering systems and independent (wired) off-line smart systems could prove highly cost effective in helping address many cyber threats].

“What if [smart] meters are told to disconnect by a worm or virus? Among all the services AMI [Advanced Metering Infrastructure] offers, the disconnect function is the most controversial … as it is the only one that directly controls the flow of power to the home or business. … The greatest concern is that a successful attack could allow someone to gain control of customers all at once. In addition to causing widespread blackouts, repeatedly switching the power off and on could create … surges in the grid that could damage loads and destabilize the entire grid, potentially causing damage to generators, transformers, and other equipment in the path [including the smart meters themselves and other electrical items]. … There will be multiple impacts that can be realized as a result of cyber security risks and smart metering. But the paradigm change is that the hackers can actually harm human life. …” Sorebo & Echols (2012) – cyber security experts.

In 2009: “IOActive Inc., successfully reverse engineered a smart meter - known as Advanced Metering Infrastructure (AMI) - and demonstrated the ability to inject a worm into the grid that would grant a hacker full control over the grid devices. The tests also revealed that the worm could spread like wildfire throughout the grid, potentially allowing the hackers to shut down massive portions of electricity to major cities, critical infrastructures and government agencies,” Verton (2011).

“… it is quite possible that a nation state might launch … [a cyber-attack targeting smart meters to switch off a country’s electricity supply] during a time of international tension. A second possibility is a terrorist organisation. A third possibility could be environmental activists; … A further possibility is a criminal, who switches off a number of an energy company’s meters and threatens widespread havoc unless a ransom is paid. … Yet another angle is the possibility of criminal energy theft …” The introduction of smart meters create significant new cyber-vulnerabilities (Anderson & Fuloria 2010).

As an example of such threats, in 2015 computer expert Professor Kim Heung-Kwang warned that North

Korea now has around 6,000 computer hackers who could be used to unleash cyber attacks to destroy London and other cities, killing thousands of innocent civilians in the process (Franceschi-Bicchierai 2015). He further stated that North Korea has developed a Stuxnet-style attack designed to destroy a city and that "up to 20 per cent of the regime's military budget is being spent on online operations" (Parfitt 2015). Under one worst-case cyber-scenario, cities can be left without gas, electricity or water supplies, with dark streets, no communications and electronically gridlocked traffic.

In 2015, it was revealed that millions of smart meters and Internet-connected devices could be at risk from cyber attacks due to weak encryption created by the Open Smart Grid Protocol (OSGP) Alliance (Jovanovic & Neves 2015).

b) PUBLIC SAFETY – In 2011, the WHO and ICNIRP classified radiofrequency electromagnetic fields "as possibly carcinogenic to humans (Group 2B)" and further stated that: "A positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered ... to be credible, ..." (WHO/IARC 2011).

As this is the case, it would appear prudent to reduce the general public's exposure to it rather than increase it 24/7 with counterproductive initiatives such as the rollout of wireless smart meters.

Peer-reviewed research now even suggests that radio frequency radiation should be upgraded to Group 2A, 'probably carcinogenic' (Davis et al. 2013), or even Group 1 'carcinogenic' (Hardell & Carlberg 2013). Many effects are noted at non-thermal exposure levels well below those that Public Health England promotes as "safe".

SMART METERS AND REPORTED HEALTH EFFECTS

A number of adverse health effects have been reported after the installation of smart meters.

Lamech (2014) noted the most frequently reported symptoms as a result of exposure to smart meters were: (1) insomnia; (2) headaches; (3) tinnitus; (4) fatigue; (5) cognitive disturbances; (6) dysesthesias (abnormal sensation); and (7) dizziness. The effects of exposures on people's lives were said to be significant.

Online testimonials relating to health effects individuals have experienced as a result of exposure to wireless smart meters are also well worth studying (EMF Safety Network 2015): http://emfsafetynetwork.org/smart-meters/smart-meter-health-complaints/

Online smart meter survey 1

Numerous health complaints have been made worldwide related to wireless smart meters. The results of a survey by the EMF Safety Network are shown (Table 4). 93% of respondents were over 40 years old. 43% were over 60 years old and 73% were women. 49% of the respondents were said to be 'electrosensitive' (Halteman 2011).

In that survey the percentage of detrimental effects reported for a variety of health conditions* were as follows: Sleep problems (49.1%); Stress, anxiety, irritability (43.1%); Headaches (40.9%); Ringing in the ears (38.1%); Concentration, memory or learning problems (34.6%); Fatigue, muscle or physical weakness (34.3%); Eye problems, including eye pain, pressure in eyes, blurred vision (33.0%); Disorientation, dizziness, or balance problems (25.8%); Cardiac symptoms, heart palpitations, heart arrhythmias, chest pain (25.8%); Leg cramps, or neuropathy (19.2%); Arthritis, body pain, sharp, stabbing pains (18.2%); Nausea, flu-like symptoms (17.3%); Sinus problems, nose bleeds (14.5%); Respiratory problems, cough, asthma (13.8%); Skin rashes, facial flushing (12.6%); Urinary problems (8.8%); Endocrine disorders, thyroid prob-

lems, diabetes (8.8%); High blood pressure (7.2%); None of the above (8.8%); Other (30.5%); I don't know (24.8%).

*Figures reflect whether individuals or members of their homes experienced health impacts (n = 318).

Online smart meter survey 2

In the 'Smart Meter Health Effects Survey and Report' undertaken by Conrad & Friedman (2013), adverse health effects were noted in a high percentage of the 210 individuals who replied.

"Nearly 98% of respondents were very sure or fairly sure their new or worsened symptoms correlated to smart meter exposure." ... "It's important to reiterate as documented elsewhere in this survey: most of our respondents (82%); were in good or excellent health before smart meters were installed and 42% of them developed symptoms prior to any knowledge of the presence of smart meters," Conrad & Friedman (2013).

"Computer Use: Before smart meters, nearly 79% of respondents were using computers without symptoms while about 20% were using computers despite having symptoms from computer use. Following smart meter exposure, those able to operate a computer without symptoms dropped (from 79%) to 39% (about one-half of before), while those showing symptoms from computer use nearly tripled (from 20%) to 57%," Conrad & Friedman (2013).

"WiFi Use: Before smart meters, about 40% of respondents were using wifi without symptoms. 11% were using wifi but with symptoms from it, and 17% were not using wifi because it had caused symptoms in the past. Following smart meter exposure, those able to use wifi without symptoms dropped (from 40%) to 18% (less than one-half of before) while those continuing to use wifi but with symptoms from it nearly tripled (from 11%) to 28%. The number of respondents who could not use wifi at all because of symptoms more than doubled (from 17%) to 41%," Conrad & Friedman (2013).

HEALTH EFFECTS ASSOCIATED WITH ELECTROMAGNETIC POLLUTION

There is substantial evidence indicating even low intensity EMF exposures can cause ill health.

OVERVIEW - Conditions linked with environmental EMF exposures include:

Cancer (Coureau et al. 2014, Moon et al. 2014, Hardell & Carlberg 2013); Childhood & adult leukaemia (Dolk et al. 1997, Hocking 1996); Autism (Herbert & Sage 2012, Kane 2004); Immune system effects (Boscolo et al. 2001, Novoselova et al. 1999); Infertility (Avendaño et al. 2012, Otitoloju et al. 2010); DNA damage (De Iuliis et al. 2009, REFLEX 2004); Oxidative stress (Kumar et al. 2012, Agarwal et al. 2009, Ilhan et al. 2004).

We suggest the cost to the National Economy of 'electromagnetic pollution' runs into many billions of pounds in terms of reduced health, wellbeing and productivity. The proposed rollout of smart meters and related wireless technologies would make the situation even worse. Two examples expanding on this are given below.

REDUCED SLEEP QUALITY

Lack of sleep may be a causal factor in premature ageing, high blood pressure, diabetes, obesity, depression and other mental health problems, and can also tax the immune system (Ackermann et al. 2012). Research by Altpeter et al., (1997, 1995) indicated that exposure to power densities of 0.002 μW/cm2 resulted in sleep disorders in subjects (along with abnormal blood pressure, digestive problems, fatigue, joint & limb pain, nervousness and weakness). Similar research by Simonenko et al., (1998) suggested that human occupational

exposures of 1.0 μW/cm2 could result in insomnia (along with headache, dizziness, indigestion, irritability, chest pain, difficulty breathing, fatigue and weakness). [The levels just mentioned are less than those some people can be exposed to as a result of wireless smart meters, which as documented earlier have been associated with sleep problems in some individuals (Lamech 2014, Conrad & Friedman 2013, Halteman 2011)].

Improved sleep has been noted in low-field environments with exposures of 0.05-0.22 V/m (0.0006-0.0128 μW/cm2) compared to 0.25-1.29 V/m (0.0165-0.4400 μW/cm2) (Oberfeld et al. 2004)

The annual cost to the UK of chronic sleep deprivation was estimated at £1.6 billion (Bupa 2010).

DEPRESSION

Suicide is the leading cause of death in England and Wales for men between 20-49 years old, and one of the main causes of death among 5-19 year olds (ONS Digital 2015). Depression is a gigantic public health burden that exceeds other common sources of morbidity and mortality. [In England in 2000, the annual cost of depression was estimated to be £9 billion (Thomas & Morris 2003)]. Individuals with depression are at heightened risk of: Alzheimer's disease; Cancer; Diabetes (type 2); Epilepsy; Obesity; and Stroke (BC's Physicians 2009).

Oberfeld et al. (2004) noted depressive tendency with 900/1800 MHz exposures of 0.25-1.29 V/m (0.0165-0.4400 μW/cm2) compared to 0.05-0.22 V/m (0.0006-0.0128 μW/cm2) ($p = 0.0016$). Others have made similar findings (Eger & Jahn 2010, Bortkiewicz et al. 2004, Santini et al. 2002). [Many wireless smart meters create RF EMF exposure levels above those associated with increased depressive tendency].

The cost to the National Economy of electromagnetic pollution is far higher than generally realised and runs into many billions of pounds annually. The adoption of wireless smart metering, as demonstrated by smart metering projects elsewhere Lamech 2014, Conrad & Friedman 2013, Halteman 2011) would further increase this cost burden.

SMART METERS AND FIRES

There are numerous reports from abroad of "… fires, explosions, electrical problems or burned out appliances due to Smart Meter installations" (EMF Safety Network 2016). It has been reported that to date thousands of smart meter fires have arisen (Thiesen 2015).

Fires associated with smart meters have been recorded in the UK too. It appears from a Fire Service report that such incidents are currently significantly under reported. Further concerns arise from that fact that incorrect or faulty installation practices appears to be major causes for such fires, and that the fitting of most smart meters in the UK will predominantly undertaken by non electricians (Sangani 2012).

The possibility of loss of life from such fires appears likely to be higher in the UK than abroad, as meters are more often located indoors (often in areas that would normally act as escape routes in case of fire (Stop Smart Meters! UK 2013).

c) ECONOMIC WELLBEING - The creation of fine-grained data that can be hacked into can reveal when individuals' homes are unoccupied, and the types of electrical equipment held, making them more vulnerable to thieves.

In September 2015, the Zurich Insurance Group (2015) announced that: "Cyber Costs Threaten To Exceed Benefits". [Some of these have already been discussed in detail earlier in this present document]. It stated

that by 2019: “The annual cost of protecting our digital world from hackers will exceed the benefits of being connected …” It further mentioned that in the USA and Europe the annual costs of protecting connected systems already outpace benefits.

From the matters already discussed in this document, it appears that any projected benefits created by smart meters are significantly overshadowed by the threats they present. “Despite the EU Directive, 11 nations have ruled out electricity smart meters and only 5 are pushing ahead with the 2020 target for gas meters” (IoD 2015). It would be prudent for the UK to show the necessary courage to halt the smart meter rollout.

The Institute of Directors has called the rollout: “… a government IT disaster waiting to happen” (IoD 2015). Which? is calling for a halt to the rollout stating: “… there are significant issues with consumer trust in smart meters, including concerns about the cost of the roll-out, data security and health concerns,” Which? (2012a,b). The present authors agree with those sentiments.

[For further discussion on these areas refer to: Jamieson & Mallery-Blythe (2015); Conrad & Friedman (2013); Jamieson (2012/2011); Peev (2012); Stop Smart Meters! (UK) (2012); Halteman (2011); Woolsey (2011); and Mills & LaMonica (2010).

Simply educating the general public to switch off items, instead of leaving them running or on standby when not required, is a far more cost effective way to enhance economic wellbeing and reduce general energy usage than smart meters.

THE FIRST PROTOCOL, ARTICLE 1: PROTECTION OF PROPERTY

“Every natural or legal person is entitled to the peaceful enjoyment of his possessions,” (HRA 1998).

ARTICLE 1 - AS RELATED TO THOSE ADVERSELY EFFECTED BY EMFS

This Article may be breached as a result of radiofrequency emissions from smart meters making parts of where individuals’ live uninhabitable to them. It is already known that electromagnetic pollution from smart meters can prevent some using parts of their homes and gardens, and can even force them to move home in order to avoid/reduce adverse health effects (EMF Safety Network 2015, Gregory 2011, Havas 2011).

ARTICLE 1 - AS RELATED TO PRIVACY

The “peaceful enjoyment of ... possessions”, and the right for individuals to be able to enjoy their property in the manner they have become accustomed to (such as being able to use their possessions as they have in the past without worries about outsiders gaining unprecedented knowledge of their personal habits), may be compromised through inappropriate and unwarranted data harvesting.

UN CONVENTION ON THE RIGHTS OF THE CHILD (UNCRC) (United Nations 1989)

“All UK government policies and practices must comply with the UNCRC,” Gov.UK (2015).

Article 16

1. “No child shall be subjected to arbitrary or unlawful interference with his or her privacy, family, home or correspondence, nor to unlawful attacks on his or her honour and reputation.”

The prohibition of children’s right of full enjoyment of proper privacy in their own homes as a result of smart meter data monitoring is an apparent breach of Article 16.

Lifestyle information determined by third parties from analysis of energy usage divulged by smart meters may potentially damage children's security of person (particularly if energy usage patterns indicate that they may be the only ones at home).

2. "The child has the right to the protection of the law against such interference or attacks."

The surveillance monitoring of children's activities that would occur through the use of fine-grained data collection obtained through smart metering and related technologies is in direct contravention of Article 16.

Article 37

"States Parties shall ensure that: (a) 'No child shall be subjected to torture or other cruel, inhuman or degrading treatment or punishment.'"

The prohibition of children's right of full enjoyment of proper privacy in their own homes as a result of smart monitoring and surveillance by the UK Government is potentially cruel, inhuman, demeaning and degrading. It would be a blatant breach of the UK Government's own policy and highly counterproductive to all.

COMMENT

The issues outlined above urgently need to be addressed with regards to metering. The present rollout should be halted at the earliest possible opportunity and replaced with an alternative that is fit for purpose.

References

Administrative Appeals Tribunal of Australia (2013), McDonald and Comcare [2013] AATA 105 (28 February 2013), http://www.austlii.edu.au/au/cases/cth/aat/2013/105.html

Agarwal, A. et al. (2009), Effects of radiofrequency electromagnetic waves (RF-EMW) from cellular phones on human ejaculated semen: an in vitro pilot study. Fertilty and Sterility, 92(4) 1318-1325.

Anderson, R. & Fuloria, S. (2010), On the security economics of electricity metering, 9th Workshop on the Economics of Information Security, Harvard University, George Mason University in Arlington, VA, June 2010, 18 pp.

Avendaño, C. et al. (2012), Use of laptop computers connected to Internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation. Fertility and Sterility, 97(1), 39-45.

BBC (2015), Gadget 'allergy': French woman wins disability grant, http://www.bbc.co.uk/news/technology-34075146

Belyaev, I. et al. (2015), 2015, Brussels International Scientific Declaration on Electromagnetic Hypersensitivity and Multiple Chemical Sensitivity, http://www.isde.it/wp-content/uploads/2014/06/2015-Bruxelles-International-Scientific-Declaration-on-Electromagnetic-Hypersensitivity-and-Multiple-Chemical-Sensitivity.pdf

Boscolo, P. et al. (2001), Effects of electromagnetic fields produced by radiotelevision broadcasting stations on the immune system of women. The Science of the Total Environment, 273(1-3), 1-10.

Cerrudo, C. (2015), WHITE PAPER: An Emerging US (and World) Threat: Cities Wide Open to Cyber Attacks. IOActive Labs.

Conrad, R. & Friedman, E. (2013), EXHIBIT D – Smart Meter Health Effects Survey and Report, http://www.mainecoalitiontostopsmartmeters.org/wp-content/uploads/2013/01/Exhibit-10-Smart-Meter-Health-Effects-Report-Survey2.pdf

Coureau, G. et al. (2014), Mobile phone use and brain tumours in the CERENAT case-control study. Occupational & Environmental Medicine, 71(7), 514-522.

Davis, D.L. et al. (2013), Swedish Review Strengthens Grounds for Concluding That Radiation from Cellular and Cordless Phones Is a Probable Human Carcinogen. Pathophysiology, 20(2), 123-129,

De Iuliis, G.N. et al. (2009), Mobile Phone Radiation Induces Reactive Oxygen Species Production and DNA Damage in Human Spermatozoa In Vitro. PLOS One, DOI: 10.1371/journal.pone.0006446

Dolk, H. et al. (1997), Cancer incidence near radio television and transmitters in Great Britain, Part II. All high-power transmitters. American Journal of Epidemiology, 145, 10-17.

EC (2011), Article 29, Data Protection Working Party Opinion 12/2011 on smart metering. Adopted on 4 April 2011, 00671/11/EN WP 183, The Working Party on the Protection of Individuals with Regard to the Processing of Personal Data, http://ec.europa.eu/justice/policies/privacy/index_en.htm

EESC (2014), Preliminary Draft Opinion of the Section for Transport, Energy, Infrastructure and the Information Society on Electromagnetic hypersensitivity (own-initiative opinion). TEN/559 Electromagnetic hypersensitivity.

EMF Safety Network (2015), http://emfsafetynetwork.org/smart-meters/smart-meter-health-complaints/

EMF Safety Network 2016), Smart Meter Fires and Explosions, http://emfsafetynetwork.org/smart-meters/smart-meter-fires-and-explosions/

Flanagan, T. (2015), From car-hacking to city-hacking; where will the security holes end? Rethink Internet of Things, http://www.rethinkresearch.biz/articles/from-car-hacking-to-city-hacking-where-will-the-security-holes-end/

Franceschi-Bicchierai, L. (2015), All the Ways To Hack a Smart City. Motherboard, http://motherboard.vice.com/read/all-the-ways-to-hack-a-smart-city

Genuis, S.J. & Lipp, C.T. (2012), Electromagnetic hypersensitivity: Fact or fiction?, Science of the Total Environment, 414, 103–112.

Gov.UK (2015), Policy paper: 2010 to 2015 government policy: equality, https://www.gov.uk/government/publications/2010-to-2015-government-policy-equality/2010-to-2015-government-policy-equality#appendix-6-the-united-nations-convention-on-the-rights-of-the-child-uncrc

Gov.UK (2015a), Policy paper: 2010 to 2015 government policy: cyber security. Updated 8 May 2015, https://www.gov.uk/government/publications/2010-to-2015-government-policy-cyber-security/2010-to-2015-government-policy-cyber-security

Greene, C.H. & Monger B.C. (2012), An Arctic Wild Card in the Weather. Oceanography, 25(2), 7-9.

Gregory, S. (2011), Letter to CPUC judge overseeing ‘Smart’ Meter proceedings, http://emfsafetynetwork.org/?page_id=2292

GSMA (2013), Australian government ordered to compensate worker with electromagnetic hypersensitivity, http://www.gsma.com/publicpolicy/australian-government-ordered-to-compensate-worker-with-

electromagnetic-hypersensitivity

Hallberg, Ö. & Oberfeld, G. (2006), Letter to the Editor: Will We All Become Electrosensitive? Electromagnetic Biology and Medicine, 25, 189-191.

Halteman, E. (2011), Wireless Utility Meter Safety Impacts Survey: Final Results Summary, http://emf-safetynetwork.org/wp-content/uploads/2011/09/Wireless-Utility-Meter-Safety-Impacts-Survey-Results-Final.pdf

Hansard (2011), Parliamentary business, http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm111129/text/111129w0004.htm

Hardell, L. & Carlberg, M. (2013), Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones. Reviews on Environmental Health, 28(2-3), 97-106.

Havas, M. (2011), Havas Submission to CCST "Report on Smart Meters", http://www.magda-havas.com/2011/01/18/havasUreportUonUsmartUmetersUforUccst/

Herbert, M. & Sage, C. (2012), Findings in Autism (ASD) Consistent with Electromagnetic Fields (EMF) and Radiofrequency Radiation (RFR). Section 20 of the BioInitiative Report 2012.

Hocking, B. et al. (1996), Cancer incidence and mortality and proximity to TV towers. The Medical Journal of Australia, 165(11-12), 601-605.

Hoffman, D. & Rowe, J. (2010), Human Rights in the UK (Third Edition), Pearson, London, 466 pp.

House of Commons Defence Committee (2012), Developing Threats: Electro-Magnetic Pulses (EMP), Tenth Report of Session 2010–12. Report, together with formal minutes, oral and written evidence. HC 1552, The Stationery Office Limited, London. http://www.publications.parliament.uk/pa/cm201012/cmselect/cmdfence/1552/1552.pdf

HRA (1998), Human Rights Act 1998, legislation.gov.uk, http://www.legislation.gov.uk/ukpga/1998/42/contents

Ilhan, A et al. (2004), Ginkgo biloba prevents mobile phone-induced oxidative stress in rat brain. Clinica Chimica Acta 340, 153-162.

IoD (2015), Smart Meters: a government IT disaster waiting to happen. Institute of Directors, http://www.iod.com/influencing/press-office/press-releases/smart-meters-a-government-it-disaster-waiting-to-happen

IUK (1980), Ireland v United Kingdom (1980) 2 European Human Rights Reports: European Court Cases 25.

Jamieson, I.A. & Mallery-Blythe, M. (2015), Commentary on the House of Lords Select Committee on National Policy for the Built Environment: Call for Written Evidence. [Main document].

Jamieson, I.A. (2014), Changing perspectives – improving lives. Presentation given at the European Economic and Social Committee's 'Electromagnetic hypersensitivity Public Hearing – EESC', 4th November 2014, EESC, Brussels. [Revised presentation].

Jamieson, I.A. (2014a). Electromagnetic Hypersensitivity & Human Rights. Commentary to the European Economic and Social Committee, EMF: HR_EHS0141204

Jamieson, I.A. (2012), Smart Meters and Weather Extremes – Set to Fail? What happens when weather is colder than smart meters can operate? http://stopsmartmeters.org.uk/wp-content/uploads/2012/09/Jamieson-I.-Smart-Meters-Weather-Extremes-1-Sep-2012.pdf

Jamieson, I.A. (2012/2011), Smart Meters – Smarter Practices, http://www.radiationresearch.org/index.php?option=com_content&view=article&id=173

Johanssen, O. (2010), Aspects of Studies on the Functional Impairment Electrohypersensitivity. Electromagnetic Phenomena and Health – a Continuing Controversy?, IOP Conf. Series: Earth and Environmental Science 10.

Jovanovic, P. & Neves, S. (2015), Dumb Crypto in Smart Grids: Practical Cryptanalysis of the Open Smart Grid Protocol, https://eprint.iacr.org/2015/428.pdf

Kane, R. (2004), A Possible Association Between Fetal/Neonatal Exposure to Radiofrequency Electromagnetic Radiation and the Increased Incidence of Autism Spectrum Disorder. Medical Hypothesis, 62(2), 195-197.

Kumar, S. et al. (2012), Impact of Microwave at X-Band in the aetiology of male infertility. Electromagnetic Biology and Medicine, 31(3)), 223–232.

Lamech, F. (2014), Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in Victoria, Australia: a case series. Alternative Therapies, Health and Medicine, 20(6), 28-39.

Legislation.gov.uk (2010), Section 149 of the Equality Act 2010, http://www.legislation.gov.uk/ukpga/2010/15/section/149

Lewis, B. (2015), Global climate change pledges will not be enough: U.N. Reuters, http://uk.reuters.com/article/2015/09/15/us-climatechange-summit-pledges-idUKKCN0RF23C20150915

LMRS (1996) LM & R v Switzerland (1996) 22 European Human Rights Reports: European Commission Decision 130.

Lobb, B. et al. (2015), Radiofrequency Electromagnetic Radiation and the Health of Canadians: Report of the Standing Committee on Health. June 2015, http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=8041315&Language=E&Mode=1&Parl=41&Ses=2

McCarty, D.E. et al. (2011), Electromagnetic Hypersensitivity: Evidence for a Novel Neurological Syndrome. International Journal of Neuroscience, 121(12), 670-676..

Metering.com (2009), Smart meters not to be compulsory in Netherlands http://www.metering.com/smart-meters-not-to-be-compulsory-in-netherlands/

Met Office (2012), Snow and low temperatures, December 2010, http://www.metoffice.gov.uk/climate/uk/interesting/dec2010/

Met Office (2011), Weather extremes – Temperature, http://www.metoffice.gov.uk/climate/uk/extremes/

Mills, E. & LaMonica, M. (2010), Money trumps security in smart-meter rollouts, experts say. InSecurity Complex, cnet NEWS, http://news.cnet.com/8301- 27080_3-20007672-245.html?tag=mncol;txt

Mogul, P. (2015), UK weather forecasters predict 2016 to be the hottest year on record. International Business Times, http://www.ibtimes.co.uk/uk-weather-forecasters-predict-2016-be-hottest-year-record-1533816

Moon, I.S. et al. (2014), Association between vestibular schwannomas and mobile phone use. Tumour Biology, 35(1), 581-587.

Novoselova, E.G. et al. (1999), Microwaves and cellular immunity. II. Immunostimulating effects of microwaves and naturally occurring antioxidant nutrients. Bioelectrochemistry Bioenergetics, 49(1), 37-41.

Orlowski, A. & Ray, B. (2012), OFFICIAL: Smart meters won't be compulsory: No offence to refuse in Blighty, The Register, http://www.theregister.co.uk/2012/02/01/smart_meters_yesno/

Otitoloju, A.A., et al. (2010), Preliminary study on the induction of sperm head abnormalities in mice, Mus musculus, exposed to radiofrequency radiations from global system for mobile communication base stations. Bulletin of Environmental Contamination and Toxicology, 84(1), 51-54.

Parfitt, T. (2015), North Korea 'could DESTROY London and kill THOUSANDS with devastating cyber attacks'. Daily Express, http://www.express.co.uk/news/world/581023/London-North-Korea-cyber-attack-hack-Bureau-121-Kim-Jong-un

Parliament.uk (2016), Smart Meters: Diagnosis and plans, http://www.parliament.uk/documents/commons-committees/science-technology/evidence-tests/smart-meters.pdf

Peev, G. (2012), Government plans to install smart meters in our homes 'will leave us open to cyber attack', Daily Mail, 8th June 2012, http://www.dailymail.co.uk/news/article-2156648/Government-plans-install-smart-meters-homes-leave-open-cyber-attack.html#ixzz24MOrvedx

Rainie, L., Anderson, J. & Connolly, J. (2014), Cyber Attacks Likely to Increase, http://www.pewinternet.org/2014/10/29/cyber-attacks-likely-to-increase/

Rao, N. (2015), SHOCK WEATHER WARNING: Coldest winter for 50 YEARS set to bring MONTHS of heavy snow to UK. The Express, http://www.express.co.uk/news/nature/604619/Long-range-weather-forecast-Britain-cold-winter-2015-arctic-snow-freeze

Rea, W.J. et al. (1991), Electromagnetic Field Sensitivity, Journal of Bioelectricity, 10(1&2), 241-256.

REFLEX (2004), Risk Evaluation of Potential Environmental Hazards From Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods. Project funded by the European Union under the programme Quality of Life and Management of Living Resources Key Action 4 "Environment and Health.

Royal Academy of Engineering (2013), Extreme space weather: impacts on engineered systems and infrastructure, http://www.raeng.org.uk/publications/reports/space-weather-full-report

Sachs, J. (2015a), The real climate battle after a sweltering 2014. Jeffrey Sachs, http://jeffsachs.org/2015/01/the-real-climate-battle-after-a-sweltering-2014/

Sachs, J. (2015b), This Year’s Climate Talks Are Our Last (and Best) Chance to Slow Global Warming. Jeffrey Sachs, http://jeffsachs.org/2015/02/this-years-climate-talks-are-our-last-and-best-chance-to-slow-global-warming/

Sangani, K. (2012), Smart meters and dumb fires. E&T, 7(12), http://eandt.theiet.org/magazine/2012/12/in-the-safety-of-our-own-homes.cfm

SMDG (2011), Industry’s Draft Technical Specifications. Document drafted by industry, stakeholders under the Smart Metering Design Group (SMDG) set up under the Great Britain (GB) Smart Metering implementation programme (SMIP). 297 pp., http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/smart-

meters/2393-smart-metering-industrys-draft- tech.pdf

Sorebo, G.N. & Echols, M.C. (2012), Smart Grid Security: An End-to-End View of Security in the New Electrical Grid. 1st Edition. CRC Press.

Stop Smart Meters! UK (2014), DEFRA confirms 'Smart' Water Meters are NOT compulsory, http://stopsmartmeters.org.uk/official-defra-confirms-smart-water-meters-are-not-compulsory/#sthash.ybJTjXHU.dpuf

Stop Smart Meters! UK (2013), WARNING: 'Smart' Meter Fire Risks – Refuse Smart Meters! http://stopsmartmeters.org.uk/warning-smart-meter-fire-risks-refuse-smart-meters/#sthash.HlD2B4qq.dpuf

Stop Smart Meters! (UK) (2012), FBI: Smart Meter hacks likely to spread — Utilities are unprepared, http://stopsmartmeters.org.uk/fbi-smart-meter-hacks-likely-to-spread-utilities-are-unprepared/

Takahashi, D. (2011), Hacking water meters is easier than it should be. VB, http://venturebeat.com/2011/08/06/hacking-water-meters-is-easier-than-it-should-be/

Thiesen, B. (2015), 1000's of smart meter fires: New whistleblower & court evidence (video). Take Back Your Power, https://takebackyourpower.net/1000s-of-smart-meter-fires-new-whistleblower-court-evidence-video/

United Nations (1989), Convention on the Rights of the Child, http://www.un.org/documents/ga/res/44/a44r025.htm

Verton, D. (2011), Smart Grid Privacy And Security Risks Loom For Agencies. AOL Energy, http://energy.aol.com/2011/08/05/smart-grid-privacy-and-security-risks-loom-for-agencies/

Wheelchair (2015), Wheelchair Statistics, http://www.newdisability.com/wheelchairstatistics.htm

Which? (2015), Do I have to accept a smart meter? http://www.which.co.uk/consumer-rights/problem/do-i-have-to-accept-a-smart-meter/

Which? (2012a), Stop and rethink the smart meter roll-out, http://conversation.which.co.uk/home-energy/stop-smart-meter-roll-out-uk-government-electricity-gas/

Which? (2012b), Time to stop and review the smart meter roll-out, http://www.which.co.uk/news/2012/01/time-to-stop-and-review-the-smart-meter-roll-out-276712/

WHO/IARC (2011), IARC classifies radiofrequency electromagnetic fields as possibly carcinogenic to humans, Press Release No. 208.

Wilkie, C. & Baker, D. (2007), Accommodation for Environmental Sensitivities: Legal Perspective. Canadian Human Rights Commission, http://www.chrc-ccdp.ca/sites/default/files/legal_sensitivity_en_1.pdf

Wisniewski, C. (2012), Smart meter hacking can disclose which TV shows and movies you watch, nakedsecurity, http://nakedsecurity.sophos.com/2012/01/08/28c3-smart-meter-hacking-can-disclose-which-tv-shows-and-movies-you-watch/

Woolsey, J. (2011), CIA Director calls Smart grid "Stupid" due to Security problems, http://www.youtube.com/watch?v=MAid1bS8t9U

Wynn, G. (2010), Privacy concerns challenge smart grid rollout, http://www.reuters.com/article/2010/06/25/us-energy-smart-idUSTRE65O1RQ20100625

Zurich Insurance Group (2015), Cyber Costs Threaten To Exceed Benefits. Cyber Risk, http://knowledge.zurich.com/cyber-risk/cyber-costs-threaten-to-exceed-benefits/