New American

Written by **Rebecca Terrell** on November 21, 2016

Published in the November 21, 2016 issue of the New American magazine. Vol. 32, No. 22

The Great Smart Meter Con

As taxpayers, utilities, and rate payers continue to pump billions into modernization of the electric power grid, controversy rages over the evolving "smart" technology that makes it possible. While proponents praise it as ushering in efficient grid management and cybersecurity, others warn that the "smart grid" is nothing less than a tool of the surveillance state that government uses to destroy liberty and privacy.

In the cross hairs of an attack are smart meters, digital devices that replace traditional automated utility meters at individual homes and businesses. Like their conventional cousins, smart meters measure electric power usage, and some record gas and/or water use, too. Utilities prefer them because they provide two-way communication between the meter and main recording station. They can be read frequently, improving accuracy in recording electric power use, and they are read remotely, without utilities sending a person to document each measuring device in the network. The National Association for Amateur Radio states that smart meters also reduce costs by alerting customers to ways they can conserve energy and by allowing utilities to pinpoint times of peak demand and resolve outages and service problems more rapidly.

But the other side of the coin, opponents say, is that government can spy on and ration your energy use by means of these digital meters. During the 2015 California drought, for example, bureaucrats used them "to catch citizens consuming more than their government-approved water rations," as Alex Newman reported for *The New American*. In what amounted to warrantless search and collection of data, Long Beach Water Department General Manager Kevin Wattier bragged, "We are using it specifically for an enforcement tool to go after those customers who we've gotten lots of complaints about," and to fine them for using more than their "fair share" of water.

In 2012, the Congressional Research Service warned about the criminal potential afforded by such detailed, up-to-the-minute recording. "By observing when occupants use the most electricity, it may be possible to discern their daily schedules," opening the door for hackers to plan robberies or worse. Newman also related that the European Data Protection Supervisor, a European Union government agency, warned that smart meters allow "massive collection of personal information … unprecedented in the energy sector."

Also sparking debate is that smart meters have proven to be dangerous fire hazards; due to a common hardware malfunction, the unstable devices easily explode and send homes up in flames. Newman recounted that the problem reached such a pitch in one Canadian province that authorities swapped out more than 100,000 smart meters with traditional units. Oregon officials replaced 70,000 digital meters in 2014 for the same reason. Randy Bays, president of leading smart meter manufacturer Sensus, made the incriminating and disturbing admission: "Our experience has shown that these issues are systemic in the industry."

Yet another argument against the controversial monitoring instruments is the allegation that radiation

emitted in their transmissions causes adverse health effects in humans. For example, the website for the 2013 documentary "Take Back Your Power" states that smart meters "emit between 5,000 and 190,000 pulses per day." No question that's a lot of radiation, right? Not really. According to the New England electric company NationalGrid, "a typical data-transmitting pulse would be 6 milliseconds long." Five thousand pulses equates to 30 seconds per day.

That may be slight, but what about 190,000 pulses? The study cited by TakeBackYourPower.net actually only found "one meter that sent out more than 190,000 signals in one day." Even in that case, the meter transmitted for less than 20 minutes. But the average device sent fewer than 10,000 pulses daily. The report concluded, "Add them together, and the meter's total transmission time equals a little more than 45 seconds per day."

The question remains: Is that enough radiation to cause disease? Or does this smart-meter-contagion argument amount to nothing more than fearmongering by those who wish to demonize smart meters at all costs, and who are taking advantage of general public ignorance of radiation? If the latter case is true, the argument certainly undermines the credibility of those with real concerns about the menacing potential of smart meters as tools that turn Big Brother into Peeping Tom. In order to answer these questions, we need to understand the radiation that smart meters emit. So we'll start with a brief review of the electromagnetic spectrum.

All the Energy in the Universe

NASA describes the electromagnetic (EM) spectrum as the span of all known types of EM radiation, arranged according to wavelength and frequency. Lower frequencies and longer wavelengths occupy the left side and transition to higher frequencies and shorter wavelengths toward the right. EM radiation moves at the speed of light and emanates from a variety of natural and man-made sources, including the sun, the Earth, and your own body. Household appliances such as your television and microwave also emit EM energy in varying forms.

Visible light is the most familiar, because it is the only type we can detect without the aid of measuring instruments. But visible light is an extremely narrow portion of the entire spectrum, slightly to the right of center. Coupled with ultraviolet radiation, it effectively marks the dividing line between ionizing and non-ionizing radiation.

Ionizing radiation contains enough energy to tear electrons away from an atom, converting it into ions with a positive or negative electric charge. This is commonly known as radioactivity, which can cause cancer in high doses because it can damage DNA. X-rays and gamma rays are well-known forms of ionizing energy.

Non-ionizing radiation does not carry enough energy to ionize atoms, meaning it is incapable of causing DNA damage. But its effects are observed elsewhere. It makes it possible for you to microwave your food, for your radio to receive a signal, and for your lights to come on when you flip a switch. Without non-ionizing radiation, there would be no such thing as laser cataract surgery, cellular phones, or sunlight.

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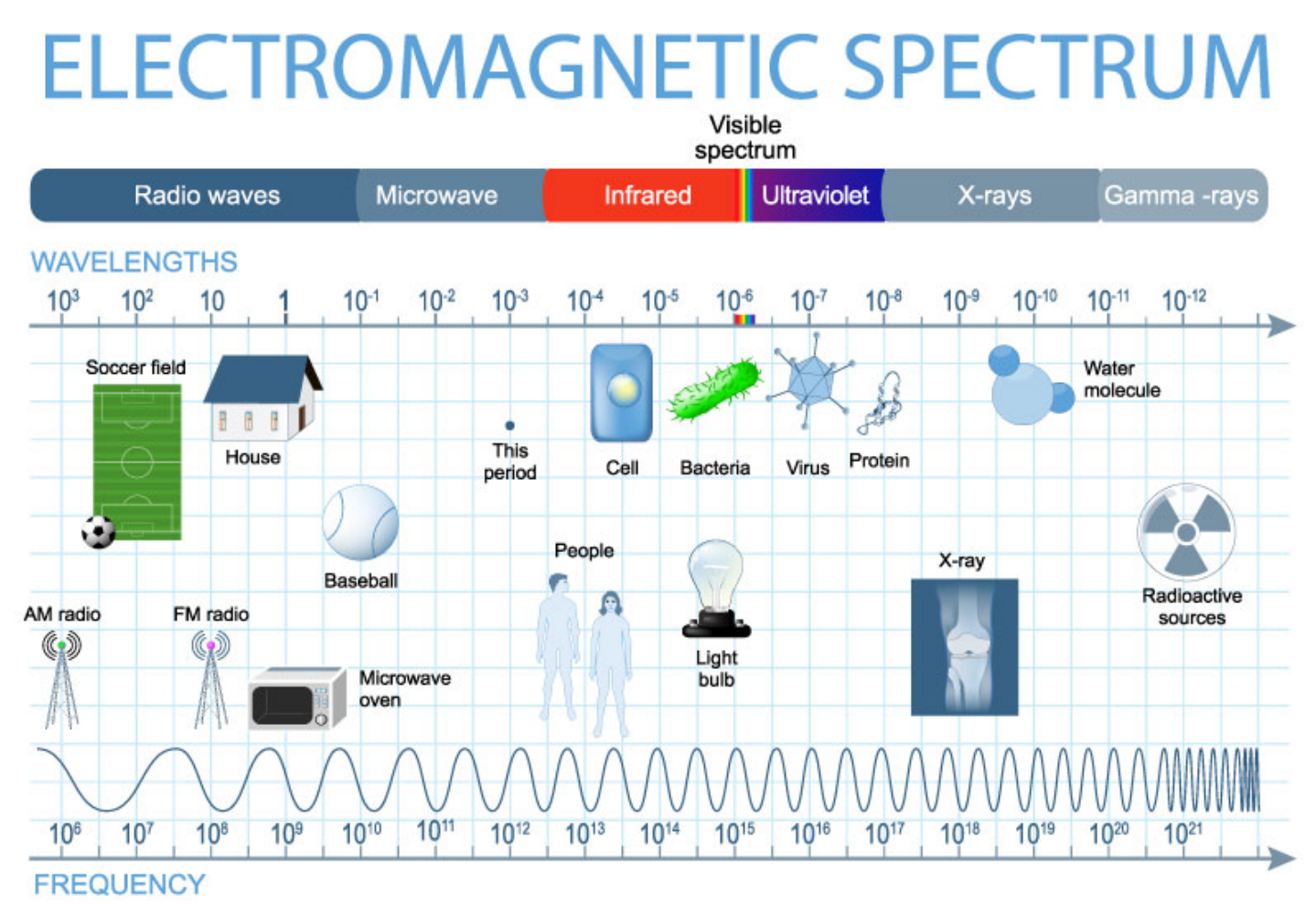

Radiofrequency Electromagnetic Fields

Obviously, non-ionizing forms of energy can affect the human body both positively (e.g., transmission of nerve impulses) and negatively (e.g., sunburns). But there is great controversy regarding whether non-ionizing radiation causes cancer — with the spotlight specifically on *radiofrequency (RF) electromagnetic fields* (EMF), which have frequencies between 300 megahertz (MHz) and 300 gigahertz (GHz). Frequency is proportional to the amount of energy transmitted, and in terms of the entire EM spectrum, RF emissions are relatively low frequency and low energy. Visible light, with frequencies ranging from 400 to 800 terahertz (THz), is thousands of times more powerful. (One terahertz is one thousand times larger than one gigahertz, which is one thousand times as powerful as one megahertz.)

RF fields are released from man-made sources, such as modern telecommunications, that help make possible our industrialized standard of living. Smart meters are one of many common household objects that emit RF energy. Other items that make the list are cellphones, wireless routers, baby monitors, garage-door openers, televisions, and walkie-talkies.

The World Health Organization (WHO) caused a stir in 2011 when it announced that RF radiation *might* generate tumors in the body. Its International Agency for Research on Cancer, which maintains a list of agents rated on the basis of their ability to cause the disease, added radiofrequency EMF to "Group 2B: possibly carcinogenic to humans." That sounds pretty damning until you look more closely at the complete 2B catalog, which includes caffeine, coconut oil, *Ginkgo biloba* extract, *Aloe ver*a extract, and

kava, a popular Polynesian social drink. And although RF fields remain in Group 2B, WHO's online fact sheet entitled "Electromagnetic Fields and Public Health" states that "a large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use." Mobile phones are ubiquitous RF emitters. Leave it to WHO to add confusion to the matter.

Electromagnetic Hypersensitivity

In addition to cancer, some attribute to radiofrequency EMF other adverse health effects, such as headaches, sleep disturbance, fatigue, and skin ailments. It's a condition known as "electromagnetic hypersensitivity" (EHS). After all, if RF from a microwave can cook your food, why can't the same energy from a cellphone cook your brain? David Robert Grimes, science contributor to *The Guardian*, explains that microwave ovens are designed to heat the water in our food, unlike cellular telephones, which are incapable of such a feat. Moreover, "the power output of our communication technology is many orders of magnitude below that of ovens, with typical home routers outputting less than 100mW," Grimes explains. That's 100 milliwatts, or one-tenth of a watt. (Smart meters' signals are similar to those produced by wireless routers.) In sharp contrast, microwave ovens typically output between 600-1200 watts of power to heat food, or 6,000 to 12,000 times the power output of a router or meter.

WHO's fact sheet relates that doctors do not recognize EHS as a valid medical diagnosis but simply treat individual symptoms. Regardless, many contend that EHS is a real condition, prompting activist and support groups worldwide. Some Santa Fe, New Mexico, residents want to ban public hotspots altogether, while a Massachusetts couple sued their son's school for making him sick with its Wi-Fi signal. A French court awarded a woman disability benefits for what she called EHS symptoms, while parents in the U.K. blame the Wi-Fi at their daughter's school for her tragic suicide last year.

One of the most oft-cited sources of research on the negative consequences of EHS is the *Bioinitiative Report* (BIR), an independently compiled meta-analysis first published online in 2007 and updated twice since. Prepared by 29 doctors and scientists from 10 countries, the latest release includes dire results of approximately "1,800 new studies reporting bioeffects and adverse health effects of electromagnetic fields … and wireless technologies." Among harmful outcomes that they tout as credible, the authors include "brain tumor risks from cell phones, damage to DNA and genes, effects on memory, learning, behavior, attention; sleep disruption, cancer and neurological diseases like Alzheimer's disease … effects on … fertility and reproduction … brain development of the fetus and infant, and effects of wireless classrooms on children and adolescents."

Yet BIR is routinely criticized as subjective and unbalanced; government agencies in Australia, India, The Netherlands, France, Germany, and the European Union have accused the authors of selective use of scientific data and erroneous reporting. The conservative-minded Institute of Electrical and Electronics Engineers has censured BIR's findings as unreliable.

Indeed, other research directly contradicts BIR. *The Guardian* reports, "Double-blind scientific trials, where neither the patient nor researcher was aware whether they had been exposed to electromagnetic waves, have disproven any link to the symptoms, and many experts ascribe the condition to a phobia." In some trials which used fake EM sources, participants reported adverse health effects without realizing they were never exposed. "Some believe it might be triggered by the so-called 'nocebo' effect — the placebo effect in reverse — when people feel unwell because they believe they have been exposed

to something harmful."

Scientists at The Netherlands' University of Twente explain the results of existing clinical studies: "The effects of radio waves are largely comparable to the effects of microwaves. Touching an object in an area with strong radio frequency radiation can even cause burns." But they also caution that there is no clear evidence for additional subjective complaints.

The National Institutes of Health agrees that current research is inconclusive, and its National Toxicology Program (NTP) is conducting extensive investigations, particularly targeted on the main object of concern — cellphones — which are held directly against the head while in use. "Currently, there's little or no evidence to suggest that cell phone usage is associated with brain tumors or any other adverse health effects in humans," reads the NTP website. However, the agency admits that no one has ever conducted a comprehensive study on the issue. NTP toxicologist Michael Wyde, Ph.D. is hoping to change that. "This study is the largest that the NTP has ever conducted — it's the largest of this kind on cell phone radio frequency radiation that's been done to date. Our studies are targeted not just at brain cancer … [they] also address effects in other parts of the body." Results are scheduled for release by the end of 2017.

Until then, the U.S. Food and Drug Administration recommends that those who are concerned about avoiding radiofrequency EMF should reduce their amount of time spent using cellphones, and use speaker mode or a headset "to place more distance between your head and the cell phone." Distance is an important factor in radiation exposure; radiofrequency emissions weaken significantly as distance increases. This will be an important factor to consider in relation to RF emitted from smart meters, as we shall see.

Chirping Meters

Like cellphones, smart meters transmit and receive information wirelessly. If you have a smart meter, it works by "calling" your utility company — sometimes called "chirping" — via a one- or two-watt wireless radio at least once a day to deliver up-to-date readings of energy usage. Unlike cellphones, smart meters are attached to your house — not held to your ear — and smart meter company Sensus explains that RF exposure from a meter "drops by a factor of 100 when you move from a distance of 1 foot to 10 feet away." The walls of your house provide additional barriers to exposure.

More importantly, a typical smart meter will transmit for less than one minute per day. So even if you stood right next to your smart meter for 24 hours straight, during at least 23 hours and 59 minutes you would absorb no radiation at all. Additionally, the RF from an average smart meter is "roughly one-thousandth that of a typical cell phone," reads the Pacific Gas and Electric Company's (PGE) webpage dedicated to radiofrequency frequently asked questions. "You'd have to have one of our meters on your home or business for more than 1,000 years to get as much exposure to radio waves as a typical cell phone user gets in just one month."

PGE offers some comparisons of its smart meters to Federal Communications Commission (FCC) health-protection regulatory standards, measured in power density of microwatts per square centimeter (μW/cm2). Standing one foot away from a smart meter as it is transmitting, a person would be exposed to between 8.8 and 24.4 μW/cm2. As a frame of reference, the FCC, which regulates telecommunications, places a safe power density average on transmitting devices such as this of 601

µW/cm2. Incidentally, these are the readings and standards for electric meters, which operate at frequencies between 824 and 1900 MHz. Gas-powered smart meters operate at lower frequencies (450-470 MHz), transmit at lower wattage (0.820 watts), and on average emit 0.00166 µW/cm2 at a distance of one foot. The average safe power density set by FCC standards for gas meters is 300 µW/cm2.

How do these power densities compare with other common household items? Standing three feet away from your microwave oven as it heats your dinner exposes you to 10 µW/cm2, and you'll get as much as double that from your wireless router at the same distance. Held right next to your head, your cellphone can deliver as much as 10,000 µW/cm2.

In other words, smart meters are far down on the totem pole of RF emitters in an ordinary household. In fact, in many cases they're not even in the house but just outside, accounting for a tiny fraction of RF emissions people absorb every day.

Does it make sense for anyone to oppose smart meters on the basis of RF emissions, if at the same time he refuses to pitch his wireless router, cellphone, television, baby monitor, and microwave oven? Does it make sense to oppose smart meters because the World Health Organization says they run as much cancer risk as coconut oil, *Ginkgo biloba* supplements, or your morning cup of joe?

We know from experience that there are valid reasons to oppose the use of smart meters. We know bureaucrats can and do use them to spy on utility customers, even bragging about their unwarranted surveillance exploits. We know smart meters open the door to espionage and that they pose dangerous fire hazards. Claims of their cost savings do not take into account the billions of dollars in taxes and rate hikes used to bolster grid modernization. With such a litany of justified complaints, does it make sense to add questionable claims of ill health from unsubstantiated sources? Sticking with verifiable facts is clearly the smart choice.

TNA contributor Ed Hiserodt, author of the book Underexposed: What if Radiation Is Actually Good for You?*, contributed to this article.*

Photo: AP Images

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