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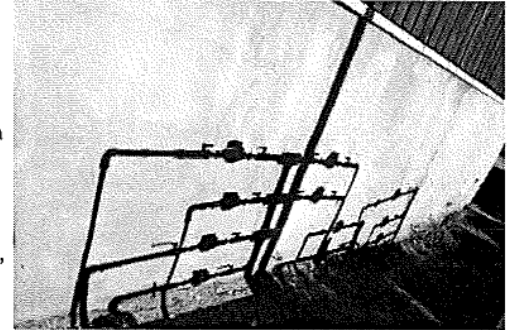
Are Smart Meters Hazardous To Public Health?



By Kevin Westerling
@KevinOnWater

The correct answer seems to be that smart meters are safe, but the question itself could prove problematic for utilities.

Two things are very clear about smart water infrastructure: the tremendous savings potential for utilities (up to \$12.5 billion a year, worldwide) and the fast-paced level of adoption (market growth from \$2.3 billion in 2011 to \$20 billion in 2020). The bright-looking future could get cloudy, however, if the anti-smart meter movement has its way. This relatively small but vocal contingent of protesters claims that the radiation emitted from smart meters — installed outside homes to record water usage — can bring about everything from headaches to cancer. If such fears take hold, it could inhibit the growth of the burgeoning advanced metering infrastructure (AMI) network.



A case in point comes from Saskatchewan, Canada, where earlier this month it was reported that Canadians 4 Safe Technology (C4ST) is attempting to stall the installation of 500,000 smart meters and 450 radio towers planned for the province by 2015. Though this instance relates to electric meters, the technology and related health concern is the same for smart water meters: data is transmitted via radio frequency (RF) waves, thereby emitting low-level environmental radiation. C4ST's CEO, Frank Clegg, argues that this radiation affects everyone differently, and that hypersensitivity to electromagnetic field (EMF) exposure can bring on memory loss, dizziness, fatigue, and altered heart rates. The claims remain unproven, but Clegg may garner a certain amount of credibility as the former president of Microsoft Canada.

Some individuals and groups, however, are decidedly more extreme (and less credible) with their claims. StopSmartMeters.org, through its collection of articles and links, not only ramps up the health concern to cancer, but warns that smart meters are a method of government surveillance. The organization also offers guidance on how to halt installations by municipalities or "opt out" on an individual basis. Perhaps the website has faithful readers in Baraboo, WI, where some residents who refused to allow smart water meters in their homes had their water supply cut off by the city in July.

Even if customers such as these are off base with their concerns, the action of refusing smart meters, as well as the municipality's response, could open up an unwanted can of worms regarding privacy rights.

Real Risk Vs. Perceived Risk

Without dismissing all health-risk concerns entirely, at this juncture I tend to side with the preponderance of evidence gathered in scientific studies. Oh, and also with the American Cancer Society. Both suggest that the health risk associated with smart meters is slim to none.

The Public Utility Commission of Texas (PUCT), in response to citizens' concerns, created a report based on its review of thousands of scientific research papers. PUCT concluded that "Decades of scientific research have not provided any proven or unambiguous biological effects from exposure to low-level radio frequency signals."

Adds the American Cancer Society, specifically speaking on smart meters: "The actual risk of harm, if it exists, is likely to be extremely low."

The World Health Organization's International Agency for Research on Cancer (IARC) has classified RF radiation as "possibly carcinogenic to humans," but it has never assessed smart meters in particular. Unfortunately, the quote has become hijacked as a main talking point for opposition groups. In truth, the IARC is merely considering the validity of studies linking *cell phone use* to tumors. Cell phones and smart meters do operate in the same frequency band (see the chart below), but the RF radiation given off by smart meters is diluted by distance and physical objects. You (hopefully) don't see people holding smart meters up to their heads as they do with cell phones.

Frequency Range	Top End of Frequency Range (in Hz)	Designation or Abbreviation	Primary Use
Radio: Non-ionizing radiation.			
3 – 30 Hz	30	ELF	Submarine communications
30 – 300 Hz	300	SLF	Not commonly used; electrical power is in this range
300 – 3,000 Hz	3,000	ULF	Military communications
3 – 30 kHz	30,000	VLF	Submarine communication
30 – 300 kHz	300,000	LF	Military, AM radio
300 kHz – 3 MHz	3 million	MF	AM radio, shortwave radio
3 – 30 MHz	30 million	HF	Amateur radio, CB radio, aviation radio
30 – 300 MHz	300 million	VHF	VHF TV, FM radio, amateur radio
300 MHz – 3 GHz	3 billion	UHF "microwave"	UHF TV, land-based mobile radio, cell phones, smart meters
3 – 30 GHz	30 billion	SHF "microwave"	WLAN, radars, industrial devices
30 – 300 GHz	300 billion	EHF "microwave"	Short range data transmission
Light: Non-ionizing radiation.			
300 GHz – 400 THz	400 trillion	Infrared (IR)	TV remote controls, heat lamps
400 THz – 770 THz	770 trillion	Visible ("light")	Illumination
Ionizing radiation.			
750 THz – 30 PHz	30 quadrillion	Ultraviolet (UV)	Tanning beds, medical, industrial applications
30 PHz – 30 EHz	30 quintillion	X-Ray	Medicine, scientific, and industrial uses
more than 35 EHz	> 35 quintillion	Gamma ray	Medicine, scientific, and industrial uses

Types of radiation and their frequency ranges (Credit: Public Utility Commission of Texas)

Just like cell phones, radios, and over-the-air TVs, smart meters emit non-ionizing radiation, which is characterized by its inability to disrupt cell structures. This is notable because the word "radiation" conjures images of nuclear disasters or cancer therapy — forms of ionizing radiation that can disrupt cell structures.

Moving Forward With Smart Meters

Casting the fears aside, the benefits of smart meters and AMI are well documented for both the water utility and the customer. For utilities, the list includes O&M (meter reading) savings, accurate billing, customer engagement and satisfaction, and the reduction of non-revenue water. Customers can benefit from access to information on usage and cost, enabling them to modify behavior and take advantage of real-time (off-peak) pricing, as well as detect potentially expensive leaks.

Most homeowners seem quite happy with their smart meters, which is evidenced by the relatively small number of complaints and opt-outs as meters get installed by the thousands. The opposition of even a small minority can be powerful, however, since fear is a very powerful emotion. As AMI continues to become more widespread, you can be assured that the voices of dissent will grow louder, more plentiful, and more organized. The real danger, then, is not the smart meters themselves, but what people say about them.

What has been your customer experience with smart meter installation? How should utilities respond to passionate opposition on an individual or group basis? Should the concerns be given more credence? Please share your thoughts.

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