

## Neighborhood

# ELECTRICAL ENGINEER EXPLAINS HOW “SMART” METERS CAN LEAD TO HIGHER BILLS

My grandchildren Teddy and Sofia complained about the jump in their electric bill.

And Dusty provided them with the following article

Jill McManus Interview with Bill Bathgate

To get more information about the inner workings of “smart” meters, we spoke with professional electric and mechanical engineer William S. Bathgate. [Bathgate worked at Emerson Electric as Senior Program Manager for Power Distribution Systems in charge of RF and IP based digitally-controlled high power AC power switching system products that sold worldwide. He has also served in the U.S. Missile Defense Agency, NASA, and Homeland Security. He is certified as a Building Biologist and Electromagnetic Radiation Specialist by the Building Biologist Institute, and an IEEE Certified Radio Frequency Safety Officer. He has testified on behalf of Resident Customer groups in Michigan and Iowa that have worked to prevent rate increases and installation of low-quality meters. He has two companies, has conducted many tests in his own lab and has test results from over a thousand homes. <https://buildingbiologyinstitute.org/find-an-expert/certified-consultants/building-biology-environmental-consultants/william-bill-bathgate-bbec-ieee/>]

While some details may appear very technical, the central theme here is that smart meters emit excessive levels of EMF radiation, harm the environment by consuming energy unlike analog meters (Check), are programmed to overcharge consumers, and are vulnerable to cyber-attack. Now here’s the breakdown.

Bathgate’s information was eye-opening. To illuminate the laxity of the FCC guidelines, Bathgate offers this example: “The Building Biology standard for the intensity of electromagnetic radio frequency (EMF) in sleeping areas is 10-100 microwatts per meter squared (10µw/m²). Most smart meters are mounted near a bedroom wall. Their range extends to 1,400 feet. Readings that exceed 100 µw/m² enter a range of ‘extreme concern.’ Based on the Letter of Authorization from the FCC, granted in what is called an equipment grant and which for many smart meters includes antenna gain, the present digital meters can emit up to or over 14,000 µw/m². That

would be 140 times over the Building Biology standard! (CK)

Some smart meters use other frequencies such as 2.4 GHz, but 99% of them use 900MHz. The FCC’s ‘safety’ guideline allows 2,000 µw/m² (2W/M²), which by our standards makes the present meters operating at 900 MHz unsafe.”

“The industry uses the environmental excuse that we will save the polar bears from rising oceans by saving CO², but none of this is provable as true,”Bathgate says. “Yet they are allowed to collect 10% a year as “Return of Investment” on the money they spend on smart meters until the terms of return of investment get changed. The energy that digital meters need to compute and send their frequent signals adds to energy use by about 2.75 KWh’s (kilowatt hours) per day. This, multiplied by millions of meters, wipes out any benefits of using a ‘smart grid.’ And this can add up to over \$120.00 per year in your individual power bill. There is no evidence that AMI meters save CO², kilowatts or money unless they ration

power. In other words, turn off your power. They are doing this today in Nashville by turning off the power to homes for 10 minutes per hour. The utilities’ ultimate goal is for you to ask permission to turn on your own lights. “Pretty Please, Mr. Utility company, can I turn on my lights and TV?”

Many people are aghast when they see their bill has increased, sometimes by as much as a third, or even nearly doubled after a digital meter is installed. Here Bathgate explains some of the hidden factors that might be causing these increases:

Unlike the steady flow of power through an analog meter, the smart meter measures by sensors that must be converted to digital signals, with computer-calculated averaging of sensor postings held in computer memory over a period of time. These computations take energy and may be reflected in usage time. The sensors can be affected by temperature or humidity, while analog readings rarely are. If the smart meter tried to keep data in real time, the data would overwhelm the ability to process

it. Collecting data once every 15 minutes will not ever accomplish the goal of being able to match capacity to demand in real time.

There is no direct ground connection in the meter for a zero EMF reference (i.e. as a base reading). Electronic circuits in the AMI meters have multilayer circuit boards where one of those layers is a “Relative Ground” reference, which refers to ground currents or voltage that may exist on the site where the house stands. In over 1,000 house surveys I’ve done more than 50% have serious wiring errors which can contribute to an unstable Relative Ground reference and affect the accuracy of the AMI meter reading. The analog meter is not affected by this characteristic.

With the AMI meter, when a light or appliance is first turned on there is a high but extremely quick surge of power, and that level is what is recorded until the next cycle begins. For example, if you open a fridge door and you cause the compressor to turn on you will be billed at the peak

### From the FCC Equipment Grant (ITRON Meter Example)

Where:

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

MPE Calculator for Mobile Equipment Limits for General Population/Uncontrolled Exposure*							
Transmit Frequency (MHz)	Radio Power (dBm)	Power Density Limit (mW/Cm²)	Radio Power (mW)	Antenna Gain (dBi)	Antenna Gain (mW eq.)	Distance (cm)	Power Density (mW/cm²)
902.25	21.36	0.60	136.77	3.5	2.239	20	0.061
2405	-3	1.00	0.50	4	2.512	20	0.000
824	32.4	0.55	1737.80	0	1.000	20	0.346
1850	30	1.00	1000.00	3	1.995	20	0.397

### Summation of Power Densities – Simultaneous Transmissions

This device contains multiple transmitters which can operate simultaneously and therefore the maximum RF exposure is determined by the summation of power densities. The maximum power density as calculated by a summation of power densities for each transmitter is as follows

GPRS Modem Operating in the 800MHz Cellular Band:

900MHz LAN: 0.061 (mW/cm²)  
 2.4GHz Zigbee: 0.000 (mW/cm²)  
 GSM 850 (GPRS): 0.346 (mW/cm²)  
**TOTAL: 0.407 (mW/cm²)**

µw/cm²	µw/m²	Plus gain of 3.5
0.407	4,070.00	14,245.00



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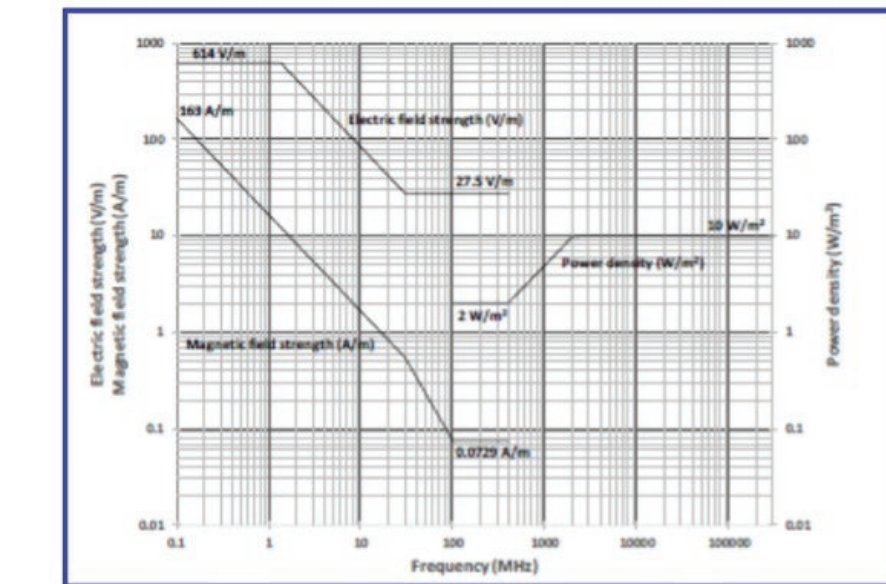
### ELECTRICAL ENGINEER EXPLAINS HOW “SMART” METERS CAN LEAD TO HIGHER BILLS

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consumption rate of that appliance from that moment for the next fifteen minutes, or until the next measurement. This alone can add hundreds of dollars a year to your bill.

Claims that AMI meters are more accurate than analogs are false. The smart meter is populated with dozens of electronic components that have tolerance swing of up to 10% which varies with temperatures and humidity. The analog meters must meet the same ANSI C12 (American National Standards Institute) specs as AMI meters, but there are no electronic components. The AMI meter does not meet the same specs as analog meters in many ways. In fact, they don't synchronize the clocks of an electronic opt-out meter with Universal time so the calibration of measurement within certain time periods is not always accurate, and there is “drift.” The analog meter has precision gears that directly convert to KWh's and there is no need for a clock reference. How does a device which calculates KWh's do that accurately if the clock drifts?

Also, light bulbs vary in power use by plus or minus 10% and LED bulbs combined with dimmer switches lead to greater inaccuracy in readings.” For an example, testing at the University of Twente in 2016 showed very high smart meter inaccuracies of 582% (<https://www.utwente.nl/en/news/2017/3/313543/electronic-energy-meters-false-reading-s-almost-six-times-higher-than-actual-energy-consumption>)



with current transformers. AMI meters are generally accurate to within  $\pm 10\%$ . That is a 20% range. So, claims by utilities that the AMI is more accurate are highly suspect. This is only true in a very tightly controlled setting such as ten 100-watt incandescent bulbs in a temperature-controlled room, not with electronic appliances, motors, CFL's, LED's etc. (Note - a 100-watt light bulb can vary 5%). The only way to have an accurate load is with a large carbon pile which is unaffected by temperature and humidity.”

Personal privacy with AMI smart meters is also a key issue for Bathgate. Your information is collected and sold to third parties, whoever they may be. And there is no security. If you're away from home, it can be detected by hackers. Wireless networks, which use software and offer so many connection points, are easy to hack. Many

in the U.S. Government, and others such as former FCC Chairman Tom Wheeler, agree and are aware that 5G wireless technology is a national security issue.

What about meter shielding and filters? Bathgate doesn't believe most of the products offered online actually work, and full metal shields may cause the radiation to reflect back. He has developed a product that he feels can lower the RF emissions, called the Iron Maiden. “You can shield the front of the smart meter with metal screens or other special materials to block the RF up to a point, and that can be helpful,” Bathgate says, “but they don't block the electromagnetic emissions. There's no way to fix this without earth grounding of the smart meter, which means redesign.” He thinks the utilities should shield the back of the meters where emissions go through the wall, and also shield the electric closets and

nearby rooms in apartment buildings where banks of smart meters are placed. But “they will fight tooth and nail about this adaptation for millions of meters, he says, “and they will complain they can't read the meters. It will be left to property owners.”

Bathgate concludes: “We need a law that says the emissions from a smart meter should not exceed 100 microwatts per meter squared. That would make present AMI meters unusable.”

Finally, there is subterfuge. Says Bathgate, “Staff for the utility companies make statements like the AMI meter is less than a cell phone. This is provable as untrue and was concluded from a clearly biased study done by the CCST, where they compared the emissions of a smart phone at the ear but not for the whole body, but they used the whole-body measurement for the AMI meter. (See CCST Study chart in adjoining smart meter story.) Bathgate calls the comparison “totally apples and oranges. And he says, “Those that state this lie should sleep with a smart meter under their pillow every night and get ready for the diagnosis of cancer very soon.”

Bathgate suggest that readers check out the scientific studies such as the Bio-initiative Report on cancers and tumors from exposure in rats <https://bioinitiative.org/category/new>,

Could add this line to What You Can Do legislation box? Everyone who pays electric bills need to understand this information and demand that smart meters are replaced with traditional analog meters. Let your state legislators know today.

### SOME TRUTHS ABOUT UTILITY SMART METERS: SHOULD YOU BE CONCERNED?

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through the house wiring. Due to its uneven bursts of pulses at millions of times per second, momentary spikes in power can cause wear and tear on the device, and on house wiring and connected appliances, just as they can on our bodies. Spikes in the pulses that go above FCC guidelines are often disguised because the guideline test averages power levels over a period of 30 minutes. If you check with your own meter you will see them. <https://mdsafetech.org/wp-content/uploads/2019/10/fire-and-electrical-hazards-report.pdf>

Engineer Timothy Schoechle, Senior Research Fellow with the National Institute for Science, Law and Public Policy (and author of “Getting Smarter About the Smart Grid”

<https://getttingsmarteraboutthesmartgrid.org/pdf/Smart%20Grid%20Report%203-15-13.pdf>) says that electrical power should be municipalized, and installation of current “smart” meters should be stopped. By

inserting a small part that costs less than a dollar, he writes, companies could provide a fiber optic or electrical connector and get rid of the problem of radiation, making current meters obsolete, and people a lot safer.

A practical, forward-looking society would heed this advice.

**For more information on smart meters see these sites:**

Ehtrust.org  
Physicians for Safe Tech  
(MDsforSafeTech.org)  
Americans for Responsible Tech.org  
NewYorkers4WiredTech.com

**WHAT YOU CAN DO**

Support Upcoming Smart Meter Legislation: NY S.5623

No Federal agencies are measuring or monitoring our levels of exposure to radiation, but local legislators are responsible for protecting the safety and well-being of their constituents. There have been several proposed bills in NY to regulate smart meters since 2013. Due to an uninformed public, and to the weighted

power of the appointed Public Service Commission that oversees electrical utilities, they all died in committee.

NY State Senator Pete Harckham introduced a bill last year (S. 8765), that would allow people to opt out of having a smart meter without a fee or monthly charge, and retain their analog if they wished. For those who already have a smart meter, the bill would enable the customer to instruct the utility to remove it. For those physically affected by the meter it must be removed within 10 days, and 30 days for anyone else who preferred their trusted analog meter.

In March, Harckham has reintroduced the bill, now called S. 5623, and expanded it to include digital water and gas meters as well. Although questions such as multi-family buildings, small businesses, and amendments for building and fires codes remain to be resolved, this bill would be a major problem solver, especially for those who are electromagnetically sensitive.

S. 5623 is also right in keeping with New York's Environmental Rights Amendment,

passed in 2021. As The National Law Journal ( March 17, 2023) pointed out: “The new “green amendment” or Environmental Rights Amendment” (ERA) places New York alongside six other states with similar provisions in their state constitutions ...These amendments may introduce new avenues for those aiming to enforce environmental laws in anticipation of harm and may invite novel protection litigation claims. (Our italics.)

Let's help Senator Harckham get S. 5623 passed! The NY State legislature is in session to June 4. Right now is the time for the process to take place that will require utilities to protect the health and privacy of New York residents as a matter of law. Please call and/or email Senator Harckham's office to support and applaud his efforts to get S.5623 passed! [harckham@nysenate.gov](mailto:harckham@nysenate.gov), phone 518-455-2340. Ask your NY Assembly Member to sponsor or co-sponsor a companion bill.

*Jill McManus is a writer and musician in New York City.*