# Smart Meter "Readings" vs. Meter Transmissions vs. Health; Testimony of Patricia Burke for MA DPU Dockets 21-80, 21-81, 21-82

This testimony pertains to lack of specificity regarding the health and environmental impact of wireless and powerline utility meter transmissions introduced by the deployment of smart meter/smart grid infrastructure.

Utilities, manufacturers, the wireless industry, and regulators have been **imprecise and misleading** in conveying **how often the meters and infrastructure transmit**. - ("every 15 minutes," "less than 2 minutes per day," "sends a radio signal to a fleet of service vans as they drive by to collect monthly meter reads").

Misrepresentations about how often the meters and networks transmit have been widely promoted, without scrutinizing the overall impact of the radio frequency emissions and power quality issues imposed on individuals and communities by the various technology choices.

## MA Ratepayers Are in the Dark

Whether intentional on the part of the MA DPU and utilities or not, the public is in the dark about the functionality of the meters currently in use in Massachusetts, as well as those intended for future deployments and investments.

Initially, as analogue meters in Massachusetts were replaced with AMR technology, or retrofitted with transmitters, assumptions about the safety of juxtaposed, cumulative, chronic, pulsed microwave radiation may have predominated.

This presumption of safety has endured, despite the Government Accounting Office calling for a review of FCC guidelines in 2013, and the report by the National Academies outlining twenty inadequacies in the health and safety research record, which was submitted to the MA DPU in 2014.[1]

As concerns and complaints about smart meter and smart grid technology increased in 2009 and beyond, the industry and decision makers had two choices.

One choice was to ignore the possibility that the technology was harmful.

The other choice was to investigate.

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[1] In her March 21, 2014 reply testimony to the MA DPU, Janet Newton of the EMR Policy Institute noted that the National Academies of Science had identified twenty short-comings in the research record, many of which pertain to smart meters.

## Smart Grid Consumer Collaborative: Marketing Missing Information as Science

As an example of the industry response to reports of harm, the non-profit "Smart Grid Consumer Collaborative" was formed, not by consumers, but by industry.

"The Smart Grid Consumer Collaborative (SGCC) is a consumer-focused 501(c)(3) nonprofit organization formed to bring about an understanding of the benefits of modernized electrical systems among all stakeholders in the United States. Membership is open to all consumer and environmental advocates, technology vendors, research scientists and electric utilities for sharing in research, best practices and collaborative efforts of the group. Learn more at smartgridcc.org."

Utility regulators were also among the parties involved.

The SGCC produced a video "Separating the Facts from the Fiction about Smart Meters" dated August 2012, to address "misinformation floating around the internet about smart meters."

Regarding health concerns, the video states, "It's alleged that smart meters are harmful to our health. The cornerstone of this argument is based on RF emissions causing cancer. The critical issue with that claim is that science doesn't support it, which is a little more understandable when you remember that this is how conspiracy theorists do their highly technical research….It might be a little tough to get the facts straight."

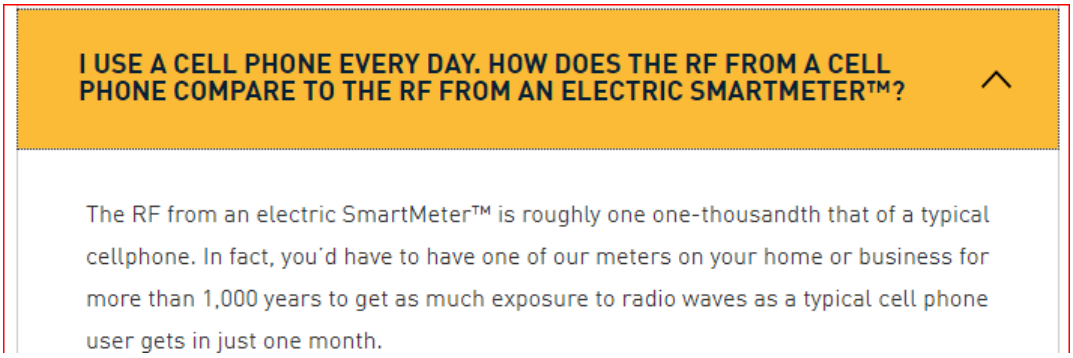
"Even if you cozied up to a smart meter all day, it would require you to snuggle next to one for 375 years before it would equal the exposure of having a daily 15-minute cellphone call over the course of one year."

SOURCE: https://www.youtube.com/watch?v=Nij-_gAMj-4&t=5s

(Note that the Smart Grid Consumer Collaborative used a play out of the tobacco playbook, by implying that the only health concern involves cancer, when in fact, citizens reporting injury by smart meter deployment reported a wide range of neurological symptoms, including sleep disruption which impairs immunity, and the acute onset of disabling Electromagnetic Hypersensitivity.)

## Pacific Gas and Electric, Industry Marketing Which is Not Science

As another example of industry marketing which is not science, the Pacific Gas and Electric Company in California's website notes:




SOURCE: https://www.pge.com/en_US/safety/how-the-system-works/understanding-radio-frequency/frequently-asked-questions/frequently-asked-questions.page
Screen shot captured Sept. 8, 2021

## Smart Grid Consumer Collaborative Fact Sheet for Missouri


"Truth: In-depth review of the scientific literature by the World Health Organization (WHO) revealed that the small amount of radio frequency (RF) energy produced by smart meters is not harmful to human health. Truth: RF emitted by smart meters is well below the limits set by Federal Communications Commission and it is below levels produced by other common household devices like cell phones, baby monitors, satellite TVs, and microwaves. In fact, you would have to be exposed to the RF from a smart meter for 375 years to get a dose equivalent to that of one year of 15-minutes-per-day cell phone use. No credible evidence shows any threat to human health from RF emissions at or below RF exposure limits developed by the FCC. With over 25,000 articles published on the topic over the last 30 years, scientific knowledge in this area is now more extensive than for most chemicals."

SOURCE: https://www.ameren.com/-/media/missouri-site/files/reliability/smart-meters-myths-facts.pdf

Note that a cellphone is a voluntary consumer choice, like the decision to smoke, while the imposition of a smart meter's RF and/or powerline emissions is associated with access to an essential service offered by a monopoly service provider.

Note also that legislation regarding tobacco followed recognition of the risks associated with second-hand, involuntary exposures.

A higher level of responsibility and trust is placed on the MA DPU and other decision-makers than on individual consumers to recognize the risks associated with increasing, ubiquitous, involuntary exposures and investment expenditures, especially when imposed on non-consenting, non-benefitting populations, and/or causing direct harm.

## The Court's Remand Regarding FCC Radio Frequency Safety Exposure Guidelines

On August 13, 2021, the court remanded the issue of safety of radio frequency exposures back to the FCC, in a decision for a proceeding that includes reports of harm associated with the installation of smart grid/smart meter infrastructure.

As reported by the Children's Health Defense, "According to the Court's decision, the FCC failed to provide evidence to support its decision in regard to the non-cancer health effects and that it **also failed to respond to the extensive evidence that was filed** with the FCC (via the docket which is also called "record") that shows that **the current radiofrequency emissions guidelines may cause negative health effects unrelated to cancer.** The court stated that, the FCC's failure, undermines the Commission's conclusions regarding the adequacy of its testing procedures, particularly as they relate to **children**, and its conclusions regarding **the implications of long-term exposure to RF radiation, exposure to RF pulsation or modulation, and the effects of wireless technologies that were developed since 1996.** The court also found that the FCC 2019 decision was arbitrary and capricious in its failure to respond to comments concerning **environmental harm** caused by RF radiation."

## In The MA DPU's Promotion Of AMI Smart Meters, It Is Crucial That Misleading Marketing Strategies Not Prevail Over Accurate Information About Meter And Network Characteristics; How Meter Transmissions Were Portrayed in the National Grid Worcester Smart Meter Pilot Program


In response to health concerns, the Worcester community was told by National Grid "these meters are wireless devices that operate for an average of one or two minutes each day…"

## MA DPU 20-69

The most recent example of inadequate or/or incomplete information about grid infrastructure radio frequency impacts in Massachusetts was provided by Eversource and National Grid, in MA DPU 20-69.

Utilities were not asked to provide specifics about the network characteristics regarding radio frequency exposures.

## MA DPU 20-69 Statement of Nstar/Eversource

**Q. Please describe the Company's current metering system**.

A. "The Company is currently using **drive-by automated meter reading AMR meters** with an average useful life of 20 years. The majority of existing AMR meters were deployed in 2000 through 2006. As a result, over the next six years, approximately 740,000 meters will be over 20 years old. Specifically, the Company uses a radio frequency ("RF")-based AMR technology that automatically collects readings remotely from most of its customers**. AMR meters are read by AMR-equipped vans using the Company's Field CollectionSystem ("FCS") Mobile Collection System. The readings are then exported out of the FCS and sent to the respective billing systems.** The type of information that can be collected using FCS will vary whether using a single Encoder Receiver Transmitter ("ERT") meter or a multi-ERT meter and is also impacted by how the meter is programmed. The type of information collected includes kWh total, kW demand, kWh on-peak and kWh off-peak. **The Company uses interval meters for approximately 10,000 of its largest commercial and industrial ("C&I") customers. Interval reads are collected via cellular communications and modems using its MV90xi data collection system**. The data is verified, exceptions are validated, estimated, and edited ("VEE") by NSTAR Electric Company d/b/a Eversource Energy D.P.U. -80 Exhibit ES-AMI-1 July 1, 2021 employees and monthly billing determinants are provided for billing purposes. Interval data is transferred to various downstream systems for additional tasks such as ISO reporting and monthly load

reconciliation. FCS and MV90xi systems have limited two-way communication capabilities. MV90 calls meters and collects data. With certain meter types, FCS can read/reset demands and turn meters off and on remotely if an Itron Security Management System is partnered with the FCS system. The MV90xi system is capable of limited data management however the majority of VEE is manual, and the system has limited capacity. The Company does not have separate meter data management system that processes interval data."

Source: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13929143

## MA DPU 20-69 Statement of National Grid

**Q. Please describe the Company's current metering capabilities.**

A." The Company delivers electricity to approximately 1.3 million customers. Currently, the Company's electric metering infrastructure has limited ability to meet the evolving and diverse needs of its customers. Most meters in Massachusetts use AMR technology**. Deployed in the early 2000s to replace manual meter reading processes, this technology sends a radio signal to a fleet of service vans as they drive by to collect monthly meter reads.** The AMR technology contains core features that the Company relies on for identifying customer load, billing customers appropriately based on their electricity consumption, and managing customer connections to the Company's infrastructure. Approximately 900,000 of the electric AMR meters currently in the field are electro mechanical meters with an AMR retrofit. The electro-mechanical portion of the meter is reaching the end of its estimated 30-year life within the next three years, which will cause the meters to slow down and offer inaccurate bills. Likewise, the AMR retrofit portion of those meters is reaching its estimated 20-year life, with a pivot point in the risk of meter failures in the Spring of 2023 and a near doubling of the forecast risk of AMR meter failures in the Spring of 2024. Every year beyond those dates represents an increased risk of meter failures for the Company and its ability to accurately perform a core business function: delivering energy and billing customers."

Source: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13720285

## The Meter Does Not Only Transmit Once a Month to a Service Van

A quick reading of the description of Eversource/Nstar and NGrid current meter capabilities might lead the casual reader to assume that the meters are inactive until the AMR-equipped van comes to the neighborhood to ping the meters for their data.

This is not true.

Electricity meters currently in service in Massachusetts have been measured using professional grade radio frequency devices by building biologists, remediation experts, and the public; and found to be transmitting 24/7/365, in both Eversource and NGrid service territories, in response to health complaints.

This discovery by MA ratepayers, in fact, resulted in the proceeding for MA DPU 13-83, requesting opt out accommodation from first generation AMR meters for MA residents from National Grid. [2] Eversource/Nstar customers have been unable to secure accommodation, with one notable exception of which I am aware.

National Grid promoted its "free opt out" during the Worcester pilot program as indicative of "its commitment to customer choice, [3] while at the same time, NGrid lobbied the MA DPU to surcharge customers elsewhere in the Commonwealth to opt out of the first generation of AMR RF-emitting meters. NGrid is currently surcharging some health-vulnerable ratepayers in the Commonwealth.

An Itron meter currently installed in Warren MA, in Eversource service territory, measured by Ken Gartner using professional equipment, yielded transmissions of 2 times per minute, which is 2880 times per day.

## How Often Do the Meters Transmit? Historical Fight for Accuracy: 2011, California, EMF Safety Network

The history of addressing the obfuscation of the meter transmission data rates dates back to 2009, when AMI meters were being installed in California, Texas, and Maine, resulting in reported injury and harm.

As outlined by the EMF Safety Network, in the article **PG&E's Big Confession:**

*"PG&E's paltry, inconsistent and contradictory information on RF emissions from Smart Meters is unbelievable and at odds with other RF expert findings. Several PG&E bulletins and spokespersons make varying claims on how often the Smart Meter electric meters transmit RF, anywhere from every hour to every 4 to 6 hours to 2% or 4% of the time.*

"In April of 2010 the EMF Safety Network filed an application with the California Public Utilities Commission (CPUC) asking for hearings on health impacts, including "Smart" Meter radio frequency (RF) emissions data.

We just wanted the facts, but the CPUC rubber stamped PG&E's claims of RF safety and dismissed our application stating:

*" All radio devices in PG&E's Smart Meters are licensed or certified by the FCC and comply with all FCC requirements."*

*"Smart Meters produce RF emissions far below the levels of many commonly used devices."*

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[2] Several testifiers requested accommodation on the advice of their health care providers.

[3] The opt out would not have been necessary if the MA DPU had not authorized the auto-enrollment design of the pilot, and had not installed the meters without an active, verified process for informed consent.

PG&E provides information from Richard Tell Associates on their website titled, “Supplemental Report on An Analysis of Radiofrequency Fields Associated with Operation of the PG&E SmartMeter Program Upgrade System.”

This report states Smart Meters transmit at 1 watt with 0 antennae gain. It claims: *The 1 watt transmitter is configured to transmit data approximately **once every four hours** back to the company **so its duty cycle is very small** (the actual data transmission duration during any four hour period will vary, however, depending on how often a particular meter transmitter acts as a repeater for other nearby meters).*

From PG&E’s Smart Meter FAQ: *SmartMeters™ utilize a low power (1 watt) wireless radio to send customer energy-usage information wirelessly to PG&E for data collection.*….Do electric SmartMeters™ constantly emit RF? PG&E answers:

*No. SmartMeters™ communicate intermittently, with each RF-signal typically lasting from 2 to 20 milliseconds. **These intermittent signals total, on average, 45 seconds per day. For the other 23 hours and 59 minutes of the day, the meter is not transmitting any RF.***

In a letter to Congresswoman Lynn Woolsey, the FCC writes, “the devices [Smart Meters] **normally transmit for less than one second a few times a day** and consumers are normally tens of feet or more from the meter face…”

## 190,000 Times a Day is Not 6 Times a Day

”CPUC administrative law judge Amy Yip-Kikugawa ordered all investor owned utilities (IOU’s ) to answer Smart Meter radio frequency (RF) questions. PG&E’s answers are an astounding confession (2011).

Question 2: How many times in total (average and maximum) is a smart meter scheduled to transmit during a 24-hour period?

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How many times in total (average and maximum) is a smart meter scheduled to transmit during a 24-hour period?

**Response 2:**

**Electric:** Table 2-1 presents scheduled electric SmartMeter™ system messages and their durations. As noted in Response 1, the information presented applies only to the 900 MHz radio. Table 2-1 presents data for all "scheduled" messages; i.e., those inherently required to sustain communications in the network that occur routinely without user intervention. "Non-Scheduled" messages created only at non-recurring times are addressed in Response 3.

**TABLE 2-1**

| Electric System Message Type | Transmission Frequency Per 24-Hour Period: Average | Transmission Frequency Per 24-Hour Period: Maximum (99.9th Percentile) |
|---|---|---|
| [a] | [b] | [c] |
| Meter Read Data | 6 | 6 |
| Network Management | 15 | 30 |
| Time Synch | 360 | 360 |
| Mesh Network Message Management | 9,600 | 190,000 |
| **Weighted Average Duty Cycle** | 45.3 Seconds[4] | 875.0 Seconds |

The electric system message types are defined as:

- Meter Read Data refers to the messages generated by each meter to transmit energy usage data.
- Network Management refers to network tasks that need to be performed to maintain the health of the network (e.g., route establishment).
- Time Synch refers to network administration messages needed to update the internal clock in the NIC.
- Mesh Network Message Management refers to activities required to forward routed messages.

SOURCE: http://emfsafetynetwork.org/wp-content/uploads/2011/11/PGERFDataOpt-outalternatives_11-1-11-3pm.pdf

**PG&E says the average number of RF pulses for the electric meter would be about 10,000, per meter, per day and the maximum number over 190,000.**

**90% of these pulses are for the mesh network maintenance (signals bouncing from homes) and only 6 pulses are for reading the meter data.** This doesn't include Home Area Network transmissions."

"How about peak power figures?

**The PG&E electric meter transmits at 900MHz with 1 watt of transmit power. It has an antennae gain 4.0 dBi for a peak level power of 2.5 watts.** *That's two and a half times more than their safety data stated.*

The wireless gas meters transmit between 4 and 5 times a day at 132-794 mW.

Answers provided by San Diego Gas and Electric and So Cal Gas were similar, although PG&E electric meters appear to be five times stronger, just like Sage Associates found in their study." *– EMF Safety Network*[4]

## Comments Pertinent to MA DPU Depiction of Health Concerns as Alleged

MA DPU 20-69-A characterizes health concerns as "alleged."

Please note that the remand to the FCC by the court indicates that FCC guidelines remain in effect, assurance of safety is not in effect, especially in regard to non-thermal effects of radio frequency exposures (below the heating threshold).

The court stated**, "The factual premise—the non-existence of non-thermal biological effects—underlying the current RF guidelines may no longer be accurate."**

MA DPU 12-76-B's dismissal of health concerns either references FCC guidelines, and/or references other agencies that rely on the FCC, or "expert" testimony provided by Peter Valberg of the product defense firm Gradient. [5]

## Stop Smart Meters (California) Accuracy, Clarification

Stop Smart Meters is another citizen-based resource organization that responded to the need to provide the public with accurate information regarding smart meter deployments.

"*FAQ: Radio-Frequency Radiation Issues*

**Q: My utility says "smart" meters emit less than my cell phone or WiFi. Is this true?**

In some cases this is true, and in some cases not true. The figures for RF exposure given by utilities are time-averaged numbers which hide the peak power of the "smart" meter, and disguise the fairly continuous nature of the pulses. "Smart" meters are unlike cell phones or WiFi in their bizarre pattern of sharp spikes of RF.

Both of those consumer devices (cell phones and WiFi) can be strong RF emitters. But people are becoming increasingly aware of the potential harm done by chronic exposure to RF radiation-emitting devices and are taking steps to change how they use them. Growing public awareness of RF exposure has led people to choose a wired internet connection or use a wired

[4] As has previously been reported to the MA DPU by ratepayers, in its 2017 compliance filing, PG&E reports zero energy savings from smart meters in 2017. See table 1 and 2 pages 17, 18. See A.07-12-009

[5] The MA DPU has received significant testimony from the public challenging the agency's reliance on comprised "experts" engaged in product defense, including tobacco science, specifically regarding Peter Valberg.

phone at home. But most people are not offered a wired “smart” meter. And you can’t turn it off once it’s installed.

**A “smart” meter is a device you cannot turn off or move, so your exposure to this source of RF is out of your control. The rate and intensity of the RF radiation is also not under your control,** and we are coming to learn, it is not under the utility’s control. Recent information “off the record” from PG&E confirms our suspicion that at least 90% of the RF emitted by the “smart” meters is NOT transmitting your electrical usage data, but is part of the “mesh network” talking to itself, and includes a lot of redundant “chatter” between your meter and other meters. This is for the convenience of your utility, and its effects on you (and other living things) apparently were not even considered when they were designing the mesh network.

**Q: What frequency do they operate at, and what sort of radiation do they emit?**

The PG&E Silver Springs Network “smart” meter operates in the 902-928 MHz range, near the range of most cell phones, and in the radio-frequency microwave range (300 MHz to 3 GHz). **The 2-millisecond spikes of RF (radio-frequency) it emits are randomly assigned to a pattern of alternating frequencies—the pulses keep shifting which frequency they are using. At least 90% of the pulses are not your data, but the “mesh network” talking to itself—also known as network “chatter.”**

The spiked pulses are like a strobe light, which also emits spiked pulses, about 1/2 millisecond each. The “smart” meter pulses can go off at a rate of 2 to 20 per second. Strobe lights are known to have neurological effects, and are not allowed to be sold if they strobe at a rate above 10 pulses per second. Some people cannot be around strobe lights, they set off visually triggered seizures. The “smart” meter RF emissions constitute an all-new, bizarre pattern, unlike the pattern of emissions from your cell phone or any other RF-emitting device**. And to date there have been no studies published on the effects of ‘smart’ meter radiation on animals, plants or humans. However, some research indicates that pulsed radiation induces a greater biological effect than constant radiation. Based on countless firsthand reports it is clear that some people are vulnerable to serious ill effects.**

**Q: My utility says they will shut off the “radio” part for a fee. How will I know if they really did?**

Unless you buy a RF measuring device, you won’t know for sure. Many people are buying these devices, so there may be someone in your community who can measure. Also, there are EMF consultants in some areas of the country who can help you assess your levels.

**Q: Why do the utility websites say that “smart” meters have low RF emissions?**

The calculations used to arrive at the low RF exposure numbers that most utilities published are arrived at by time-averaging. “Smart” meters have an unusual, unpredictable pattern of RF emissions, usually referred to as “pulses”—sudden high levels of RF followed by no emissions. Each pulse is about 2 milliseconds (2/1000th of a second) long.

By time averaging, they can bring down the total peak level that they claim the meters emit. This is bogus science. If you time-average the strong millisecond pulses of a strobe light, they "equal" a low-wattage light bulb continuously on; but no one would legitimately make such a claim. Strobe lights have distinct neurological effects in many people—headaches, dizziness, and for some- epileptic seizures.

**Q: I see videos online of "smart" meters pulsing a lot. But my utility says they only emit for about a minute a day? Which is true?**

Let's take an example from PG&E's claim that the meters emit only 45 seconds a day. Since each pulse is about 2 milliseconds long, that comes out to 22,500 pulses a day, which can be going off at any rate, even 2 to 20 pulses per second. At the rate of twice per second—which is as "constant" as anything could reasonably be considered to be—the pulses would be going off for a total of about 3 hours per day—spread over the whole day, at times you neither choose nor are aware of.

It is only by the specious, unscientific manipulation of the facts that utilities can claim the short emission periods that they do.

Thanks to the work by several citizen-scientists who take it upon themselves to buy equipment, measure "smart" meters, and post documentation online, we have some truly independent data to counterbalance the load of propaganda that the utilities would have us swallow.

**Q: How high are the pulses on "smart" meters?**

The peak power density varies depending on a large number of factors: distance from the meter, type of meter, environment, measuring device, position, and perhaps even whether the pulse is sending data or just "chirping" to its neighbors to maintain the mesh network. It is their high variability, combined with the rash of complaints, that by itself raises questions about possible effects on people's neurological systems.

There are individuals who have measured peak power density on pulses on single meters that are more than 300 microwatts per centimeter squared (µW/cm2), but we are unable to confirm this as a reference figure. Here is a post we did on this. The FCC guidelines says you shouldn't be subjected to a field of about 600 microwatts per centimeter squared (µW/cm2) for more than 30 minutes, but as noted in a previous answer these extraordinary levels are based in outdated science and in urgent need of revision. And your "smart" meter is 24/7. To give the issue context, the Bioinitiative Report recommends a level of 0.1 microwatt per centimeter squared (µW/cm2) for human exposure, about 10,000 times less than the FCC number.

There are some videos online, though we can't confirm their accuracy.

**Q: How often do 'smart' meters pulse?**

One thing that has been revealed by people who've tracked "smart" meter pulses: they are highly variable. Other descriptors: unpredictable, random, very erratic, and even bizarre. One

EMF consultant has told us that it is impossible to extract meaningful conclusions about the fields created by the pulses.

**PG&E's own documents revealed last year that their meters pulse between 10,000 and 190,000 times per day.**

SF Chronicle article: http://blog.sfgate.com/energy/2011/11/03/smartmeters-send-almost-10000-signals-a-day/

**The *median* was 10,000 pulses/day—**that means half the meters emit MORE than this. The reason they didn't use a different and more usual statistical figure–the average–is because it's likely that figure would have been higher. The highest meter they measured emitted 190,000 pulses/day.

"Smart" meters seem to pulse a lot at certain times, and less at other times. PG&E for one says that data about the ratepayer's electrical usage is only broadcast 6 times per day. Another PG&E executive told us "off the record" that at least 90% of the emissions from a "smart" meter are NOT user data, but mesh-network "chatter." Those pulses have nothing to do with your home.

**If you are wondering about meters in used by other utilities, consider this: If they claim the meter only emits "60 seconds a day", then you can calculate the approximate number of pulses. Sixty seconds of of 3-millisecond pulses (typical) equals about 20,000 pulses.** There about 85,000 seconds in a day. If the rate of pulsing were consistent (though it never is) that would be about one pulse every 4 seconds, for the whole 24 hours  Depending on the rate of pulsing, the meter is very likely to be emitting something during most of the day.

All of this speculation on our part arises because of a lack of true disclosure on the part of the manufacturers and the utilities as to how the meters operate.

**Q: Why is RF radiation bad for people (and animals and plants)?**

The effects of low-level non-thermal exposure to radio-frequency microwaves has been studied since the 1950s. A range of subtle effects have been identified over the decades, from an auditory sensation to infertility to sleep disturbance to irregularities in the heart rhythm, depending on exposure type, level, and duration..

The current focus on brain cancer caused by cell phones hides a wider, more pervasive issue: the ways in which exposure to microwave RF can erode human health by disrupting a number of basic systems like sleep and immunity, resulting in ill health from a number of conditions.

For the military in the 1950s and 1960s, for the wireless industry in the 1990s, and for utilities deploying "smart" meters now, these biological effects are not convenient to their purposes, and have been dismissed. "The FCC sets the guidelines," has been the cry of utilities commissions. But those guidelines were set largely without regard to the subtler effects or the consequences of long-term exposure, and before much of this research was done.

In May 2011, the World Health Organization, which is a notably conservative and slow-moving organization regarding public health precaution, finally declared that RF radiation is a "possible human carcinogen," placing it in Class 2B, along with engine exhaust, lead, and DDT. So far, however, the FCC does not look set to make any changes in allowable levels, and in fact has complained about recent state and local government objections to new cell antenna installations, for instance.

**Q: My cell phone doesn't bother me, but the "smart" meter gives me headaches (or insomnia or heart palpitations). Why is it different?**

As we discussed above in questions about the power of the pulses and how often they happen, it might be possible that it is the very bizarre and erratic nature of the emissions that are making people ill. We are not medical experts or scientists, and so don't make claims about the reasons for your distress. But the complaints and stories received by this website and elsewhere make it clear that, for whatever reason, these meters make some people sick, and often in quite similar ways. –Stop Smart Meters

SOURCE: https://stopsmartmeters.org/frequently-asked-questions/radio-frequency-radiation-issues/

## Testimony Submitted in Arizona in 2012 Regarding Accuracy of Utility Claims Re: Meter Transmissions

April 25, 2012
By US Mail

Arizona Corporation Commission
Docket Control
1200 W. Washington St.
Phoenix, Arizona 85007

***Docket # E-00000C-11-0328 – Smart Meters***
***Re: How often wireless smart meters actually transmit***

Dear Commissioners:

During the March 23rd hearing, **one Arizona Utility stated that it only receives transmissions 14 times a day from each of their smart meters. Another Utility stated that they receive data every 15 minutes.** These are low-end numbers, and not representative of the current technologies**. As evidenced by the September 8, 2011 hearing when Tucson Electric/Unisource disclosed that their AMR meters transmit every 30 seconds, or 2880 times a day.**

There have been complaints in other states that utilities there did not fully disclose how often their meters actually transmit. **Some utilities were apparently only stating how often they read their meters, but omitted other types of transmissions. From a human health perspective, the informational content of a wireless transmission is irrelevant. It is the actual act of transmission that matters. Otherwise, there is no distinction.**

Following these complaints, on October 18, 2011 Administrative Law Judge Yip-Kikugawa directed the three largest California utilities to make specific and detailed disclosures. The response from Pacific Gas & Electric is enclosed.

In Table 2-1 of the response, it is stated that each meter is read six times a day. However, the total number of transmissions from each meter is typically 10,000 a day, or once every 8.6 seconds.

The PG&E system is a "mesh network" where some of the meters act as relay stations. These meters can transmit much more often. According to PG&E's Table 2-1 (right side**), they may transmit as often as 190,000 times a day or about twice a second. It is not possible to know which of the meters serve as relays, and it may change over time which of them does. Mesh networks are state of the art and are being deployed by many utilities, including utilities in Arizona.**

Therefore, the public health is best served by limiting these transmissions as much as possible, especially since most, if not all, of the desired goals can be accomplished with much less.

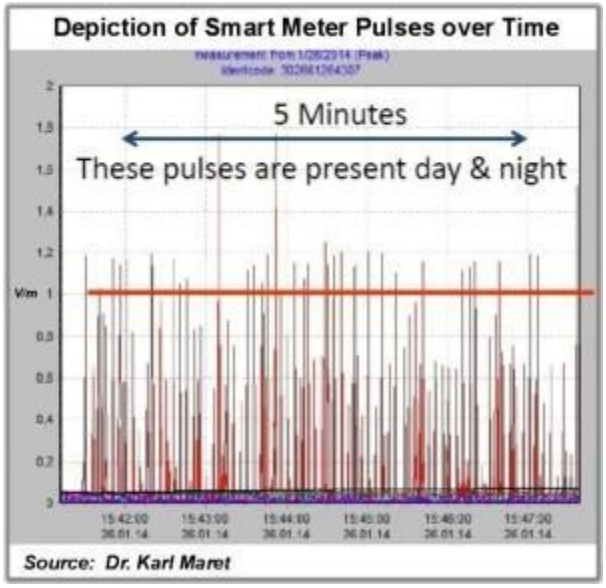
However, we must stress that limiting the transmissions is not a viable alternative to a medical opt-out for people with electrical hypersensitivities. **People with EHS must be allowed to have a non-communicating electromechanical meter.** There is no other choice.

Submitted on behalf of: Safer Utilities Network P.O. Box 1523 Snowflake AZ 85937

Source: https://www.eiwellspring.org/smartmeter/AZCC_mesh_duty_cycle.htm

## Smart Grid Awareness Article Addressing Smart Meter Transmission Claims: Misinformation or Missing Information?

**Smart Meter Transmission Frequency Claims – "Misinformation" or "Missing Information"?**
Posted on June 7, 2013 by SkyVision Solutions by K.T. Weaver, SkyVision Solutions, Updated October 25, 2018




Introduction

When installing wireless smart meters in the neighborhood, utilities typically attempt to downplay customer concerns with so-called "Fact Sheets" and marketing campaigns. One of the issues normally deals with answering the following question:

***"How often is my smart meter transmitting?"***

Utility Claims

Here are some of the actual answers to this question, as provided by utilities:

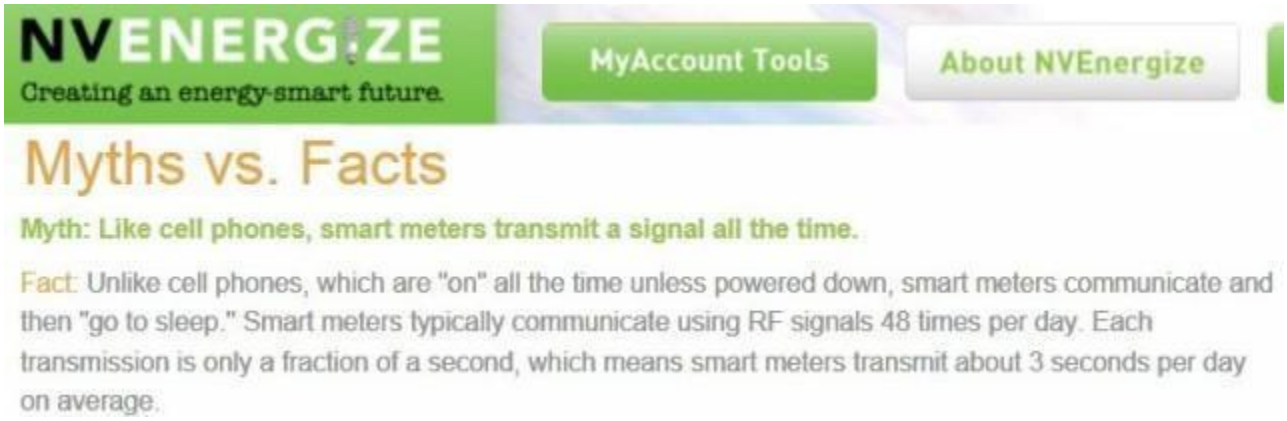
"Smart meter communications are typically less than a second and under normal operations, **take place every 4-6 hours**." (Reference: Pepco Fact Sheet on Smart Meter RF Transmissions; see link below, top of page 2, downloaded 6/7/13.)

Pepco RadioFrequency "FactSheet"

"LUS's smart electric meters will typically communicate using RF signals **6 times per day**." (Reference: Lafayette Utilities System website; see captured webpage image below, captured 6/7/13.)


**Myth: Like cell phones, smart meters transmit a signal all the time.**
**Fact:** Unlike cell phones, which are "on" all the time unless powered down, smart meters communicate and then "go to sleep." LUS's smart electric meters will typically communicate using RF signals 6 times per day. Each transmission takes only a few seconds, which means the meters will transmit less than one minute per day on average.

"Smart meters typically communicate using RF signals **48 times per day**. Each transmission is only a fraction of a second, which means smart meters transmit about 3 seconds per day on average." (Reference: NV Energy website; see captured webpage image below, captured 6/7/13.) [*Note that the NV Energy and LUS somehow used the same "Myth vs. Fact" template, but NV Energy used somewhat different numerical values for number of transmissions and transmission time per day*.]




In the City of Naperville, Illinois, concerned citizens at a City Council meeting were told that smart meters are only on "**six times a day**." (Reference: Naperville City Council meeting, February 15, 2011)

Analysis

**The above information is "misinformation" due to "missing information."** It is generally true that an individual customer's smart meter is programmed to transmit his or her energy-related data back to the utility once every hour or once every few hours. But that is an extremely *small* percentage of the actual number of transmissions per day. The wireless smart meter performs many other functions, such as network management, time synchronization, and activities related to forwarding routed messages for **other** customers. Smart meters chatter back and forth among each other throughout the day. For that reason, it is correct to

state that smart meters transmit a signal every few seconds (if not more frequent) on a round-the-clock basis, for basically forever, i.e., 24/7. To state otherwise is deceptive.

Supporting Evidence

It is likely that the original source of most of the utility industry misinformation is an Edison Electric Institute "white paper" document entitled, "A Discussion of Smart Meters and RF Exposure Issues," dated March 2011. On page 14 of that document there appears the following sentence:

"***Smart Meter communications are typically less than a second and under normal operations, the programmed interval for randomized transmissions is 4 to 6 hours or longer***."

The above statement is very simplistic in nature and really only addresses the communications of one smart meter and the customer energy usage-related data collected by that one meter. *It has nothing to do with reality, in terms of smart meter radiofrequency emissions associated with communicating within a network of other smart meters*. One could say that utilities took that one statement "out of context," misapplied it, and then spread it like wildfire.

Presented below is information presented before the Public Utilities Commission of the State of California in 2011 was intended to provide *clarification* on the frequency and duration of RF emissions from wireless smart meters. The table below presents data for "scheduled" messages for Pacific Gas and Electric Company's wireless smart meters operating in the 900 MHz range. *Scheduled messages* are defined as those inherently required to sustain communications in the network that occur routinely without user intervention.
[For the entire document, refer to: PGE ALJ Response 01 NOV 2011 CPUC Document.]

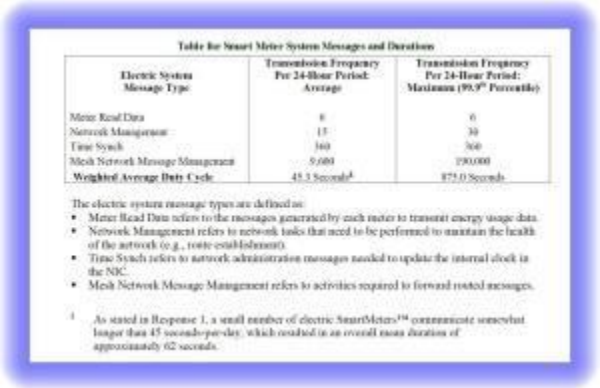


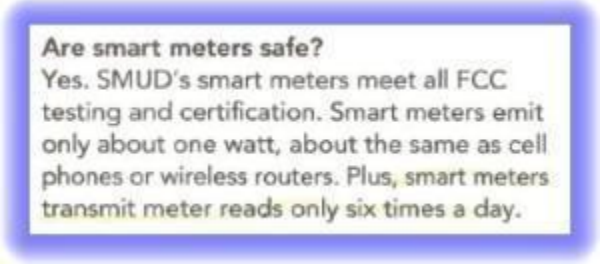
Table for Smart Meter System Messages and Durations

| Electric System Message Type | Transmission Frequency Per 24-Hour Period: Average | Transmission Frequency Per 24-Hour Period: Maximum (99.9th Percentile) |
|---|---|---|
| Meter Read Data | 8 | 6 |
| Network Management | 15 | 30 |
| Time Synch | 360 | 360 |
| Mesh Network Message Management | 9,600 | 190,000 |
| **Weighted Average Duty Cycle** | 45.3 Seconds[1] | 875.0 Seconds |

The electric system message types are defined as:

- Meter Read Data refers to the messages generated by each meter to transmit energy usage data.
- Network Management refers to network tasks that need to be performed to maintain the health of the network (e.g., route establishment).
- Time Synch refers to network administration messages needed to update the internal clock in the NIC.
- Mesh Network Message Management refers to activities required to forward routed messages.

[1] As stated in Response 1, a small number of electric SmartMeters™ communicate somewhat longer than 45 seconds-per-day, which resulted in an overall mean duration of approximately 62 seconds.



**Are smart meters safe?**
Yes. SMUD's smart meters meet all FCC testing and certification. Smart meters emit only about one watt, about the same as cell phones or wireless routers. Plus, smart meters transmit meter reads only six times a day.

In 2012, another utility, the Sacramento Municipal Utility District (SMUD), performed a similar study to determine how many radiofrequency transmissions were occurring per day. Originally, **SMUD had claimed (or only acknowledged) that six (6) transmissions were occurring per day.**

**Actually, the average SMUD smart meter transmits several thousands of times per day.**

In September 2012, SMUD conducted a detailed analysis of the transmission frequency and weighted average "on air" time across the smart meters network. The results of the study are below:

| Electric system message type | Transmission frequency per 24-hour period: Average | Transmission frequency per 24-hour period: Maximum (99.9th percentile) |
|---|---|---|
| Meter read data | 6 | 6 |
| Network management | 15 | 30 |
| Time sync | 360 | 360 |
| Mesh network message management | 13,000 | 240,000 |
| Weighted average duty cycle | 61.4 seconds | 1,262 seconds |

So, as you can see from the above tables, it is true that the utility "detailed analysis" shows that the "meter read data" for each customer is transmitted 6 times per day.

But if you are a person concerned about the RF emissions from a wireless smart meter, you are *obviously* interested in the total number of "bursts" of RF energy from the meter. **There are actually thousands and thousands of RF transmissions occurring for each wireless smart meter each day**.

Also, there is no practical manner for an individual customer to know if his or her smart meter is "only" transmitting at the *average* rate of 10,000 to 15,000 times per day, or if you are the unlucky person who has a meter that is transmitting at a rate of 200,000 or more times per day.

The source for the above SMUD table can be viewed at: http://web.archive.org/web/20150316152744/https://www.smud.org/en/residential/customer-service/smart-meters/common-questions.htm.

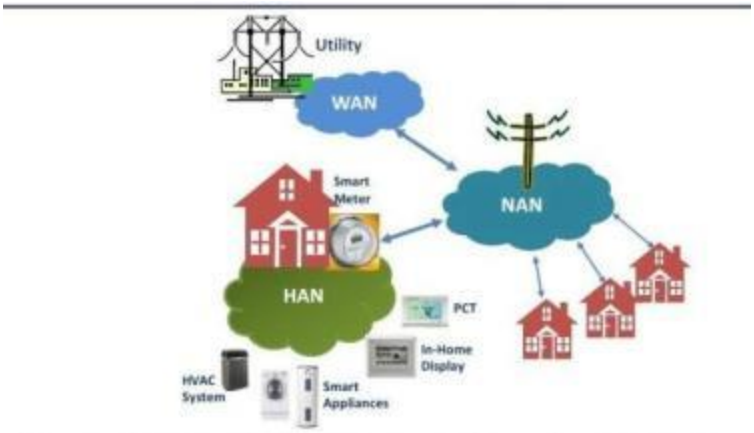
Scheduled Messages vs. Unscheduled Messages

At one point in the above paragraphs, there was reference to "scheduled messages." Another pertinent question would be to ask about "unscheduled messages." These messages would pertain to such items as theft or tamper alerts, configuration errors, and firmware downloads.

According to one document prepared by the San Diego Gas & Electric Company, dated November 1, 2011, it was *estimated* that "communication between the customer's meter and the utility is approximately 95% scheduled. The 5% is attributed to ad-hoc contingency read request for meter mitigation and firmware downloads." It was further stated that "[t]he firmware download process is a background activity for the network typically spanning from 12 hours to 12 days (depending on the number/type of firmware modules downloaded)." Thus, it would appear logical to conclude that during periods where smart meters are undergoing a firmware upgrade process that there would be a time span of several hours to days where there would be substantially increased RF transmissions and message traffic as compared to "normal."

Two Different Transmitters

**Another complicating issue is that most new wireless smart meters being installed in the United States and Canada contain two separate transmitters.** One transmitter operates in the frequency range of 900 MHz and functions within the Neighborhood Area Network (NAN), communicating with the utility and with other smart meters in the area. The second transmitter operates in the frequency of range of 2.4 GHz and exists to function within a Home Area Network (HAN), communicating with "smart" appliances within an individual residence and with an in-home display unit.



*Advanced Metering Infrastructure with Home Area Networking*

It is likely that the smart meter transmission data information discussed earlier in this posting only addresses the NAN communications. Unfortunately, the utilities aren't specific enough to explain what is what. So what about the HAN communications?

Here is some limited evidence:

From a City of Naperville (Illinois), smart meter testing plan document, dated September 22, 2011, it contains the following statements:

"Note that the 2.4 GHz ZigBee radio in the Elster residential REX2 meter is programmed to transmit beacon signals periodically, even if a ZigBee HAN device is not being used with the REX2 meter. These beacon signals, which are part of the ZigBee protocol, let other ZigBee devices know they are within communication range."

In addition, from a document entitled, "An Evaluation of Radio Frequency Fields Produced by Smart Meters Deployed in Vermont," by Richard Tell Associates, Inc., dated January 14, 2013, it contains the following statements:

"Despite the fact that the Elster meters were not generally 'activated' to interact with In-HomeDisplays (IHDs), the HAN radios in the smart meters periodically issue a brief signal lasting approximately 1.75 ms once every 15 seconds plus a group of four closely spaced signals once per minute for a total of eight pulse emissions per minute. These signals are presumably related to the HAN radio searching for IHDs in the vicinity to wirelessly connect to the meter." So even if a customer does not have a smart appliance or in-home display unit, the smart meter will emit, at least for some models, a total of eight (8) HAN-related pulses per minute. Over a period of 24 hours, that is 11,520 pulses. And what if you do have an in-home display unit or smart appliances with which the smart meter would communicate? I have not been able to find any documentation that would quantify the pulses that would result from a home that was so equipped with an in-home display unit and several smart-enabled appliances. Logically, the potential for increased exposure is great.

Summary

Utilities do not properly inform customers of the true nature of the smart meter emissions. **Utilities misinform by omission**. Utilities normally limit their discussion to the narrow topic of individual customer data transmission frequencies, neglecting to mention the vast majority of RF transmissions that pertain to other functions of the smart meter. In addition, the utilities do not properly inform customers of the potential exposure from RF emissions associated with a Home Area Network (HAN).

So, no, it is not six (6) transmissions per day, not 48 transmissions per day. **There are, on average, thousands and thousands of RF transmissions occurring for each wireless smart meter each day**. In fact, wireless smart meters and associated equipment within the home (as part of a Home Area Network) would apparently emit, at a minimum, tens of thousands of radiofrequency radiation pulses each and every day.

## Conclusion:

As noted previously, concerns and complaints about smart meter and smart grid technology increased in 2009 and beyond, the industry and decision makers had two choices.

One choice was to ignore the possibility that the technology was harmful.

The other choice was to investigate.

The desire to address the dual challenges of climate and covid has driven the conversation about grid modernization back to the forefront in Massachusetts, ostensibly, to protect public health and the environment.

Unfortunately, inadequate scrutiny of the supposed solutions of smart grid investments and additional wireless and powerline technologies, including 5G, has resulted in a situation where tobacco science strategies and tobacco scientists themselves have been given free reign, enabling profound risk and harm to human health and the environment.

As a result, volunteer citizen groups and independent researchers with extremely limited resources have been attempting to stem the tide of misinformation and missing information.

Further scrutiny and a necessary course correction are required.

The DPU should direct utilities to resubmit plans for smart meter/AMI deployment that include evidence-based research demonstrating safety for human health and the environment; exact engineering specifications for juxtaposed, cumulative, chronic exposures for all transmissions, (including co-location and banks of meters), and cost forecasting for accommodations for health vulnerable ratepayers requiring more than just an opt out meter and a surcharge.

In addition, the DPU and utilities, and public health agencies could report how they have addressed health complaints and accommodations requests in the past, and what procedures will be in place in the future. These human rights protections should be subject to oversight by an independent authority providing human rights advocacy for ratepayers only, and not only for investor-owned utilities.

Respectfully Submitted,
Patricia Burke 8 Eden Street Millis MA 02054