

Important Smart Meter Information

Information from a conference call on 4/26/12 given by Prof. Glen Chase, Professor of Management Systems, Environmental Economics, and Statistics. The information is based mostly on information from California, where the earliest roll-out of smart meters in the US began. While some details may vary, generally the California information is relevant to other locations.

Three key subject areas covered by the call:

- 1. Issues raised by the type of information gathered by smart meters, what information is available to customers and what information is available to the utility company, the information that can be garnered using current software from the smart meter data, and privacy issues around the collecting and selling of this information to third parties.**
- 2. Non-industry information about the actual RF exposure for whole body. Industry information about the frequency of transmissions.**
- 3. Evidence for biological effects of low levels of non-ionizing radiation— levels much lower than smart meter levels. Responsibility of public health regulatory agencies to use the 'precautionary principle'.**

The call and supporting documents are available at <http://thepowerfilm.org/thurs-april-26-smart-meters-public-conference-call-health-and-privacy/>

At the bottom of this webpage are the 3 source documents which Prof. Chase used:

- Source document #1: Smart Meter - Privacy Issues- Colorado Public Utilities Commission, "Smart Metering & Privacy: Existing Law and Competing Policies"
- Source document #2: Smart Meter - Health Issues- PG&E lawsuit documentation 11/1/11 "Pacific Gas and Electric Company's Response to Administrative Law Judge's Oct. 18, 2011 ruling directing it to file clarifying radio frequency information."
- Source document #3: Smart Meter - Health Issues- Santa Cruz County Health Department: "Health Risks Associated with SmartMeters - dated 1/13/12"

Other useful websites with supporting documentation:

- BioInitiative Report <http://www.bioinitiative.org/freeaccess/report/index.htm> Section 1: Summary for the Public, is probably the most useful. Section 16: The Precautionary Principle, and Section 17: Key Scientific Evidence and Public Health Policy Recommendations, also contain important information
- Prove It website <http://www.justproveit.net/content/prove-it-initiative-main>
Click on link for "5000 scientific papers"
Click on link for "165 biological effects"
Click on "Standards"

1. Utility companies say, Smart Meters "will help customers conserve energy."

a. The information available to customers is on the utility company's website *only*, is approximately 18-48 hours delayed and given only in block time periods of total electrical usage. Most people do not bother to go to the website. If they do, the information isn't useful because it does *not* identify which electrical devices were on and it does *not* identify how much electricity any individual device used. So it does not assist customers to manage or conserve electricity.

b. The information available to the utility company is all the data of the electrical devices used in the home. There is software currently available to interpret that data, telling what appliances and all other electrical devices were being used, for how long and when.

c. In California, the utility company was given authorization and encouragement to sell this data to 3rd parties. In fact, this kind of data is highly coveted by appliance manufacturers, marketing people, law enforcement, etc. The utility companies have the potential to make a lot of money by selling this information.

d. The customer, not only does not have the same access to this information, they have not given permission for this information to be shared with 3rd parties, and, this information is NOT necessary for accurately billing the customer, nor for the implementation of the smart grid.

e. Potential extreme dangers are also created due to skilled smart meter hackers seeing patterns of days and times when no one is in the home, or when young children are home alone without adult supervision.

See following page (p. 3) for the kind of information current software can interpret from smart meter type readings. This information is an excerpt from the Colorado PUC report. Full report is available at <http://thepowerfilm.org/thurs-april-26-smart-meters-public-conference-call-health-and-privacy>.

Additional resources of interest about current developments:

See the following article from Wired online magazine for the data collection, analysis and usage of information capabilities of a new site being constructed by the government: http://www.wired.com/threatlevel/2012/03/ff_nsadatacenter/all/1

See the following article from Wired online magazine with quotes from CIA director David Petraeus' (formerly General Petraeus) on the usefulness of smart and other technologies to assist in collecting data on citizens that can be used for tracking "items of interest." (people identified as potential threats to national security) <http://www.wired.com/dangerroom/2012/03/petraeus-tv-remote/>

See information about the "Cybersecurity" bill which has already passed in the House of Representatives and is being considered in the Senate <https://www.eff.org/deeplinks/2012/04/cybersecurity-bill-faq-disturbing-privacy-dangers-cispa-and-how-you-stop-it> and an update here: https://action.eff.org/o/9042/p/dia/action/public/?action_KEY=8444

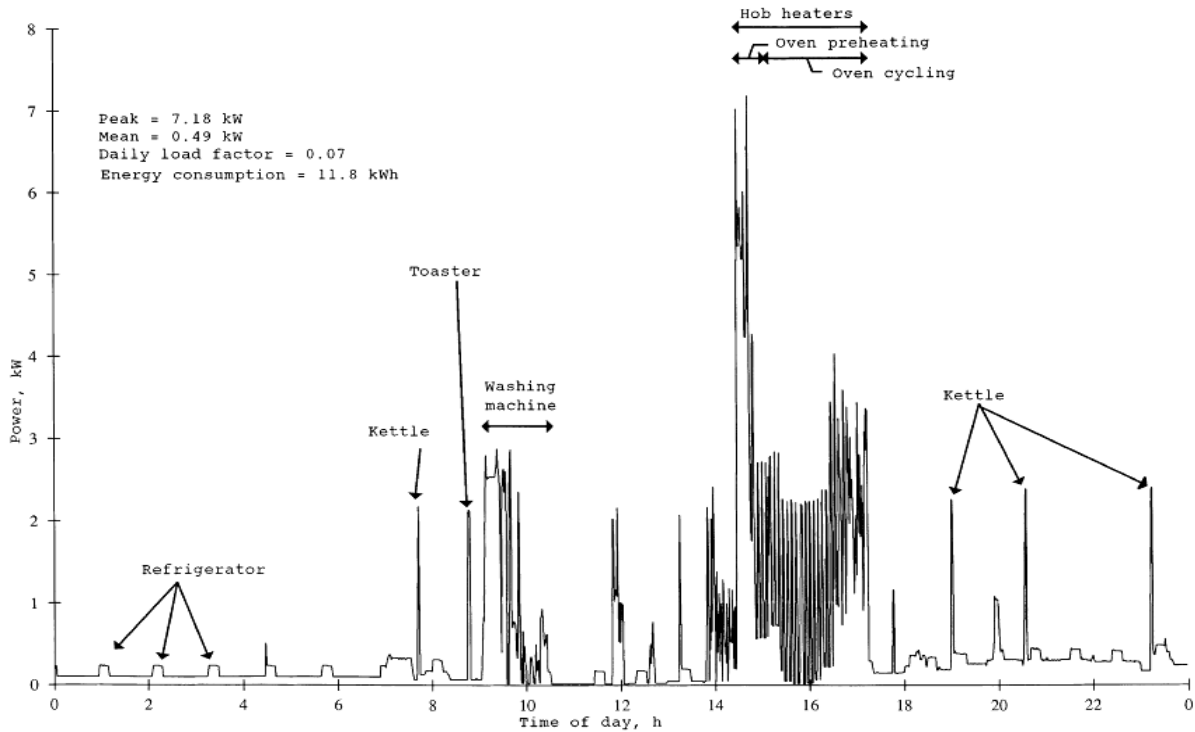


Figure 1: Household Electricity Demand Profile Recorded on a One-minute Time Base⁶

As analytic tools evolve, even information collected at significantly longer intervals—e.g. every fifteen or thirty minutes—can be used to pinpoint the use of most major household appliances.⁷ Such detailed information about the in-home activities of electricity customers can thus be used to piece together a fairly detailed picture of an individual’s daily life or routine. Furthermore, as plug-in hybrid electric vehicles are deployed and customers engage in electricity sales on the grid outside of their homes, an electricity usage profile may become a one-stop-shop for tracking behaviors even outside the walls of the residence. Cataloging and analytic methods advance, and thus the huge volumes of data about electricity usage soon to be unleashed, rather than seen as overly burdensome and expensive to make use of, are likely to be found treasure troves of information.⁸ A more thorough treatment of the technological capabilities and development vectors surrounding smart grid information collection and analysis is set forth in Appendix A.

⁶ G. Wood & M. Newborough, *Dynamic Energy-consumption Indicators for Domestic Appliances: Environment, Behavior, and Design*, 35 ENERGY AND BUILDINGS 821, 822 (2003) (citing M. Newborough & P. Augood, *Demand-side Management Opportunities for the UK Domestic Sector*, IEE Proceedings of Generation Transmission and Distribution 146 (3) (1999) 283–293).

⁷ An Italian study published in 2002 used fifteen-minute interval data—the same resolution collected by most smart meters today—to identify heavy-load appliance uses within an electricity usage profile. Researchers there were able use artificial neural networks to pinpoint the use washing machines, dishwashers, and water heaters with accuracy rates of over 90 percent from within the noise of the aggregated load information. See A. Prudenzi, *A Neuron Nets Based Procedure for Identifying Domestic Appliances Patern-of-Use from Energy Recordings at Meter Panel*, IEEE Power Engineering Society Winter Meeting 941, 942 col. 1, 946 col. 1 (2002).

⁸ See, e.g., Ashlee Vance, *Hadoop, A Free Software Program, Finds Uses Beyond Search*, N.Y. TIMES, Mar. 16, 2009, available at <http://www.nytimes.com/2009/03/17/technology/business-computing/17cloud.html?n=Top/News/Business/Companies/Google%20Inc> (discussing new breakthroughs in software managing internet advertising placement based on search queries and the ways in which these programs are being used in other contexts, such as photo-cataloging, facial-recognition software, and biotech applications). See

2. Utility companies say that Smart Meters give off RF radiation "equivalent to talking on a cell phone for only minutes per day" (or some similarly innocuous seeming comparison).

a. Actual full body radiation exposure equivalency is 40 to 450 times that of a cell phone held at the ear, at various distances from the smart meter in the room of the home to which it is attached outside.

See next page (p. 5) for a graph from the Santa Cruz Health Services Agency, comparing different types of RF (non-ionizing) radiation, including cell phone, WiFi and smart meter (at 3 ft) for full body radiation exposure. (Original document: Santa Cruz County Health Department: "Health Risks Associated with SmartMeters, 1/13/12" Full document available at <http://thepowerfilm.org/thurs-april-26-smart-meters-public-conference-call-health-and-privacy>.)

Figure 4 from Hirsch; 2011

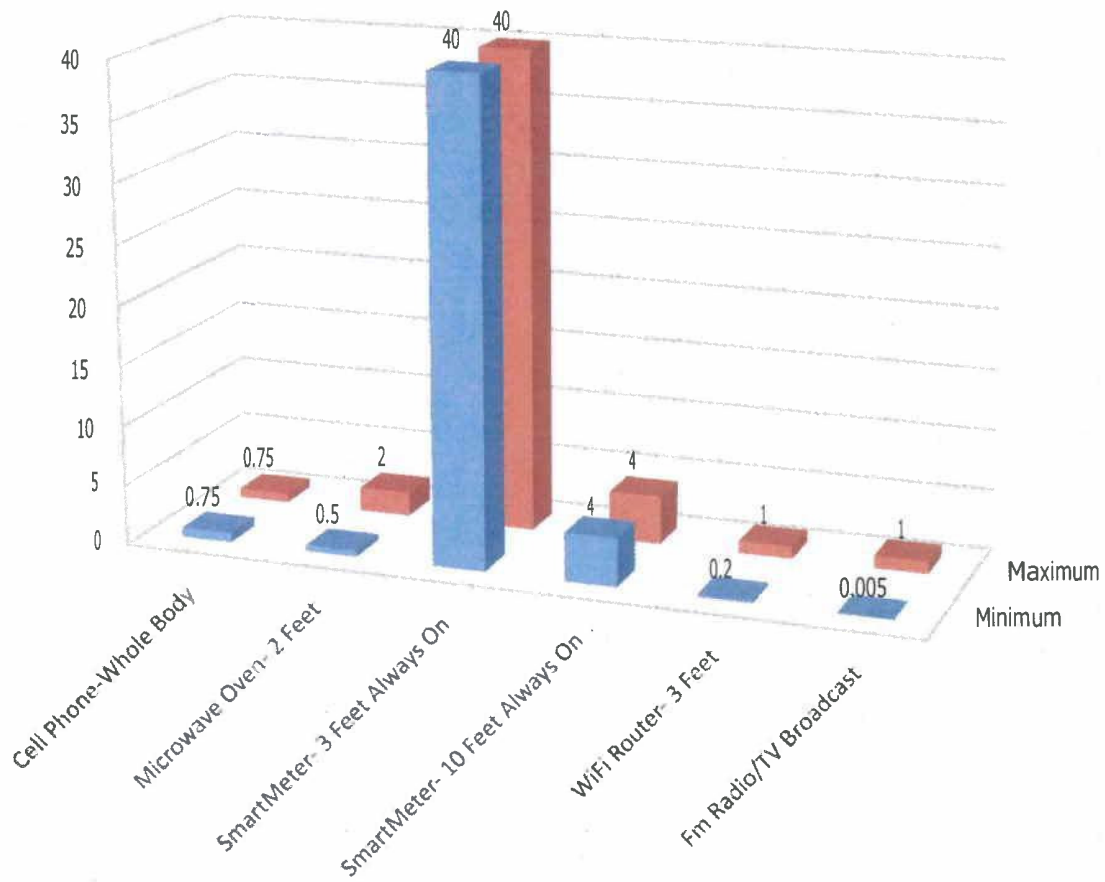


Figure 4. Comparison of Radio-Frequency Levels to the Whole Body from Various Sources in μ W/cm² over time [corrected for assumed duty cycle and whole body exposure extrapolated from EPRI/CCST SmartMeter estimated levels at 3 feet].

2. Utility companies say that Smart Meters "only transmit for an average of 45 seconds per day" (or some similar number).

b. The 45 seconds average per day reported by PG&E (a California utility company) is actually a mean average of 62 seconds, and consists of *constant radiation transmissions, once every 6 seconds on average, 24 hours per day*. Utility companies have been averaging the transmission data to cover up the actual strength of the radiation transmissions occurring every 6 seconds.

See following page (p. 7) for tables submitted by PG&E (Pacific Gas & Electric - the company in California which has been installing smart meters for several years), from the original document: PG&E lawsuit documentation 11/1/11 "Pacific Gas and Electric Company's Response to Administrative Law Judge's Oct. 18, 2011 ruling directing it to file clarifying radio frequency information." Full document available at <http://thepowerfilm.org/thurs-april-26-smart-meters-public-conference-call-health-and-privacy>.

Note: While the table sites an "average" time of exposure to 45 seconds per day, the small footnote states that actual *mean* average (what people usually understand when the word 'average' is used) is 62 seconds - which translates to approximately one 4.5 thousandths of a second burst, **every 6 seconds, 24/7**. Full document available at <http://thepowerfilm.org/thurs-april-26-smart-meters-public-conference-call-health-and-privacy>.

Question 2:

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 [a]	Transmission Frequency Per 24-Hour Period: Average [b]	Transmission Frequency Per 24-Hour Period: Maximum (99.9th Percentile) [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 Seconds⁴	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.

Gas: Table 2-2 presents scheduled gas SmartMeter™ system messages and their durations.

TABLE 2-2

Gas System Message Type [a]	Transmission Frequency Per 24-Hour Period: Average [b]	Transmission Frequency Per 24-Hour Period: Maximum [c]
Meter Read Data	4.228	4.305
Weighted Average Duty Cycle	0.676 Seconds	0.689 Seconds

⁴ 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.

3. Utility companies say, "There is no proof of health effects" from RF radiation, and as well, "Smart Meters meet all FCC RF radiation regulations."

a. Many peer-reviewed studies and articles show various biological effects of non-ionizing radiation at low levels of exposure, much lower levels than those emitted by smart meters. These health effects include disruption of cell membrane, breaking of DNA strands, leaks in the blood brain barrier, and others.

b. Note that FCC regulations have not been re-evaluated in 20 years, and are only meant to protect against tissue *heating* which happens at much higher levels of RF radiation exposure.

c. The regulatory commissions whose job it is to protect public health, need to use the idea of the "precautionary principle" in regards to potential threats to public health. For public safety guidelines, "compelling evidence", not "proof" is what is relevant. Full scientific evidence of causality (or lack thereof) is likely to take 20 to 30 years to give a clear verdict on the biological effects of RF. The effects of waiting for this level of evidence could be disastrous - remember how long it took to "convince" the government regulatory agencies that smoking or asbestos was harmful to health, and to get regulations in place. Public Health officials are charged with protecting the public from *possible* harm for which there is some evidence, particularly in a case where the public is about to be **universally and compulsorily exposed** (as in the case of smart meters).

Source: BioInitiative Report <http://www.bioinitiative.org/freeaccess/report/index.htm>
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Section 16: The Precautionary Principle, and Section 17: Key Scientific Evidence and Public Health Policy Recommendations, also contain important information

Source: Prove It website <http://www.justproveit.net/content/prove-it-initiative-main>
5000 scientific papers for a list of studies linking biological changes and effects from low-level exposures from microwave/RF radiation.

<http://www.justproveit.net/studies>

"165 biological effects" for a list of effects and the US Naval Institute report from **1971** on biological effects from low-level microwave radiation

<http://www.justproveit.net/content/biological-impacts>

"Standards" in the orange menu bar to see a comparison between US and other countries' standards for allowable RF radiation, and a summary of how the current FCC standards were arrived at.

<http://www.justproveit.net/content/safety-standards>

Highlights of the 4/27/12 call by Prof. Chase were summarized, checked with Prof. Chase, and further sources were listed by Helen Slomovits, helens22@comcast.net, to enable the excellent information to reach more people. 5/6/12