EXPOSED - Electronic Utility Meters
A Fire Safety, Health, Privacy and Security Threat

Michele Hertz, Founder - Stop Smart Meters NY

Introduction

In the mid-2000s, utility companies launched a mass effort to replace electro-mechanical analog utility meters with "smart" electronic utility meters.

Utilities and government regulators, with the support of several large environmental groups, including the Environmental Defense Fund, the Natural Resources Defense Council and the Sierra Club, rushed to embrace electronic utility meters. This was done with no public input. It was done without considering the health and safety risks of imposing millions of electronic communication metering devices on an electric utility system that was set up for non-electronic analog meters.

This paper exposes the reckless decision, by meter manufacturers, utility companies and government regulators to eliminate life-saving electrical safety features from the design of electronic meters.

Dangerous Electronic Meters vs. Safer Analog Meters

Electronic meters that contain electronic components are also named "smart," AMR, ERT, AMI, digital opt-out, digital radio-off, Power Line Carrier (PLC) and more. Electronic meters are designed to harvest personal utility usage data from consumers to sell to third parties and for cutting meter-reading costs. These meters consume electricity and have no proven environmental benefits.

Electronic meters contain fragile miniaturized electronic circuit boards that are prone to igniting and exploding when exposed to utility-side electrical fire risk events and outdoor weather conditions. These meters pose unacceptable hazards because they lack essential electrical safety components - circuit breakers[1] and surge arrestors.[2]

The installation of electronic meters on homes and businesses has resulted in hundreds of thousands of reported health,[3] fire,[4] electrical,[5] privacy,[6] and overbilling complaints and incidents. According to cyber-security experts, electronic meters are an unaddressed and looming threat to the utility grid and public safety.[7] Many thousands of these meters have been recalled.[8]

By contrast, mechanical analog utility meters have been in place in the United States for decades. They have been the subject of few, if any, reported complaints or unsafe incidents. Analog meters are *electrical* [9] and contain no ignitable or energy consuming *electronic* [10] components. Analog meters protect privacy and pose no cyber-security breach risks. Analog meters have no history of being recalled.

Missing Safety Features Raise Red Flags on Electronic Utility Meter Scheme
Electronic meters are a threat to public health and safety because they lack surge arrestors and circuit breakers. Without these essential electrical safety features electronic meters are an open portal for dangerous electrical fire risk conditions to enter into and overwhelm a consumers' electrical system.

That is among the reasons why, after less than a decade of use, electronic utility meters have caused personal injuries and deaths,[11] interior and exterior home and business fires, extensive property damage and electrical equipment damage.

Electronic Meters Lack Surge Arrestors
Missing from electronic meters are adequate surge arrestors. Surge arrestors protect electronics from extreme voltage surges. This in turn prevents fires and electrical equipment damage.

Although the tiny electronic components inside electronic meters may be fitted with tiny surge arrestors, there is no evidence that these surge arrestors were designed to withstand extreme voltage surges from the utility-side electrical grid. Nor would these tiny surge arrestors help protect consumer-side electrical circuitry from extreme utility-side voltage surges.

By contrast, an analog meter contains surge arrestors that are appropriately designed to specifically protect consumer-side electrical circuitry from the damaging effects of utility-side voltage surges. The surge arrestors inside analog meters are part of a conductive metal design that intercepts and directs utility-side electrical surges to ground before these damaging surges enter the consumer's electrical system. An analog meter does in fact act as a surge arrestor and protects consumers' electrical circuitry.

Electronic Meters Lack Circuit Breakers
Another distressing oversight in the design of electronic meters is the lack of circuit breaker protection. Contrary to common assumptions, circuit breaker panels in homes and businesses do not provide protection from electrical fire hazards that originate upstream from a circuit breaker panel on the utility grid or at an electronic meter.

Circuit breakers in such a panel—the point at which electricity enters into a building's electrical circuitry — are designed to "trip" in one direction, only from an electrical fire risk event, that originates downstream from the circuit breaker panel, on a consumer's electrical system.

Unlike an analog meter, electronic meters are not designed to protect a consumers' electrical circuitry. Where an electronic meter is installed, there is no circuit breaker protection because a circuit breaker will not trip from an electrical fire risk event that occurs upstream from the circuit panel, on the utility-side distribution grid or at the electronic meter.

Moreover, analog meters contain no flammable electronic parts. Analog meters do not need circuit breaker protection.

According to the National Fire Protection Association standards, (NFPA 70: National Electrical Code (NEC), Article 240 - Overcurrent Protection - 240.4 Protection of Conductors), [12] any device that contains electronic components would be required to be connected to a circuit breaker if it were installed downstream from the consumer's circuit breaker panel.

Utilities' Are Tampering with Evidence of Fires Caused by Electronic Meters

Hazardous electrical events that either originate on the utility-side distribution grid or at electronic meters are overheating and/or igniting electronic meters, blowing through the breaker panels, bypassing consumers' circuit breakers, destroying appliances and causing electrical fire conditions, which ONLY THEN cause the circuit breakers to trip in a back-flow response after these events have already occurred. These destroyed appliances are the symptom, not the cause of these fires.

Alarmingly, there are numerous reports of unlawful tampering with evidence by utility companies, which have removed meters after a fire has occurred and before fire inspectors can examine these devices. This has impeded investigations of fires caused by electronic meters.[13] It has also led fire inspectors to blame electrical appliances for causing electrical fires, when in fact the appliances failed only after being damaged by a hazardous electrical condition that originated on the utility-side distribution grid and/or the electronic meter.

Electronic Utility Meters Were Never Tested For Safety

There is no evidence that the electronic components inside electronic meters were ever tested for tolerance to extreme utility-side voltage surges, other electrical fire risks or outdoor weather conditions. There is also no evidence that electronic meters were ever safety tested *in-situ*, connected to utility-side distribution wiring, consumers' electric circuit panels and consumers' electrical circuitry, or the unpredictable and varying conditions that take place within these systems.[14]

State regulators rushed to approve electronic meters based on Federal Communications Commission (FCC) Part 15 testing. This test was designed to detect interference. It is set up for wireless devices that employ power cords. This test is improper for electronic utility meters because an electronic meter does not employ a power cord. Instead of developing proper testing for electronic utility meters, the FCC-accredited laboratory workers altered the electronic meter by fastening a power cord to it. They altered the meter to fit a test modality that was not designed for utility meters. This laboratory set-up, in isolated conditions, failed to include utility-side wiring, a consumers' circuit panel and consumers' electrical circuitry. Together the colossal system design failures and negligent testing oversights have resulted in suffering and loss of life and property.

The only proper way to test electronic utility meters is *in-situ*. It has never been done. This may be why it was not discovered that electronic meters lack circuit breakers and surge arrestors.

Electronic Meters Are Not Underwriter's Laboratory Approved

All of these facts demonstrate gross negligence, if not recklessness or even willful misconduct, by the designers of electronic meters and the utility companies that are installing them, as well as the government regulators, including the FCC, that rushed to approve faulty meters before any safety testing was performed. Perhaps all of the risks associated with electronic meters explain why Underwriter's Laboratories has not approved them.

Conclusion

In the mid-2000s, utility companies, government regulators and several large environmental groups dispensed with essential public health, safety, privacy and security considerations to embrace electronic utility meter technology that has no proven consumer or environmental benefits.

The public is unaware that it is paying for electronic meters that cause fires, electrical problems, radiofrequency radiation emissions and privacy and cyber-security risks. They do not know that utility companies, government regulators and environmental groups are actively promoting dangerous utility meter technology that is destroying lives and properties.

Electronic meters should have never been approved, but now they must be recalled.

In the meantime, for its protection, the public must assert its right to refuse electronic meters and accept only analog meters without any fee or penalty.

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