



# ***Emerging Issues***

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# Smart Meter Safety



# Smart Meter Safety

## Michigan Public Service Commission

- **Staff investigation finds:**
  - “After careful review of the available literature and studies, the Staff has determined that the **health risk from the installation and operation of metering systems using radio transmitters is insignificant.**”
  - “... appropriate **federal health and safety regulations provide assurance that smart meters represent a safe technology.**”

# Smart Meter Safety

## UTC and EPRI

- **The Utilities Telecom Council (UTC)**
  - “...smart meters did not pose a health or safety threat. ... computers using Wi-Fi transmit at levels similar to smart meters, although laptop transmitters are always “on” or transmitting and smart meters transmit for short intervals periodically throughout the day.”
    - [www.utc.org/utc/no-health-threat-smart-meters-says-latest-utc-study](http://www.utc.org/utc/no-health-threat-smart-meters-says-latest-utc-study)
  
- **Electric Power Research Institute (EPRI)**
  - “(1) exposure levels from individual meters declined rapidly as distance from the meter increased
  - (2) meters transmitted for only a small fraction of time,
  - (3) **RF exposure levels remained well below the FCC exposure limits.**”
    - [https://www.nvenergy.com/NVEnergize/documents/EPRI\\_1022270\\_caseStudy.pdf](https://www.nvenergy.com/NVEnergize/documents/EPRI_1022270_caseStudy.pdf)



# Smart Meter Safety

## Lawrence Berkley National Labs

- Lawrence Berkley National Labs reviews County of Santa Cruz Health Services Agency Memorandum
  - “[T]he Agency memorandum **does not appear to provide a balanced representation** of research, the risks, or mitigation options. Instead ...**largely focused on scientifically unsupported claims related to “electromagnetic hypersensitivity” (EHS)**
  - “Individuals with EHS report real symptoms; however, **health research has been unable to consistently attribute those symptoms to EMF exposure**
  - “LBNL’s review ... **highlighted concerns with the methodology of the agency memorandum cited sources.**” MI PSC report
    - <http://smartresponse.lbl.gov/reports/schd041312.pdf>



# Smart Meter Safety

## World Health Organization (WHO)

- WHO's International Agency for Research on Cancer's (IARC) Monographs Working Group reviewed roughly 900 studies and found
  - “limited evidence linking glioma and acoustic neuroma to **wireless phone use**”
    - [http://monographs.iarc.fr/ENG/Publications/REF\\_Poster2012.ppt](http://monographs.iarc.fr/ENG/Publications/REF_Poster2012.ppt)
- **Michigan PSC Staff Report**
  - “WHO's decision to classify RF EMF ... based on studies involving **wireless phones, not smart meters**. ... major difference ... is the lower level of exposure to frequencies from smart meters”

# Smart Meter Safety Expert Testimony

- **Dr. Valberg, testifying before the Maryland PSC stated**
  - IARC has not found any “. . . adverse health consequences established from exposure to RF fields at levels below the **international guidelines** on exposure limits published by the International Commission on Non-Ionizing Radiation Protection.
    - [http://webapp.psc.state.md.us/Intranet/Casenum/CaseAction\\_new1.cfm?CaseNumber=9208](http://webapp.psc.state.md.us/Intranet/Casenum/CaseAction_new1.cfm?CaseNumber=9208)
- **Dr. Yakov Shkolnikov and Dr. William H. Bailey testifying before the Public Utility Commission of Nevada**
  - “. . . the **evidence is limited** that cancer develops from exposures from RF fields.” “. . . the **indications of potential risk** derive almost entirely from **statistical associations** in some studies **between the use of mobile phones and certain types of cancer.**”

# RF Power Density in the Everyday Environment

In microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ )

Source: Richard Tell Associates, Inc.

**FM radio / TV broadcast station signal**

**0.005 microwatts**

**SmartMeter™ device at 10 feet**

**0.01 microwatts**

**Cyber cafe (Wi-Fi)**

**10-20 microwatts**

**Laptop computer**

**10-20 microwatts**

**Cell phone held up to head**

**30-10,000 microwatts**

**Walkie-Talkie at head**

**500-42,000 microwatts**

**Microwave oven, two inches from door**

**5,000 microwatts**



# EMF Exposure from Smart Meters

- UTC participated in field measurements of Smart Meters and the associated pole mounted collector devices.
- Measurements shows emissions well within FCC guidelines for general population exposure to these signals.
  - **Measurements**
    - **At 1 foot is 9.9% of the FCC Guidelines**
    - **At 3 feet is 2.5 % of the FCC Guidelines**
    - **At 10 feet is 0.5% of the FCC Guidelines**



# EMF Exposure from Smart Meters

## UTC / EEI Report

- Exposure levels drop significantly with the distance from the transmitter and **even further in living spaces** due to the attenuation effects of building materials
- Due to **shielding of the meter enclosure and signal patterns**, RF exposure from the rear of a metering location is nominally **10 times less** than in front of the meter and notably below FCC limits.
- **At maximums**, Smart Meter exposure results in **125 to 1250 times less exposure than a cell phone** and 5 to 50 times less than a microwave oven.
- **In practice**, under common operational parameters for power (250 mWatt - 1 Watt), duty cycle (2%-5%) and distance (10 feet) from the transmitter, **Smart Meters cause minimal RF exposure to the consumer, typically well under 10 % of the FCC exposure limits.**



# Opt-Out

# Opt-Out Decisions Impact Others

- **Not a personal decision like choosing not to have a cell phone, microwave or WiFi**
- **Each opt-out increases costs and limits financial, operational and environmental benefits**
- **Opt-out requires a non-standard service which regulatory precedents support – “payments by cost causers”**
- **Impacts system reliability and restoration efforts**

# Opt-Out Impacts

- **Special utility visits for**
  - Monthly meter reading
  - Beginning, ending or temporarily interrupting service
  - Changing service providers
- **Limits optimization and environmental savings for all**
  - No conservation voltage reduction (more fuel and emissions)
  - No use of appliances to balance renewables (need spinning reserves)
  - Limits utility ability to understand power demands across the grid, distribution transformer loading, forecast problems
  - Limits utility ability to avoid rolling or unintended blackouts by implementing emergency shut-offs for high current appliances
  - Limits utility ability to avoid expensive infrastructure investments through programs that engage consumers to allow cycling of devices



# Opt-Out Impacts

- **Limits on consumer choices**
  - No usage data available for customers to track, manage and control their own energy usage
  - No ability to know energy usage/costs to-date
  - Limits ability to easily implement home energy management systems
  - Limits ability participate in PUC approved cost reducing programs
    - Discounts for controlled electric vehicle chargers, water heaters, air-conditioning and other consumer devices
  - No meter to smart device communications and programmed responses
  
- **Slows restoration efforts undermines reliability**
  - Limits utility ability to identify problems, take preventive actions
  - 1000s of needless truck rolls, need customers to call in outages

# Costs for Non-Standard Service

- **Central Maine Power estimates**
  - Hard wired meters
    - ~ \$70 million over life of project if 1-2% opt-out
    - At 10% opt-out costs exceed total cost of smart meter project
  - Just turn off smart meter radios
    - ~\$60 million over life of project
- **Commissions typically charge customers for non-std service**
  - Real cost about \$250 initial charge plus ~\$60/month



# Privacy

# Privacy Issues

- **Colorado PUC Recommended Decision (8/2011)**
  - Lists recommended smart grid data privacy rules that subject utilities to a whole range of requirements, and **penalties up to \$2000 per violation.**
  - The rules would require utilities to **explain their data collection processes**, the **frequency of data collection** and the **security measures** that will be taken to ensure privacy of customers. Additionally, the utilities would be expected to provide this data to anyone authorized by the customers, with **no charge to the customers or recipients.**
- **California PUC Smart Meter Decisions (9/11 and 10/2011)**
  - Orders utilities to allow customers to delay installation of smart meters, pending final decision in ongoing proceeding.
  - ALJ Orders PG&E to report by Oct. 28<sup>th</sup> estimated cost and technical feasibility of various opt-out alternatives.



# Cyber Security



# Cyber Security

- **Two sides**
  - Cyber espionage for financial gain / criminal activity
  - Cyber warfare for disabling national defense, economic system and public services
- **Value of intellectual property already stolen est. ~\$1T**
- **Stuxnet launched cyber warfare onto world stage**
- **Threats continuous, always changing, traveling at speed of light**
- **Everyone agrees that better information sharing is a good thing, but first need to address**
  - FOIA, transparency laws, antitrust, liability, regulatory impact and privacy protections



# How High A Cyber Standard?

- **Congress seeking a higher standard for electric and nuclear industries - but they already are!**
  - Only sectors currently subject to mandatory compliance with CS standards by FERC, NERC and NRC
- **Importantly –**
  - **Compliance with mandates doesn't equal greater security!**

# State of Play in Congress

- **House passed CISPA which focused strictly on info sharing**
- **Senate failed to reach agreement before August recess**
  - If no agreement in September, legislation will be dead for the year

# Summary

- **Opt-out – those who opt-out should pay their own way**
  - Direct costs – labor and equipment
  - Indirect costs – lost benefits
- **Utilities have been keeping customer data safe, secure and private for decades. State commissions have set up rules to protect consumers.**
- **Cyber Security is one of the most important issues for all critical infrastructure industries. We need security not more mandates.**