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LAWS

Incalculable Costs: Why Smart Meters Should be Halted or an Opt In Program

Kirstin Beatty
Beatty.fyi, Resume

MA Department of Public Utilities Docket 20-69
20 November 2020 Technical Presentations:
Modernization of Electric Grid Phase 2

Kirstin Beatty

Director, Last Tree Laws
Co-chair, Last Tree Laws
Massachusetts Ballot Measure Committee

- Last Tree Laws refers to making laws to stop the last tree from falling as result of greed, such as in the Native American saying or in *The Lorax* by Dr. Seuss – for environmental and social justice laws.

Beatty.fyi, Educational & Political Blog

- Beatty.fyi has some educational materials on electromagnetic health impacts, such as a Green New Deal critique & presentation on infertility. I have a store and resume, in part as I am currently seeking paying work or greater support to continue legislative work.

MA Legislation 2015 - 2021

- I am sensitive to wireless and electricity, so have worked on ordinances and written several bills to limit exposures, such as:
  - Medical education (2015)
  - Patient education (2018)
  - Eliminate wireless from schools (2015, 2018)
  - Register cell towers (2018)
  - Hard-wire infrastructure (2018)
- For 2021, I plan new bills and hope to post at LastTreeLaws.com.
- Coordinating in support is welcome. These bills have not had enough popular or legislative support or positive publicity. Funding is also needed. I can be contacted via:
  - LastTreeLaws.com
  - LinkedIn
  - @BeattyKirstin

Current MA Legislation

- **S. 1988 allows a no-cost opt-out and replacement by analog**. This is better than nothing, but I hope for more from the DPU.
  - **Two more relevant bills I oppose unless amended:**
    - **S. 129** is for a wireless investigative commission. All the appointees are by Governor Baker, lacking diversification of nominations for independence.
    - **H. 383** is for industry to write and propose 5G laws.
  - **Proposed amendment**:
    - This amendment would be for a wireless/ electromagnetic investigative commission, but insure appointments are from a diverse set of Massachusetts-based groups.

The smart grid is a bad investment.

Not just a bad investment, but a terribly harmful, negligent investment.

The DPU and AG must insure investors & utilities eliminate the smart grid.

Incalculable Costs of Smart Grid

The smart grid replaces meter readers, reducing labor costs for savings.

However, the smart grid has other costs:

- **Cybersecurity Costs**
  - 69% of businesses agree **cybersecurity costs are unsustainable** (Accenture Cybercrime Report 2020)
- **Potential Legal Action**
- **Deployment & Upkeep**

Legal Actions are Smart Grid Costs

- **Health** (e.g. Ed Friedman *v. Central Maine Power Company*; 5G)
- **Equal protection** (medical conditions, electromagnetic sensitivity)
- **Property rights** (e.g. environmental harm, cybercrime, power quality, fires, property devaluation, UL certification missing or possibly inadequate)
- **Billing** (demand charge inequities or errors)
- **Workman's compensation** – cases in the USA allowed compensation for ensuing sensitivity and even when exposure strength was unknown, e.g. John Orchitt (Alaska Supreme Court); Samuel Yannon (NY).
- **Radio interference**
- **Misrepresentations or excess costs** (e.g. *Deborah Kopald v. The New York Public Service Commission and Orange and Rockland Utilities, Inc.)*
- **Privacy**
- **Settlements** – e.g. *not* wireless: $500K (1990), unknown amount (1989)
- **Targeting, stalking, abuse** (using smart grid data or remote control)

The EMF Medical Conference 2021 will help insure a greater number of medical doctors acknowledge and diagnose associated health conditions, potentially increasing mainstream understanding and the number of claims.

Cyberattacks are Dangerous

- Eversource acknowledges its' cybercrime **insurance is likely "insufficient"** to cover all losses (2019 Annual Report)
- **Severe financial, environmental, and infrastructure damage** – "56% of utilities report at least one shutdown or operational data loss per year . . . [reporting] crippled operations by causing outages, damage, injury, and even environmental disaster." – 2020 Ponemon Institute & Siemens Report
- **MONTHS to YEAR – how long before US power utilities recover from nation-state cyberattack** like Ukraine's, intended for lasting damage. This, according to Umass Amherst engineer Dr. Shenoi, is because the US lacks mechanical controls, adequately skilled, on-call technicians, and adequate replacement equipment. In contrast, Ukraine required just 6 hours to recover from a Russian cyberattack of power utilities.
- **Crippled military and essential services**

CC Scott Akerman

GNU FDL - Jacoplane

Coin Toss:
Utility Cyberattack

- **CISA (TA18-CISA Alert-074A) March 16, 2018: "Since at least March 2016, Russian government cyber actors**—*hereafter referred to as "threat actors"*—***targeted government entities*** *and multiple U.S.* ***critical infrastructure sectors****, including the* ***energy,*** *nuclear, commercial facilities, water, aviation, and critical manufacturing sectors.*" Also see the Idaho National Laboratory's *Cyber Threat and Vulnerability Analysis of the U.S. Electric Sector* (2016)

- **54% of utilities surveyed expect a cyberattack within the next year** – 64% describe cyberattacks as "top challenge." 2020 Ponemon Institute & Siemens Report)

- **250,779 – In 24 hours, number of reported U.S. malicious activities, hitting power utilities hardest** (Florida Atlantic University's College of Engineering and Computer Science) – note attacks are not always reported.

Are shareholders & the DPU being informed of the likelihood of cybercrime?

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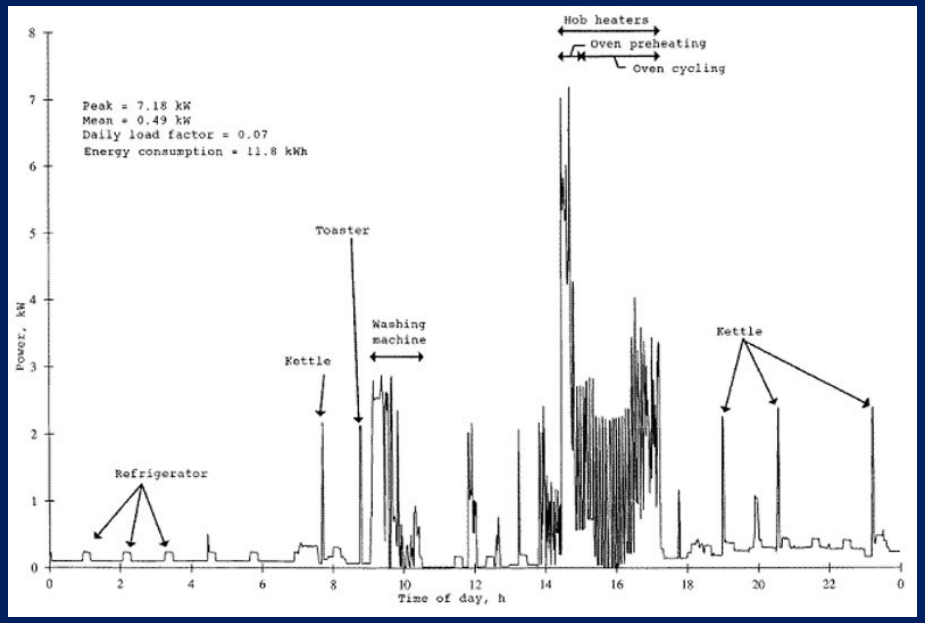
Smart Grid Data Requires a Warrant



Smart meters paint a detailed story of who is home, who is not, who is asleep and what is in use: medical devices, television, chargers, showers, etc.

Photo: DOI: 10.1109/SMARTGRID.2010.5622047

In 2001 *Kylo vs. United States* allowed smart grid data to identify a marijuana growing operation. In 2018, the Seventh Circuit recognized smart meter data should be protected from third parties in the appeal of *Naperville Smart Meter Awareness v. City of Naperville** - however, the Seventh Circuit erred in assuming smart grid data collection justified for grid modernization, I.e. "increasing energy efficiency, reducing emissions, and lowering electricity consumption costs."

Smart Meter Data Protected BUT

Many avenues exist for human error or malicious intent:

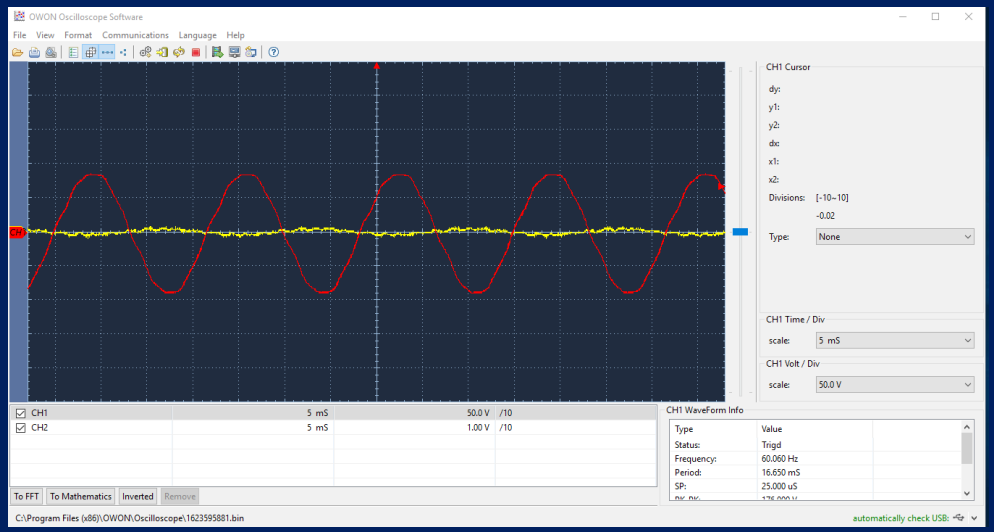
- Utilities:
  - Eversource has c. 8000 employees
- Connected services:
  - Verizon offers a smart grid cloud (3649 employees)
    - Aside: Verizon employees accessed Obama's cellphone records without authorization
  - Honeywell offers managed smart grid services (113K employees)
- Smart city 3rd parties:
  - Smart lights, roads, garbage, parking apps, researchers, etc.
- Consumer connected equipment:
  - In 2009 Google partnered with Itron to provide a PowerMeter
  - Other examples: Energate Inc., Aztech Associates Inc, Ambient, Rainforest Automation, etc.
- Government abuse or, in granting warrants, errors
- Cybercrime and data theft

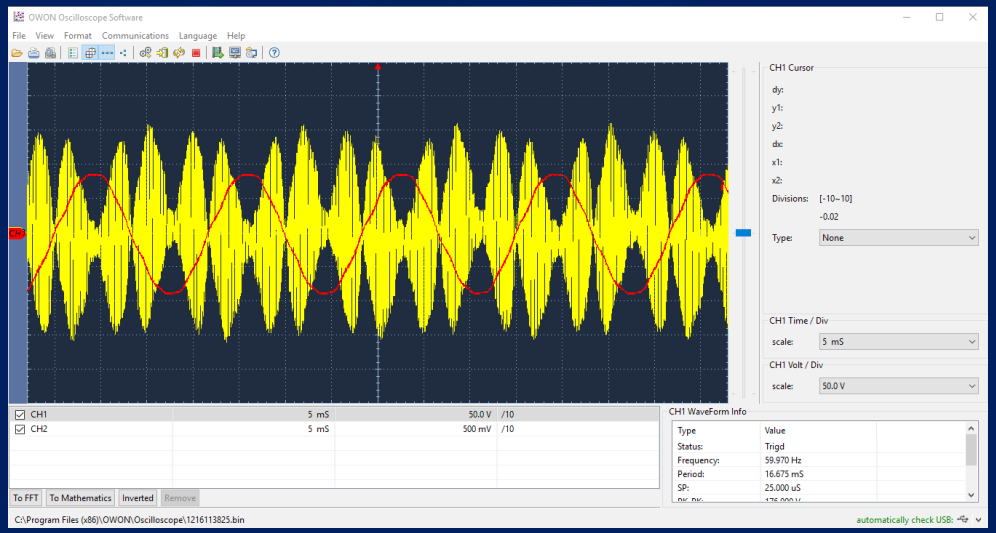
Smart Grid Disrupts Power Quality

Poor power quality is generated by **all smart meters and the grid** from AC to DC switch mode components (~16 kHz) or a capacitive based power supply (300 to 450 kHz), alternative energy solar inverters, Treac based utility solar & wind inverters, and **EV charging**.

Instead of a smooth 60 hertz sine wave, harmonics or transients (surges) are generated. Pictured is the same home, the lower showing severe power quality problems from a solar array.

Source: Bill Bathgate, electrical engineer, 17 November 2020 conversation and emails. Photos attributed to real customer.





Hidden Economic Costs from Smart Grid Power Quality

Power quality causes significant loss of energy efficiency, equipment shutoff, memory loss, computer errors, burned circuit boards, overheating, nuisance tripping, & short equipment lifetimes.

- **c. $1,700** – The cost per household to fix poor power quality courtesy of smart meters.
- **c. $7,200/ per household*** – The cost (e.g. $1710 + $5500) to fix poor power quality sourced from alternative energy via the smart grid; if not corrected, then major appliances will die within a year.
- **Premium Power** reports one client had **€2 million** in losses due to poor power quality. Clients served include biopharma, IT, food, etc.
- **$110 billion** – Estimated world-wide losses from poor power quality (Introduction of *Decision Making Applications,* Naderi et al., 2020)
- **Mitigation of harmonics can increase service life** 32% for single-phase machines, 18% for three phase machines, and 5% for transformers. IEC 61921 (2003). Power capacitors – Low voltage power factor correction banks.

* Bill Bathgate, electrical engineer, 17 November 2020 conversation and emails.

Smart Grid Power Quality Impacts Health

Power quality causes significant loss of energy efficiency, equipment shutoff, memory loss, computer errors, burned circuit boards, overheating, nuisance tripping, & short equipment lifetimes.

- **Higher current density in kids** – Children absorb more.
- **c. $7,200/ per household*** – The cost (e.g. $1710 + $5500) to fix poor power quality sourced from alternative energy via the smart grid; if not corrected, then major appliances will die within a year.
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* Bill Bathgate, electrical engineer, 17 November 2020 conversation and emails.

Out-of-Pocket Health Costs High

The DPU and utilities need to **proactively address harm to public health in 5 areas:** wireless communications, sensors, fields of electricity, poor power quality, and stray voltage - not wait to settle. Consider these direct costs:

- **$31,030/person** – U.S. Medicare average cancer payments
- **$3.35 trillion or $10K/person** – U.S. cardiac disease burden
- **$12,400** – average cost for one IVF cycle for infertility, minus genetic testing
- **$635 billion** – U.S. chronic pain burden
- **$236 billion** - U.S. direct care for Alzheimer's & related disorders costs in 2016

Disabilities may Result in Class Action

The **First Circuit** (MA) in *G, a minor v. The Fay School* (2019) not only acknowledged electromagnetic sensitivity, but found the Telecommunications Act of 1996 and the FCC **cannot bar disability claims** under the Americans with Disabilities Act.

The smart grid presents access barriers interspersed through home, building, and outdoor environments. Impacts include:

- Homelessness, living in cars or tents
- Losing access to room(s) near meter
- Losing ability to visit neighbor(s) or other venues with meters
- Losing ability to work
- Losing ability to use connected devices: TVs, thermostat, etc.
- Costs of shielding or extra health care
- Inability to move into apartments or condos with banks or meters
- Taking a circuitous path to avoid cell towers or outdoor meters

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Consumers Burdened by

Opt Out Fees & Pricing Schemes

Given cybersecurity, health, and power quality concerns, are not opt-out payments extortion?

Raising prices to reduce costs for a few using EVs or following energy use schedules clearly burdens the poor. **Opt-out fees and subsidized pricing schemes should not be set on the backs of the poor or disabled.**

Wide Range of Smart Meter Conditions:

- States rejecting smart meters: NM (2018); KY (2018); VA (2020)
- Eversource offers a **blanket refusal to opt out**
- **Low income (% of poverty) vs. standard costs** may be provided
- **Health no-fee opt out** may be allowed
- **Fees vary** across the USA & North America:
  - Installation fees may be zero (keep existing meter) to $27 to *more than $200*
  - Monthly readings range from $8 to $32
  - MA Electric Co.: $26 to replace smart meter and $11 monthly charge

Sufficient Legal Evidence to Indicate Civil Rights Breached

Ample evidence has been provided to the docket that the smart grid breaches civil rights – thus, utilities may be charged with punitive damages and qualified immunity may fail for the DPU. The following on the DC Circuit, including amicus briefs & submissions, adds support:

- *United Keetowah Band of Cherokee Indians in Oklahoma, et al. v. FCC (2019)* ~ Ruling required NEPA review of 5G infrastructure; in terms of smart grid, environmental rights may be a new cause of action. A related case is developing that satellite infrastructure ignores federal laws & international treaties.
- *Environmental Health Trust et al. v. FCC* - filed in 2020 charging the FCC has failed to update guidelines based on copious scientific evidence (please see amicus briefs in link)
- *Children's Health Defense et al. v. FCC* – nonprofit also charging FCC has failed to update guidelines based on scientific evidence

Reliance on Bad Science Fails to Justify Smart Grid

- **Engineers who evaluate medical effects, quantum physics,** and non-thermal biological effects from 0-300 GHz.
- **Industry-funded consultants** such as from Exponent or Gradient, often with exaggerated expertise & rhetoric.
  - Peter Valberg testifies across the country, including in MA, yet could not be said to represent mainstream scientific views and has been profiled by the Center for Public Integrity as a 'scientist for sale.'
- 'Experts' who **refuse to testify under oath**.
- Industry-funded groups or groups dominated by industry consultants (e.g. IEEE work groups, WHO EMF Project, ICNIRP)
- Comments, WHO fact sheets, opinions, **research missing authorship or corrrectly cited references – and incorrect 'proof'**
- Research and opinions **lacking data or peer review**
- Studies with significant selective bias
- Psychological studies to deny concrete laboratory findings
- Shady rhetoric to dismiss concerns

Credible Experts Admit Harm

Respectable experts exist who admit harm, such as:

- **Public health doctors** such as Dr. Joel Moskowitz and Dr. Devra Davis, and doctors such as Dr. Cindy Russell, Dr. Erica Mallery-Blythe, or the authors of the EUROPAEM EMF Guidelines 2015 (Belyaev et al)
- **Academics/ scientists** such as doctors Beatrice Golomb, Fiorella Belpoggi, Paul Héroux, Oleg Grigoyev, De-Kun Li, Henry Lai, Andrew Goldsworthy, Anthony Miller, Karl Hecht, Lennart Hardell, Ulrich Warnke, Igor Belyaev, Livio Guiliani, Ronald Powell, Sam Milham, & Andrew Marino
- **Engineers** such as Bill Bathgate and Alasdair Phillips or electricians like David Stetzer – potentially Building Biologists

- **A New Hampshire commission** reviewed the science & released a **report** that wireless is harmful. Oregon is working on a report as well.
- **Science overwhelmingly supports evidence of harm:**
  - The majority of experts in the field recognize biological effects from non-ionizing radiation (restated from Dr. Joel Moskowitz)
  - Seeing a black swan is proves its existence, whereas that some have not seen a black swan proves nothing (restated from Dr. Magda Havas).

Note: Experts may not be expert in all types of non-ionizing radiation or health effects, and some experts, hopefully none listed here, may be more compromising about impacts than individuals with sensitivity.

Smart Grid Lacks Benefits: Marketing is Suspect

The smart grid has unwarranted costs. These appear to be false marketing promises:

- **Reduce costs to ratepayers**
- **Reduce electricity use**
- **Reduce outages** (by reducing customer use of energy when excessive)

Source: National Grid Smart Energy Solutions Pilot (May 5, 2017) Prepared by Navigant

Green ‘Smart’ Meter Myth

PG&E 2010 Program Year Demand Response and Energy Conservation Annual Report

Table I
PG&E SmartMeter™ Program Enabled Demand Response Programs
Subscription Statistics
December 31, 2010

Program	Service Accounts[21]	Demand Reduction (MW)		Energy Savings (MWh)		
		Aggregate Load Impact[22]	Financial Benefits[23] (thousands)	Energy Savings[24]	Financial Benefits[25] (thousands)	Total Financial Benefits (thousands)
Demand Response						
PCT	0[26]	0	$0	0	$0	$0
PTR	0[27]	0	$0	0	$0	$0
SmartRate™/PDP	24,535[28]	6.5	$546	0	$0	$0
RTP	0[29]	0	$0	0	$0	$0
TOU	0[30]	0	$0	0	$0	$0
Total	24,535	6.5	$546	0	$0	$0

In **Tables I & II** of California PG&E’s 2010 Program Year Demand Response and Energy Conservation Annual Report the **energy savings from demand response are ZERO.** A University of Essex 2015 study, published in the journal *Energy Policy*, finds that smart meters do not change customer usage behavior. A 2010 study at the Environmental Change Institute at the University of Oxford found customers did not sustain initial savings. *Note: Data compilation courtesy of Smart Meter Education Network.*

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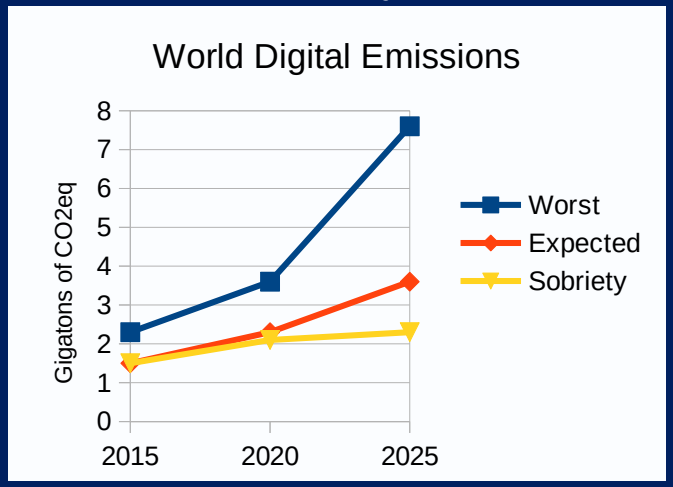
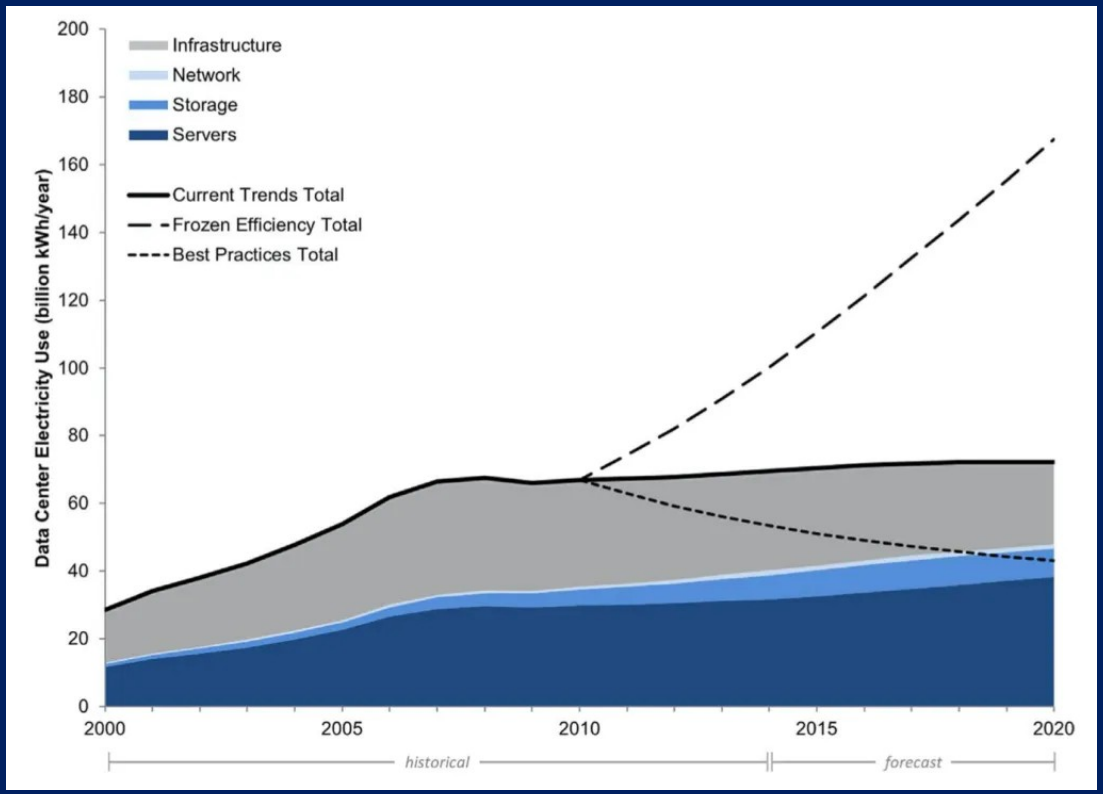
Smart Data Consumes Enormous Energy
Smart Grid Data Does Too

Data centers alone contribute at least 1% to global emissions with expectations of 14% by 2040 – data centers are just 19% of digital emissions. **Exponential data connections** to the smart grid and **advanced tech translate to exponential energy use**, while wireless and aged equipment further increase energy demands. We need 'sobriety,' or reduced consumption.

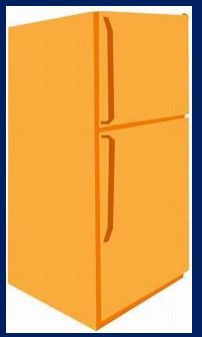


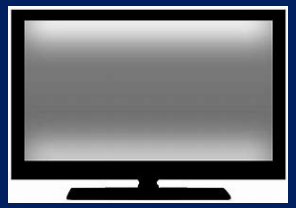


Above: Lean ICT Materials. Forecast Model. Produced by The Shift Project from data published by (Andrae & Edler, 2015)
Right: Current trends of US data center equipment use from 2000-2020 (historical and projected), with two alternative scenarios beginning in 2010 (Shehabi et al, 2018).

If Ratepayers Use Same Energy & Data Requires More, Loads Increase



Insulation is a better investment than the smart grid, since the EPA estimates 15% cost savings on average through home insulation. Despite significant marketing and prizes, the Worcester pilot managed just to get 25% of customers active, and these customers saved just 5.4% of energy costs. How much energy was spent to maintain the smart grid? **If loads increase, blackouts increase.** If power quality is poor, energy use increases. Smart meters fail to hasten response to power outages, and if utilities claim a need, according to Dr. Tim Schoechle, SCADA networks are more effective than smart meters in sharing load information.

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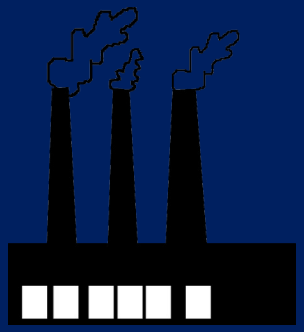
Resource Costs from Digital Tech & EVs

Katie Singer's *Letters to Greta* spell out huge hazards and consumption costs of our digital infrastructure. Consider just letter #5 on electric vehicles (EVs):

France's energy use would double if it switched to all EVs.

Mining of rare earth metals for just China's Batou region leads to 10 million tons of poisoned water – discarding lithium batteries poisons water supplies too.

EV manufacturing emits more than twice the GHG of gas-powered vehicles.



If cargo shipping were a country, it would rank as the world's 6th biggest GHG emitter.

§ No US agency evaluates labor standards or energy use, fluids, gases, and carbon monoxide emitted by a vehicle *from cradle to grave*.

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What is the Direct Impact of Wireless on Climate?

Non-ionizing electromagnetic waves like wireless can generate climate warming, e.g. (a) solar rays and (b) microwaves warm or boil water, a component of the atmosphere. Wireless can also move electrons and alter chemistry: hence, r**esearch is needed into the atmospheric biochemistry of wireless.**

- Robinson et al (2004) Environmental Impacts of Microwave Beams
- Einar Glydal & Else Nordhagen: Planned satellite increase will damage Earth's life conditions *(this is a hypothesis)*
- Dr. Livio Guiliani, Director of Research for the Italian Health National Service and spokesperson for ICEMS, has stated wireless 5G satellites are capable of adding warmth equal to the sun. *What about the smart grid?*
- Influence of geomagnetics on health or mood: see work by Dr. Neil Cherry, Kuleshova et al 2001, doi 10.2466/pms.1992.74.2.449 & doi 10.1016/j.jstrokecerebrovasdis.2017.09.017
- Najmi et al (2016) Simulations of ionospheric turbulence produced by HF heating near the upper hybrid layer
- An article discussing the linkages between ionosphere, sun, etc.: DOI 10.1098/rsta.2002.1092

BIG Subsidies for BIG Smart Grid
Is this the wrong investment?

Smart grants:
American Recovery and Reinvestment Act of 2009
lists **$33,647,566** matching grid funds for MA, of **8 billion** for USA including research & training – see right for top 20 ARRA recipients.

Other funding sources are the **MA Renewable Energy Trust Fund** (**29 cents/mo per customer**), the MA Clean Energy Center, USDA, National Grid, National Science Foundation (e.g. **1 million** for University of MA Amherst), and the **Green Communities Act** which supported the Worcester pilot project (**$44+ million**).

Company	ARRA Funds ($)
Itron	$304,828,804
Trilliant	$99,494,396
Accenture	$53,955,271
Honeywell	$50,856,201
GE	$44,646,429
Landis+Gyr	$44,388,260
Sensus	$38,900,498
IBM	$36,461,152
S&C Electric	$33,590,952
Alcatel-Lucent	$33,171,014
Elster	$30,223,339
Oracle	$26,730,073
Tantalus	$21,059,544
Black&Veatch	$19,787,742
Silver Spring Networks	$14,417,285
BPL Global	$12,728,072
ABB	$12,424,186
Grid One Solutions	$10,014,822
Cooper Power Systems	$8,964,545
Quanta Services	$8,646,263
Total (top 20)	$905,288,847

‘Smart’ Grid $$$ Deployment
What about Upkeep?

MA costs:

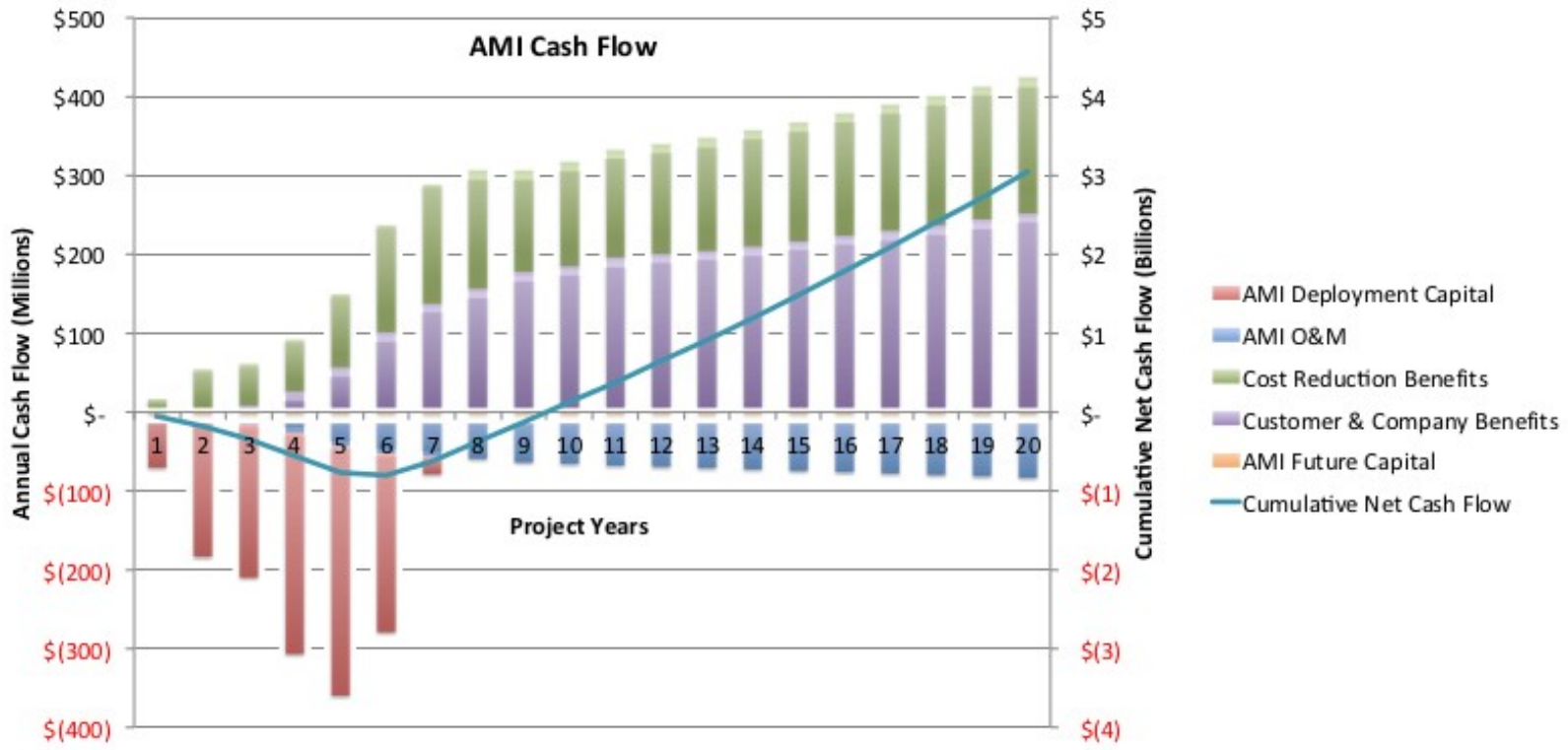
- **$44+ million for Smart Meter Pilot** in Worcester – just 15,000 meters.
- **$11 million excess costs of pilot** requested by National Grid
- **1.3 billion smart grid modernization** requested by National Grid
- **Smart meters die in 5-10 years** vs. 30+ for analog meters – & cost more up front
- **Demand charges used to penalize solar or alternative energy providers** (overturned by legal challenge from Attorney General Maura Healey)
- **Funds also used for marketing**

Relevant concerns:

- **Numerous ‘*pre*’ opt outs** in Navigant’s SES Pilot Final Evaluation Report (May 5, 2017) for National Grid - health concerns were a primary opt-out reason
- **Will cost recovery fail? Deployment costs are high. Will upkeep & replacement costs be high?**

Savings forecast after 6 years: how?
Where? Rates continue to increase

Figure 5-3 Capital Investment and Ongoing Cost-Benefit Comparison



ConEdison AMI Business Plan (November 16, 2015) for NY

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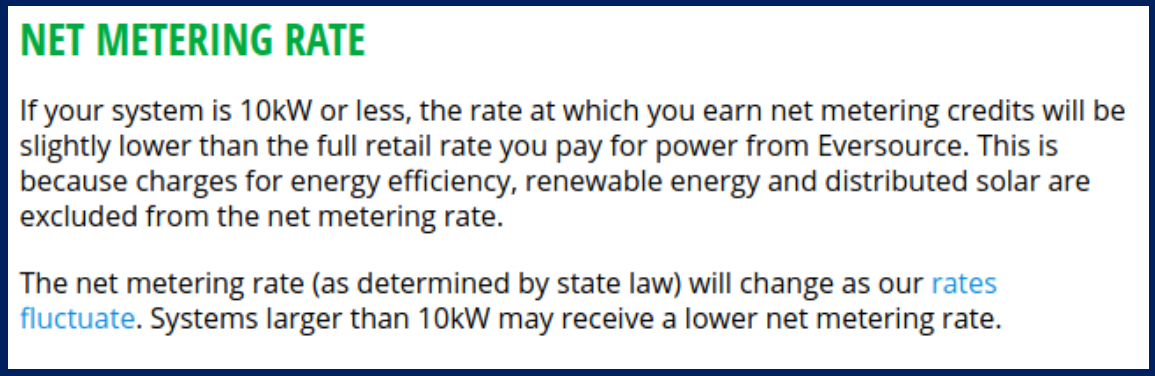
Smart Meter Billing Benefit Utilities at Consumer Expense

Billing incentives, such as reducing prices at midnight, amount to increasing bills to offer subsidies to a few. In contrast to analogs, smart meters do not allow for an equal credit if creating additional energy, as explained by Eversource below, to the financial benefit of utilities.



NET METERING RATE

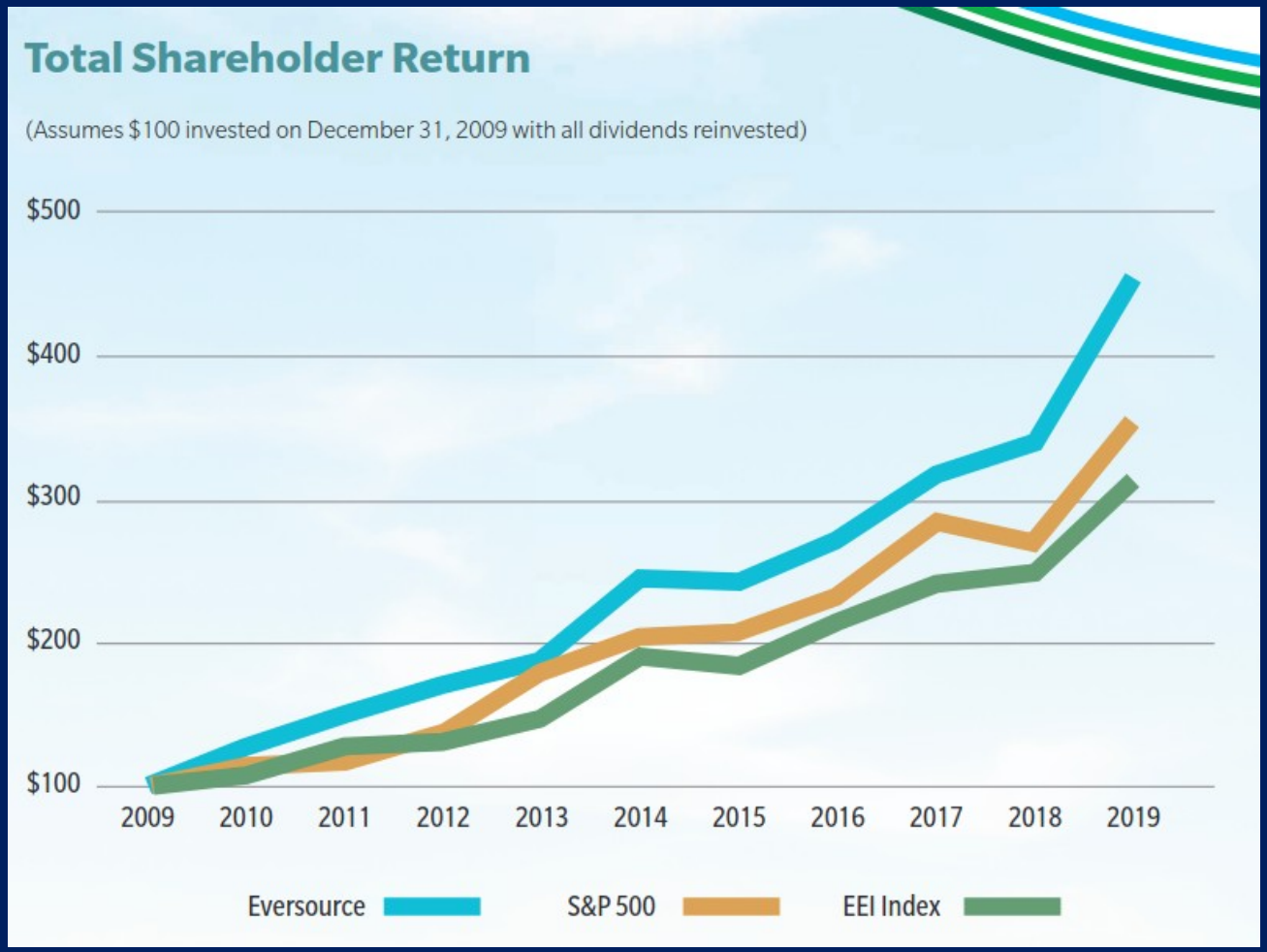
If your system is 10kW or less, the rate at which you earn net metering credits will be slightly lower than the full retail rate you pay for power from Eversource. This is because charges for energy efficiency, renewable energy and distributed solar are excluded from the net metering rate.

The net metering rate (as determined by state law) will change as our rates fluctuate. Systems larger than 10kW may receive a lower net metering rate.

Further, smart meters are associated with billing errors *[such as resulting from power quality (Leverink et al, 2016) or other reasons as detailed in a letter and report from the Division of Ratepayer Advocates for the California Public Utility Commission].*

Utility Shareholders Doing Well

Eversource Shares Better than Inflation Rate



Source: Eversource 2019 Annual Report

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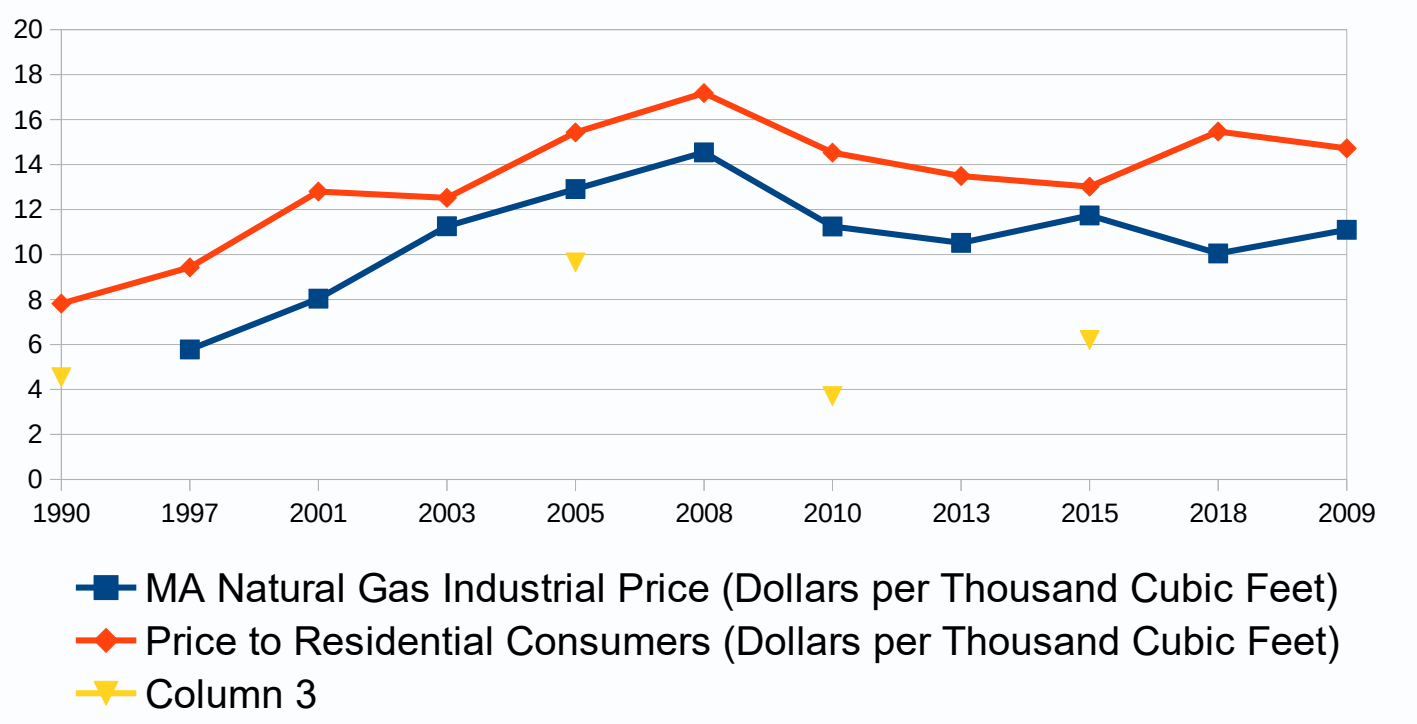
With subsidies and shareholder profits, why don't ratepayers see lower costs?



Natural gas statistics from US Energy Information Administration

On January 1, 2019 Eversource Energy also **enacted a rate increase on their small business default rate**. The default rate increased from $0.10859 per KWh to $0.12355, which represents a **13.78%** increase.

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Are Cost-Savings a Sham?

"**[The smart grid] costs too much, and we're not sure what good it will do.** We have looked at most of the elements of smart grid for 20 years and **we have never been able to come up with estimates that make it pay**. . . . The real issue is, are we doing the customers more good by putting money into more advanced electronics or **would we do them more good by putting the same money into replacing more old cable**? To me that's an unknown answer. If I had to choose, I'd bet on the cable."

John Rowe, CEO of Illinois utility ComEd, in an unguarded moment. E&E TV transcript of American Enterprise Institute event March 9, 2011 ~ found thanks to Smart Meter Education Network.

Third Circuit Wrongly Denies 14th Amendment

No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property, without due process of law

A lower court decision under appeal, *William and Jean Haas v. Pennsylvania Public Utilities Commission* (2020), allowed opt outs but decided grid modernization justified as complaints constituted only allegations of risk of a percentage of harm. This decision is wrong in three parts:

- Grid modernization lacks purported consumer and environmental benefits.
- Harm from the smart grid, to health and otherwise, is great and real
- Using the argument a percentage of harm is fine is a slippery slope, ignoring tipping points to injury plus allowing for harm.

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Better Choices than Smart Grid

- **Prefer mechanical controls** and analog meters
- **Establish power quality practices & third party monitoring**:
  - Opt for universally safer electromagnetic design
  - Use high-quality filters to prevent harmonics, transients
  - Improve grounding and eliminate stray current
  - Extend power quality assistance into residences
  - Invest in undergrounding and new infrastructure
  - Work with manufacturers
- **Recover costs of smart grid by prosecuting** fraud, negligence, and harm
- **Invest in local, decentralized control**
- **Encourage independent, microgrid controls**
- **Invest in insulation and other energy savings**
- **Shift utility profits away from energy sales**
- **Promote slow living & human interaction**
- **End use of smart meters**

If Using Smart Grid, Strict Rules are Needed:

- **Hard-wired deployment** – no wireless connectivity of meters or relays
- **Curtail sensor use** and investigate parameters to insure safety
- **Protections for no-cost opt-out** in favor of analog – allow self-reporting
- **Opt-in** for smart meters
- **Electromagnetic shielding** if wireless utilized
- **Assumption of additional deployment costs by requesting party**, with subsidies for the lower income population
- **Demand charges limited to upper class**
- **Independent monitoring & transparency of**:
  - Billing errors attributed to smart meters
  - Power quality and, if wireless, wireless frequencies & densities
- **Power conditioning rules & equipment** with teeth to insure good power quality
- **Privacy rules to protect consumer data with teeth (punitive measures)** improving on rules set by the California Public Utility Commission to establish fair information practice requirements; recommendations of the Trans Atlantic Consumer Dialogue on June 2011; as recommended by the Electronic Privacy Information Center (EPIC) and the Electronic Frontier Foundation (EFF) in 2008; and efforts to conceal appliance load signatures and to limit access to numerous persons and entities working with utilities.

All links and references in this presentation are hereby incorporated into this docket.

Please see further documents submitted to docket 20-69 and 12-76 dockets, including on health – this topic been omitted in this presentation as experts can be consulted and docket evidence exists. Keep in mind studies show all non-thermal, non-ionizing frequencies 0-300 GHz, not only cellular frequencies, can have biological effects.

If interested in fires, see Nina Beety's testimony & the 10/27/2014 Crown Investments Corporation of Saskatchewan Smart Meter Review. Sharon Noble's website the Coalition to Stop Smart Meters BC, based in Canada, may be a good resource.

For further information that smart meters fail to provide a net economic benefit, testimony by Einar Olsen on the 20-69 MA docket highlights relevant actions by the Michigan attorney general *(see dissenting opinion, not appended to Einar's testimony, for reference to an economic analysis by Sebastian Coppola)* as well as a summary of some other states. A new summation of electrical costs is available in Appendix A in an article by Anon critiquing the Green New Deal (blog.interlinked.us).

Further resources on dirty electricity may be available from Dr. Sam Milham, Dr. Magda Havas, and educated electricians, engineers, and Building Biologists. Dr. William Bruno alluded to **dirty electricity** in his 12-76 and 20-69 testimony, and may be an expert resource on this subject or in relation to other 0-300 GHz frequencies.