Smart Meters - Industry Plot to Manipulate Public Acceptance

Wireless Smart Meters and Public Acceptance:

The Environment, Limited Choices, and Precautionary Politics

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Abstract

Wireless smart meters (WSMs) promise numerous environmental benefits, but they have been installed without full consideration of public acceptance issues. Although societal-implications research and regulatory policy have focused on privacy, security, and accuracy issues, our research indicates that health concerns have played an important role in the public policy debates that have emerged in California. Regulatory bodies do not recognize non-thermal health effects for non-ionizing electromagnetic radiation, but both homeowners and counter-experts have contested the official assurances that WSMs pose no health risks. Similarities and differences with the existing social science literature on mobile phone masts are discussed, as are the broader political implications of framing an alternative policy based on an opt-out choice. The research suggests conditions under which health-oriented precautionary politics

can be particularly effective, namely, if there is a mandatory technology, a network of counter-experts, and a broader context of democratic contestation.

The wireless smart meter (WSM) for electricity (a digital device that emits a pulsed radiofrequency signal) is a green technology that provides significant environmental benefits. It allows utilities to moderate peak load and avoid using additional short-term energy, which is usually a fossil-fuel such as natural gas. Generally located on the exterior wall of a building, a WSM is able to communicate with a wireless thermostat inside the house and make it possible for utilities to turn off air conditioners and other appliances. However, public opposition and societal implications issues have plagued the widespread installation of WSMs. Although the standards-setting bodies have focused on privacy and security issues, at the grassroots level another issue has emerged: experienced and potential health effects. Unexpectedly, a relatively green technology intended to reduce greenhouse gas emissions has become embroiled in widespread public controversy. This study will answer the following questions: 1) What role did health concerns as opposed to other stated concerns play in the mobilization of public opposition to smart meters in California? 2) How did precautionary arguments and counter-expertise play a role in the opposition? and 3) What were the policy responses to the opposition?

Conceptual Framework and Argument

The precautionary principle has been formulated in diverse ways; it is understood here as an approach to policy that advocates the delay of regulatory approval of a new product or

technology if suspected harms are substantial and even if adequate scientific research to prove the suspected harms has not been completed. Terms such as “substantial,” “adequate,” “scientific,” and “harms” suggest the many ways in which the precautionary principle can be contested. The principle has become a political resource for mobilized publics that have opposed industrial pollution such as exposure to toxic chemicals and electromagnetic fields (EMFs), but in countries where precautionary approaches have gained policy traction, industries also tend to oppose the precautionary principle and policies based on it (Mayer, 2009). For example, in the U.S. industry-supported legislation by the federal government pre-empted the authority of local governments, which had developed a precautionary approach to mobile phone masts by setting stronger electromagnetic emissions standards than those of the federal government (Burgess, 2002). In Australia, where the government at first adopted a precautionary approach, industry mobilized against the approach and eventually weakened government support for precaution. One industry representative explicitly urged “a cautious approach to the precautionary principle” (Maisch, 2010).

Thus, one primary criticism of the precautionary principle is an industry-oriented criticism of the opportunity cost associated with precautionary policy. A “cautious approach” to the precautionary principle has also begun to appear in the social science literature on risk and uncertainty. For example, Burgess warns against the “impact of politicising every possible hazard” (2002, p. 186) and argues that the relatively favorable approach to precaution advanced by Wynne, Stirling, and colleagues (in Harremöes et al., 2002) “lacks any critical or self-reflective element” (2006, p. 106). Although Burgess makes an interesting empirical claim (there are feedback loops between public acceptance of precautionary politics and government

acceptance of it), his general skepticism of policies based on the precautionary principle ends up making his analysis isomorphic with that of industry critics. But as Wynne and colleagues argue, recognition of uncertainty and ignorance requires a broader public discussion than risk assessment (Harremöes et al., 2002).

A more general criticism of precautionary approaches suggests that when mobilized publics accepting precautionary reasoning, they limit political debate to technical issues (Drake 2011: 525). As Kinchy (2012), Kleinman et al. (2008), Winner (1986), and Wynne (2007) have argued, the scientization of public policy debate into technical risk assessment can narrow debate by not allowing citizens to raise general issues such as democratic control of industrial power. In many situations, citizens effectively have no choice but to participate in technocratic decision-making if they want to have any voice in the policy process.

We agree with arguments that point to the shortcomings of engaging in technocratic politics, but we turn the general political argument into an empirical research question: what are the conditions under which such engagement can be more or less successful? There are several factors that could explain the relative success of health-related precautionary arguments in California, and those factors could be applied more generally to begin to develop an analysis of precautionary politics that seeks to understand the conditions under which they are politically effective.

First, there was general public outrage because of the sense that people's homes were being invaded without any public debate and any option for choice. The absence of choice tends to trigger public outrage and opposition (such as occurs in the case of mobile phone masts that are placed in communities without permission), whereas the presence of choice

tends to facilitate consumer acceptance (such as in the case of mobile phones and wireless routers in homes). As will be shown, the politics of choice turned out to be central in the response of the California Public Utilities Commission. Thus, issues of choice and non-choice were both enabling for opposition but also constraining for the policy response.

Second, in this case there was also an associated network of counter-expertise, that is, scientists and other experts who contested the official assurances of safety from the federal government and utility industry. As in many other environmental health controversies, there is a dominant epidemiological paradigm (Brown, 2007), in this case the view that health effects are limited to thermal effects and that thermal effects should be the sole basis for regulatory thresholds. This view is consistent with a society that heavily uses wireless devices and has considerable corporate power invested in maintaining unfettered access to those devices. But in the case of WSMs in California, there were counter-experts who argued that there is growing evidence for health effects based on data on the health risks of heavy mobile phone usage. Thus, the case of WSMs in California suggests conditions where health-based claims can be effective: a network of counter-expertise and a new technology with little or no evaluation (i.e., a condition of "undone science," Frickel et al., 2011). In calling for delays until more research on WSMs is conducted, science-based evaluation becomes less a constraint on political action than an arena of political contestation.

Third, precautionary politics in the case of WSMs in California are embedded in a broader history of democratic contestation and a wider range of public concerns. There are other issues at play in WSMs (including privacy and security), and there is a longstanding battle in California for democratic control of the utilities, from protests against nuclear reactors during

the 1970s to attempts at municipalization during the 2000s (Hess, 2009). There is also direct protest action and some civil disobedience. The organization Stop Smart Meters! coordinates some protests, and its web site features a section called “Defend Your Analog Meter,” which shows visitors how to install chains, shelters, plexiglass, and other protective devices on or around their analog meters (Stop Smart Meters 2012). For customers who already have WSMs, the organization points readers to web sites where they can buy and install their own analog meters. Thus, one of the conditions for the efficacy of health claims may be their embeddedness in broader complaints and a wider history of contestation (see also Mayer, 2009).

In summary, the case of WSMs in California suggests that health-oriented precautionary politics may achieve policy outcomes even when there is strong industrial opposition and a government agency that engages in scientized regulatory politics with a pro-industry stance. An absence of choice for the new technology, a network of counter-expertise with a condition of undone science (and therefore high potential for uncertainty and ignorance), and the embeddedness of health claims in a wider range of concerns and history of contestation played a role in this conflict. Although we agree with the argument that ideally a much deeper democratic politics would be desirable, we suggest that there are conditions under which health-based precautionary politics can play an effective role in achieving policy reform.

Smart Meters and Other Forms of Non-Ionizing Radiation (NIR)

WSMs emit NIR, specifically radio waves and microwaves, generally at the 902-928 MHz and 2.5 GHz frequency in California (that is, frequencies similar to those of mobile phones and

wireless routers). Although there is a high degree of consensus about the thermal effects of NIR, there is much more controversy on non-thermal health effects, and industry groups claim that the current state of the science provides no basis for policy intervention. This study is neutral on the scientific controversy; instead, it shows how the existence of the controversy has become relevant to the public acceptance issues and policy responses.[1]

Disputes over safety issues associated with electromagnetic fields (EMFs) have already been a topic of discussion in the social science literature. Although there is work on both high-voltage electricity transmission lines and mobile phone masts, the discussion here will focus on the latter because the technology and siting issues are similar to wireless meters. Much of the policy- and industry-oriented literature explains public opposition as based on lack of knowledge (e.g., General Electric, 2010; see also Hom, Plaza & Palmén, 2009; Stilgoe, 2007). In contrast, the more sociologically informed literature follows the tradition of Wynne (1992, 2007) in viewing public acceptance issues as expressions of mistrust in the credibility and independence of government institutions. Whatever one's evaluation is of the scientific basis for public mistrust, there is a gap between industry and public perceptions of risk, uncertainty, and ignorance, and the gap in perceptions has policy effects.

Why is there public opposition to NIR and mistrust of official assurances of safety? Research has indicated that there is a mixture of motivations, including siting issues, health concerns, and the lack of local control over decisions that affect communities (Drake, 2006; Soneryd, 2007). Public opposition has also emerged from networks of electrosensitives, that is, the growing number of people who claim that there is a relationship between their experienced health conditions and EMFs (Hallberg and Oberfield, 2006). In Sweden, a public consultation

process for mobile phone safety involved encounters between electrosensitives and representatives of the government and mobile phone companies (Lezaun and Soneryd, 2007). The Habermasian goal of rational deliberation remained elusive for such opposing groups, because neither side recognized the validity of the epistemological claims of the other side.

The background on other controversies for NIR is relevant for the study of WSMs, but there are also some differences. WSMs are installed on people's homes without their permission, and consequently perceptions of risk and outrage at the sense of loss of rights may be more proximate than in the case of mobile phone masts. There is also almost no research on the health and safety aspects of WSMs, so the level of undone science is higher, and there is a broad range of privacy and security issues that do not appear in the siting controversies for mobile phone masts. Furthermore, in California, which is ground zero for WSM opposition in the U.S., the state has a long history of resistance to the investor-owned utilities, which became magnified during the electricity black-outs of 2000 and 2001 and subsequent battles over municipalization and community choice legislation.

With this background in mind, it is now possible to discuss the empirical research that answers the three research questions outlined above.

The Role of Health Concerns in Public Opposition

With respect to the first research question (on the role of health concerns in public opposition), most of the discussion of the societal dimensions of the smart grid has focused on privacy and security concerns that emerge from a technology that is capable of turning appliances on and off and of identifying which appliances are being used and when they are

being used. Numerous civil and criminal law implications occur from the capacity to know who is and is not at home at any given time and what they are doing (Quinn, 2009). To respond to privacy and security concerns, the Trans-Atlantic Consumer Dialogue (2011) has issued calls for security and privacy rules from the European Union and United States, and the National Institute for Standards (2010) in the United States has reported on the concerns. To some degree policymaking organizations have responded; for example, in 2011 the California Public Utilities Commission (2011) issued rules to protect consumer privacy. In the Netherlands, the Dutch parliament initially rejected mandated universal use of smart meters because of privacy concerns, and it subsequently issued stronger privacy rules and an opt-out provision (Trans-Atlantic Consumer Dialogue 2011). However, government regulations at the broader EU level and, in the U.S., federal-government level have not yet been implemented.

Although privacy and security issues are well recognized, how important are they with respect to health and other concerns? It is not clear how valuable general survey data would be, because as for other areas of new technology such as nanotechnology, public awareness of the research controversy and policy debates is probably low. It is known that by 2010 over 2,000 Californians had filed health complaints about WSMs with the California Public Utilities Commission (KCRA 2010). Citizens also launched web sites and other initiatives to investigate health risks.

Multiple data sources suggest that in California health concerns are the top concern expressed for WSMs. First, the EMF Safety Network launched a web site (SmartMeterHelp.com) for individuals to register complaints, and it conducted a nonrandom survey that was circulated on its web site and on social media sites. In a commissioned study of the complaints, the

highest level of concern was expressed for “health and environmental impacts” (91%), compared with the security and privacy risks, which were the next highest category of complaints at 70-72% (Halteman, 2011). The most common health complaints were sleep disturbances (49.1%), “stress, anxiety, irritability” (43.1%), headaches (40.9%), and ringing in the ears (38.1%). The survey also found that health complaints were roughly twice as high among respondents who had wireless utility meters installed in their homes in comparison with those for whom wireless utility meters were installed in other places in their town or city (Halteman, 2011). The degree to which the experiencers of health effects have had a previous history of sensitivity to NIR is unknown; however, our review of all 400 complaints in this dataset as well as public commentary for legislative hearings (discussed below) suggests that expressions of health concerns and health effects came from a wide range of people, including some who were otherwise healthy prior to the installation of the wireless meter.

Second, we analyzed two sets of public commentary. We reviewed each public commentary statement and coded each comment based on reasons given for opposition to WSMs, using the broad categories of health, privacy, security, implementation process, and technological capacity. The method allowed us to develop two small databases to assess the relative importance of health concerns. We also noted inequality and disparities issues when they emerged. Both sets of commentary indicated that health concerns were the primary rationale given for concerns with and opposition to WSMs.

The first set of public commentary analyzed was from a meeting of the Board of Supervisors of Marin County, which was considering a resolution in favor of a county moratorium (Marin County, 2010). All 33 residents who spoke demanded an end to smart

meters, and several expressed anger that the county had not yet declared a moratorium equivalent to those already declared in Fairfax and Santa Cruz. When reasons were given in support of the moratorium, they were almost entirely related to health concerns (22 of the 33 residents explicitly mentioned health concerns). Two-thirds of commenters were women, but most of the men also mentioned health concerns. The people appeared to be from a wide range of different backgrounds, and only one identified as an electrosensitive. Expressions of other concerns were rare, but many of the people expressed general anger about a sense of violated civil rights due to the mandated installation and lack of choice or public input.

Using the same coding scheme, we also analyzed six hours of public commentary and questions in a hearing for the California Public Utilities Commission (CPUC) on September 14, 2011. Here, about 15 people, all representing the parties in litigation against the state and anti-WSM organizations, were allowed to ask questions to representatives of industry and the state government. The CPUC attempted to restrict questions to alternatives (keeping analog meters, having the radio turned off, and moving the WSM to a different location), but the public comments consistently raised other concerns. Of the 114 questions (some of which expressed multiple concerns), health concerns were raised 42 times, cost concerns 39 times, policy concerns (that is, concerns about how the opt-out would be implemented) 35 times, technology concerns (that is, concerns about the capabilities of smart meters or alternative technologies) 15 times, security concerns 2 times, and privacy concerns 2 times.

Finally, we analyzed local resolutions and laws in California. A summary of the stated reasons for the local policy response, based on our review of all available policy documents released before April 15, 2012, is compiled in Table 1. Of the 53 local government actions, we

were able to obtain policy rationales for 44. In some cases, local governments passed moratoria in favor of making WSMs illegal (often using the same language, indicating a template was being used). In other cases, local governments voted to petition utilities to stop smart meter installations. Finally, many of these actions were also accompanied by support for AB 37, a bill in the state legislature that would provide an opt-out choice, but in three cases local governments only took policy action in favor of AB 37. We analyzed the rationales given in the text of local petitions, moratoria, and ordinances using the coding categories of health, privacy, accuracy, security, transmission, environmental, and safety. The category of "transmission" includes interference with amateur and emergency radio transmissions and household electronics, and also possible effects on migratory birds. "Environmental concerns" include the vague phrase that smart meters could increase the carbon footprint, without an explanation (we presumed due to possible rebound effects in household consumption). "Safety" generally refers to the possibility of fire hazard from the smart meters. As in the other two analyses, health concerns again topped the list of reasons given.

	Petition	Moratorium	AB 37 Support Only
Health	22	13	3
Privacy	14	12	2
Accuracy	12	12	0
Security	8	7	2
Transmission	5	5	0
Environmental	2	5	0
Safety	7	1	0

Table 1. Local-level Policy Responses and Rationales to WSMs in California

In summary, although we know from research on mobile phone controversies that historical events and changes in the political opportunity structure could alter the salience in health concerns as a base for opposition to WSMs, in California at this time health concerns are repeatedly at the top of the list of public expressions of concerns. The potential for security and privacy breaches currently is largely hypothetical and could become much more pressing if breeches were to occur.

Precautionary Arguments and Counter-Expertise

Our second research question sought to understand the role of precautionary arguments and counter-expertise in opposition to WSMs. Opposition organizations such as the EMF Safety Network web site, which collected the complaints discussed above, and Stop Smart Meters! discuss precaution in their materials, and the EMF Safety Network includes the term in the tagline that appears on hundreds of web pages: "Environmental protections, education and science based precaution for EMF and RF technologies" (EMF Safety Network, 2012a). Qualitative data from the Marin County public commentary meeting also indicate that in some cases precautionary arguments were mobilized. Here, most of the residents were not counter-experts in the sense of possessing specialized research knowledge, but even some of the lay people made reference to the precautionary principle. For example, one male resident made a comment that provides an example of how the issue of health concerns, health disparities (in this case elderly people), and precaution were woven together:

> I have several elderly residents in…who have asked for my help. They are concerned with EMF exposure, and they are in frail health. They are frightened in their own homes.

> To me this is unacceptable. The two things that are certain are that this is not the precautionary principle in action and this is not honoring our pledge to protect the most vulnerable among us. (Marin County 2010).

In other cases, citizens pointed to failures in the current regulatory science. For example, one resident commented that the peak pulses of WSMs exceed FCC limits and that the use of a timed average emission is inaccurate because of pulsing. She added, "Neglecting an immediate moratorium is the most acute act of neglecting the precautionary principle" (ibid.). An educational professional noted, "We voted a couple of years ago to use the precautionary principle on wireless in our schools, and this is going to make it impossible for us" (ibid).

Some residents also made explicit links to scientific research. One resident self-identified as a scientist, but she was not necessarily a counter-expert in the sense of someone who has studied NIR and health. She was aware of the literature on the health effects of radiofrequency waves, and she urged the county board of supervisors to go to Pub Med and read the science on the health effects of NIR. She added:

> Look at the research on cell phones and on wireless networks in general and see what the cumulative effects are. We are not a bunch of wackos. There is science there that you can tap into (Marin County 2010).

Another resident read a letter from Michael Lerner, the founder of Commonweal, an environmental-health organization located in Bolinas. In the letter, Lerner did not use the word "precaution," but he made the following precautionary argument: "I believe that until adequate testing of smart meters is conducted by neutral scientists, no resident of California should be

required to have a smart meter attached to his residence" (ibid). He also stated that the private utility should be expected to assume full liability for future health risks.

Although a small number of the comments (5 out of 33) in the Marin County public commentary meeting made reference to precautionary politics, the comments show that precautionary politics were relevant to the political process in this case. The use of the statement from Michael Lerner also pointed to the connection between residents and the network of counter-experts that had emerged. This network of researchers itself is a continuation of the network that has developed in support of stricter standards for NIR in general.

Specifically, Commonweal is connected with other organizations that have mobilized counter-expertise with respect to NIR health effects. For example, it partners with the Collaborative on Health and Environment (2012), a San Francisco-based environmental health organization that includes an EMF working group, and it served as fiscal agent for the BioInitiative Working Group. Scientists associated with the latter, a group of researchers who support a precautionary approach for NIR, recommended a precautionary threshold of .1 $\mu w/cm^2$ for pulsed radiofrequency radiation for outdoor exposure (Blackman et al., 2007; Carpenter and Sage, 2007). In the U.S., the regulatory power limit for smart meters is 601 $\mu w/cm^2$ for the lower frequency 902 MHz range and 1000 $\mu w/cm^2$ for 2.3 GHz . The working group also suggested an even lower (what has been termed a "hyperprecautionary") threshold of .01 $\mu w/cm^2$ for indoor exposure. With respect to WSMs, a report by Cindy Sage, coeditor of the *BioInitiative Report* and former co-chair of the Working Group on Electromagnetic Fields of the Collaborative on Health and Environment, utilized a set of assumptions based on Federal

Communication Commission standards and summarized the risk of meter banks located on the outside wall to a living space: “Multiple smart meters in the nursery/bedroom example at 11 inches are predicted to generate RF levels from about 5 to 481 μw/cm^2 at the lowest (60%) reflection factor; and 7.5 to 751 μW/cm^2 using the FCC’s 100% reflection factor” (Sage, 2011, p. 1). She also noted that radiofrequency levels would likely become higher in a home that gets a collector meter, which sends out and receives signals from 500 to 5000 homes, and at sites where reflection of radiofrequency waves creates hot spots even at some distance from the meter.

The network of counter-experts who advocate a more precautionary approach has also been evident in response to a study by the California Council on Science and Technology (2011), a nonprofit organization that was initiated by the state government in 1988. At the request of Assembly Members Jared Huffman and Bill Monning, the council issued a report that concluded that the level of radiofrequency exposure from WSMs was lower than that of other household devices, including cell phones and microwave ovens. Drawing on data from an industry-funded study, the Council stated that the estimated exposure for a person standing in front of a smart meter was only 8.8 μw/cm^2, and the meter would be transmitting just 2 to 4% of the time (Richard Tell Associates, 2008). The Council also recommended an independent review by the California Public Utilities Commission to check for proper installment, and it recommended consideration of a wired meter option for people who have health concerns.

The Council report drew substantial criticism, including from David Carpenter, coauthor of the part of the *BioInitiative Report* that urged precautionary levels and founding dean of the School of Public Health at the State University of New York at Albany. He made several specific

arguments and concluded, “This document is not an accurate description of the state of the science on the issue of radiofrequency fields and is full of inaccuracies” (Carpenter, 2011). Carpenter’s coauthor Sage, whose submitted report the council ignored, published a review letter that detailed numerous flaws in the council study (Sage, 2011b). A California physician and electrical engineer who was active in the debate on WSM politics also published a rebuttal (Maret, 2011). Daniel Hirsch, a lecturer at the University of California at Santa Cruz, noted that the council “largely cuts and pastes estimates from a brochure by the Electric Power Research Institute, an industry group, issued some weeks earlier” (Hirsch, 2011, p. 1). In a reanalysis that used similar body exposure assumptions for cell phones and smart meters, Hirsch suggested that cumulative exposure of smart meters could be “two orders of magnitude higher than that of a cell phone, rather than two orders of magnitude lower” (Hirsch, 200, p. 1)

In addition to the California-focused networks of counter-expertise, there are various national and international networks, such as the EMR Policy Institute (2003), a Vermont-based nonprofit organization that has a scientific advisory board of EMF researchers, and the American Academy of Environmental Medicine (2012), which issued a statement in opposition to the installation of WSMs. The academy’s statement followed another, broader statement by an international group of EMF researchers, who recommended against the installation of WSMs (Fragopoulou et al., 2009).

Although local and global scientists with expertise in the field of NIR have called for more research and more stringent thresholds, the Federal Communications Commission did not develop an inquiry into the health effects of 3G wireless communications (EMR Policy Institute, 2004), and funding from the National Institute of Environmental Health (2012) is limited to an

intramural study on rodents and one extramural study on NIR (see also Maisch, 2010). Nevertheless, research on the related topic of cell phones has continued to accumulate. The large international study conducted by the International Agency for Research on Cancer (part of the World Health Organization) found health effects for heavy users of cell phones (Interphone Study Group, 2010; cf. Hardell et al. 2011), and in response to that study and other evidence the International Agency for Research on Cancer (2011) declared cell phones potential carcinogens. The large, international epidemiological studies and finding of the international agency suggest that by 2011 the research field was shifting toward recognition of limited carcinogenic effects among high-exposure groups for NIR for mobile phones.

Policy Responses

With respect to our third research question (on policy responses), the first government responses to WSMs in the U.S. occurred in 2010, when many utilities began to take advantage of a new wave of federal government grants to install WSMs. In June 2010, Maryland's Public Service Commission voted against plans by Baltimore Gas & Electric Co. to install WSMs in the state, even though the utility had received $200 million from the U.S. Department of Energy to do so. After Baltimore Gas & Electric Co. addressed concerns that customers' rates would increase and that customers were not being fully informed about changes, the state authority reversed its decision (St. John, 2010). Similarly, in July, 2010, the Hawaii Public Utilities Commission denied a request by the Hawaiian Electric Company to install WSMs in the state because of concerns that customers would not see enough benefits in comparison with the

costs of installation, but the commission reversed its decision as well (Smart Grid News, 2010; Smart Meters, 2012).

After WSMs began to be installed, a few states approved opt-out policies. In 2011, the Maine Public Utilities Commission ruled that the Central Maine Power Co. must give customers the option to keep their analog meters (for an initial $40 fee, plus $12 monthly fee); have the wireless transmitter on their smart meters turned off (for an initial $20 fee, plus $10.50 monthly fee); or allow customers to move their wireless smart meter to another location (fees vary but are generally more expensive). Some low-income residents have been given subsidies that cut the fees in half (Turkel, 2011). In February, 2012, Nevada's Public Utilities Commission ruled that NV Energy customers could request a digital device that did not transmit information wirelessly (for an initial $110 fee, plus $15 monthly fee) (Robison, 2012). Furthermore, Georgia's State Senate passed an opt-out bill in March, 2012, but a House subcommittee voted to table the bill (Keller, 2012).

Because of inaction at the state government level in California, many local cities and towns began to ban smart meters and petition the state to develop opt-out policies. In California as of March 2012, four counties (Lake, Marin, Mendocino, and Santa Cruz), nine cities (Capitola, Clear Lake, Fairfax, Lakeport, Palo Alto, Rio Dell, Ross, Seaside, and Watsonville), and one tribal community had voted to make smart meters illegal in their jurisdictions. The policies were symbolic, because utility companies rejected the authority of the local governments, but the resolutions did move the installation of the meters to the end of the queue and put pressure on the California Public Utilities Commission (CPUC) to develop a statewide response. Seven other counties and thirty-two other cities and towns petitioned utilities to stop the smart

meter installations or issued statements in support of AB 37, the state government bill that required an opt-out policy but failed to pass through committees in the state legislature (Stop Smart Meters, 2012a).

In response to public concern with mandated WSMs, in February, 2012, the California Public Utilities Commission voted that Pacific Gas & Electric must offer customers the opportunity to opt out of WSMs and keep their analog meters (for an initial $75 fee, plus monthly $10 fee; for low-income customers, the initial fee was cut to $10 and the monthly fee to $5; Hull, 2012). During the following month the same offer was extended to customers of the two other investor-owned utilities in the state, San Diego Gas & Electric and Southern California Edison. The establishment of specific fees was in response to demands from activists, because utilities have tended to make opt-out policies expensive and difficult to initiate. For example, a publicized recording of the Sacramento Municipal Utility District showed that the directors made fun of “tin hat” customers who wanted to opt out and expressed hope that the opt-out price would be so high and so poorly advertised that few customers would take advantage of it (EMF Safety Network, 2012a).

The decision in California to address public concerns with an opt-out policy is different from what many of the residents and local governments had requested. They wanted a full moratorium until research had been conducted (a condition that would take years) or until wired smart meters were installed instead. The state commission’s opt-out policy will likely weaken and divide opposition, and it will also limit any liability that the utilities could face from litigation.

In addition to dividing opposition, the opt-out policy may enhance a new "digital divide" with respect to the mitigation of potential health risks. Differences in income and wealth, which in some cities are highly correlated with ethnicity and race, can be associated with disparities in exposure to EMF and access to mitigation. People who own their own homes and have large homes may find that the smart meter is placed on a garage wall that is located far enough away from the living space that the power of the signal is highly diminished. Likewise, people who live in suburbs with large lots may find that the smart meters of neighbors are far enough away that the power of the signal entering the home is within even a hyperprecautionary range. Furthermore, for about $400 to $500, homeowners can purchase meter shielding devices now on the market, which significantly limit the radio wave exposure in the direction of the house but still allow the utility company to read the signal. For the wealthy, the ultimate "choice" is also increasingly available: to go off-grid entirely.

For people who live in small homes and apartments, there are fewer options. Some apartments have meters located together in a meter bank, and the effects of radio waves from multiple meters may be magnified. Apartment dwellers who have their a bedroom or other highly used living space directly on the other side of the meter banks are likely to have higher levels of exposure. Furthermore, renters generally do not have the right to opt out of a smart meter installation, because the decision rests in the hands of the building owner. Even if they do, other renters may not do the same, and the exposure level from the meter bank remains unchanged. Likewise, for homeowners with smaller homes, meters may be located on an exterior wall next to a living space. Of particular concern are beds, desks, and cribs that are located on the inside wall on the other side of the meter. As one owner of apartment buildings

commented, “I am particularly concerned with one unit that will have nine smart meters on the back of it. There is a bedroom there and a single mom living there, and her daughter lives in that bedroom” (Marin County 2010). Again, no one knows the extent of the health risk, if any, from the meter bank on the other side of the young girl’s bed. Such knowledge will only become possible after decades of exposure, although animal studies could provide an indication of the level of risk. People are responding to uncertainty, that is, the lack of prior evaluation, and also to the lack of rights that they have in being subjected to long-term exposure with uncertain effects.

Conclusion

The case of WSMs in California reveals several differences from the very similar case of mobile phone masts. First, a wider range of public acceptance issues is at stake, including privacy and security concerns, and opposition to WSMs is part of a longer history of contestation with utilities in the state. Second, the biological effects of the EMFs from WSMs may be different from other forms of NIR because of differences in the pulsing, the distance between the WSM and living spaces, the mounting of collector meters on some homes, and the interaction of EMFs in meter banks. Third, unlike mobile phone masts, there is an available, affordable alternative technology that accomplishes the same goals (wired smart meters), and state governments are also able to respond to public outrage by creating opt-out policies, thus turning WSMs into a consumer choice. Fourth, because the effects of EMF exposure vary greatly based on the layout of the building and location of the meter, there is potential for health disparities and a new kind of digital divide.

The focus on “choice” in opt-out policies suggests that the politics of WSMs are being enmeshed in the cultural logic of enterprising self-responsibility associated with advanced liberalism, a pattern also recognized by Drake (2011) for the study of mobile phone masts. In the case of WSMs, households and businesses are given opt-out choices, albeit often at significant cost. Although communities may have some “choice” about the location of a mobile phone mast, the opt-out politics of choice for the WSM make it more like a cell phone or wireless router than a mobile phone mast. A second-order choice occurs at the state government or utility level, where a decision can be made to choose a wired technology. Wired smart meters have been installed in Italy, where there is a history of highly precautionary politics for NIR, and also in Idaho (Burgess 2002). Because of the alternative technology and the relationship between the WSM and personal health and privacy, the long-term likelihood that opponents of WSMs will win concessions from utility companies is probably greater than for the case of communities that are opposing mobile phone masts.

The framework of choice via an opt-out policy may have restricted the alternatives for the stop smart meter movement, but a choice-based policy also opens a political opportunity for the next phase of the battle over wireless home energy devices. Utilities plan to offer customers a wireless thermostat that will be connected to a device on the air conditioner, hot water heater, and pool pump, so that utilities can shave peak loads by reducing usage for a few hours. These are opt-in plans, and they will be motivated by savings on energy bills. Here, consumers will have the right to accept or decline more wireless devices, but it is likely that their right to say no will appear at considerable opportunity cost in foregone savings.

Linking the opt-out and opt-in policies for smart meters to the politics of individualized choice must be done with some care, because it can entail blaming the opponents of WSMs for accepting health-oriented precautionary politics that lead to an individualized, choice-based, and in some sense "neoliberal" policy regime. In the comments made before various California governing bodies, there were also frequent allusions to the sense that civil rights and democratic processes had been violated. Thus, there are other forms of "choice" that could be debated if the terms of the debate were opened up to more genuinely democratic participation. In other words, if the 99 percent were offered more "choice," such as public ownership of utilities or greater democratic accountability, Californians would likely accept the choice. For example, the city of San Francisco battled for years to municipalize its electricity distribution, but the investor-owned utility successfully resisted the popular movement with a well-funded counter-campaign. The result, "community choice aggregation," was a Plan B alternative for gaining more power over the utility (Hess, 2009). The current cycle of meter wars is in some ways a continuation of the longstanding struggle in California over democratic control of the investor-owned utilities.

Notes

[1] Our perspective on the scientific controversy begins with the strong-program principles of impartiality and symmetry, but we also suggest the value of a higher-level asymmetry and partiality, in which social scientists can make assessments about issues of undone science, the need for more research on a topic, and the policy implications of circumstances under which the precautionary principle is warranted (See Hess 2001.)

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[Correction: The BioInitiative Working Group notified us that the preferred citation for the editors is "BioInitiative Working Group, Cindy Sage and David O. Carpenter, eds."]

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