

Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early Findings

Produced for the California Energy Commission by Indicia Consulting in fulfillment of Task 2 Deliverable 1 of the project *Cybernetic Research across California: Documenting Technological Adoption and Behavior Change across Diverse Geographies and Populations to Inform Energy Efficiency Program Design* Funded by EPIC PON 14-306

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Introduction

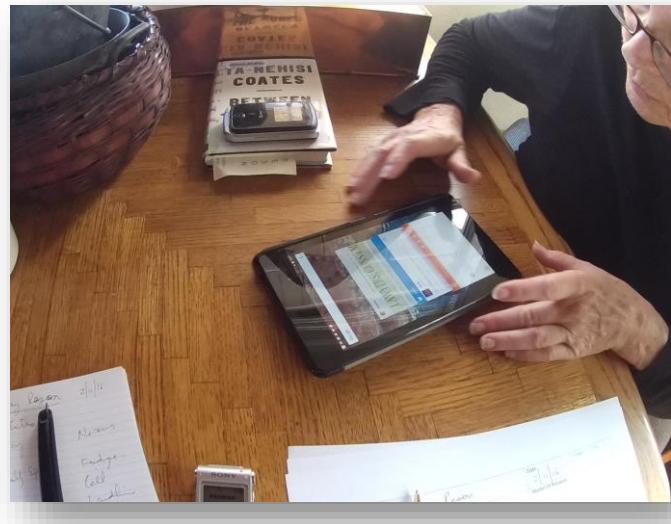
Our “Preliminary Ethnographic Report on Cybersensitives and Technology Detailing the Fieldwork and Early Findings” was prepared at the behest of, and with funding from, the California Energy Commission via Electric Program Investment Charge (EPIC) Program (Program Opportunity Notice 14-306). This report fulfills the first deliverable for Task 2 for our project, *Cybernetic Research across California: Documenting Technological Adoption and Behavior Change across Diverse Geographies and Populations to Inform Energy Efficiency Program Design*.

This report provides an overview of the project to date, including background on the development of the main thesis, the theoretical framework for the project, and how we operationalized the focus of our research, individuals who may be ‘cybersensitives’ and ‘cyberawares.’ We explore the use of social practice theory and cybernetics to help explain why cybersensitives may be more responsive to real-time feedback delivered via consumer electronics. We discuss the emerging role of ethnography in designing technology for consumer use as well as an explanatory mechanism for understanding consumer behavior.

In addition, our recruitment efforts are reviewed in detail, including the development and deployment of a screener survey and the production of a guide¹ used by senior anthropologists on the team when conducting in-depth interviews (IDIs). We explore how intrinsic vs. extrinsic motivations affected recruitment. We look at the general demographics for the region² and compare them to the demographics of our survey takers as well as respondents. We then discuss the applicability of our findings based on the characteristics of our initial sample.

Background

This research project sheds light on energy consumption behavior³ within households in California by focusing on the affective aspects of technology engagement with personal consumer electronics (e.g. smartphones, tablets, laptops). Our focus on social and emotional factors developed after a review of the literature around energy savings turned up a persistent group of high savers with no easily identifiable demographic affinities. A meta-analysis conducted on a diverse set of pilot programs involving in-home devices (IHDs) (Foster and Mazur-Stommen, 2012) informed speculation about the possibility of segmenting consumers in terms of the emotional relationships they have with the technology in their lives. We call these



¹ Reproduced in the appendices

² This report focuses on fieldwork in Marin, which has been completed. Fieldwork is continuing in Southern California.

³ For the purposes of this paper, behavior should be understood as ‘activity in the world’ that encompasses a stimulus, a physical response (even if that is neurological) and some type of manifestation of that response.

consumers ‘cybersensitives’ and ‘cyberawares’ for their respective responses to energy messaging delivered via digital devices—cybersensitives are the group that tended to save between 8-12% on average, while cyberawares saved around 4-8% on average (across the diverse set of pilot projects reviewed in the 2012 report).

Cybersensitives and cyberawares (combined as ‘cybersensitives’ for the remainder of this paper) appear to have a higher level of responsiveness to energy messages delivered via digital devices. This is commonly known as a ‘real-time feedback’ program in the energy efficiency space. Both of these segments save energy in response to prompting via real time feedback at higher rates than those which ‘asynchronous feedback’ programs (Mazur and Farley, 2013) run by companies, such as Opower, have been reporting (1-3%). Therefore, we framed our research design using cybernetic theories from the social sciences, because cybernetics is the paradigm that gave rise to the concept of feedback in the first place.

We hypothesize that cybersensitives are people with a greater than average emotional response to, and affinity for, technological engagement. Specifically, we hypothesize that these two groups of individuals, together comprising approximately 20% of the population⁴, enjoy interacting with technology in their everyday lives and/or are otherwise more viscerally responsive to technological interventions than peers in cohorts organized by locale, gender, age, or income stratification. We think that looking for emotional markers⁵ in the relationships people form with the personal electronics in their lives is a new and innovative way of answering how people engage with and consume energy in the 21st century. By understanding behavior better, energy efficiency programs can be tailored to produce greater residential energy savings.

Our multi-year research project has several distinct phases and objectives. One of our first objectives is to establish whether or not the segmentation we are positing is a valid one. We are using ethnographic research to ascertain whether people can be sorted into the category of the cybernetically responsive or not. We think that the use of ethnography will provide context for identifying and understanding cybersensitive behaviors. This method will provide data that, in combination with other types of information (such as household energy usage) will allow us to identify reliable characteristics of this population. Together, this will assist the State and utilities to improve energy efficiency program messaging within and across California.

Residential electricity consumption

The acquisition and use of new technologies (of all kinds) always affects residential electricity consumption trends. Over the last decade, various studies suggest that electricity savings from the steadily increasing efficiency of major household appliances and lighting has been largely offset by the power consumption associated with the rapid increase in consumer electronic devices and other miscellaneous plug-loads. This shift in consumption patterns has also shifted electricity usage from more autonomous appliances with consumption relatively less driven by user behavior (e.g. refrigerators and water heaters) to devices where consumption is relatively more driven by user behavior (e.g. televisions and computers). Miscellaneous end loads, or MELs, have risen to claim an ever-greater share of plug-loads both residentially and commercially (Kwatra, 2014). With the multiplication of devices contributing a larger and growing share of demand, we think it is important to look more closely at what devices people own and how they engage with them.

⁴ In the literature we reviewed there was evidence for these groups persistently appearing as deciles of the population, comprising about 10% each of all energy utility consumers.

⁵ E.g., use of emotion words, like ‘love’ ‘like’ ‘hate’ ‘feel’ with respect to inanimate objects.

Specifically, this research seeks to establish if there is a positive relationship between device usage and responsiveness to messaging about energy delivered via device.

Influence of behavior

This shift from energy consumption centered around larger appliances to that centered around smaller, end-use consumer electronics, makes it imperative for the energy efficiency (EE) community to engage more specifically with personal technology and its users, in order to slow the growth of household energy use. One of the difficulties encountered when attempting to understand the dynamics of technologically enhanced systems is that of human variability. Machines can be set and regulated, within certain parameters or tolerances, but the same is not true of human beings. There is a growing body of field research attempting to quantify the amount of variance in residential energy consumption that can be influenced by user behaviors. For example, a study on residential consumption in the UK estimated that 57% of the variance in heating energy and 37% of the variance in electricity consumption could be ascribed to differences in user behaviors (Gill et al., 2010).

Paradigm Shift

"New ways of thinking are called for... in understanding the ways in which family relations (kinship), gender, relations of production, meaning and morals are all mutually implicated in the uses of energy" (Wilhite, 2005).

Utilities have traditionally thought in terms of accounts rather than customers, and of households rather than individuals. Energy efficiency interventions, such as messaging, education, and feedback, have therefore often taken place with the household as the intended audience and vector of change. However, if people use services (e.g., heating, lighting, cooling) that depend on energy, then the unit to be targeted to reduce energy use is the individual's relationship with the service, and the resulting energy-use profile due to their specific behavior. A collection of individuals in a household should not imply a blending of those profiles into an aggregate. Instead, one might need to target each member individually, and with the proliferation of smartphones and tablets, this becomes a reasonable possibility in terms of program design.

We believe that we are coming to the end of the era of treating consumers as if they are identical, and opening the door to the potential upside that could come from 'farming' more responsive segments (Mazur-Stommen, 2012). It is our perspective that up until now many utilities have acted as if they were in the commodities business, when in fact they should be acting as if they are selling a customizable product. When we use the term 'farming' with respect to cultivating energy savings based on these different profiles, it is to make an analogy to a farmer switching from large-scale commodity production (e.g. wheat) to smaller-scale, intensive operations (e.g. organic strawberries). Wheat farming is a low-profit margin business, especially when divided up and measured per stalk of grain. In contrast, specialty crops like strawberries can make larger profits on individual fruits. It is our assertion that changing their perspective regarding behavior-change efforts could garner utilities higher savings at lower overall costs. The way forward is for utilities to treat their customers like organically grown, hand-picked, strawberries, each with a specific, high value.

Role of culture and behavior

This project, also referred to as "Cybernetic Fieldwork across California," is conducting an 'ethnography of energy' to inform the development of cost-effective programs that holistically address how different people experience and respond to technologies. Ethnographies of energy look at how energy is involved in the construction of "socially meaningful worlds" (Strauss, Rupp and Love, 2013). This topic requires the use of systemic theories such as social practice theory, stemming from the work of sociologist Pierre Bourdieu, and cybernetics, developed by the anthropologist Gregory Bateson in the 1930s (Bateson, 1936).

Our goal in conducting cybernetic fieldwork across California is the "understanding, regulation and management of cognitive and affective processes" (Scott, 2011) of personal technology, and how that translates to energy consumption. Today, cybernetics is the field charged with understanding the integration of technology with human biology and behavior. Identifying and characterizing population segments using cybernetic theory opens the door to creating energy efficiency programs to serve the needs of newly established segment types. For example, a cybersensitive household may do well with an 'Energy Plus' type of plan that comes with smart meters, feedback displays and widgets, responsive customer service, energy audits, and a programmable thermostat with automatic demand response participation. Another household may be looking for a generic, low-cost, low-hassle basic energy delivery plan. By understanding the segments of their customer base more fully, utilities could tailor educational efforts for better outcomes, or use creative channels to reach their intended audience in new, more effective ways.

Social Practice Theory

In a chapter for his book, *Cultures of Energy*, titled "Energy Consumption as Social Practice," author Hal Wilhite (2013) recommends the use of social practice theory "to encompass the contributions to consumption of embodied knowledge, habit, and artifacts." Unpacking this sentence, Wilhite is arguing that we should consider how consumers are actually in physical bodies that get hot or cold and need light or warmth, and that these physical states require the services energy provides. These bodies carry around brains that have accumulated information about their needs and their environment over decades of living. The decisions that people make with those brains are also culturally mediated; heating or cooling one's home to a certain temperature may differ depending on whether one has guests, for example. Finally, the consumption of energy is directed and constrained by the technologies available, from individual thermostats to the presence or absence of air-conditioning, to the availability and cost of fuel.

Wilhite proposes a conceptual move "from viewing energy consumption as something performed by individuals and individual devices to something that is a result of the interaction between things, people, knowledge and social contexts." His recommendation is that we need to understand the relationship between people and the technologies they interact with in order to understand (and potentially shift) patterns of consumption around energy. The better we understand the forces acting on individuals' decision-making—or the tension between their agency as individuals and the structures which constrain them—the better we can design effective models for encouraging energy efficiency on a larger scale. As mentioned above, one way can be to re-imagine energy efficiency programs using new technologies to interact directly with consumers as individuals, rather than as members of households (whose dynamics are not visible to the energy provider) or simply as rate payers (which reduces behavior to a single economic relationship).

Wilhite's proposal to view energy consumption through the lens of interaction is similar to the argument propounded by Loren Lutzenhiser, who recommends a move away from the 'physical-

technical-economic' model (PTEM) that has long dominated discourses of energy (Lutzenhiser et al., 2009). PTEM is a worldview that has "characterized consumer behavior and choice as instrumental, purposeful, rational, and secondary to the devices, machines, and appliances that are seen as the actual users of energy." In the not too distant past, human beings have either been left out of the equation all together, with devices holding the responsibility for managing usage, or they have been treated as if they were themselves machine-like; rational and responsive to in-puts with predictable outputs. The consistent failure of these approaches is an opportunity for more nuanced behavior-based energy efficiency programs, based on up to date social and behavioral science.

How then does decision-making work according to social practice theory? The concept of social practice theory stems from its earliest proponent, French sociologist Pierre Bourdieu. Bourdieu used the terms 'social capital' and 'cultural capital' as analogous to the concept of 'economic capital' in that individuals acquire a certain amount of leverage in each category that they can deploy alongside cognitive decision-making. We acquire the bases for our capitals from our parents and early peers, as values, habits, and identities. Though we might add or subtract to them later in life, these inherited capitals form a core identity from which decision-making proceeds, mediated by one's position in life. Thus 'social' and 'cultural capital' are not simply alternative descriptors of socio-economic status; rather, the ways in which capitals intersect provide a window into the process by which we make decisions and navigate the networks and institutions that structure our everyday lives (Bourdieu and Passeron, 1977; Tzanakis, 2011).

With respect to energy consumption, research done in this area suggests that, "how people use energy is related to how people value it; and how people value energy is related to what it enables them to accomplish not only materially but also socially and culturally" (Strauss, Rupp, and Love, 2013). As an example, Winther (2013) discusses the arrival of electricity to rural Zanzibar, where the villagers needed time to reconcile the lifestyle changes that accompanied the provision of electricity with both Zanzibari and Islamic values. No innovation is culturally neutral, despite the seemingly utilitarian nature of electricity. The provision of energy in this context meant that there was a redistribution of agency among members of the society, and new social norms and ways of behaving that went along with it. The public of Zanzibar⁶ ultimately came to see electricity as a signifier of development, modernity, connectedness, and progress, but it was the *practice* of consuming energy, mediated by culture, which normalized the new form of energy.

When individuals perform an action regularly, they are predisposed to perform that action in the future based on the cultural atmosphere, training, and the way they performed that action in the past (Wilhite, 2013). As Zanzibarians began to practice the action of energy consumption for the first time, they quickly became predisposed to continue to do so because of the new cultural atmosphere and training they were exposed to. With *cybersensitives* (like Zanzibarians), the agency cybersensitives receive from their personal technology changes their lives and influences the actions they perform, including energy consumption.

⁶ Similar processes of agency and normalization was found by Love and Garwood (2013) in Cajamarca, Peru, and by Rupp (2013) in New York.

Cybernetics

"Cybernetics is the study of processes of information, communication and control within...systems where feedback is the mechanism for that communication and control" (Ramage, 2009).

The concept of *cybernetics* is that systems are regulated by positive or negative mechanisms. Today, cybernetics has come to be primarily associated with mechanical/digital information, however in the earliest incarnation it referred solely to social systems. Our goal with this project is to reunite these two definitions.

Gregory Bateson, an anthropologist working in Papua New Guinea in the 1930s, defined the principles of cybernetics in his ethnography *Naven, a survey of the problems suggested by a composite picture of the culture of a New Guinea tribe drawn from three points of view* (Bateson, 1936). Bateson extracted the principles that would form the basis for cybernetics through observing a ritual among the Naven people called 'Iatmul'. In so doing, he saw how the behavior of performers in the ritual was influenced through audience *feedback* (cheers) and vice-versa, and how the audience engaged more deeply the wilder the ritual became. In a break for his time, Bateson went beyond merely describing these activities in a socially realistic manner, and instead evaluated them as examples for the schema he was forming around more general 'laws' of human behavior. For Bateson, there existed two types of feedback: positive (reinforcing or intensifying) and negative (dampening, delimiting). These types were social mechanisms that controlled behavior among larger sets of members of a society, who could find themselves in either a complementary/unequal dynamic (such as audience and performers) or else a symmetrical/equal dynamic (such as two opposing teams in a sport). Anthropologists since Bateson, particularly those working on environmental topics, have identified several classic examples of how feedback loops operate to regulate overall consumption of resources.

Roy Rappaport wrote the seminal ethnography of ecological anthropology, *Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People* (1968). In the monograph, he uses his fieldwork among the Tsembaga Maring of New Guinea to explore the relationship between how people 'think' about their environment versus how the environment looks from an empirical, measurable perspective. Specifically, he demonstrates how the Tsembaga correlate pig rearing and ritual warfare among symmetrically opposed groups in such a way that ultimately maintains the ability of their ecosystem to support them. The relationship between pigs, humans, the carrying-capacity of the environment, and the deployment of symbols is a complex one, highly dependent upon multiple levels of feedback (i.e. size of pig herd, location of shrub markers, cycles of time):

"But it will be argued that in some instances ritual actions *do* produce a "practical result on the external world." In some instances, the "function" of ritual *is* related to the "world external to the society." Among the Tsembaga, ritual not only expresses symbolically the relationships of a congregation to components of its environment but also enters into these relationships in empirically measurable ways"

(Rappaport, 1968).

Marvin Harris similarly delineated the feedback relationships among people, their mode of production and economic base, and their belief systems. One example (1975) was his advancement of the theory that kosher (and halal) dietary restrictions, with their basis in the Abominations of Leviticus, served to protect ancient Middle Eastern tribes from further degradation of their environment.

"Why should gods so exalted as Jahweh and Allah have bothered to condemn a harmless and even laughable beast whose flesh is relished by the greater part of mankind...the divine prohibition against pork constitutes a sound ecological strategy. The nomadic Israelites could not raise pigs in their arid habitats, while for the semi-sedentary and village farming populations, pigs were more of a threat than an asset" (Harris, 1975).

Pigs, being close competitors with humans in terms of the food types they consume, were a too costly choice for the society to make, thus it required the 'word of God' to get everyone to fall in line, says Harris, because any one individual's decision to rear pigs in a fragile ecosystem could have had devastating consequences for the entire population (similar to the situation we see today with residential use of water in Southern California)

In a similar line of theorizing, Harris is known for championing Michael Harner's theory that Aztec human sacrifice was the result of 'protein deficiency' (1977):

"The Aztecs responded to their increasing problems of food supply by intensifying agricultural production with a variety of ingenious techniques, including the reclamation of soil from marsh and lake bottoms in the chinampa, or floating garden, method. Unfortunately, their ingenuity could not correct their lack of a suitable domesticable herbivore that could provide animal protein and fats. Hence, the ecological situation of the Aztecs and their Mesoamerican neighbors was unique among the world's major civilizations. I have recently proposed the theory that large-scale cannibalism, disguised as sacrifice, was the natural consequence of these ecological circumstances" (Harner, 1977).

In Harner's case, the feedback system involved groups internal to Aztec society, with a complementary/unequal dynamic operating between the various class strata; as well as groups external to Aztec, with a symmetrical/equal relationship, those tribes they made war against, and conquered:

"A principal -- and sometimes only -- objective of Aztec war expeditions was to capture prisoners for sacrifice. While some might be sacrificed and eaten on the field of battle, most were taken to home communities or to the capital, where they were kept in wooden cages to be fattened until sacrificed by the priests at the temple-pyramids" (Harner, 1977).

More recently, Paul Gelles (2000) explored contemporary water rights management in the Andes of Peru. From antiquity to the modern day, settlements in Peru have divided themselves into two groups, called moieties. These 'halves' of the group play against one another in a symmetrical/equal relationship, managed through ritual, which handle such things as water rights and timing of irrigation. Maintenance, repair, and distribution of the water as well as the needs of local government are shared on an alternating schedule, with leaders of the moieties taking turns as mayor of the small town of Cabanaconde, Peru.

"Ritual offerings during the rounds are made not just to secure safety for the water mayor and his family but to create a greater volume of water to proceed more

rapidly. Competition between the opposed and alternating water mayors is viewed as the motor of the system, that which "makes the water advance" (Gelles, 2000).

In each of these cases people manage the demands of their environment using rituals to encode specific practices (pig rearing, protein acquisition, dryland irrigation). The role of feedback as outlined in cybernetics theory is useful in describing the effectiveness of personal technology on achieving desired energy behaviors. Understanding this process and its associated meaning is key to developing energy management technology and tools that people will use consistently to manage their needs and surroundings.

Feedback and the 'efficiency gap'

According to classical economic theory, people are rational actors who, as consumers, will always choose to maximize utility given their particular budget constraints. Following this model, we could argue that people already use an optimal quantity of energy given their willingness to pay, and that the way to shift behavior is through subsidies, penalties, credits, or other manipulations to the market. Alternatively, energy efficiency is framed as merely a technological problem with technological solutions, to the point where funding for energy efficiency research nearly always goes to "device-centered" solutions to the problem (Wilhite et al., 2000). Yet the economic-rational or techno-scientific framings of the energy efficiency problem have not been sufficient for establishing an optimal level of energy efficiency; therefore an "efficiency gap" between intention and implementation remains (Jaffe and Stavins, 1994; Allcott and Greenstone, 2012) which undermines assertions of maximum utility.

Understanding the role of feedback in human behavior offers a solution to the energy efficiency gap because it goes beyond one-dimensional economic or technological approaches to energy. Findings from social science and behavioral economics indicate that individuals make decisions based on such things as social norms, personal emotions, and cultural notions of reciprocity, in addition to economic factors (Wilson and Dowlatabadi, 2007; Lutzenhiser, 1993; Hofmeister, 2010).

Acknowledging this reality, behavioral economists have moved past neoclassical explanations. Michael G. Pollitt and Irina Shaorshadze (2011) point out that, "[r]esearch in behavioural economics and psychology has demonstrated that non-pecuniary interventions compare favourably to monetary interventions in changing consumer behaviour. It was also shown that judiciously applied pecuniary interventions increase the impact of monetary interventions if used in combinations."

Feedback programs

'Feedback' programs, offered by utilities and vendors, such as Opower, frequently provide information to consumers regarding how much or how frequently they engage in a particular behavior, allowing them to make adjustments. Mazur-Stommen and Farley (2013) define energy efficiency feedback programs as "using a variety of media to give customers frequent feedback on their energy use and related cost." Electric utilities have been providing information of some kind to consumers about their energy consumption for many years, but only recently have these energy efficiency information programs begun to incorporate behavioral insights. Such interventions are sometimes called "nudges," after Sunstein and Thaler's book *Nudge: Improving Decisions About Health, Wealth, and Happiness*, which argues that people make decisions based on cues from their environment, and that these cues can be subtly manipulated to gently "nudge" people into desired behaviors (Thaler and Sunstein, 2009). Fischer (2008), drawing on psychological theory and empirical evidence, asserts that a successful energy feedback program must capture consumers' attention, draw a close link between specific actions and their effects, and activate various motives that may appeal to different consumer groups.

There are a variety of types of energy efficiency programs that can fall under the general rubric of feedback. These can range from home energy reports (HERs) that appear on a monthly bill to real-time energy reports via smartphone, web-browser, or in-home displays (IHDs) which are typically proprietary devices that interface directly with the home's smart meter. One of the most heavily studied feedback program operators is Opower (Allcott, 2011; Ayres, Raseman, and Shih, 2011; Costa and Kahn, 2010; PG&E, 2014). Opower is a private company that works in partnership with electric utilities to provide information to customers via Home Energy Reports about their own energy consumption, in addition to an assessment of how consumers' energy use compares to that of others. Opower maintains a robust program database, making it an attractive object of study. Empirical evidence indicates that feedback programs affect consumer demand in measurable ways. For instance, Allcott reviewed Opower's program and found that it led to a decrease in energy consumption comparable to the decrease in consumption caused by a price increase of 11% to 20% in the short run and 5% in the long run (Allcott, 2011). Other studies of Opower programs have also found energy reductions ranging from about 1.2% to 2.2% per household (Ayres, Raseman, and Shih, 2011; Wu, 2012).

Studies of non-Opower programs have also found positive results. A 2010 meta-analysis by American Council for an Energy-Efficient Economy (ACEEE) found that residential energy consumption decreases, on average, between 4% and 12% in response to feedback programs, and estimates that in the United States, residential energy demand could decrease by as much as 6% after implementing feedback programs nationally (Ehrhardt-Martinez, Donnelly, and Laitner, 2010). Another ACEEE study that looked specifically at residential real-time feedback programs found a wide range of energy savings, with some individual households reporting no savings at all while others reduced consumption by as much as 25% (Foster and Mazur-Stommen, 2012). A study of a Denmark-based real-time feedback program found that families receiving feedback reduced energy use by 8.1%, compared to 0.7% in the control group, with the largest savings found in households with teenage children at home. The authors attribute the success of the intervention to the fact that it clearly and easily brings information about energy use to the attention of household members (Grønhøj and Thøgersen, 2011). Another program, based in Ireland, found that homes with smart meters reduced their energy consumption by 1.8% compared with houses without smart meters. Interestingly, these reductions are not correlated with how much information participants report they feel they have about their energy use, suggesting some other mechanism may be at work (Carroll, Lyons, and Denny, 2014).

Some authors have argued that the recent enthusiasm for feedback programs is misplaced, and that they are not truly as effective as they appear to be. Buchanan et al. (2015) argue that existing empirical studies of feedback programs in the UK are not extensive or robust enough, and instead turn to qualitative studies. They find that there is a high degree of variability in consumer engagement, which does not justify investing large sums of money in "one size fits all" feedback approaches. Foster and Mazur-Stommen (2012), however, take a different approach to the high variability in feedback program results. Instead of arguing that the enthusiasm for feedback programs is misplaced, they propose that the types of consumers that respond well to feedback constitute a discrete population, which they term "cybersensitives," and that this population deserves further study.

The Cybernetic Fieldwork across California project is a positive step towards expanding and deepening understandings about how people and their technologies intertwine in the home to produce specific, patterned, energy profiles. By better understanding customer energy profiles, utilities can solve multiple problems, and can provide customer rewards in the form of energy efficiency, whereby savings in turn offset any increased kWh costs for a 'smart' energy plan.

Meanwhile, the utility provider will have a productive ‘crop’ of reliable savings to farm, reducing peak loads and the need to bring new power plants online, which will become increasingly costly and complex as the Clean Power Plan is enacted. One potential outcome of this research would be the ability to refine approaches that use peer champions to represent or model ideal energy consumption practices. Examples of such programs include home energy retrofits or energy conscious appliance purchases, where we have data that demonstrates the importance of cultural context. This new rubric means looking beyond simple adoption, and recognizing that different types of consumers encounter and incorporate technology into their lives in a variety of ways and at different rates.

Cybersensitives

Our hypotheses are that a group of individuals, cybersensitives, enjoy interacting with technology in their everyday lives to a greater degree, and/or are otherwise more viscerally responsive to technological interventions than are their peers when organized into cohorts defined by class, gender, neighborhood, age, or income stratification. Cybersensitives, as we define them are *not* the same thing as early adopters, because early adopters are by definition dependent upon a particular (new) technology. In contrast, cybersensitives may use widely available, even out of date technologies, but they extract more utility—potentially more enjoyment, satisfaction, and happiness—from their engagement with technology, than do other members of a given cohort.

Refining our definition

Recall that our hypothesis is that cybersensitives and cyberawares combined (a) make up about 20% of the population, and (b) have a strong emotionally expressed relationship to their personal consumer electronics. For this project, we needed to look for them in order to talk to them. In order to find cybersensitives, we had to think about ways of segmenting the general population in a meaningful way. At the outset of our research, we asked people the question “How do you feel about your phone?” and it resulted in a roughly three-way split among the responses.

- “I love my phone!”
- “I like my phone, it’s ok.”
- “What do you mean, *feel* about my phone? It’s a device. I don’t have any feelings about it whatsoever.”

In the initial face-to-face questioning, people who gave the third response would also volunteer that they were utterly baffled that anyone would have any emotional attachment to a phone. Meanwhile, people who answered either “I love my phone” or “Yes!” when asked the question, “Do you love your phone?” were highly enthused, and would go on in detail about the many ways in which they were attached to their phone, using language laden with terms descriptive of emotions. Language we will later look for in our analysis of interview data.

Our respondents roughly stratified as follows:

Cybersensitives/Cyberawares: They value technology for what it can do for them. They dive deep into all the various features of the devices and optimize their usage of any given technology. They do not upgrade for the sake of getting the “latest and greatest” gadgets, rather each purchase has clear motivations as to its usefulness. Brand loyalties are strong.

Generally positive: These are broadly the mainstream or average consumers of technology. They may know (and like) many of the uses of their devices, but generally do not spend the

time to optimize every technology in their lives. Purchase motivations are sometimes unclear and inconsistent. Brand loyalties are weaker.

Generally negative: They do not have any particular affinity for, or attachment to their personal consumer electronics. Compared to the other two groups, they tend to own fewer items, including those that a more mainstream consumer may consider a necessity, such as mobile phones. Often had strongly negative opinions which they voiced in the open ends of our survey.

We will discuss more about how these divisions were treated in the recruitment section.

Ethnography and technology

Ethnographic research is the study of cultures and the habits, behaviors, perceptions, and beliefs of people. In recent decades, ethnographic research has entered the business, design, and technological fields. Many major technology corporations today have incorporated anthropologists and ethnographers into their research and development teams to support design operations, and smaller boutique firms that provide research and design for larger companies also employ anthropologists and ethnographers trained in a wide range of fields. Bernard et al. (2006) says of the business context:

“Often, because of tall chains of command or elite social status, decision makers have little or no idea of what is really going on in the trenches, and they are often surprised or shocked when they find out.”

This represents a significant development in industrial practice that does not appear to be a passing phase, but rather the permanent incorporation of a new set of knowledge and skills that until now were not readily available to many industries (Baba, 2012a). Anthropologists provide technology organizations with understandings about their users' culture engagement with technologies, and make recommendations for designing products targeted to their lifeways and cultural meanings, while extending their insights through collaboration on interdisciplinary teams (Wasson and Squires, 2012). Anthropologists pursue an iterative study of how technology and information structures change the world, while engaging both engineers and potential users of technology, combining anthropological methods within engineering processes and producing artifacts-of-evidence. These artifacts may include documentation of human thought processes and/or research methods of interaction, or the environment people may use a potential new technology within. Though changing and iterating through time, the relationship of technology companies and anthropologists has solidified as evidenced in various projects (Forsman and Rojas, 2011).

One of the early success stories of design anthropology in technology is that of Lucy Suchman at Xerox, who conducted an ethno-methodological study of computer supported work – video studies of engineers working with a copying machine and comparisons of engineering instructions for use of that machine that led to the discovery that natural human interaction and communication practices are not like those envisioned by the designers of equipment. In the shorthand version of this story, this work led Xerox to change the design of its equipment, and gave credibility to Suchman, so that she was able to establish a research group that included other anthropologists. They established the Work Practice and Technology area in 1989, and mobilized arguments centered upon the value of ethnographically-informed design of prototype technology in research and development. This group engaged in productive collaborations with members of other disciplines over more than a decade to address many important questions related to computer

supported cooperative work, including creating an international network of computer scientists and systems designers committed to a more participatory form of systems development with workers and users. This approach illustrates one of the ways in which ethnographic practices became a resource for participatory design (Baba, 2012b).

Over the past three decades, numerous papers and articles have been written about various case studies of successful applications of design anthropology with different types of technologies. Bailey et al. (2012) describe a case study of assisted living technologies, where multidisciplinary teams of clinicians, physical and social scientists, technologists, engineers, designers and ethnographers are working with older people to design, test and deliver, new home-based technologies that focus on mitigating falls, facilitating social connectedness and maintaining or improving cognitive function. Cliver et al. (2010) demonstrate a case study in developing scalable financial service prototypes designed to promote financial inclusion for the world's poorest individuals. The late Genevieve Bell, formerly lead anthropologist at Intel, published numerous accounts of cultural explorations around the world that eventually lead to product development at the technology giant's laboratories. One such example is of "unpacking cars," demonstrating their use of anthropological research in studying cars as field sites, cars as mobile technologies, and in exploring the tensions between cars as designed and cars as inhabited and embodied (Bell, 2011). This provides a real-life example of the holistic approach taken by anthropologists in pursuing open-ended discovery research in building technologies from the ground up.

Participant-observation and interviewing

In their texts on ethnographic field methods, Bernard (2006) and Spradley (1979) describe two of the most commonly-used methodologies for gathering information about people's beliefs and habits: participant observation and semi-structured interviews. Participant observation is simply the practice of spending time with people during their everyday activities or as H. Russell Bernard puts it, "[p]articipant observation fieldwork is the foundation of cultural anthropology. It involves getting close to people and making them feel comfortable enough with your presence so that you can observe and record information about their lives" (Bernard, 2006).

Traditional ethnographies usually involve many months or even years of participant observation. However, if there is a time constraint, researchers may conduct participant observation only during an activity of special interest. Participant observation is an essential tool for establishing context surrounding a research topic. In addition, it is also often used to verify a correlation between actions and information gathered from interviews. We will incorporate participant-observation in Tasks 3 and 4 on this project, with the assistance of student researchers from California State University campuses.

There are three main types of interviews that are used in anthropology: structured, unstructured, and semi-structured. This project makes use of semi-structured interviews, also called in-depth interviews, or IDIs. These are scheduled in advance, sit-down meetings with a respondent, often at a site relevant to the research being conducted. This could be a home, an office or workspace such as farm or factory. The goal is to establish a sense of rapport between the ethnographer and the respondent, and allow them to take initiative in answering questions, prompted by the ethnographer. This may be accompanied by a tour, and photography or videography of the site, along with audio-recordings and note-taking. In this project we do all of those except professional videography (though short videos may be taken where deemed appropriate).

During a semi-structured interview, a field guide is followed to ensure that the same topics are covered in each interview. Bernard explains how "[i]n situations where you won't get more than one chance to interview someone, semi-structured interviewing is best. It has much of the

freewheeling quality of unstructured interviewing, and requires all the same skills, but semi-structured interviewing is based on the use of an interview guide. This is a written list of questions and topics that need to be covered in a particular order" (Bernard, 2006).

The semi-structured format allows the respondent to lead within the topic, and enables the ethnographer to capture unanticipated information. Bernard adds that usually these discoveries are explored when the ethnographer probes deeper into the information that is given by the respondent. The semi-structured interview type allows the ethnographer to probe new or surprising answers, while still providing a common structure and set of questions. By asking all informants the same set of questions, textual analysis of the resulting narratives is both easier and more robust. At the same time, it also allows for clearer coding situations, enabling the later interpolation with quantitative data sets as planned later in project.

Recruitment

Partners

This project has several partners with varying degrees of commitment, who are all helping us to some degree with recruitment. The role of our partners has been critical in delivering our message to potential respondents, and we discuss their impact on our recruitment outcomes in this section.

Strategic Energy Innovations (based in Marin) wrote us a letter of support at the outset of this project, and have remained a helpful member of the project team-at-large, serving on our Technical Advisory Committee and assisting with intern recruitment, among other activities.

Meanwhile, we began the project with a firm 'handshake' commitment from Marin Clean Energy (MCE) to be our utility partner, which is why our Northern California fieldwork focused strongly on Marin. We (Indicia Consulting) signed a Memorandum of Understanding (MOU) with MCE in September 2015, which enabled us to use their customer list and receive assistance with recruitment. As discussed below, they produced multiple messaging efforts on our behalf. We also intend to pursue a second MOU with MCE to acquire smart meter data to aid energy analysis later in the project.

Finally, we have another MOU with Embertec, a manufacturer of smart energy management devices who has a new in-home device (IHD) that they are bringing to market. They have committed to donating up to 70 devices for customers of participating utility partners to install—free of charge. The home energy usage data collected via Embertec devices (with written customer consent) will be provided to Indicia Consulting for analysis. Embertec devices were delivered to participants in July/August of 2016.

Investor Owned Utilities

Our original objective was to recruit approximately 30 households per utility partner, up to three partners and 90 households. We intended to spread these across the various microclimates contained within the territory. We anticipated having targeted email lists from our utility partners, with a minimum of 3000 households. From previous experience working with utility customers and cool roofs, we hoped for a 10% response, from which to select down to 10% comprising potential cybersensitive households.

We had hoped to get the three major California utilities on board and participating in the project. Our goal was to have them send an email to a minimum of 3000 customers each, whose eligibility

would be determined by the utility. We planned to work closely with each utility on the language of the outreach effort and expected that the utility would retain full control over the delivery of the outreach, including final language, channel, logos, etc.

We initially approached Pacific Gas & Electric (PG&E) in San Francisco, Southern California Edison (SCE) in Irwindale, and San Diego Gas & Electric (SDG&E) in San Diego. Though intrigued enough to hold an initial meeting, SDG&E was uninterested in any follow-up conversations, so we will focus on the negotiations and outcomes of the other two.

PG&E

We had some wonderful internal champions at PG&E and we had high hopes that we would be able to access a list of approximately 15,000 customers who had 'opted in' to research and/or marketing trials. We were seeking a minimum of 300 total survey respondents (a possible response rate of between 2-10%) in three identifiably distinct communities/ geographies within PG&E territory. From the 300 selected, we expected to use our screener survey to select the households most closely approximating the characteristics of cybersensitives. Our goal was thirty households, optimally in three distinct locales.

On 24 September 2015 PG&E requested the text of the letter for the email drop and Indicia lawyers sent them the draft MOU. By early October we were finalizing terms of agreement among the various divisions. Our contacts had prepared and communicated our research goals to the various internal stakeholders. On the strength of our communication with PG&E at the time we widened our interview eligibility beyond Marin to include PG&E territory. Sadly, by 5 November we received word that PG&E Marketing was concerned our research might impact something they had planned, and our pathway towards use of their list was terminated. *The loss of 15,000 potential outreach recipients definitely affected our recruitment efforts.* From that point forward we refocused our Northern California efforts on Marin, however we kept the five interviews from the wider Bay Area in the sample.

SCE

As with PG&E, we had strong internal support for our project. By late December 2015 we had a provisional go ahead from SCE management and received a final approval on 22 March 2016, despite SCE having undergone a significant reorganization and layoffs. We were slated to have access to a mailing list of approximately 3500 customers who, as with PG&E, had opted in to receiving notices about research projects and marketing trial offers. On the strength of our communication with SCE at the time we waited to pursue internally driven recruiting efforts in Southern California, though we had decided to begin on 1 April regardless of any decision made by SCE. That was a lucky decision, for on 10 May we received word that budget for the email had been eliminated in the internal restructuring. As with PG&E, the loss of institutional support constrains the rate of recruitment for Southern California.

Screener Survey

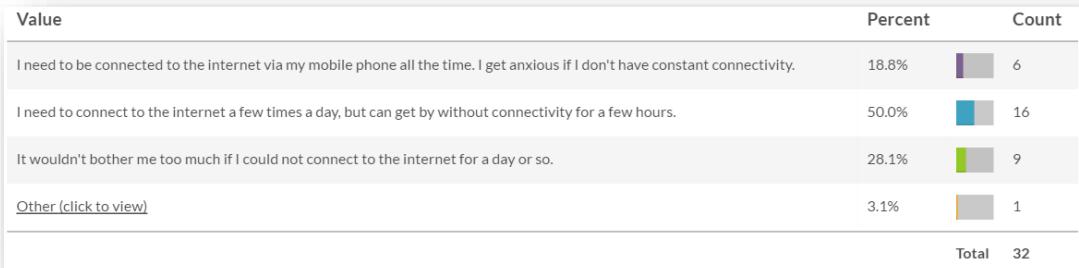
It is common practice to use a screener survey to recruit respondents into a study, per desired recruitment criteria. While a survey or a screener was not included in the original project scope, a survey was developed with detailed questions about device ownership, usage, attitudes towards technology and energy consumption, basic demographic data, and finally, contact information if they wanted to participate in the interview. Thus, the survey was developed purely with the objective of identifying and recruiting our potential cybersensitives, and not as a means to provide the project with statistically significant or reliable information (though we may perform some cross-tabulations for a future deliverable).

We next needed to define the characteristics of cybersensitives in a way that can ultimately be operationalized. We also wanted to separate them out from run of the mill ‘techies’ who work with and understand technology, and also from ‘gadget freaks’ who wait in line for a new iPhone for status enhancement purposes. In our initial pilot screener, fielded solely for question development purposes, we asked people, “Would you say you love your phone?” we received the following results:

Answer Choices	Responses	
Yes, truly, madly, deeply	30.00%	3
Maybe I LIKE my phone	40.00%	4
No, what kind of crazy question is that?	30.00%	3
Total	10	

We generated this alpha version of the survey on the free platform Surveymonkey.com as a very early and rough test for language around emotions and technology. All versions of the survey can be found in Appendix B. It was sent to a non-random sample of 300+ people in a social network on Facebook and received 10 responses. Although, this survey was clearly non-representative, non-random, and not statistically significant, three out of ten people felt comfortable describing themselves as ‘truly, madly, deeply’ in love with their phones! Of that group one person (ten percent) said that they were connected “24/7”.

The beta version was constructed on a different platform, Surveygizmo, which we bought a year’s license on in order to have access to more design and analysis features. This was also a test and was sent to the social networks of the ethnography team members. It received 25 responses.



The survey had an average time to completion of five minutes and was perceived by respondents as ‘accessible’ and ‘not fatiguing’. In our second iteration of the survey, still in test mode, we received 25 complete responses (and several partials). When we asked about feeling the need to stay connected, nearly 20 percent of our respondents reported that they ‘get anxious’ if they don’t have constant connectivity. It seems reasonable to conclude that we were getting close to our potential pool of cybersensitives!

Our final version of survey went out multiple times to a variety of audiences since the first deployment on 19 September 2015. We have sent it to Marin Clean Energy customers, Sierra Club members in IOU territories across California, and a proprietary Constant Contact list from Indicia

Consulting. It also was deployed multiple times via Facebook, LinkedIn, Twitter, and NextDoor. There were 281 complete and 109 partial responses, for a total of 390 participants. In the early stages of using the survey (prior to the TAC meeting on 22 October 2015), we limited ourselves to the goal of recruiting only cybersensitives, and we did not reach out to those categorized as “generally positive” or “generally none.” However, when the recruitment effort produced a smaller than expected pool of respondents, we opened up the interviews to all categories. This proved to be a successful inclusion, as it expanded our knowledge of all three categories.

The survey was created to target the cybersensitive persona, but the intent of the survey changed as the research progressed. As previously mentioned, recruiting only cybersensitives proved to be a challenge when simultaneously aiming for 30 households, so the recruiting was instead expanded to include all people. The survey then became a document that guided the ethnographers to enter the interview with information about the respondent as well as discussion points to bring up in the interview. Surveys such as this could easily be a tool to find discrepancies between perceived and actual behavior regarding technology use and energy saving, and the information can be used for further research.

Initial Campaign

Our final version of the survey went ‘live’ in September 2015. MCE is the project’s utility partner in Northern California. Therefore, our goal was to recruit respondents primarily in MCE territories, which included Marin County, Richmond and adjacent areas. MCE sends electronic newsletters via email twice a month to their customers to provide information about key updates, upcoming projects, events, energy efficiency tips, etc. Since they are a key partner in this study, they agreed to include an invitation for their customers to participate in our research. They included the project and participation link in three newsletters sent on 9 and 15 October 2015, and on 8 March 2016⁷. Respondents who participated in MCE in-home interviews were requested to pass along information about our study to their friends and family in the area who might be interested in participating. This method of social network recruiting, aka ‘snowball sampling’—resulted in eleven completed surveys, of which four respondents left their contact information, but no interviews resulted.

Social Media

Posts were created on Indicia Consulting’s Facebook page and Twitter feed. We created a tagline and attached a flyer which contained information about the project and a link to the survey. Marin Clean Energy also promoted our research and the link to the survey on their social media channels, including Facebook and Twitter. A unique survey link was created for each new source deployed, in both northern and southern California. This helped us track where the respondents were coming from, and therefore measure the effectiveness of each source of recruitment.

In Appendix D there are snapshots of how the various advertisements appeared in the target audience’s newsfeed on the different platforms. Regardless of platform, whenever a user clicked the “Sign Up” link, they were redirected to a landing page on Indicia Consulting’s website, designed specifically for these recruitment respondents. The landing page (screenshot shared in Appendix D) made it clear that after taking the survey, and completing the in-home interview, the respondents would receive the \$25 Amazon gift card.

⁷ Initially, due to a short lived glitch, survey respondents were unable to leave their contact information. This was quickly resolved in one day and we were able to collect contact information of respondents who signed up for in-home interviews. It also turned out that MCE had mistakenly only sent newsletter to about a third of the intended recipients, and so rectified that with a second drop a week later.

Facebook

An 'organic' Facebook post to the Indicia Consulting page acquired 39 'likes' but despite this, there was no engagement and resulted in zero completed surveys. A (paid) Facebook advertisement was then created in January 2016 that was designed to specifically reach Marin County residents only. This announcement included the \$25 gift card incentive. This advertising ran for about a week and generated the following engagement: 6391 users were reached, of which 30 users clicked on the ad, which generated two survey takers who gave their contact information, but resulted in zero interviews.

Twitter

An 'organic' Twitter post to the Indicia Consulting twitter feed generated 327 impressions and 28 survey takers. Unfortunately, the majority of the respondents were outside California or outside the recruitment area. Some of the responses had invalid contact information, and some seemed to be posted by the same individual who was perhaps mistaken that they would receive multiple gift cards by completing multiple surveys. The Twitter post ultimately generated zero interviews.

LinkedIn

Two groups on LinkedIn that were specifically created for Marin County residents were joined by one of the ethnographers, who posted on each forum. This link directed respondents to the landing page described above, with a customized link to track respondents coming from this source. There were 347 impressions, but nothing in the way of survey takers and therefore no interviews.

Nextdoor

Nextdoor is a neighborhood-centric mobile application that creates a private social network for each neighborhood. Because users reside nearby each other, and are often known to other neighbors, the hypothesis is that they are likely to trust each other more than they would trust a complete stranger who did not belong to their neighborhood. If a user were to post about our study via this forum, the underlying intent would be to reach specific neighborhoods in our target geographies via a local resident.

Team ethnographers used their own connections in Marin County to invite them to participate in the study, as well as post on their own Nextdoor applications in their neighborhoods. This effort generated 30 survey takers, and three interviews. The ethnographer in the Los Angeles area posted a recruitment request on her local Nextdoor network. The ethnographer also encouraged one of the interview respondents to post on her Nextdoor application in her own neighborhood, which led to two additional interviews. This gave the impression that if potential respondents personally know and trust the source of the posting, then it is likely to generate a better response.

Incentives

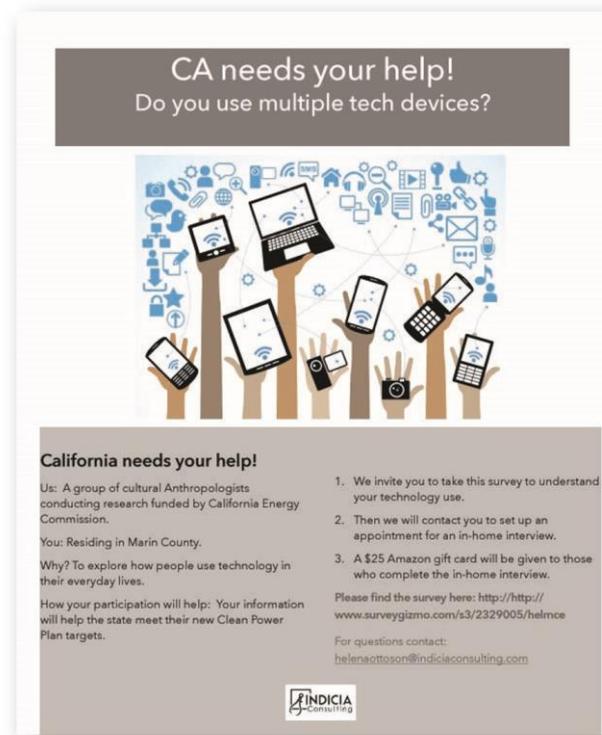
Over the course of recruiting for survey takers, we shifted from a non-incentivized approach to offering a small incentive (\$25 Amazon gift card⁸). It is common practice for research projects to provide incentives to increase participation. Incentivized research can be conducted through a recruiting agency or through the project team members' private and extended social networks, among other means. If a recruiting agency is used, there is a risk of obtaining "professional

⁸ Sometimes people objected to Amazon, whereupon we provided alternative gift cards for Whole Foods or Powell's Books. These requests underlined the relative wealth, class position, and political ideology of the households who were participating; they are not necessarily representative of the United States, or California as a whole, but they were extremely 'Marin.'

respondents." One could also argue that professional respondents, who regularly participate in such incentivized research, do so primarily to supplement their income, thereby potentially introducing a bias, and not necessarily because they are interested in the topic at hand. Another option would be to recruit respondents by providing incentives, without using the services of recruitment agencies. This tactic has proven to be successful on previous research projects conducted by the research team.

Intrinsic vs. Extrinsic Motivations

A secondary interest of ours was to see if we could identify response rate differences between groups who were offered an extrinsic motivation, via a cash award, gift, or product, and those relying on intrinsic motivations, such as environmentalist stances, religion, altruism, or civic pride.



Much of our messaging relied on a certain 'California' pride, for example, asking people to pitch in to help their state plan for the future.

MCE: Energy conscious

The first two newsletter drops from MCE in October 2015 did *not* include an incentive. This presumably generated a respondent pool that was intrinsically interested in our research. It is important to note that this respondent pool also included many respondents whose occupations were directly or indirectly related to energy conservation or management. As we wound down the Marin campaign in late winter/early spring of 2016, we added a \$25 Amazon gift card. It was specified that the \$25 gift card was given only to those who completed the in-home interview.

Our click rates for the October 2015 email campaigns ran between 2.8 and 4.2%, while the March 2016 email returned a measly

.7% click rate. Germane to the discussion about incentives, however, it is worth noting that the March email carried the gift card incentive. We found that the click rate was only 20-25% that of the earlier emails, possibly signifying some fatigue with the subject. Yet, despite the much lower click rate, participants left their contact information at exactly the same rate as the earlier emails had elicited (64%). Further, the conversion rate from survey participant to in-home interview was three times as high (43% vs 13%). In numerical terms, the first emails (of roughly the same sample size) garnered us 71 contact names, from which we finalized 14 interviews. With the incentive we only had nine (9) contact names but from that we finalized six (6) interviews. Our interpretation of these results is that an incentive cannot substitute for the intrinsic interest of the content offering, nor does it necessarily motivate people to participate in a survey, but it can strengthen the willingness to *continue* participating in the process leading to an IDI.

Sierra Club: Environmentally minded

In October 2015, a newsletter with a brief description of the study and link to the survey was sent out to chairpersons of Sierra Club chapters within IOU territories. We received the blessing of

Sierra Club Magazine's Mr. Green columnist, Bob Schildgen, to use his name as someone supporting our research. We approached Sierra Club members because it is an organization comprised of volunteers and funders who are committed to various environmental causes. The group of chairs was small, but had a higher open rate than the MCE or Indicia emails, of 40%. Initial survey responses indicated a higher than normal rate of interest in participation from this group. We hypothesize that this is because they were, by their virtue of participation in the Sierra Club, passionate about environmental causes.

Faith-based: motivated by stewardship

We also reached out to faith-based organizations to expand our recruitment efforts. We chose to pursue faith-based organizations in order to introduce more diversity to the recruitment pool by reaching a wide range of faiths, cultural, and ethnic groups. A location-based search using Google Maps was used to identify various faith-based organizations in Marin County. This list provided the name of the organization and contact information. We called and emailed the organizations with information about the project, and contact information of the ethnographer. We asked them to post/share a recruitment flyer. The recruitment flyer, containing a brief description of the project, contact information, and a link to the survey, were sent to these organizations via email. Further follow-ups were conducted over the phone and email within four to seven days. No incentive was offered during this effort. Unfortunately, this method did not generate any survey takers or interviews.

In Los Angeles and surrounding areas, fewer organizations have been contacted since initial recruiting efforts targeted MCE territories. However, a mosque in Mission Viejo and the interdenominational church, Agape, agreed to work with us. Agape agreed to post the flyer, which was emailed to them. No survey takers were generated via this effort. The representatives from the mosque were open to working with us. They offered to set up a small table outside the mosque to hand out the flyers after Friday prayer. We handed out 25 flyers to people who showed interest by coming over to the table. This effort generated one survey taker who did not leave their contact information, and no interviews.

Intrinsic

For this project, when we asked participants what had motivated them to do an in-home interview, most people who decided to participate in our research that offers no or minimal incentives told us that did it for one of a few reasons:

- They are invested in the topic because it is something they find interesting and care about.
- They want to help out, which might be because they themselves rely in their own work on people to answer surveys, or they know the ethnographer and want to help them gather data for their work.
- They are curious people and believe they have something to offer.

Singer (2012) found similar reasons for survey participation: "altruistic reasons (e.g. wanting to be helpful to research, researchers, society), egoistic reasons (including monetary incentives) and reasons associated with aspects of the survey (e.g. topic interest, trust in sponsor or research organization)."

However, intrinsically driven respondents are rare, because with the increasingly common recruiting companies and market research firms, answering surveys and participating in interviews have become a money-making business. Professional recruitment agencies regularly provide incentives of \$200-\$400 for two-hour in-home interviews to respondents on their panels.

Extrinsic

"Possibly, if there's an honorarium involved. I actually don't remember which survey this is, so please provide more information." – Survey respondent in California

Research from Church (1993) and Singer et. al (1999) found in two meta-analysis reviews of telephone, mail and face-to-face surveys that incentives improve response rates. Incentives include gift cards, products, discounts, and cash payments. In our professional experience, people who are outside of the qualitative field of social science research think that incentives could introduce bias into the research. However, there is evidence that shows the use of incentives does not appear to affect response quality (Singer, 2002).

A number of survey takers—who completed the survey and provided their contact information for an interview—did not respond positively to follow-up requests by the ethnographers to schedule an in-home interview. Some of the reasons stated and our hypothesis for not participating in the interviews are listed below.

- Some simply did not reply to any of the emails or phone calls.
- Some survey takers explained that they simply did not have time to participate in an interview of that duration, despite a moderate degree of interest.
- A few respondents initially showed interest in the study, but were deterred by the prospect of the interview being conducted in their homes; they (or their families) found this methodology "invasive."
- Several respondents filled out the survey, and then inquired if there was compensation for the interview. Some of these respondents chose not to participate in the interview, stating that the \$25 Amazon gift card was not adequate compensation for their time.

Unfortunately, there is not a lot of research to demonstrate how large of an incentive is needed to increase participation rates (Singer, 2012). In the end, the presence of incentives in social media campaigns did not produce greater participation than that we received through email campaigns without incentives, but where there was an established relationship between sender and recipient.

Professional recruitment

When several of our recruitment efforts did not produce the desired results, we considered the option of paying out-of-pocket for the services of a professional recruitment agency in helping us reach the goal of 30 interviews in Marin Clean Energy territories. We solicited proposals from five different agencies for recruiting, however the costs were prohibitive. Here is a summary of the average costs according to the proposals:

- Recruitment cost per respondent: This ranged between \$140-\$175 per respondent.
- Incentive: This is where the costs really escalated. The agencies required paying \$200-\$300 per respondent in incentives. Since these recruits are on the agencies' panels, they are used to receiving such incentives for 2-hour interviews, and the agency may have a hard time finding respondents who would be willing to accept a lower incentive.
- Project management: This ranges from \$0-\$1000 depending on the agency.

It would have cost a minimum of \$9375 out of pocket to recruit 25 respondents in Marin County and Richmond (another city in the MCE territory) using one of these firms. Even given the costs, it is important to note that some of the agencies expressed concern that they might not have been able to help us reach our quota in Marin. We believe these figures, however, give a yardstick against which to measure our recruitment efforts: to date we have recruited nearly 40 participants (in both Northern and Southern California) for an out of pocket cost of \$300.

Discussion of recruitment

Indicia Consulting ran very inexpensive campaigns via email and social media that reached a minimum of 20,000 eyeballs. Our email campaigns had open rates of between 23-40%, which is about what you would expect in terms of performance when using highly targeted lists, where the recipient trusts the sender⁹. Our email costs were, at most, \$35 dollars (out of pocket) which is the monthly price Indicia Consulting pays for a subscription to Constant Contact. The lists were organically developed over time/provided free by a partner. For comparison, a similar survey conducted by Indicia Consulting during the same timeframe for a corporate client cost \$13-15,000 in list acquisition alone.

Social media, though it gave us some exposure and 'likes', actually gave us very little in the way of survey completion, and nothing in terms of interviews. The slightly older skewing audience in Marin (see next section) may be one of the reasons for the low response rate we received from targeted social media outreach.

We also found it was also easy to manipulate our social media results, the highest number of likes and click-throughs we received was on a Facebook post with a picture of a squirrel on a pumpkin. The text asked people to click through to the survey, but the picture was what drew them in. Even so, despite clicking, people drawn to the squirrel picture did not produce many survey takers or interview participants. Our total out of pocket costs for social media were in the range of \$150, solely for the Facebook ad campaigns.

In contrast, recruiting through Nextdoor yielded good results, with 30 surveys taken in Southern California, resulting in three interviews¹⁰. However, it is hard to compare Nextdoor, because we do not know what the reach of each campaign was due to the varying nature of social networks. Our out of pocket costs for Nextdoor were zero.

At the outset of our recruiting process we made the decision to 'funnel' potential participants through a survey regarding their technology habits, in order to pre-qualify them for in-home interviews. This decision has affected our recruitment and data collection in diverse ways. On the



⁹ Based on long-time professional experience, and also: <http://www.smartinsights.com/email-marketing/email-communications-strategy/statistics-sources-for-email-marketing/>

¹⁰ No incentive has been offered in the Los Angeles area as of this writing.

one hand, it added a layer to the process that likely acted as a hurdle for some would-be participants. On the other hand, we now have a rich attitudinal data set about the technology habits and attitudes of nearly 400 people. In addition, we will be able to interpolate this data set with our in-depth interview data for those who did participate. We can go back and compare the answers to in-home questions to similar ones asked in the survey.

Demographics

Our goal is to disentangle the qualities that distinguish cybersensitives from demographic factors—partly by showing that they exist in diverse segments, and are not merely a new synonym for a previously identified segment.

Age

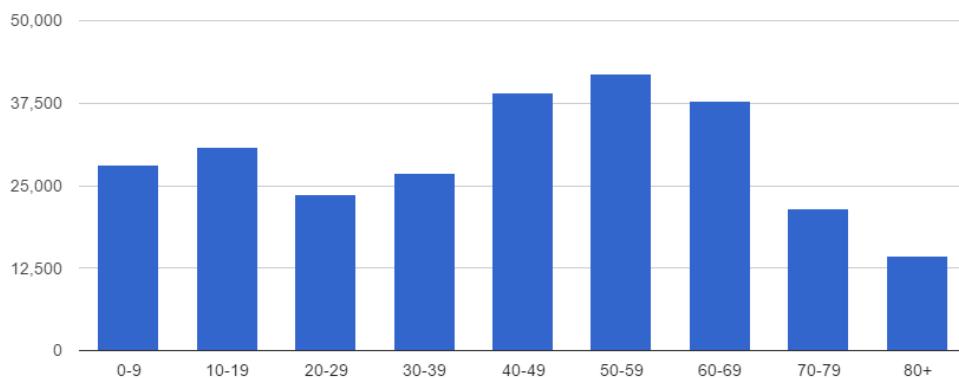
As the demographic data in Figure 1 depict, Marin County has a median age that is higher than other parts of California.

The current population of Marin County is 264,209 with the median age of 45. Marin County's median household income is \$91,375, and the average household net worth is \$1,379,747.

	Marin County	California	United States
Population	264,209	39.88M	320.100M
Median Household Income	\$91,375	\$59,859	\$52,746
Average Household Net Worth	\$1,379,747	\$667,573	\$484,469
Median Age	45 years	35 years	37 years

Age Distribution for Marin County

Show Data



Age distribution represents the distribution of the population in Marin County by age group. In Marin County, the male-to-female ratio is 129,057:135,152, which is 3% lower than the ratio of California, which is 19,335,825:19,547,962. Age demographic data is sourced from census, 2015.

Figure 1. Demographic data for Marin County ([Realtor.com](#), 2016)

The age pyramid (Figure 2) for the survey respondents has a very similar shape to that of Marin County residents in general. This suggests that our sample of Marin residents was fairly representative with respect to age. The modal age range for survey takers was 45-54 with 58% of survey takers older than 45 while 38% were younger (percentages rounded).

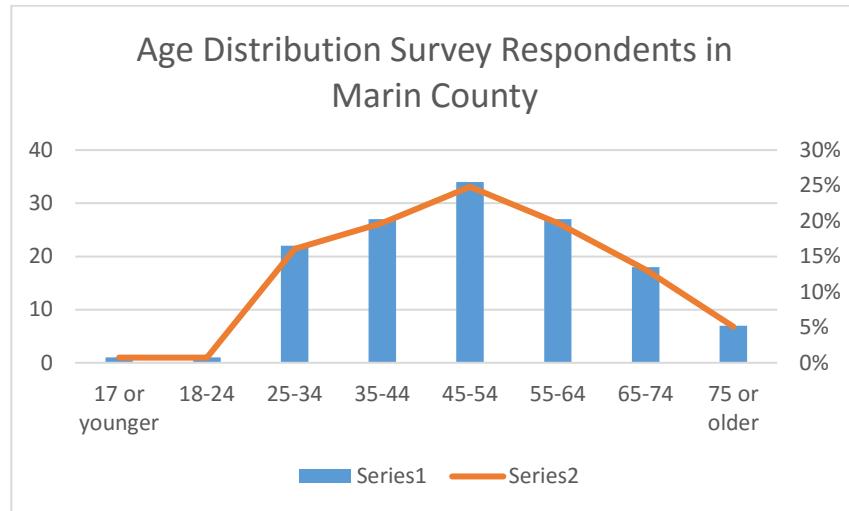


Figure 2. Age distribution of the survey respondents in Marin County.

However, the set of interviewees for Marin County skewed a little older than either the survey responses set, or Marin County generally (Figure 3).

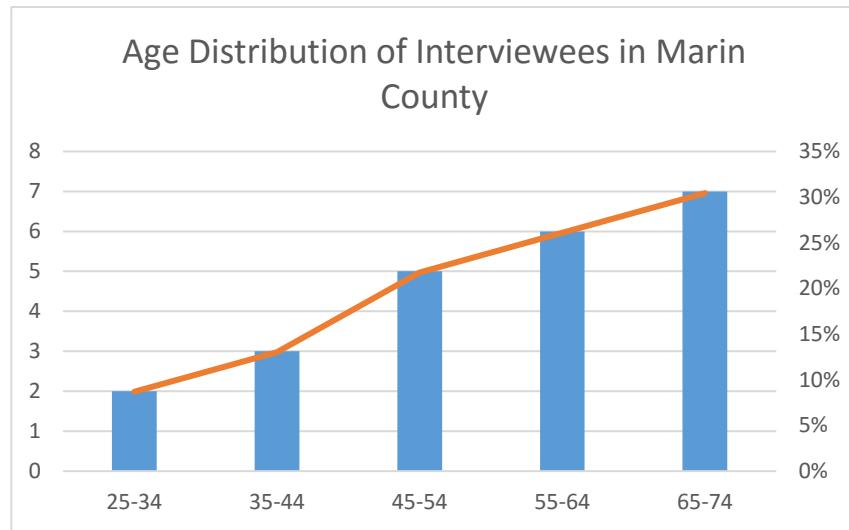


Figure 3. Age distribution of the interviewees in Marin County.

Gender

Our interviewees in Marin were comprised of 13 women and 11 men, or 54% women (Figure 4). For comparison, Marin's gender ratio is 51.2% male (United States Census, 2014) so our set was slightly favoring women. Interestingly, we had a decided gender imbalance in the survey responses — the ratio of gender among survey respondents was 3:2 in favor of women (Figure 5).

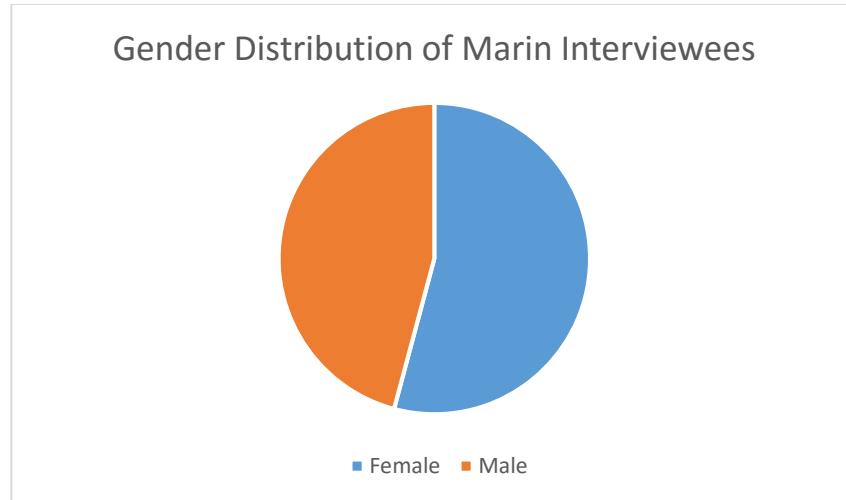


Figure 4. The gender distribution of the interviewees in Marin County.

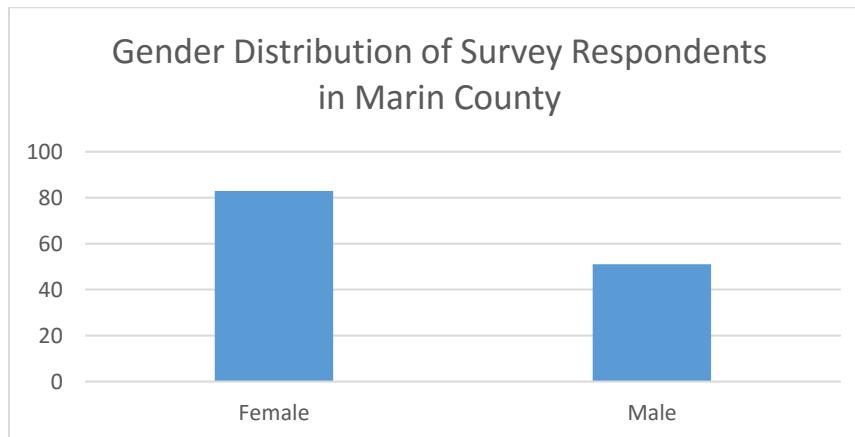


Figure 5. The gender distribution of the survey respondents in Marin County.

Income

The median household income for Marin County is over \$91K and average household worth is over \$1.3 million dollars making for a very wealthy sub-region of California (Figure 1). Our survey respondents were definitely on the high end of income stratification, with 49% making more than \$100K in household income. The modal answers were \$50K-99K and \$100-149,999 (Figure 6).

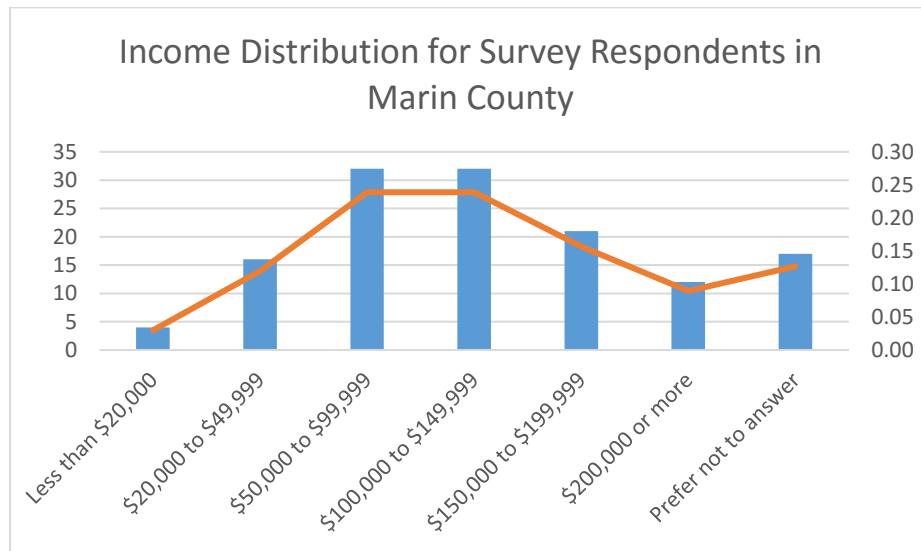


Figure 6. The distribution of income among survey respondents in Marin County.

Our interviewees were in line with this, with 49% having a household income at or above \$100K and 39% having less than \$100K (12% preferred not to answer); very close to the median household income for Marin of \$91K (Figure 7).

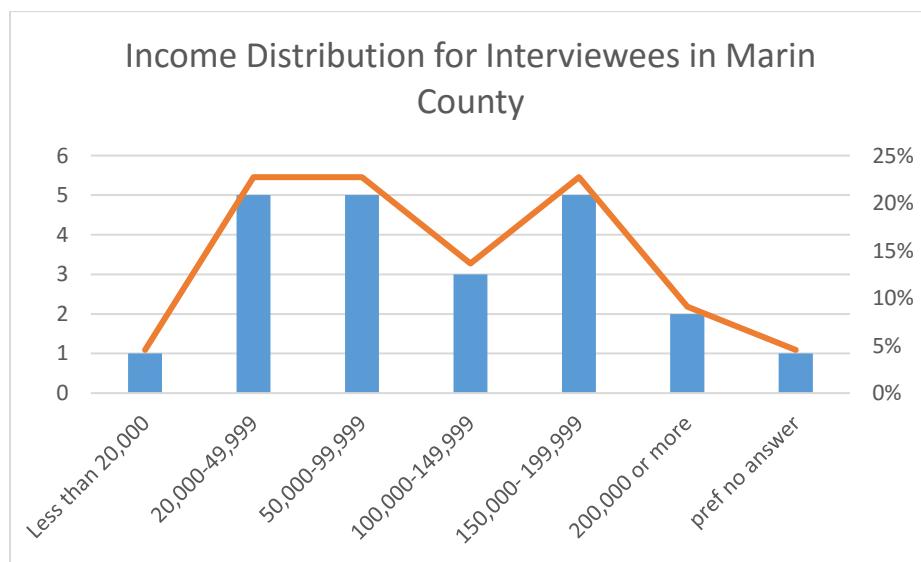


Figure 7. The distribution of income among interviewees in Marin County.

Race and Ethnicity

The racial profile of Marin County (80% white) lead to a rather homogenous respondent pool. The research team recognized the impact of Marin County on the diversity and representativeness of our fieldwork in Northern California, and continually adjusted our outreach efforts with the aim of broadening our respondent pool. We also believe that Southern California will offer more diversity in general.¹¹

Discussion of demographics

Our initial set of 24 interviews—conducted in Marin between October 2015 and May 2016—skew older, wealthier, and slightly more female than the general population, however we assert that they are highly representative of our utility partner's customers. While we are not seeking to be able to generalize findings from this sample to California as a whole, we believe the findings we will report¹² will be representative of the attitudes and beliefs held by Marin Clean Energy customers more generally.

One of our hypotheses is that, despite prevalent preconceptions, age will not be correlated with cybersensitivity (despite prevalent conceptions). Though people younger than 25 are often referred to as 'digital natives' we do not believe that they will show a greater propensity towards a positive emotional engagement with technology than their elders. There are several reasons for our belief. First of all, one does not need to demonstrate a baseline technical knowledge to positively respond to information provided via device—the openness and receptivity to feedback should be distributed equally across generations. Second, we are not positing that cybersensitives are purchasing consumer electronics for status enhancement, as 'gadget freaks,' but rather they may not have the latest and greatest technology, but instead get the most utility from it regardless of vintage or brand. Finally, in the Bay Area, there is a preponderance of people who have spent their careers in the technology sector, which dates back several decades. It is highly likely that residents of Marin in their 60s and 70s would be as familiar with technology and consumer electronics as anyone else, and possibly even have an advantage.

Much as with age, we also do not believe that gender will have an impact on the likelihood that someone is predisposed to receiving (and acting upon) feedback via electronic devices. We believe that this predisposition is a psycho-social trait, as will be discussed in the next deliverable. As such, we hope to at least have our case-study stand as a 'negative' example, combating pernicious and persistent stereotypes about women and technology adoption and usage.

The racial homogeneity of Marin impacted interviews in terms of homogeneity of responses received. When fieldwork reached the halfway mark in Northern California, we reached a point of saturation in terms of new information or patterns coming out of the interviews. This is commonly seen in qualitative research—a plateau is reached after a certain point when repeating the same set of questions within the same population does not generate new insights. One hypothesis is that the homogeneity of Marin County may have added to this saturation factor.

Our survey takers and interviewees were not representative of the U.S. populace in general, in terms of wealth, but they *were* representative of Marin, which is an extremely wealthy sub-region of California. Most of the people we spoke with had household incomes well above the median for the

¹¹ We are not advancing any hypotheses about race, ethnicity, and cybersensitivity, and therefore did not collect data on race in the survey or interviews. This could be an area for future research.

¹² In the next deliverable, for Task 3

state. That does not mean, however, that their attitudes and behaviors should be discarded, as non-representative. It is important to engage in ‘studying up’ when discussing energy consumption: energy efficiency measures and programs are adopted and participated in by more affluent segments of the population, to a degree that it has been called ‘a dirty little secret’ in personal communications with industry insiders:

“The bottom three income quintiles have received about 10% of all credits, while the top quintile has received about 60%. The most extreme is the program aimed at electric vehicles, where we find that the top income quintile has received about 90% of all credits” (Roberts, 2015)

The notion of ‘studying up,’ or looking at people with a higher status than that of the interviewer, is a well-established concept in ethnographic methodology (Nader, 1972). One of the earliest (and still one of the best) examples of this was Hortense Powdermaker’s ethnography of Hollywood in the 1930s (Powdermaker, 1950). This example is still considered one of the few serious analytical examinations of the social networks and culture of Hollywood. The reason for its power and scarcity is that people with high status have the ability to say no to the ethnographer, and often very few reasons to say yes. They may lack time, and incentives can be either perceived as picayune or even insulting. The ethnographer who wishes to study elite communities needs to find creative means of accessing and communicating with elites, especially if they want to penetrate the home and take up several hours of their time.

Conclusion

From June 2015 through the present time, Indicia Consulting has been conducting fieldwork in the territories of two California utilities, investigating the relationship between individuals and their personal electronics. The goal of this research phase seeks to establish the presence of a group of people termed cybersensitives, for their propensity to have a deeper emotional relationship with their electronics (smartphones, tablets, laptops). Based upon a meta-review of energy efficiency program pilots using in-home devices, the authors of this research believe that this propensity will be a unique attribute, not associated with membership in any particular demographic: e.g., age, gender, socio-economic status.

This paper outlines the theoretical framework Indicia Consulting is using to explore the behaviors and values exhibited by cybersensitives; a combination of cybernetics and social practice theory. These two theoretical approaches are well suited for understanding problems that have both material/technological aspects, as well as cognitive/behavioral ones. Both of these theories are rooted in anthropology, which has made inroads with respect to the design and development of consumer products. Ethnographic methodology has thus been shown to be effective in collecting data around questions of innovation, adoption, and usage of new technologies.

The authors of this paper discuss the design and implementation of a recruitment strategy for conducting in-depth interviews, or IDIs. This recruitment strategy involved the development of an online screener survey – an assessment of potential participants’ attitudes towards their personal electronics – as well as a series of email and social media campaigns designed to promote the survey, particularly in and around Marin County. This strategy produced a set of respondents who are demographically representative of Marin, with very little out of pocket expense.

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Appendix A: Interview Process and Guide

Interview process

- Before the interview begins, review the respondent's survey answers and prepare/customize interview flow as needed.
- Go to respondent's home at scheduled time of interview.
- Setup, usually at dining table or living room seating - base
- Introduction about the project, no right or wrong answers
- Consent form signed
- Introduction about the respondent
- Day in the life of respondent
- Walk-through of home. Memorized cheat-sheet used to observe energy efficiency around the house. Make list of devices observed and demonstrated by the respondent. Take photos/video of the entire walk-through.
- Back to base, continue line of questioning around devices observed and discussed during walk-through.
- Revisit survey, ask about any missing devices that were mentioned in survey but did not talk about during walk-through
- Continue line of inquiry on communication methods, attitudes, energy consumption, etc.
- Conclusion - Ensure that the interview does not exceed 2 hours. Thank respondent, snowballing request, follow up on incentive if needed. Interview length varied depending on how articulate the respondents were and how much technology they owned. Most were between 1 hour and 45 minutes and 2 hours and 15 minutes.

Consent Form

A consent form was created to have documented record that the respondents were participating voluntarily, and understood clearly what was involved in conducting the in-home interview, such as the use of audio recording device, photography and videography. During fieldwork in Northern California, as well as some initial interviews conducted in Southern California, we did not give the Embertec devices to our respondents immediately after the interview. This will change moving forward, such that the ethnographers would carry an Embertec device to each interview, and give it to the respondent (if they consent) at the end of the interview, while in their homes. The consent form will be modified moving forward to reflect this change.

Consent to Participate in a Research Study

Cybernetic Fieldwork across California

Introduction

You have volunteered to be in a research study of consumer behavior and habits as they relate to the consumption of energy.

You were selected as a possible participant because you completed the technology profiling survey and gave us permission to contact you for further research.

We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study

The purpose of the study is to gain insight into consumer behavior with respect to energy consumption and technology usage.

This research will be published in a series of reports to the State of California, and the findings may be made public in a variety of media, including academic journals, social media, and news articles.

Description of the Study Procedures

If you agree to be in this study, you will be asked to do the following:

Participate in an interview for approximately two hours at your residence.

Accompany researchers on a walk-through of your residence to document technology ownership.

Allow photography and videography of selected personal electronic devices and appliances

Allow an audio recording of the interview session

Risks/Discomforts of Being in this Study

There are no reasonable foreseeable (or expected) risks associated with your participation in this study.

There may be unknown risks.

Benefits of Being in the Study

You will be offered copies of all research deliverables

The goals of this study are directed toward consumer energy cost savings and reduced energy consumption across the state of California, which benefit all citizens

Payments / Compensation

You will not be receiving payment or compensation for participating in this study.

Confidentiality

Your identity will be kept confidential.

While we retain information about your identity for contact purposes, it will not be correlated with your answers for the purposes of data analysis.

All answers from interviews will be coded and entered as numbers.

All publicly reported data will be aggregated.

Names of participants are given pseudonyms for times when excerpts from interview sessions may be used.

Right to Refuse or Withdraw

The decision to participate in this study is entirely up to you. You may refuse to take part in the study *at any time* without affecting your relationship with the investigators of this study. Your decision will not result in any loss or benefits to which you are otherwise entitled. You have the right not to answer any single

question, as well as to withdraw completely from the interview at any point during the process; additionally, you have the right to request that the interviewer not use any of your interview material

Right to Ask Questions and Report Concerns

You have the right to ask questions about this research study and to have those questions answered before, during, or after the research. If you have any further questions about the study, at any time feel free to contact the Principal Investigator, Dr. Susan Mazur-Stommen at susanmazur@indiciaconsulting.com or by telephone at (951) 907-8069.

If you have any problems or concerns that occur as a result of your participation, you can report them to Dr. Susan Mazur-Stommen at the number above.

Authorization to Release Data

During the course of this study, data, including but not limited to, recorded audio, photos, video, and written notes will be collected. By signing below, you are authorizing the collection of these data types in order to accomplish the goals/objectives of this study.

You specifically consent to the release of collected data, in aggregated and anonymized form, to the following organizations associated with this study: Indicia Consulting (Principal Investigator), MCE Clean Energy (Utility Partner), and California Energy Commission (Funder).

Consent

Your signature below indicates that you have decided to volunteer as a research participant for this study, and that you have read and understood the information provided above.

You will be given a signed and dated copy of this form to keep, along with any other printed materials deemed necessary by the study investigators.

Subject's Name (print):

Subject's Signature: _____ Date: _____

Investigator's Signature: _____ Date: _____

Discussion Guide

Brainstorming among the core ethnographic team generated a list of topic areas to be explored, which were translated into discussion questions, which in many cases were open ended so as to allow maximum free flowing information from the respondent. The interview guide is literally that - a guide. It includes topic areas and lines of inquiry which need to be addressed during interviews. However, it is not a script, and interviews do not necessarily follow the precise wording or the exact order of questions set out in the guide. The interview flows as a natural conversation, bouncing off discussion topics as they naturally flow, and is often influenced by what interests the respondent, the site of the interview, among other factors.

A couple of questions were removed, and one more added during first few interviews. The guide remained consistent thereafter, and will continue to be used in Southern California as well. Overall, the interview guide served us well to reach the broad objectives that we set out to achieve. We have found that it helps us get a good understanding of the technology affinity of our respondents, and identify the key drivers and motivations. A consistent effort was made throughout the interview to probe on actual behavior, and make observations about perceived versus actual behavior. Please note that depending on the natural flow of the interview, sections and questions within each section were moved around as deemed appropriate.

Introduction

My name is_____ and I work with Indicia Consulting. This research project is funded by the California Energy Commission. We want to ask you questions about technology - what devices you use, what you like, dislike, etc. Eventually, the CEC will use this information to design programs for energy savings. That's the end goal here. Thank you so much for participating.

There are no right or wrong answers here. We are looking for people who use a lot of technology, as well as people who use very little technology, and everyone in between.

*Here is the **consent form** we need you to sign before we begin the interview. This consent form states that your participation is voluntary and anonymous. The information gathered from our interviews will be reported anonymously to the state of California and your utility company. Please read through this consent form, and while you do, please feel free to ask any questions.*

This introduction sets the stage for the interview, and attempts to make the respondent comfortable about their honest and candid participation.

Warm up

Tell me about yourself and your family.

An attempt is made to understand where the respondent is originally from and where their friends and family are located. This information is later used when asking questions about how they communicate with their broader network.

Day in the life of ...

Let's a day in the life of <respondent's name>. Maybe you can use yesterday as an example and tell me from the time you woke up in the morning till you went to bed at night, how your day went about, and at what points did technology come into play.

Here, the focus is on actual behavior rather than perceptions, with an emphasis on how they engage with technology throughout the day. This format of discussion helps us to start compiling a list of key technologies to discuss later in the interview.

Home tour

Ok, let's take a tour of your house and take a look at your devices throughout the house.

Photos and videos are taken with the respondent's permission around the house, with a special emphasis on all technology, new and old, as well as any energy-related features of the home. Examples include thermostats, security systems, dimmer switches, motion sensors, photosensitive lighting, kinds of light bulbs (incandescent, fluorescent, LED), solar panels, etc.

The list of key devices is completed at the end of the home tour. Responses and observations are compared with survey responses to remind respondent about any missing devices that they may have forgotten to mention.

Devices

When did you buy this device?

What prompted the purchase of this device?

Where did you buy it?

Discuss purchase processes, bearing in mind that they may be significantly different for each device. For example, Fitbit purchase could be very different from phone purchase. How do they make trade-offs when buying tech devices? Discuss motivations, priorities, elimination process, and key influencers. These questions help us determine if buying the "latest and the greatest" is their guide to purchasing new devices, or whether practicality is the main purpose. There are key differences in these intentions, which will be discussed in the final analysis.

What activities do you conduct on these devices?

Why do you switch from one device to another when conducting the same activity?

What do you like about your devices?

What do you not like about your devices? (anxieties, fears, frustrations)

What would you change about them?

Since you have owned these devices, has the usage been the same as what you anticipated or has it changed? What led to the changes?

Do you have any devices that track your behavior - are they using any trackers - health, finance, etc.? are they using any technology to help them with that? why or why not?

What apps do you use and how do they fit into your life?

Do you play games? Which devices do you use for games, and when do you play?

What do you do with the old device when you buy an updated version? (if they save them and why if they do - attachment)

How do you treat your devices?

When do you charge your devices?

When was the last time you shut down your laptop?

Probe on actual behavior.

Think of devices you have bought in the past 1-2 years but no longer use - why did you buy them? why are you not using them?

Are you in the market for any particular device right now?

Do you pay attention to what sort of devices your friends and coworkers have? (wired vs gadgets)

These questions help us understand how the respondent interact with devices: are devices a natural part of their everyday life and accepted, or are they a necessary device that is a hassle and perceived as challenging to understand? Or are devices a status symbol and a talking piece?

Behavior and tech knowledge

Can you recall for me a moment when you solved a problem with your tech skills?

Can you recall for me when you had a problem due to lack of tech savvy?

How do you feel about the amount of time you use your devices?

Have friends ever commented on your tech usage? Do you agree with their statements?

Do any of the devices, and the activities that it allows you to do, interfere or enhance your daily life?

Is there anything you feel ashamed of, with respect to technology?

Is there anything you feel proud of, with respect to technology?

Have you ever lost a device or forgotten it someplace? Tell me about what happened and your reaction.

Why have you not lost a device?

This section was initially included to gauge respondents' behavior and knowledge around technology. The intent was to tap into their philosophical bend towards technology and their reflections on the role technology plays in their lives.

Communication with network

How do you communicate with other people? How about family and friends locally versus in other parts of the country or the world?

How often do you (text/email/IM/video call/phone call)?

Do you think you do any of these more than the others?

What mode of communication do other people use, in your opinion?

Do you agree with their mode? Reasons for doing so?

Would you consider yourself in step with technology? What does that mean for you?

Who is the person who gives tech advice in your circles? you? someone else? Do people come to you for advice about technology?

This line of questions will answer questions about how people are communicating with each other and if there is a difference between how cybersensitives communicate versus other users.

Children / babies and technology

What do you think about people using technology? About parents using technology for their kids?

How do kids and even babies interact with technology these days, in your opinion? How does that affect parenting? Did it affect how you parented (if they have kids)?

This section briefly touched upon their attitudes towards technology as it relates to parenting. The intent was to enable respondents to reflect on conscious or unconscious decisions they may have made in this respect, or observed other parent's decisions.

Substitutes used in the absence of technology

When respondents chose not to participate in certain technologies that may be considered necessities by mainstream consumers, such as mobile phones, this question probed on whether and how they conducted certain activities and participated in society, and if any substitutes came into play.

Energy

How do you pay your electricity bill every month? Is it online or via paper checks? Is it on auto-pay? Why have you chosen this particular method of bill payment?

What information do you receive from your utility, aside from billing information?

Do you read the information you receive from your utility? What do you do with the information that you receive from your utility? Is any of it memorable?

Did any information from utility change your attitude? Why or why not?

Did any information from utility change your behavior? Why or why not?

Have you thought about methods on how you can save energy?

Where do you get information about methods to save energy?

Do you use any device to manage energy? Why or why not?

What does energy mean to you?

Are there any areas in your life where technology and energy intersect?

A lot of research has already been conducted in the area of energy consumption and behavior, therefore this section was intentionally kept brief in our interviews. This area of inquiry probes on the effectiveness of communication sent by the utilities, and whether it generates any action on the part of the recipients. This section also probes on whether respondents draw the link between energy and technology. If these two thought processes are completely separate, utilities will have some serious work to do to try to apply this research to program design.

In the survey, respondents provided information about whether they rent or own their primary residence. Without specifically probing about this aspect, this section also gauges whether renting versus owning a home influences their energy consumption and saving behavior. As with cybersensitives, observations are to be made as to whether energy features in their household (such as type of lightbulbs) reflected their own perceptions.

Appendix B: Survey development and deployment

Beta Version: 8/24/2105

Identifying cybersensitives

Cybersensitives are people with a higher than average emotional response to the technology in their lives. We think about 10% of the population is cybersensitive and we are conducting research on whether or not this is true. We are currently testing question design. To help us shape our future instrument for this research, please take a moment to fill out this survey. To learn more about this concept, check out this link: <http://indiciaconsulting.blogspot.com/2015/07/cybersensitives-who-are-they.html>

1. Would you say you LOVE your phone?

Other (please specify)

2. What is your data usage per month?

I know exactly how much

3. Pick the answer that best matches your lifestyle

I can go a whole day without checking email or social media

I check email and social media pretty regularly

I am connected 24/7

4. Which of the following do you use (more than one can apply)

Skype/Hangout/Facetime

Pinterest

Online banking

Energy app for home (on web or phone)

Mint/Quicken

Aggregating dashboards (mileage)

Coupon sites

5. Technology allows me to (1 is highest, 5 is lowest)

- Monitor an activity
- Stay organized
- Offers metrics
- Allows me to optimize
- Puts me in control

6. Technology that offers the following cross-over benefits would be of greatest interest to me (1 is highest, 5 is lowest)

- Energy/Health tracking
- Energy/Time management
- Energy/Home security
- Energy/ Thermal comfort
- Energy/Money management

7. How important are the following qualities when it comes to consumer electronics?

Extremely unimportant	Not important	Somewhat important	Important	Very important
Enhances my lifestyle				
Is fun to use				
Connects me to others				
Is easy to use				

8. Please rank the following in answering the question "My personal tech choices allow me to..."

Extremely unimportant	Not important	Somewhat important	Important	Very important
Gain control				
Enjoy mastery				
Alleviate anxiety				
Optimize choice				
Manage time				

9. Please rank the following in answer to the question, "Technology is critical to my..."

Extremely not important Not very important Somewhat important Important Very important

Daily life (calendars)

Entertainment (games, media)

Manage details (To do lists)

Social life (texting, IMs)

Communication (Skype, Facetime)

Other (please specify)

10. What is your favorite website or app and why?

Thank you for completing our survey!

Recruitment Survey Test Pilot V1: 9/1/2015

We are conducting research to understand peoples' usage of, and attitudes towards, different products and services. Please answer the following questions to the best of your ability, specifically focusing on your own usage, habits and opinions.

1. Which of the following, if any, do you own? *This question is required.

- Mobile phone with internet capability
- Mobile phone without internet capability
- Gaming console (such as Playstation, X-box, etc.)
- Laptop
- Portable digital music player (such as iPod, etc.)
- Health / fitness tracker (such as Fitbit, Garmin watch, etc.)
- Wifi-enabled home automation system (such as Nest, etc.)
- Health / fitness tracking apps on your mobile phone (such as RunKeeper, Strava, etc.)
- Home security or home monitoring system (such as ADT, web-enabled surveillance devices, etc.)
- Energy consumption tracking devices, apps or services
- Money management applications (such as Mint, Quicken, etc.)
- None of the above

2. Which of the following statements best describes you? *This question is required.

- I need to be connected to the internet via my mobile phone all the time. I get anxious if I don't have constant connectivity.
- I need to connect to the internet a few times a day, but can get by without connectivity for a few hours.
- It wouldn't bother me too much if I could not connect to the internet for a day or so.
- Other Please enter an 'other' value for this selection

3. What type of the data plan do you have on your mobile phone? *This question is required.

- I do not have a data plan
- 1-5 GB per month
- 6 GB or more per month

Unlimited data plan

I have a data plan, but not sure about the type

4. Consider the level of energy consumption in your household. Which of the following statements would you agree with the most? *This question is required.

I am fully aware of the level of energy consumption in my household. I monitor energy usage carefully, especially with regards to appliances and other items that consume a lot of energy. I have made and continue to make many changes to our energy consumption patterns, and lead the charge in this aspect in my household.

I am generally aware of some aspects of energy consumption in my household. I do not monitor all aspects of energy usage in great detail, but participate in making changes to our energy consumption whenever it is convenient.

I am not aware of the level of energy consumption in my household. I generally do not participate in making changes around the house to reduce our energy consumption.

Other Please enter an 'other' value for this selection.

5a. To what extent, if at all, do you agree with the following statements? *This question is required.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

When I get a new device, I figure out how to use it on my own, and look at the instructions only if I get stuck

Friends often ask for my advice before buying new devices

When I get a new device, I usually wait for someone else to help me figure out how to use it

Technology enhances my life

Technology is functional

5b. To what extent, if at all, do you agree with the following statements? *This question is required.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

When I have a good experience with a new product or service, I encourage my friends and family to try it as well

I am usually among the first ones to buy the latest electronic devices

I try new things all the time, but do not pursue most of them in great depth; I quickly move on to the next new thing

When I get a new device, I jump right into the instructions and learn how to use it in detail

I use technology to manage my time

5c. To what extent, if at all, do you agree with the following statements? *This question is required.
Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

Technology is easy

I am usually the last one to adopt any new technology

Technology is fun

I use technology to stay organized

When I find something useful, I explore it in as much detail as possible

5d. To what extent, if at all, do you agree with the following statements? *This question is required.
Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I use technology to stay connected to my friends and family

When I find a new app or service that will enhance my life in some way, I adopt it right away

I wait for new technologies to be somewhat widely adopted before adopting them myself

6. Tell us about a website or mobile app you use at least once a week that you think is interesting, fun, or useful, and why *This question is required.

7. Please indicate your gender below: *This question is required.

Female

Male

8. Please indicate your age below: *This question is required.

17 or younger

18-24

25-34

35-44

45-54

55-64

65-74

75 or older

9. Which of the following ranges best indicates your annual household income? *This question is required.

- Less than \$20,000
- \$20,000 to \$49,999
- \$50,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$199,999
- \$200,000 or more

Prefer not to answer

10. Including yourself, how many people reside in your household? *This question is required.

11. Do any individuals under the age of 18 reside in your household? *This question is required.

Yes

No

12. How would you describe the type of community you reside in? *This question is required.

Suburban community

City or Urban community

Rural community

Other Please enter an 'other' value for this selection.

13. Do you currently rent or own your primary residence? *This question is required.

Rent

Own

Other Please enter an 'other' value for this selection.

Wave 1 Recruitment Survey Final: 9/16/2015

We are studying how technology is used in everyday lives and homes of California residents and what this means for our future energy consumption. Please answer the following questions to the best of your ability, specifically focusing on your own usage, habits and opinions.

How to participate:

Step 1 - Complete this survey

Step 2 - If you qualify, we will schedule an in-home interview with you at your residence.

1. Which of the following, if any, do you own? *This question is required.

- Mobile phone with internet capability
- Mobile phone without internet capability
- Gaming console (such as Playstation, X-box, etc.)
- Laptop
- Portable digital music player (such as iPod, etc.)
- Health / fitness tracker (such as Fitbit, Garmin watch, etc.)
- Wifi-enabled home automation system (such as Nest, etc.)
- Health / fitness tracking apps on your mobile phone (such as RunKeeper, Strava, etc.)
- Home security or home monitoring system (such as ADT, web-enabled surveillance devices, etc.)
- Energy consumption tracking devices, apps or services
- Money management applications (such as Mint, Quicken, etc.)
- Tablet (such as iPad, etc.)
- Music apps on my phone
- Gaming apps on my phone
- None of the above

How often, if ever, do you use or access the following? *This question is required.

2. What type of the data plan do you have on your mobile phone? *This question is required.

- I do not have a data plan
- 1-5 GB per month
- More than 5 GB per month
- Unlimited data plan
- I have a data plan, but not sure about the type

3. Think of a time when you forgot your phone at home and could not access it for several hours. How did that make you feel? Select up to three of the following: *This question is required.

- Relieved
- Devastated
- Happy
- Anxious
- Unaffected
- Concerned
- Sad
- Unsafe
- Bored
- Free
- Excited
- Crippled
- Stressed
- Unproductive
- More productive
- Alert
- Frustrated
- Lonely
- Disconnected

4. Consider the level of energy consumption in your household. Which of the following statements would you agree with the most? *This question is required.

I am fully aware of, and monitor the level of energy consumption in my household. I have made and continue to make many changes wherever possible to our energy usage, and lead the charge in this aspect in my household.

I am generally aware of some aspects of energy consumption in my household. I do not monitor all aspects of energy usage in great detail, but participate in making changes to our energy consumption whenever it is convenient.

I am not aware of the level of energy consumption in my household. I generally do not participate in making changes around the house to reduce our energy consumption.

5. To what extent, if at all, do you agree with the following statements? *This question is required.
Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

When I find something useful, I explore it in as much detail as possible

When I find a new app or service that will enhance my life in some way, I adopt it right away

Friends often ask for my advice before buying new devices

I try new things all the time, but do not pursue most of them in great depth; I quickly move on to the next new thing

6. To what extent, if at all, do you agree with the following statements? *This question is required.
Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

Energy saving is important to me.

Saving money on energy bills is important to me

Technology is easy

Technology is fun

I regularly keep up with the latest news and information about technology

7. Which of the following statements best describes you? *This question is required.

I am usually among the first ones to buy the latest electronic devices

I wait for new technologies to be somewhat widely adopted before adopting them myself

I am usually the last one to adopt any new technology

8. Which of the following statements best describes you? *This question is required.

When I get a new device, I jump right into the instructions and learn how to use it in detail

When I get a new device, I figure out how to use it on my own, and look at the instructions only if I get stuck

When I get a new device, I usually wait for someone else to help me figure out how to use it

9. Tell us about a website or mobile app you use at least once a week that you think is interesting, fun, or useful, and why *This question is required.

10. Please indicate your gender below: *This question is required.

Female

Male

11. Please indicate your age below: *This question is required.

17 or younger

18-24

25-34

35-44

45-54

55-64

65-74

75 or older

12. Which of the following ranges best indicates your annual household income? *This question is required.

Less than \$20,000

\$20,000 to \$49,999

\$50,000 to \$99,999

\$100,000 to \$149,999

\$150,000 to \$199,999

\$200,000 or more

Prefer not to answer

13. Which of the following best describes your current occupation? *This question is required.

Student

Homemaker

Retired
Not Employed
Education, Training, and Library Occupations
Healthcare Practitioners and Support Occupations
Office and Administrative Support Occupations
Management, Marketing, Sales, and Related Occupations in Technology Industry
Management, Marketing, Sales, and Related Occupations, not in Technology Industry
Finance and Business Operations Occupations
Engineering and Technical Occupations
Product Management, Product Marketing, Product Design, and Related Occupations
Market Research and Related Occupations
Community and Social Service Occupations
Arts, Entertainment, Sports, and Media Occupations
Farming, Fishing, and Forestry Occupations
Food Preparation and Serving Related Occupations
Protective Service Occupations
Personal Care and Service Occupations
Construction, Manufacturing, Installation, and Maintenance Occupations
Legal Occupations
Transportation and Materials Moving Occupations
Other Please enter an 'other' value for this selection.

14. Including yourself, how many people reside in your household? *This question is required.

15. Do any individuals under the age of 18 reside in your household? *This question is required.

Yes

No

16. How would you describe the type of community you reside in? *This question is required.

Suburban community

City or Urban community

Rural community

17. Do you currently rent or own your primary residence? *This question is required.

Rent

Own

[OLD VERSION] Would you like to participate in a follow up interview?

Remember, if you qualify, we are offering a \$25 Amazon gift card for completing the in-home interview!

Please share your name, email, phone number, and city of residence and we will contact you if you qualify.

Thank you!

Appendix C: Recruitment marketing/outreach materials

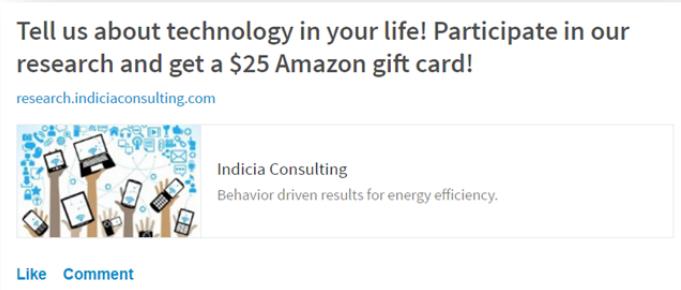


Figure 8. The Facebook post featured for northern California recruitment efforts.

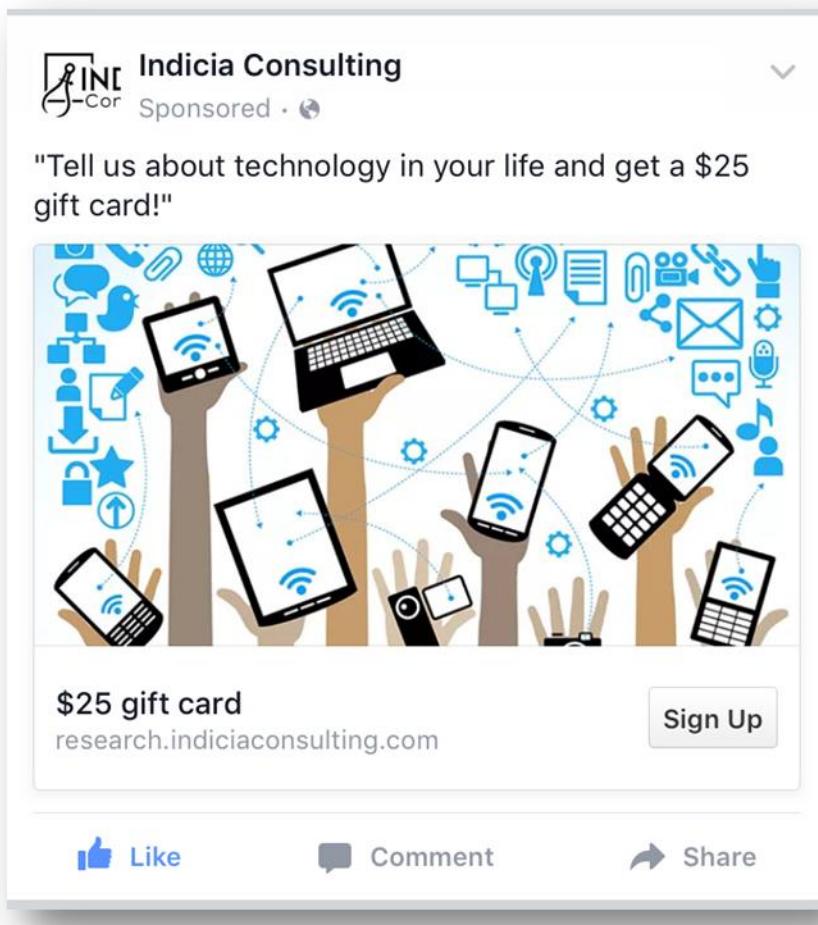


Figure 9. The paid Facebook advertisement created to specifically reach only Marin County residents that would be displayed in target audience's newsfeed.

CA needs your help! Do you use multiple tech devices?



California needs your help!

Us: A group of cultural Anthropologists conducting research funded by California Energy Commission.

You: Residing in Marin County.

Why? To explore how people use technology in their everyday lives.

How your participation will help: Your information will help the state meet their new Clean Power Plan targets.

1. We invite you to take this survey to understand your technology use.
2. Then we will contact you to set up an appointment for an in-home interview.
3. A \$25 Amazon gift card will be given to those who complete the in-home interview.

Please find the survey here: <http://www.surveygizmo.com/s3/2329005/helmce>

For questions contact:
helenaottoson@indiciaconsulting.com



Figure 10. The Facebook advertisement directed potential survey respondents to this landing page describing the process for participation in more detail.

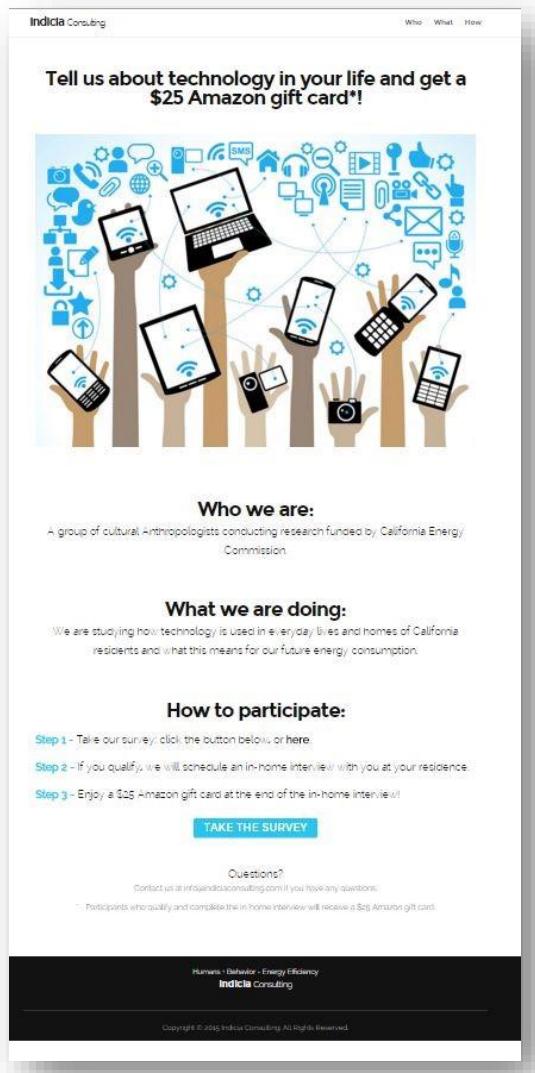


Figure 11. Another landing page on Indiciaconsulting.com specially designed to recruit households for the in-home interviews.