Chapter 47
Citizen Perspectives on the Customization/Privacy Paradox Related to Smart Meter Implementation

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ABSTRACT

This paper employs the framework of contextual integrity related to privacy developed by Nissenbaum (2010) as a tool to understand citizen response to implementation of residential smart metering technology. To identify and understand specific changes in information practices brought about by the introduction of smart meters, citizens were interviewed, read a description of planned smart grid/meter implementation, and were asked to reflect on changes in the key actors involved, information attributes, and principles of transmission. Areas where new practices emerge with the introduction of the smart grid were then highlighted as potential problems (privacy violations). Issues identified in this study included concern about unauthorized use and sharing of personal data, data leaks or spoofing via hacking, the blurring distinction between the home and public space, and inferences made from new data types aggregated with other personal data that could be used to unjustly discriminate against individuals or groups.

INTRODUCTION

The smart grid is a next-generation electrical power grid intended to upgrade and replace aging infrastructure, enhance energy conservation, and provide real-time information for decision making, allowing energy companies "full visibility and pervasive control over their assets and services" (Farhangi, 2010, p. 19). Whereas the existing power grid is an inefficient, unidirectional pipeline that is unable to access information about its endpoints (e.g., residences receiving power) in real-time, the smart grid represents the marriage of information and communication technologies and power systems, adding new communication and data management capabilities (Depuru, Wang, Devabhaktuni & Gudi, 2011).

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The smart grid can be seen as an aspect of broader sociotechnical developments focusing on the sensoring of everyday objects, the Internet of Things. The Internet of Things is described as a “backbone for ubiquitous computing, enabling smart environments to recognize and identify objects, and retrieve information from the Internet to facilitate their adaptive functionality” (Weber & Weber, 2010, p. 1). It is an emerging architecture intended to enable billions or trillions of heterogeneous objects to interact over the Internet. A key component is the development of machine-to-machine communication to automate the exchange of information, goods, and services. These developments represent the integration of the physical world with the virtual world, enabling the increased instrumentation, tracking and measurement of natural processes. The new types and massive volume of data created in this environment are mined to enhance decision-making in business and government and offer citizens increased convenience and safety (Uckelmann, Harrison, & Michahelles, 2010). One aspect of the Internet of Things is the development of smart cities that, via ICT integration, allow advanced infrastructure monitoring, including smart grid management to govern cost- and resource-efficient use of energy (Khan, Khan, Zaheer, & Khan, 2012; Atorzi, Iera, & Morabito, 2010). Smart homes can include automatic lighting and power allocation (CERP-IoT, 2010). This use of ICT to lower environmental impact has been referred to as “Green ICT” (Vermesan et al., 2011).

Smart meters, a component of the smart grid, are energy meters installed at residences by electric utilities to capture energy consumption with more granularity than a traditional electrical meter. This data is captured in real-time and transmitted to the utility via a wireless network. In addition to allowing a constant stream of data about a home’s energy use, smart meters also allow a utility to send commands to the meter, such as turning off the power due to nonpayment of tariffs or reducing the amount of energy available to a home based on the time of day or type of energy use. Energy use data is stored and analyzed by the electric company to identify energy usage patterns and related pricing schemes. In the United States, the *American Recovery and Reinvestment Act* of 2009 funded more than $3.4 billion in grants for smart grid development (Department of Energy, 2011). As of July, 2013, nearly 40% of households in the United States were equipped with a smart meter (Innovation Electricity Efficiency Institute, 2013). Resistance to smart meters has already been documented in a number of communities. For example, Pacific Gas and Electric’s introduction of smart meters in Northern California has been met with protests and publicity campaigns warning of potential threats to health and liberty (Barringer, 2011). When considering how shifting information practices related to residential smart meters might be perceived as violations of social norms, the field of technoethics illuminates the complex relationship between technologies and ethics. It represents an effort to ground inquiry about this relationship in a framework that is holistic, rather than fragmented among multiple, technical disciplines (Luppicini, 2009). Placing this relationship at the center of intellectual inquiry, technoethics enables us to reflect on both anticipated and unexpected outcomes related to emerging information and communication technologies (ICTs) (Stahl et al., 2010).

The Smart Grid/Smart Meters in Hawaii

Hawaii is by far the most petroleum-dependent state in the United States, with almost 85% of total energy consumption in 2008 fueled by petroleum, compared with a national average of 37.5% (State of Hawaii, Department of Business, Economic Development & Tourism, 2011). The existing power grid is limited in regards to incorporation of clean energy sources such as solar or wind power. In 2008, recognizing the long-term economic effects of, and ongoing vulnerabilities imposed by, reliance on oil, the State of