

Title: Lifestyle AMI Home Automation Networks
Author: Bill Melendez
Date: June 18, 2009
Published: Metering International

The recently passed stimulus bill has impacted greatly the electricity industry's business models and notions of consumers as partners in reducing energy consumption and carbon footprint. In the past the utilities' actions on Federal and State demand response initiatives have been mixed. Now there is a new drift towards energy reduction as a means of reducing carbon footprint. But to do this, the utilities will need to elicit energy consumer buy-in and support. Research has shown that consumers do have an interest and desire in reducing energy, in doing their part towards eliminating global warming. The lack of a clear business and technological model within the electric industry, however, has hindered this effort.

To date, there are only a few multi-year studies with smart metering AMI/HAN that capture the energy consumption lifestyles of energy consumers – particularly residential users. There are many pilot programs being deployed (or deployed in the past) to capture some data on consumer trends and habits in home appliance use. These programs are limited in scope with mixed results that may be interpreted either positive or negative, depending on points of view or bias. In order to truly know how consumers can and do respond to energy use reduction, to understand how technology and consumers may interact now and in the future, a new approach needs to be implemented. If the industry is serious about understanding consumer behavior and how technology shapes perspectives and attitudes then tracking ALL appliance use within buildings is the best option to do this. A “whole” house power monitoring system that identifies each and every energy-consuming appliance, which integrates consumer needs, perspectives, and lifestyles with how they consume energy via their appliances and every day living, is needed.

The common problem in the studies published is the focus on electricity consumption and pricing (commodity) verses other potential data that better portray consumer mindsets. Most studies use a question and answer approach to understanding what motivates the consumer to reduce consumption or change appliance usage habits. An old saying state that “actions speak louder than words” and ingrained consumption habits tend to reveal themselves after prolonged periods. Energy use within a home is complex with multiple factors impacting the amount of electricity consumed. Getting a “lifestyle” sampling would help verify data given.

Understanding consumer lifestyles through the way they apply appliances to their every day living is key to modifying consumption behavior. Integrating conservation programs with how people live is the right step towards winning the minds and hearts of energy consumers and getting successful results in demand response or AMI/HAN implementation.

When our company first started pitching in early 2004 about the HAN technology it was developing, the initial response was negative. As one individual put it: “saving electricity when it is so readily available and cheap is a waste of my time.” Things have changed since and consumers are more prudent with this valuable resource. Converting the 2004 mindset of the industry and consumers to the current focus on “green” and global warming issues that now dominate the political and social landscape has been an upward battle. If minds can be changed due to social and political changes, then any implementation of technology has to take these market factors into consideration as part of the strategy for successful HAN development and deployment.

Home automated systems that do not consider the lifestyles of consumers and the impact it has on reducing energy use limit the benefits of smart technologies. In fact, current implemented technologies lack the capacity to do lifestyle analysis and to automatically modify the home network accordingly so as to meet customer expectations while focusing on reducing energy waste. The systems model needed would encompass the emphasis on “energy services” rather than “commodity consumption” and billing. Such home networks advance intelligence in understanding consumer needs while balancing those of the industry. The trend towards consumer partnering with energy providers and service companies will eventually influence what the industry perceives and develops in technology. As the market matures in this

area of home automation, convergence of multiple technologies will seamlessly provide energy services never before imagined or contemplated. Energy management would be an integral part of a typical home environment.

One of the things that an AMI/HAN needs to ascertain is the impact that a continuous interactive technology has on how the occupants use energy. In part this can be derived from historical data, whether the occupants reduce consumption when the system is implement or if there is an increase or flat lining. Manufacturers and implementers need to know what specific things move occupants towards energy conservation and a greater awareness of carbon footprint reduction.

- a. Provide occupants with information as to carbon footprint and how they rate when compared with other participants.
- b. Provide occupants with information of energy saved and cost and their rating when compared to other participants.
- c. Provide occupants with information of energy saved and cost and their rating when compared with previous historical records.
- d. Provide occupants a means to gauge savings goals (budget) verses actual accomplishment in savings on a daily, weekly and monthly basis.
- e. Provide occupants with “energy credit” capacity for trading usage allocations among participants across the network. Swap or sell energy credits on a social network environment.
- f. Provide occupants with real-time pricing information so they can make decisions as to consumption rates and times.
- g. Provide an auto response method for real-time pricing that automates any adjustments needed within the network so as to minimize peak demand costs.
- h. Provide occupants with warning messages that relay costs and usage status
- i. Provide occupants with the capacity to identify critical appliances and receive status messages on those appliances when those appliances meet set criteria as defined by the owner.
- j. Provide remote capacity for distance interaction with the home appliances.

While the list is not all encompassing, it does show the need for a complex software base that takes the AMI/HAN beyond the dollar and kilowatt-hour mindset. Lifestyle systems take into consideration a conglomerate of consumer behavior and adjust accordingly to accommodate utility and consumer needs.

For Further Reading:

John Steinberg, Optimizing HVAC Programming Behavior Remotely to Enhance Energy Efficiency and Demand Response: A Residential Field Study, (EcoFactor, BECC - November 2008).

Peter S. Fox-Penner, Return of the Energy Services Model: How Energy Efficiency, Climate Change, and Smart Grid Will Transform American Utilities, The Brattle Group, Inc., May 2009.

Nathanial Gronewold, “MARKETS: Entering a brave new world of higher-priced electricity” May 5, 2008, ClimateWire.

Andy Frank, “Residential Energy Efficiency: This Is How We Do It (Parts 1&2)” June 9, 2009, EnergyPulse.

Dennis Du Bois, “Demand-Side Management Technology Avoids Grid Construction for Bonneville Power” (Case Study) April 28, 2006, Energy Priorities.

Wayne P. Olson and Gene Meehan, Demand Response and Efficiency as Tools for Mitigating Consumer Impacts, May 17, 2006, NERA.



About the Author: Bill Melendez, Founder and CTO of HEMS Technology has a background in RF and RF systems, both management and product R&D, engineering, marketing, and sales. As a military officer in the US Army Signal Corps, he received training in Communications-Electronics, both fixed and mobile. Bill has over 8 years in utility market and approximately 15 years in RF and AMI/AMR RF systems. He current holds an MBA from the University of Maryland.

About the Company: HEMS Technology provides consumer level, plug and play tools for home appliance energy management and remote control. The company's solution enables a utility to get past the meter for monitoring and controlling home demand at a reasonable price point while providing a potential means of managing rolling blackouts and peak demand.