

Research in Progress Abstract - Construction Practice (Non-Pedagogical Content)

Sustained Energy Reductions in Buildings through Informed Consumer Decision Making

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Building energy use is dependent not only on energy efficient components, but also the behavior of the building's occupant. As such, there is a symbiotic relationship between buildings and their occupants that must be acknowledged. The goal of this research is to improve the energy performance of buildings by treating building occupants as an interdependent part of buildings. This research purports that the hourly and daily modification of occupant behavior leads to effective and viable energy sustaining practices that are currently unrealized. Electricity consumers know more about the daily fuel use of their vehicles than the daily electric energy use of their homes. Consumers are left unaware with little ability to make informed, daily decisions regarding their energy consumption until receipt of their electric bill. To remedy excessive monthly energy use, consumer awareness to construction technologies is promoted, relying on long term technological intervention that does not engage or allow users to quickly evaluate the impact of their behavior on their energy consumption. While various feedback studies on energy consumption exist, this research investigates methods for monitoring electric energy use in buildings using infrared optical signals and evaluates the micro effects of consumer behavior on reducing and controlling electric energy use. To conduct this study, an energy monitoring device was develop at the meter and was hard wired to a panel display within the building. The panel display communicates instant electric energy use, hourly energy use, and daily electric energy use. Overall, the measured data show a 99.7% agreement with billing data reported by the electric utility company. Initial behavioral studies show that consumer control of their energy use is directly related to their awareness to their hourly and daily electric energy consumption. More importantly, a more interactive link between consumers and their energy consumption will lead to fundamental changes in consumer behavior, creating a sustainable and energy conscious society.

Key Words: Residential, Energy Use, Consumer Decision Making, Sustainability