Engaging Building Occupants to Improve Sustainability Performance

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A sustainability initiative is only as successful and meaningful as its ability to improve performance and drive positive change within a building or organization. Increasingly, we are realizing that performance – in the form of energy and water efficiency, waste diversion, improved human health and quality of living, etc. – is only in part a function of the technologies installed in a given facility. It is equally dependent on the extent to which owners, operators, occupants and employees are engaged in actively participating in the effort to improve the sustainability of the building or organization.

Engagement strategies aim to influence behavior changes of employees and building occupants in order to achieve a desired level of performance for sustainability goals. While very few organizations and buildings have made serious strides in addressing the critical issue of occupant engagement, there have been a few notable efforts and significant trends in closing this performance gap. In this whitepaper, we explore the trends, opportunities, technologies and challenges of developing and implementing a successful occupant engagement program for buildings and businesses.

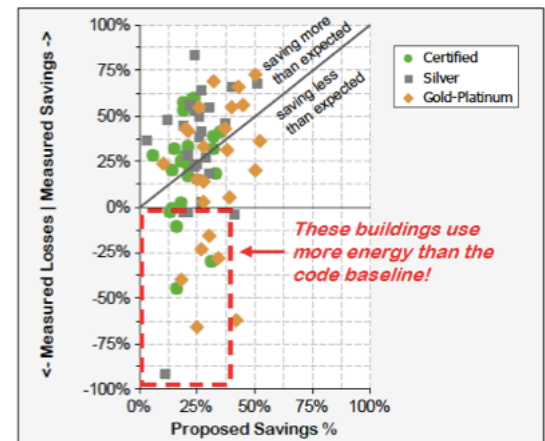## The Problem – Why Occupants Matter

Good intentions do not necessarily equal good results – and this is especially true for initiatives related to the greening of buildings. When a building owner invests the money and effort into achieving LEED® (Leadership in Energy and Environmental Design) certification, they anticipate that the building will perform as projected (in areas such as energy and water usage). However, *actual* performance data – once the building has been occupied – often suggests otherwise.

Many are suggesting that occupant behavior often has a much greater effect on building performance than is taken in consideration – especially with regards to energy models and calculations within the LEED Rating System that anticipate performance. The diagram on the right shows the results of a New Buildings Institute study and speaks to the varied outcomes of modeled performance versus actual performance for a selection of LEED-certified buildings. A building system or program is only as effective if it is implemented and used properly with the building users in mind. Although models and calculations may serve as valuable tools, they don't tell the whole story. For instance, automated lighting controls can be used for significant energy savings – unless building occupants don't know how to use them, therefore they are always left on.

Source: New Buildings Institute

For a building to perform well over time, it is imperative that the sustainability technology and initiatives that we use are aligned with how building users will actually interact with them.

Information and Feedback

Providing meaningful information is an important factor in creating behavioral change. A great way to do this is through real-time building dashboards, developed by companies such as Lucid Design Group (www.luciddesigngroup.com) and Noveda Technologies (www.noveda.com). These dashboards use building metering systems (for electricity use, water

consumption, etc) to gather real-time data that is displayed on a user-friendly sleek-looking interface that can be viewed as a website or physical kiosks at the building (or some even through smartphone apps). Interested building occupants and visitors can play around with the data to see a variety of energy use breakdowns, compare consumption over different time periods, or even to communicate with other building occupants through the social media functions. The dashboard can be used to host competitions between buildings or building floors. In various ways, a building dashboard can be a lot more than tool for displaying information – it can become a means of creating a relationship between the building users and the building itself.

Box-matrix barcodes, or quick response (QR) codes, are smartphone-scannable barcodes with the ability to hold any kind of data (even real-time data), and they are being used to engage app-savvy occupants in educating them on sustainability features. One company is using QR codes to lead building occupants on a sustainability scavenger hunt: occupants to learn about the company's different sustainability practices by finding and scanning the codes, which are hidden throughout the building.

Other technologies give more targeted information, such as the Nest Thermostat (www.nest.com) that employs a simple graphic interface to give users relevant information and store energy usage data to tell you how and when your energy bill is affected the most. The thermostats can also learn energy use habits to create a customized heating and cooling schedule. Another feature responds to human absence to avoid heating and cooling imbalance. The simple interface, automated features and understandable metrics change the way occupants use energy. Another example of technology-fostered engagement is the Syracuse Center for Excellence's use of a Building Management System (BMS). In this system, a red light signals to occupants that windows can be opened to bring in fresh air and shut off unneeded mechanical ventilation, heating, and cooling in the building.

And while there is often a focus on energy, other resource usage, such as paper consumption, can be a prime candidate for increased efficiency through simple information. A number of organizations have been employing paper use optimization software (such as PaperCut, www.papercut.com) that offers a way for users and managers to regulate printing resources. The software uses alerts to prioritize dual-sided printing and low ink usage, and tracks paper use by department or individual, resulting in massive reduction in unneeded paper usage.

Technology-based approaches, while often high in wow-factor, are not the only options for improvement. A marketing technique called Community Based Social Marketing (CBSM) is increasingly being used to facilitate behavioral change by analyzing and responding to human habits. Where typical marketing campaigns focus almost exclusively on one-way communication and may only temporarily raise awareness about an issue, CBSM involves interaction and dialogue at the community level. By focusing on simple and incremental changes in habits and setting measurable short- and long-term goals, CBSM campaigns are uniquely able to track progress and effect change. Psychologist Doug Mckenzie-Mohr cites CBSM as a powerful form of feedback with the ability to change behavior, a phenomenon he has termed *social diffusion*. In one example, Bear Creek Elementary School in Boulder, Colorado wanted to increase the number of students walking or biking to school. Students were given colored armbands based on the distance they either walked or biked, which generated conversations amongst the children about walking and biking to school, harnessing the power of dialogue to effect behavioral change.[1]
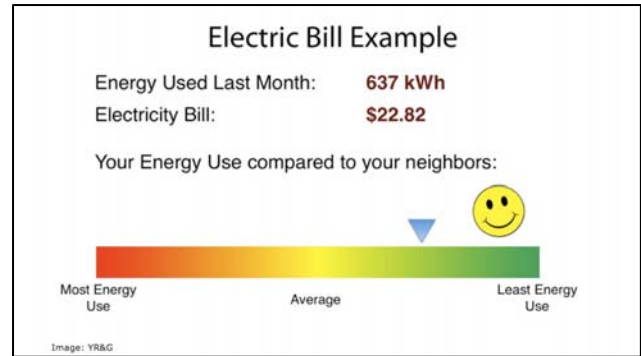
It should be noted that social diffusion among building users might be an effective way to engage occupants in achieving a sustainability goal. In other cases, it might be as simple as a suggestion box, an email list-serve or web-based comment box.

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[1] *Fostering Sustainable Behavior: Community Based Social Marketing,* Doug Mckenzie-Mohr. www.cbsm.com/pages/guide/preface/

Understanding Human Behavior
The environment shouldn't be some abstract pity case that you need to take a moment to remember – akin to sticking to a diet or personal austerity plan. People respond to things that are interesting, that tell a story, that feel like a game, while they do terribly at remembering to send their aunts and cousins cards on their birthdays. The way to make things interesting and to tell compelling stories is to provide simple, digestible and relevant information that draws people forward and in.

How the information is presented can be equally as important as having it available in the first place. In California, the Sacramento Municipal Utility District (SMUD) conducted a study to see how they could affect their energy performance of their residential customers through their monthly utility bills. In the study, the monthly utility bill included a smiley face for customers who consumed less energy than average and a "frowny" face for those who consumed above average that month. As it turns out, smiley faces work - of the 35,000 homes that received the energy comparison on a monthly basis, SMUD reported that they've lowered their energy usage by about two percent,[2] while customers who received the "frowny" faces generally took action to improve their score (although many frown recipients reportedly wrote letters to the utility unhappy with being judged in such a negative fashion, and the utility has had to repeal the "frown" portion of the program).

Electric Bill Example

Energy Used Last Month:	637 kWh
Electricity Bill:	$22.82

Your Energy Use compared to your neighbors:

Most Energy Use   Average   Least Energy Use

Image: YR&G

Building owners, operators, and facilities managers should consider themselves as *choice architects,*[3] as they can have an amazing effect on behavior simply by organizing the context in which people make decisions. Simple actions such as placing signs by the elevators that encourage people to take the stairs can increase stair usage by 50 percent.[4] Similarly, a composting sign in a grocery store or restaurant that has images of the things sold there that can increase the chances of a successful composting program. Providing a list of local restaurants that provide organic, local or low waste packaging options makes it easy to choose these types of options and incentives the restaurants to make changes to be on the list. Even subtle language changes such as signs that say "Landfill Waste" rather than "Trash Only" can make an increase in recycling efforts.

It's true that we don't all have offices like Google with slides and ladders to go up and down between floors, but we can still have a little fun through initiatives that work with our human nature rather than against it. There are countless examples of competitions (with prizes of course) that have fostered our desire to compete in the name of sustainability. One such example is the Massachusetts boarding school that, after hosting a Green Cup Challenge using a building dashboard, cited a monthly energy savings of 10,000 kWh ($1,500/month, or approximately $18,000/year).[5] Stonyfield Farm challenged its employees to save energy by tying energy savings to employee bonuses, and the company ended up reducing annual energy use by over 22 percent.[6]

Developing an Occupant Engagement Strategy
There are many ways to go about engagement employees in support of a broader sustainability initiative. When deciding on which set of strategies to use, it important to identify clear goals and barriers that might

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[2] http://abcnews.go.com/GMA/Weekend/story?id=6879243&page=1#.TtZ2YHMbWHs
[3] Nudge: Improving Decisions About Health, Wealth, and Happiness by Richard H. Thaler and Cass R. Sunstein
[4] www.nyc.gov/html/doh/html/pr2008/pr033-08.shtml+&cd=4&hl=en&ct=clnk&gl=us
[5] Lucid Building Dashboard website. www.luciddesigngroup.com/
[6] NEEF. The Business Case for Environmental Sustainability Employee Education, p.5. www.neefusa.org/BusinessEnv/white_paper_feb2010.pdf

affect how to go about achieving those goals. The barriers might have to do with the people or the existing infrastructure or both. It is important to recognize that there may be different kinds of barriers for different building populations, who will respond to the same strategies in different ways. In some cases, multiple strategies might be needed. In others, a test-run or pilot program could be useful. Lastly, be sure to develop an appropriate metric by which to measure your success. And most importantly, don't expect technology along to lead to success without the supporting efforts to communicate, intrigue, tell stories, and give meaningful feedback.

For more information, please contact Josh Radoff at *jradoff@yrgxyz.com*.

Suggested Reading
Drive: The Surprising Truth About What Motivates Us, Daniel H. Pink.

Fostering Sustainable Behavior: Community Based Social Marketing, Doug Mckenzie-Mohr and William Smith.

Going Green: The Psychology of Sustainability in the Workplace, Ed. Dean Bartlett.

Nudge: Improving Decisions About Health, Wealth, and Happiness, Richard Thaler and Cass R. Sunstein.