

Energywi\$e Pilot – Results and Lessons Learned

Do you know how much electricity your campus building consumes every month? How much does that electricity cost the University? How much money could be saved and greenhouse gas (GHG) emissions avoided if you and your peers more effectively conserved energy? These questions prompted the Office of Sustainability to explore how a culture of energy conservation might be promoted in campus buildings.

The Premise

Most of us know how much electricity we use at home. Monthly bills provide periodic feedback, and the choice is a personal one – to write a bigger check or reduce our use. On a large campus like the University of Maryland, there are more than 46,000 different energy users *but just a handful* of people who pay the electric bills and know the true costs. To address this disconnect, the Office of Sustainability, with support from Facilities Management and select campus departments, piloted a program called *Energywi\$e UM* in fall 2009 to more actively engage building occupants in energy conservation.

The Pilot

Energywi\$e educated building occupants about how much electricity their building uses, what it costs, and where their help was needed to reduce consumption. During a six-week pilot, occupants in three campus buildings – the Chesapeake Building and Van Munching and Martin Halls were given weekly electricity usage reports. These surrogate utility bills tracked building electricity consumption against a weather adjusted baseline. The data included kilowatt hours (kWh), dollars, and pounds of carbon dioxide (CO₂) released into the atmosphere. Each week, building occupants were encouraged to beat the previous week's usage by adding an additional conservation strategy – simple things like turning off lights, powering down computers when not in use, and putting on a sweater instead of plugging in a space heater. When a building did well, it received a ☺. When consumption went up, it received a ☹.

The project was coordinated by the Office of Sustainability, a small group within the Division of Administrative Affairs that is working across the campus to promote GHG reductions and environmental sustainability. Three student interns working for academic credit served as building coordinators, meeting with liaisons in each building to understand the occupants' unique needs and culture and touring the buildings with Facilities Management (FM) staff to identify promising energy conservation strategies. They also surveyed occupants to assess their willingness to conserve energy and to gather their suggestions. In two of the buildings, relationships that were forged with FM led to heating, ventilation, and air conditioning (HVAC) schedule adjustments, which reduced electricity usage during unoccupied hours.

Each week the interns tracked building electricity usage and distributed the building energy reports to occupants. They tacked up signs reminding folks to take the stairs (instead of the elevator) and to open doors manually (instead of using electric doors that draw large volumes of air out of the building, making mechanical systems work harder). They left notes and chocolates on chairs in darkened offices to reward those who were saving energy. None of this was expensive – there were direct costs for food rewards, copying expenses, and a couple of “Kill-a-watt” meters that the students used to show building occupants how much electricity certain equipment used. The pilot was supported through a grant from the National Wildlife Federation's Campus Ecology Fellows program.

The communication materials made use of social marketing research about behavior change. Messages were specific (“Flip the switch” instead of “Save energy”) and were framed in terms of what could be lost (scarce utility budget resources). They tapped into the social norm of consensus because research shows that people are most motivated by what their peers are doing. They also used simple symbols - ☺, ☹, and ☹ - which have been demonstrated to motivate behavior change.

Results

Compared to a weather adjusted baseline for each building, the reductions ranged from 0% to 10%, with the Chesapeake Building seeing the largest reduction. This is not surprising since staff members in administrative buildings are generally easier to reach than faculty and student populations in buildings with greater transience during the work day.

Electricity savings during the six-week pilot amounted to 32,000 kWh, which at average daily rates would have cost the University \$3,800. This translated into more than 50,000 pounds of CO₂ emissions, which is equivalent to taking 4 cars off the road for a year. Importantly, there were a number of factors beyond behavior change and weather fluctuations that could have influenced electricity usage, such as occupancy levels, equipment changes, and mechanical problems or upgrades. Even so, the reductions were welcome news.

Beyond the data, there is additional good news about educational outcomes among building occupants. Post pilot surveys indicated that a number of building occupants were willing to change their behavior as a result of participating in *Energywise*. In the Chesapeake Building for instance, 45% of 70 survey respondents reported that during *Energywise*, they were more likely to turn off unneeded lighting during the day. Sixty-four percent reported changing their behavior based on a reminder sign (e.g., “Take the Stairs”). Half of respondents claimed to have learned something new from the pilot and 40% reported using the conservation tips at home.

Results from the academic buildings were similar with over 90% recommending that *Energywise* be expanded to other campus buildings. Since the pilot ended in late 2009, the three buildings have consistently used less energy than the prior three year average. Temperature is a significant factor, but the HVAC schedule adjustments implemented as a result of *Energywise* during evening and weekend hours are also likely contributors to the reductions. The Office of Sustainability continues to send monthly messages to building occupants, sharing the positive downward trend along with reminders for how to effectively conserve electricity.

Lessons Learned

There are a number of lessons and observations from the pilot that will be incorporated into any energy conservation effort going forward:

1. Occupants want to conserve energy but need prompting and specific guidance. Messaging should focus on efficacy (*you can do this and it will save electricity*).
2. Data about building energy use is motivating to some occupants and can be a powerful tool in the hands of operations staff. Data collection and reporting costs must be balanced against other

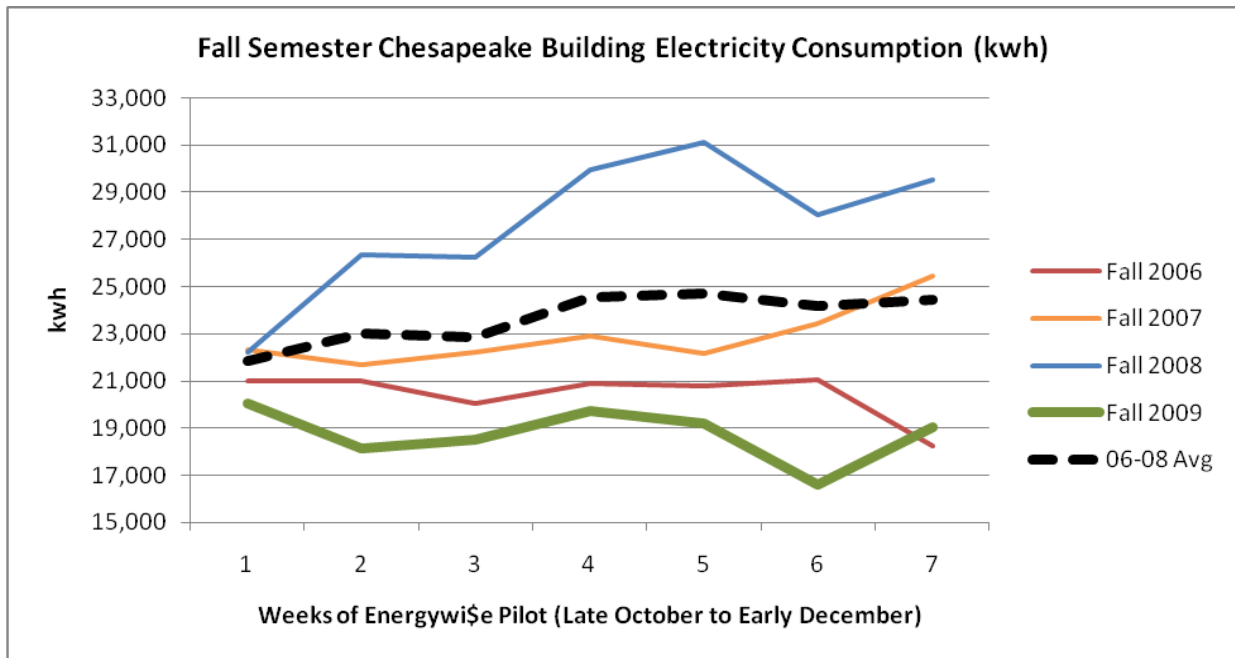
programmatic requirements. Monthly reporting, though less “real time” may be adequate to provide operational insights and motivate some occupants.

3. Strengthening relationships between departmental liaisons, operations staff, and FM can lead to opportunities for additional schedule-related (e.g., HVAC and lighting) savings. These savings will likely dwarf occupant-related conservation measures.
4. Fixing a highly visible source of waste (e.g., architectural lighting left on during the day) could influence additional conservation. Anecdotally, visible examples of waste were cited as a potential reason that some building occupants will not conserve.
5. A more nuanced information technology (IT) understanding is needed. *Energywise* communicated about “powering down” computers when not in use but there are a number of myths that need to be addressed (e.g., computers in “sleep” mode cannot be accessed remotely). Power settings are generally within occupant control and are an opportunity for real savings if barriers can be understood and addressed.
6. A culture of energy conservation is needed. This will take constant reinforcement. Suggestions from participants included having conservation messages reinforced in staff/faculty meetings and by faculty in their classes (e.g., the last person to leave turns off the lights). People need to hear the message from multiple sources to believe that it is an institutional priority and understand what is expected of them.

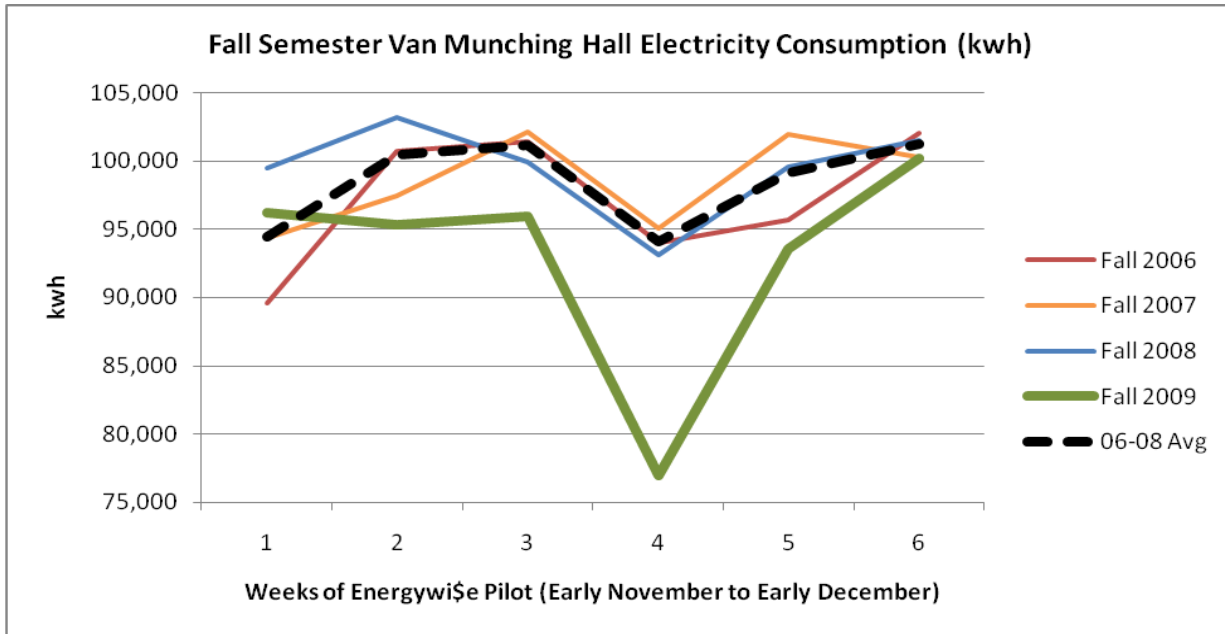
APPENDIX – Building Specific Data

For those with a building-specific interest, the following graphs show how the three pilot buildings performed against the same period in prior years. These graphs do not normalize for weather but do plot a three year average (dashed line). Thanksgiving occurred during week 6 in the Chesapeake pilot and during week 4 in the Van Munching and Martin Hall pilots.

Chesapeake Building – 40,000 sq. ft., built in 1991. Houses four Administrative Affairs departments – Human Resources, Comptroller, Procurement, and Environmental Safety. The overall Chesapeake reduction, against a weather adjusted baseline, was calculated to be ~10%. Data analysis in Chesapeake showed that building HVAC systems were running during unoccupied periods. As a result, several evening and weekend HVAC schedule adjustments were implemented during the pilot period, modifications which contributed to the reported reductions.



Van Munching Hall – 150,000 sq. ft., built in 1992. Houses the Smith School of Business and the School of Public Policy. The overall Van Munching reduction, against a weather adjusted baseline was calculated to be ~3.0%. The *Energywise* reporting process gave operations and FM staff in Van Munching Hall information about how electricity use corresponded to building schedules. This highlighted opportunities for setbacks that would not inconvenience occupants. The precipitous dip in week 4 was in part due to extensive HVAC set-backs that were implemented for the Thanksgiving break. This was a result of a strong partnership forged between FM, Smith Operations, and the *Energywise* building coordinator.



Glen Martin Hall – 88,000 sq. ft., built in 1950. Houses Clark School of Engineering Departments – Mechanical, Civil and Environmental, and Aeronautical. Reductions in Martin Hall against a weather adjusted baseline were negligible.

