THE MAGAZINE OF MILITARY HOUSING, LODGING & LIFESTYLES

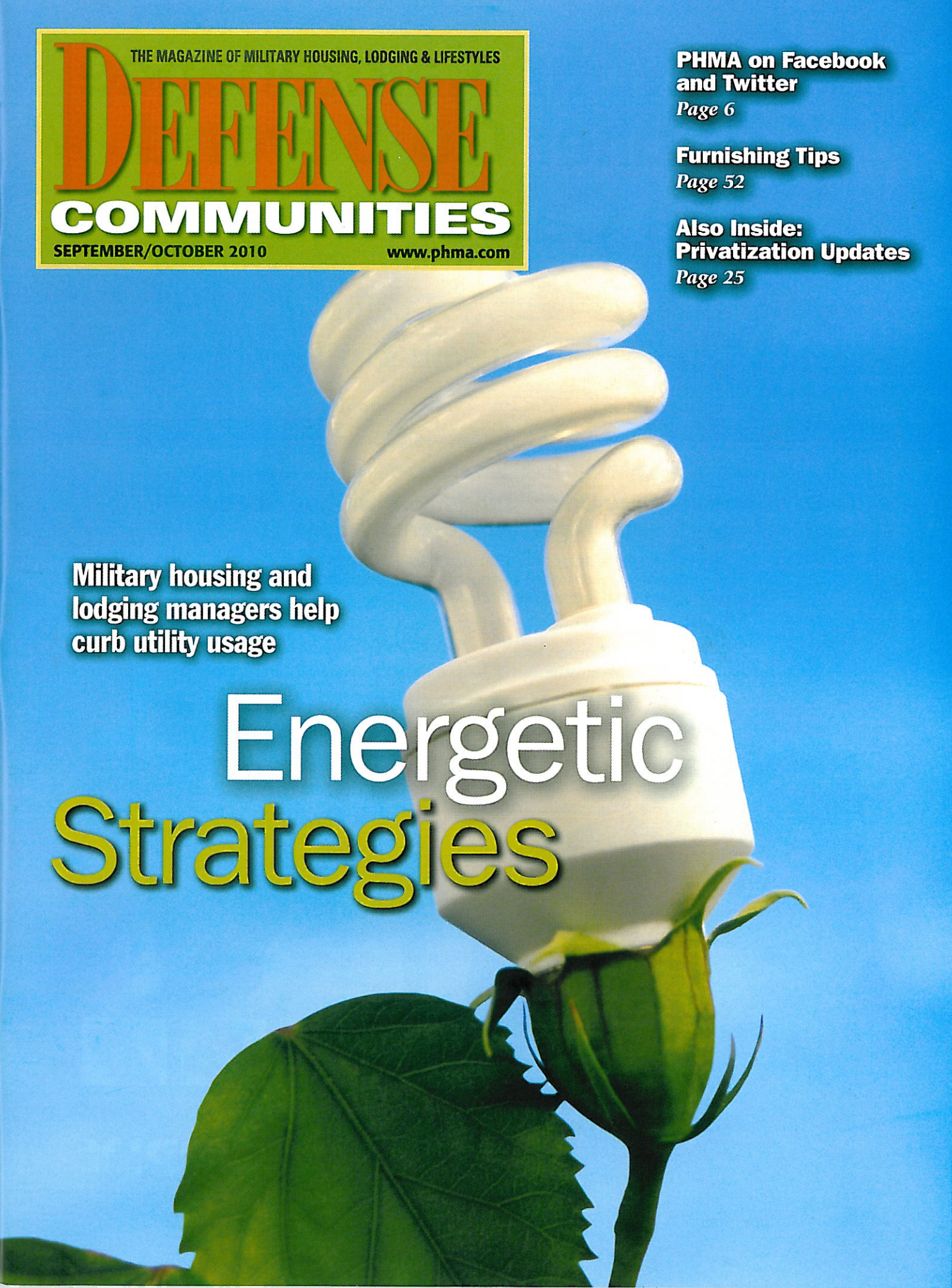
DEFENSE COMMUNITIES

SEPTEMBER/OCTOBER 2010 www.phma.com

PHMA on Facebook and Twitter
Page 6

Furnishing Tips
Page 52

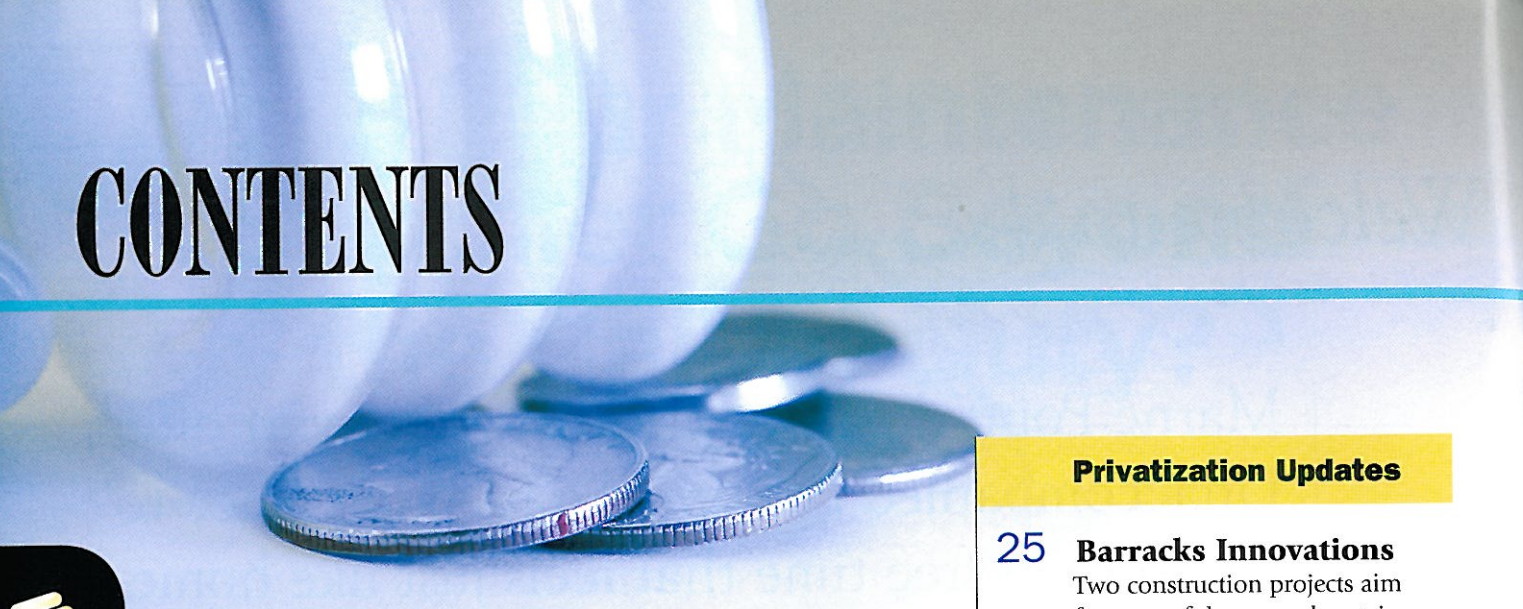
Also Inside: Privatization Updates
Page 25



Military housing and lodging managers help curb utility usage

Energetic Strategies

CONTENTS



SPECIAL SECTION:
energy conservation

Please send your articles for *Defense Communities* to Birgitt Seymour at *phmadefensecommunities@earthlink.net.*
NEXT EDITORIAL DEADLINE:
January/February: *November 5*

Privatization Updates

Shedding New Light on Older Buildings

Retrofit strategies that curb electricity use help reduce expenses and environmental effects

By Andy Wakefield

Statistics about electricity use by the US Department of Defense are rather startling. For example, the Defense Department's electricity use would supply enough electricity to power more than 2.6 million average American homes. In electricity consumption, it would rank 58th in the world, using slightly less than Denmark and slightly more than Syria.

Lighting is a major contributor to this electricity use because it is often the single largest consumer of electricity in buildings. Studies of private-sector commercial buildings show that electricity accounts for 38 percent of the electric bill—more than cooling, heating, and equipment. If you walk around the average building, you'll see why: The lights are too bright, they're on for too long, and they illuminate vacant spaces. To control total energy costs, military housing and lodging managers would see immediate results by addressing lighting strategies.

Take control of lighting

Often, the root of high costs is outdated lighting design that lacks flexible lighting control management tools that help minimize electricity use. The solution is an energy-saving retrofit using lighting control technology that may not have been available when the building was constructed.

Georgian College in Barrie, Ontario, Canada, reduced its lighting bill by 70 percent ($137,000 annually) with a lighting retrofit. The college's lighting system was nearly 25 years old and represented technology and deployment that was characteristic of its time. Jeff Choma, Georgian College's manager of mechanical and electrical systems, oversaw the project.

"We really took the time to select the best technology for our campus," he says, adding that after reviewing several products, the college went with a versatile and user-friendly solution.

The school hired electrical contractors to retrofit the fixtures and add communication wire where needed. Existing wiring was used whenever possible. Once the wiring was in place, a system of daylight sensors, occupancy/vacancy sensors, and in-wall controls were installed, all of which could be easily programmed by school staff.

The results and benefits were immediate. Daylight sensors in windowed areas dimmed fixtures to take advantage of daylight. The system directs fixtures throughout these rooms to react to commands from the daylight sensor as a group. The school is using combinations of daylight and occupancy/vacancy sensors in more than 500 areas. As a result, Georgian College is saving more than 70 percent in energy costs over the previous lighting systems. The school is paying off its renovation loan with the savings.

Save energy and money

Depending on the investment, housing managers can expect to reduce lighting costs by 20 to 60 percent by using a light-

Strategies for Lighting Control

Each of these lighting control strategies can be built upon a previously installed strategy, allowing the total lighting control system to suit any space and budget. These are examples of ways to retrofit lighting control solutions one room at a time.

1. Replace switches with dimmers. A stand-alone solution is the simplest and most cost-effective way to retrofit for energy savings. A facility manager simply replaces the switches with dimmers. Using the dimmers for tuning and high-end trim will typically reduce electricity use by 20 percent in every space.

The stand-alone solution for fluorescent lights is to replace switches with dimmers and replace switching ballasts with dimming ballasts. Fluorescent dimming ballasts are generally more efficient and cost-effective than switching ballasts. The typical payback period is less than three years.

2. Install occupancy/vacancy sensors. The addition of occupancy/vacancy sensors can save another 15 percent in a stand-alone system. Sensors turn off lights completely when a room is unoccupied. Wireless occupancy/vacancy sensors are ideal for retrofit applications because they require no re-wiring. Installation is easy, by simply attaching the sensor on the ceiling and replacing the on/off switch with a matching dimmer.

With dimmers and occupancy/vacancy sensors, stand-alone systems can cut electricity costs by 35 percent in each retrofitted space. Stand-alone system retrofits yield electricity savings for individual rooms, but multiple rooms containing these controls cannot be tied together and operated as a single system.

3. Consider going digital. To retrofit a fluorescent lighting system that requires more complex energy-saving strategies, start with a digital dimming ballast. Digital dimming ballasts provide a flexible, scalable foundation for lighting control systems that can deliver electricity savings of more than 50 percent.

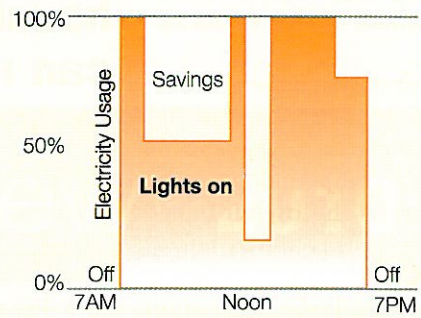
Using digitally addressable ballasts allows light fixtures to be directly networked with time clocks, occupancy/vacancy sensors, daylight sensors, wall controls, handheld remote lighting controls, and window shades to create a total light management system. Additionally, digital dimming ballasts can be easily reconfigured as spaces change.

4. Control sunlight with sensors.

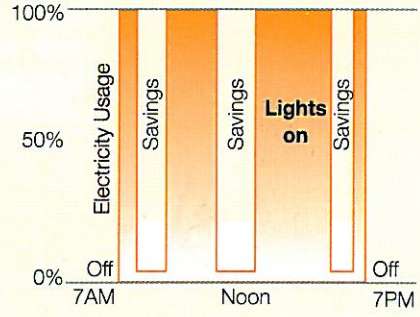
A combination of dimming ballasts, daylight sensors, and automated window treatments can maintain the optimum light level for each space in a facility and effectively use the available ambient light to save energy and improve occupant comfort.

Electrical lights automatically dim when enough daylight is available. Harvesting daylight with dimming ballasts, daylight sensors, and automated window treatments maintains overall light levels and maximizes the use of free sunlight. In addition, sheer window shades automatically close to reduce glare and solar heat gain while maintaining the view.

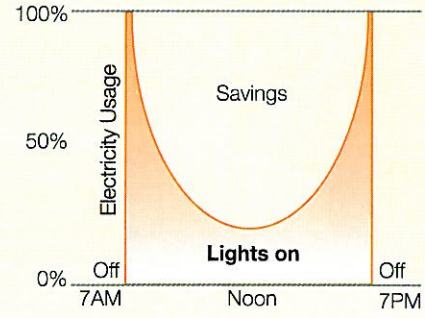
Manual dimming



Occupancy/Vacancy sensing



Daylight harvesting



ing system like the one at Georgian College. Additionally, lower lighting costs translate directly to lower HVAC costs. With less heat from the lights, there is less need for air conditioning. The rule of thumb is that for every three watts of lighting cut, a housing manager can reduce HVAC needs by one watt.

Lighting control systems employ a variety of strategies to save electricity use. These strategies and the resulting cost savings compound as each strategy is added to the overall lighting control system. This allows housing managers to build a total lighting control system gradually by employing one strategy at a time to suit any space and any budget.

Dimming is the easiest way to cut lighting costs. Dimmers can easily reduce electricity usage from 15 to 20 percent through high-end trim, light-level tuning, and personal light control.

High-end trimming sets the maximum light level for each space. For example, the human eye can barely distinguish between a light level of 100 percent and a light level of 80 percent. Dimming lights to 80 percent reduces energy use by about 20 percent while keeping light levels comfortable for the human eye.

The rule of thumb is that for every three watts of lighting cut, a housing manager can reduce HVAC needs by one watt.

Light-level tuning sets the appropriate light level for each space. Typical lighting levels in office spaces are much higher than necessary, which is often due to large, outdated banks of overhead lights that were installed before the widespread adoption of computers. Using high-end trim in addition to dimming lights in home office spaces, for example, minimizes glare from computer screens and creates a more comfortable lighting environment for the human eye. Even when high-end trim is used, many offices choose to dim the lights even further to minimize glare on computer screens.

Empower energy users

Personal light control lets individuals control energy consumption using remote-control units that affect specific areas of the home. For example, in a home office space, a resident may choose to dim the light level using a remote-control unit to lower the lights directly above the desk, and in the kitch-

en, the task lights can be slightly brighter. Studies show that giving people direct control over their own lights can reduce electricity use by at least 10 percent.

Occupancy/vacancy sensing automatically turns off lights after occupants leave a room or space. On average, occupancy/vacancy sensors can reduce lighting electricity use by 15 percent. Depending on the use and size of a space, sensors can save electricity use by as much as 60 percent.

Daylight harvesting automatically dims electric lights when enough daylight is present. Daylight harvesting can save an additional 15 percent in lighting electricity costs in buildings with many windows or skylights. With continuous dimming ballasts, daylight sensors start to dim the lights as soon as daylight is sensed in the space, thereby immediately saving energy.

Controllable window shades serve a dual purpose to let daylight in and keep excess heat and cold out. For total control of the visual environment, shades can open and close automatically at different times of the day to harvest daylight and reduce HVAC costs by as much as 30 percent.

React to energy demands

Demand response/load shedding reduces the overall lighting load at times when electricity costs are the highest. Many utility companies offer incentives to customers who are willing to reduce their electricity use during peak demand periods, i.e., during normal office hours when residents are at work, overnight hours, or holiday hours.

Scheduling will automatically dim or turn lights off at certain times of the day. Although large residential buildings with many occupants operate on 24-hour schedules, most of the common areas are thinly populated during normal office hours, overnight hours, and holiday hours. With scheduling, a housing manager does not have to depend on the last person that leaves a common area of the building to turn off the lights. The housing manager can use scheduling to automatically dim or turn off lights at appropriate times. Scheduling can reduce lighting costs by an additional 10 percent.

An energy-saving retrofit can save 35 percent of electricity costs immediately after installation. (See "Strategies for Lighting Control" on page 13.) By employing a scalable lighting control solution to residential buildings, military housing and lodging managers can better control their lighting costs and help reduce overall energy use. ■

Andy Wakefield is Government Business Development Director for Lutron Electronics. For more information, contact Leanne Hanson at lhanson@psbpr.com.