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Title: Green design nets results, study shows
Author: Tim Kauffman
Source: Federal Times
Date Written: 5/13/2008

Federal facilities incorporating sustainable design features cost less to operate, consume less energy and have more satisfied employees on average than all U.S. commercial buildings, according to a landmark study to be issued this week.

The study evaluated performance data from a dozen owned or leased buildings either constructed or renovated this decade by the General Services Administration and compared it to results from surveys of commercial buildings. The results should sway skeptics inside and outside of GSA who continue to doubt the true benefits of building sustainable facilities, said David Bibb, acting GSA administrator.

"I think when people see this study, people on the fence will jump over to the right side of the fence," Bibb told *Federal Times*.

The results, overall, are impressive. The 12 buildings surveyed produce 33 percent less carbon emissions, consume 26 percent less energy and use 3 percent less water, on average, than all U.S. commercial buildings. In addition, employees in the 12 federal buildings were 29 percent more satisfied with their working conditions than other employees.

But the findings do suggest areas for improvement. Even though the 12 buildings were designed to meet sustainability requirements or save energy, some performed worse in other respects than buildings designed with no green features. The lowest-performing green buildings used 33 percent more water than the national average, had higher energy and maintenance costs than commercial buildings and had less satisfied employees.

Those results reinforce the need to set specific performance goals at the outset and adhere to those goals throughout the design and construction of buildings, said Donald Horn, director of sustainable design at GSA.

"If you set good project goals to be energy efficient and focus on these higher performing issues, you're more likely to achieve them. The projects where green was maybe not a top priority from the start are buildings that don't perform quite as well," Horn said. "It's kind of obvious, but this helps to reinforce that it's got to be a project priority from the start if you want to achieve a high-performance green building."

The study found that occupant satisfaction is undermined in many of the buildings by poor acoustics, poorly planned lighting and maintenance problems. Some green buildings sound louder than traditional offices because of open layouts, the use of hard surfaces such as steel and concrete and deliberate efforts to minimize background noises. Another common complaint is glare on computer monitors that results from poorly designed natural lighting features.

GSA officials intend to continue studying the buildings and adding others to its study as they come online so building owners and developers can make better choices about sustainability features.

"We hope that the study itself will spur follow-on research. You can come back and look at those buildings and look at a larger set of buildings and see if there are trends we can identify," said Kevin Powell, director of research in GSA's Office of Applied Science.

Federal Times obtained an advance copy of a white paper summarizing the findings of the report, which was completed by the Energy Department's Pacific Northwest National Laboratory.

The buildings were selected to represent different regional climates and a mix of uses, including courthouses, multiagency federal centers and agency-specific offices.

The best-performing buildings by far were two facilities that earned the second-highest ranking, gold, from the U.S. Green Building Council's Leadership in Environmental Design (LEED) program. The two buildings - the Carl T. Curtis Midwest Regional Headquarters of the National Park Service in Omaha, Neb., and the Omaha regional headquarters of the Homeland Security Department - use 54 percent less water than the national average, have the lowest utility and maintenance costs, and have the highest employee satisfaction scores of all other federal and nonfederal buildings.

GSA requires a minimum LEED rating of silver, one step below gold, for all new buildings and major renovations. That's unlikely to change any time soon because of the higher upfront costs involved in achieving top LEED ratings, but the study clearly documents the benefits, officials said.

"I don't know that we will request funding to go to the gold level, but if we do, we have the data to back that up," Bibb said.

Eight of the 12 buildings studied meet or exceed basic LEED certification, while the others were designed to meet requirements of Energy Star or other programs.

One of the buildings analyzed was the John J. Duncan Federal Building in Knoxville, Tenn., which houses local offices of the FBI, Internal Revenue Service, Housing and Urban Development Department and other agencies.

The eight-story building was completed in 1986, but by 2004, the building's energy system was "on its last leg," building manager Johnathan Sitzlar said at the GSA Expo last month in Anaheim, Calif.

A modern energy management system was installed that centralized control over the chillers and boilers, lighting, restroom exhaust fans and practically anything else that uses energy. Sitzlar uses meters to see how much energy the building is consuming at any given time and can adjust systems if needed to reduce the energy load. For example, Sitzlar can turn off the chillers near the end of a day to avoid cooling a building that soon will be empty.

Other renovations included replacing the old wooden cooling tower with a stainless steel model that uses half the horsepower, installing motion sensors so lights turn off automatically when rooms are unoccupied, reducing the height of furniture to bring more natural light into the building and installing waterless urinals that save 40,000 gallons of water per fixture annually.

In its first year, the building surpassed federal energy reduction goals by 33 percent. It saves more than 290,000 kilowatt-hours of electricity annually over previous use, enough to power 26 average homes, and saves 400,000 gallons of water annually.

All told, Sitzlar spent \$160,000 for the improvements and will have recouped that investment in less than four years.

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