FEDTECH TECHNOLOGY INSIGHTS FOR LEADERS IN FEDERAL GOVERNMENT
BROUGHT TO YOU BY: CDW-G
Published on *FedTech Magazine* (http://www.fedtechmagazine.com)

How to Re-Energize Government Buildings to Meet Sustainability Goals

Green IT is critical for sustainability.

Agencies are making significant progress toward the sustainability goals established in an executive order issued by President Obama in 2009, and technology is a valuable tool in these efforts. The focus on reducing greenhouse gas emissions and improving energy efficiency, among other sustainability goals, is driving innovation across the government.

The success that agencies have had in using technology to make progress toward these sustainability goals offers lessons to others looking to improve building efficiency.

Assess the Situation

Most agencies start by performing an energy audit. It's the best way to truly understand where the greatest inefficiencies are, says Thomas Day, chief sustainability officer at the U.S. Postal Service. The Postal Service has a goal to reduce total facility energy use by 30 percent by fiscal 2015. Although it is conducting some data analysis in this effort, the USPS uses a "feet on the ground" approach to examining its 400 mail processing facilities, along with some of its larger post offices, Day says. These audits include all systems in the building, from lighting to airflow.

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Many agencies, including the General Services Administration and the Agriculture Department, use a more automated approach to energy audits, such as the Environmental Protection Agency's web-based Portfolio Manager. This tool helps agencies benchmark a building's energy performance and summarize energy information and building characteristics, such as energy intensity, greenhouse gas emissions and gross floor area.

Use Automated Monitoring Systems

In wide use among agencies is energy management software, which automates the utility monitoring process, allowing quick fixes that save money over time. This growing category of software includes tools for metering, automation of lighting and heating, ventilation and air conditioning (HVAC) systems, utility bill tracking and IT equipment management. IBM, CA Technologies and Schneider Electric are among the many vendors that offer these types of tools.

"Energy management software is increasingly cloud-based, so decision-makers can see what is going on down to the control or meter level," says Eric Bloom, a senior research analyst at Pike Research. "It is a great way for organizations to identify opportunities to retrofit specific pieces of equipment that are malfunctioning or wasting energy. It's also a good way to have ongoing verification that a building is operating as efficiently as possible."

GSA, which is responsible for more than 9,600 government buildings, both owned and leased, has installed advanced meters, sometimes called smart meters, in 450 of its largest and most remote facilities. The agency also has installed an advanced analytical system so its Public Building Service can remotely analyze, manage and monitor energy consumption in real time.

"It allows us to compare historical data with current performance over different time periods and compare one building's performance with another," explains Dorothy Robyn, commissioner of GSA's Public Building Service.

The Postal Service uses its Utility Management System, a web-based system that analyzes utility consumption and related costs at nearly 6,000 facilities. "It allows us to look at anomalies within a building or similarly situated facilities to see if something is out of line and needs to be addressed," Day explains.

$2 Billion

Amount directed by a 2011 presidential memorandum to go to green building upgrades for federal properties

SOURCE: The White House

The Value of Integrated Building Automation Suites

While automated monitoring technology for individual systems such as HVAC or water consumption is extremely useful in reducing energy consumption, some agencies are turning to more comprehensive building management systems, which control and monitor all of a building's energy-intensive equipment, such as power systems, lighting and ventilation. Many also can interface with smart meters to control and manage water, electricity and gas consumption. These systems, which include IBM TRIRIGA Energy Optimization, Honeywell Enterprise Buildings Integrator, Siemens InfoCenter Suite and Emerson Network Power's Critical Power Management System, not only collect and analyze data in real time, but also provide a consolidated, user-configurable, web-based dashboard.

"These systems allow you to monitor and track building energy use to ensure that it is running as efficiently and effectively as possible, and set certain parameters so that if one of those building systems isn't within those parameters, you would receive an alert," explains Dean Johnson, facilities energy and water program manager in the Environmental Management Division at the USDA. "If we had these in all of our facilities, I could get daily or weekly updates on the performance of all buildings just by going to a web portal. It would help with both communication and troubleshooting."

The USDA has deployed building management systems primarily in its more energy-intensive facilities. Johnson says that these systems, along with the EPA Portfolio Manager and smart meters, have helped the agency measure and verify a 22-percent decrease in energy intensity since 2003.

42%

The percentage of electricity buildings consume worldwide, surpassing any other asset

SOURCE: ABI Research, 2011

Other agencies are turning to whole-building management systems as well. The USPS, for example, uses its Enterprise Energy Management System to consolidate internal and external facility-related energy data, including data from its Utility Management System, to help measure, monitor and manage facility performance.

GSA's Public Building Service recently settled on IBM TRIRIGA for analyzing the energy use in its buildings and identifying opportunities for increased efficiency. During the first year, the system will be installed in about 50 buildings. As additional federal buildings are constructed and other facilities are upgraded, those buildings will also be managed with the platform.

"We developed this program as a result of an analysis that Lawrence Berkeley National Laboratory did for us in 2008," Robyn says. "They concluded that if we went to this kind of system, we could reduce the cost of operating our buildings by an estimated 52 cents per square foot."

Policies Are Essential

When it comes to building sustainability, technology can take an agency only so far. The human element is best addressed through policies such as these:

- Promote and foster sustainable operations by creating a team focused on this topic, a step the USDA has taken. In addition to increasing the focus on sustainability, establishing a team creates excitement for reaching federal goals.
- Require each program to monitor sustainability improvements through a self-assessment every year, as the Veterans Affairs Department has done.
- Take advantage of the Energy Department's *You Have the Power* campaign to distribute important sustainability information to employees.

Don't Dismiss Quick Wins

As important as comprehensive systems are, implementing smaller changes can yield significant value. For example, the General Services Administration conducted a study on the potential energy savings of new workstation lighting systems in five federal buildings and found that savings could be as high as 63 percent, depending on the workspace's normal use.

A related study on plug loads — the energy used by products that are plugged in to ordinary AC power sockets — found that by using advanced power strips, federal buildings could reduce plug loads at workstations by 26 percent, and nearly 50 percent in kitchens and printer rooms. Plug loads account for about 25 percent of total electricity consumed in office buildings, according to the GSA.

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