



By Christopher P. Hodges, P.E., CFM and William W. Elvey, P.E.

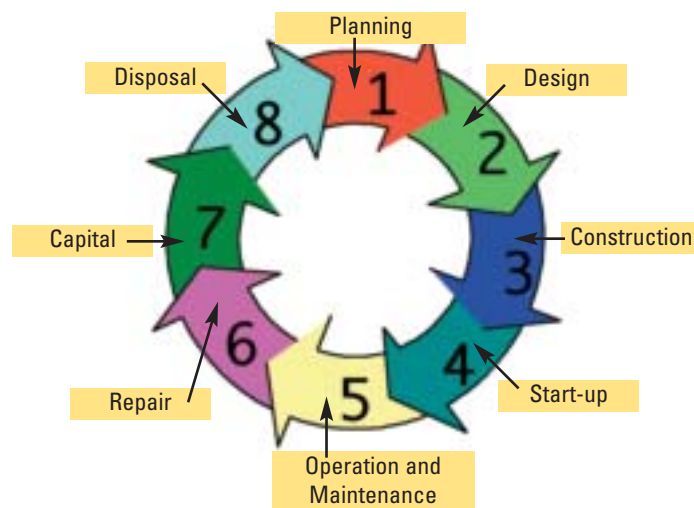
Architects and designers have done an admirable job of bringing sustainability and “green” buildings to the front of our consciousness in recent years. Once only the battle cry of environmental activists, environmental stewardship has reached the mainstream of our society. However, as effective as the “green” movement has become, we still have a ways to go toward making our facilities sustainable.

The term Sustainable Facility Management (SFM) has cropped up over the last several years and may soon dominate every aspect of the way we design, operate, maintain, and ultimately dispose of our facilities. Architects and designers have always addressed the design and build portion of the building’s cost, however, that is typically the least costly and shortest portion of a facility’s life cycle. The operations, maintenance, and capital renewal portion of the facility life cycle is the most costly and accounts for more than 95 percent of the time on the facility life cycle timeline.

That is precisely the portion of the facility’s life that is under the direct care and management of the facilities manager.

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Figure 1—Building Life Cycle



ager. Yet, most facilities administrators do not have much influence over the design and construction of the buildings they inherit. Now is time for the facilities manager to have their say.

Why the Facilities Manager?

It’s all in the numbers—facilities professionals manage and control facility related O&M expenditures, which account for over 85 percent of facility life cycle costs. Facility operations and maintenance and demolition/capital renewal costs over the useful life of the building can be up to 40 times greater than design and construction costs. Yet, most decisions that

have an effect on sustainable and green practices are made with an eye toward reducing first costs without regard to these "life cycle costs."

There currently are significant disagreements about the construction of green buildings in the United States. The disagreement exists because it is difficult to justify long-term savings when higher initial costs for green buildings are the major consideration. Making the business case for sustainable practices becomes an important skill for the facilities manager. This is a skill that is not always present in your tool kit, and it takes time to develop in even the most seasoned of veterans.

What's Behind the LEED Point System?

The United States Green Building Council (USGBC) has had significant impact on the design and construction market over the past several years. The Leadership in Energy and Environmental Design (LEED) program was created to accredit buildings that use design and construction practices that minimize the negative impact on the environment and save energy. The LEED program measures the buildings effect on sites, water efficiency, energy efficiency, use of materials and resources, and indoor environmental quality.

All of the LEED programs are points-based. Certifications are granted under LEED for new construction and for existing buildings based on the ability to meet the minimum amount of points necessary for "Certified," Gold, Silver, and Platinum levels. The USGBC deserves much credit for putting a competitive spirit back into the design and construction process. Designers are seeking new and creative ways to seek LEED points for their buildings.

The LEED program has also been extended to existing buildings through LEED-EB. The LEED-EB program will only apply to an older structure if it is undergoing a significant renovation where the owner decides to attempt to certify the building under the LEED program. This applies to an inventory of millions of existing buildings that facilities managers are tasked with maintaining and which have generally older, less energy efficient systems.

What does all this mean to you? Facilities managers can seek LEED certification for their new construction, and most campus design and construction groups are seeking at least a minimum level of sustainability in their new facilities, even if they have not completely bought into the LEED rating system in new construction, or are still struggling with the cost of green construction. The existing building

program is still in its infancy, and it will take several years to become commonplace on campuses as buildings undergo major renovations.

Sustainable construction practices have become more commonplace on campuses. Practices that encourage the use of day-lighting, more efficient lighting fixtures, energy efficient roofs, energy efficient equipment, less dependence on harmful materials, use of more local materials, reduced VOCs (volatile organic compounds), and many other practices are now commonplace. Most campus design and construction groups are familiar with, and some are leading, the LEED movement in new construction.

As most facilities managers know, sustainability in design and new construction is an admirable goal, but there is a gap between new construction and day-to-day operations. After all, it does little good to design and build millions of dollars worth of energy efficient, well lighted interiors with lots of natural lighting if the building users draw the blinds every day to reduce the glare on their computer screens. Energy efficient HVAC systems can save in utility costs, but some of those good efforts can be thwarted if every other desk in the occupied office space has a fan or space heater under it. The same energy waste can occur in a university research and development setting where fume hoods are left running constantly after their required usage is completed or in any set-

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ting where lighting is left on, long after occupancy. That's why sustainability is not just about design and construction—it needs buy-in from those who manage day-to-day operations, and those who use and occupy our facilities.

An Effective Approach to Sustainability

The real impact of sustainability on most campuses comes from their energy management practices. Energy management is first and foremost on the minds of progressive directors of facilities. It is in these day-to-day operations of buildings that we can reduce utility consumption and waste and can return significant savings to our institutions.

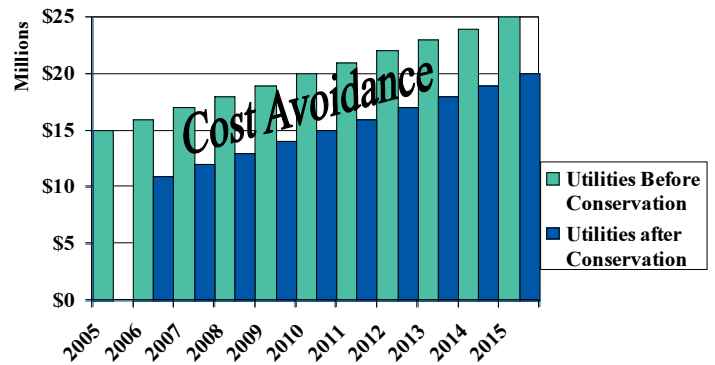
According to most benchmarking studies a significant portion of a campus operating budget is spent on utilities, typically in the \$1.50 to \$2.00 per square foot range, on average. With millions of square feet of campus buildings, just a small incremental saving on utilities can lead to millions of dollars toward the bottom line of the college, university, or school. Those millions saved can be applied to a number of institutional initiatives.

At Virginia Polytechnic Institute and State University (Virginia Tech), energy management has been a long-standing concern of the facilities group. With over 200 buildings on 2,600 acres in Blacksburg, Virginia, energy and utility management has been part of the design, construction, and operations and maintenance for many years.

Virginia Tech has been faced with numerous logistical challenges. One of the primary challenges is to meet the changing needs of the institution as its mission changes to allow it to move to a higher placement on the list of top research institutions. Research facilities can be some of the most energy-intensive facilities built, and the challenge is to reduce energy and utility consumption in the face of higher demand and higher prices.

At Virginia Tech, there are traditional energy management initiatives to create efficiencies and reduce energy consumption. Water management, building control upgrades, lighting retrofits, daylight harvesting, energy efficient roofs, and the use of energy management software are just a few of the initiatives used at the campus. There are also other options such as using energy performance contracting services (EPCS) to

Figure 2 - Theoretical/Traditional Energy Project Financing Model



reduce the energy required to run the campus and fund capital projects with a shared-risk/reward approach with outside contractors. Virginia Tech and other universities also have an advantage in that not only are they major users of energy, they also have power generation capabilities. This gives them the advantage to control their own energy future and reduce dependence on utility companies. Hence, Virginia Tech is exploring the construction of a biomass power plant to help it meet future energy needs.

Virginia Tech's focus on utilities and energy consumption has led them to hire a full-time energy manager, whose task it is to monitor and review all energy savings initiatives, and promote the business case for energy management and sustainable practices.

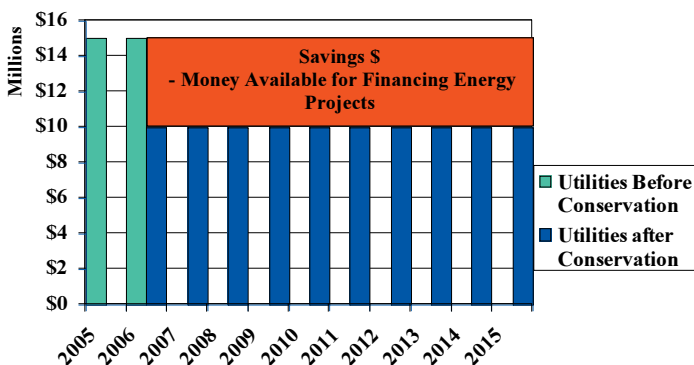
The goal for the near term is to continue to meet the growing needs of the institution, counteract the growing cost of energy, and reduce the university's energy bill, all at the same time. Traditional models for saving energy look at relatively constant energy consumption and cost models by implementing incremental energy savings technologies. The challenge at Virginia Tech is to meet a constantly increasing energy demand and rising costs. This requires a much more aggressive energy program.

How Do You Meet These Aggressive Goals?

It can't be done by facilities management alone. The involvement of the academic community is critical to the success of an aggressive energy management program. Buy-in by the administrative and business groups is also required so that the long-term view of sustainable and energy savings practices can be adopted. That's where the business skill of the facilities manager comes in handy. The better we are at building a solid business case for sustainable practices, the more effective we will be at selling these ideas to the business and administrative community.

At many universities, the business and administrative community creates the financing and accounting structure that either allows smooth transitions toward energy and sustainable programs, or provides significant obstacles. Those obstacles are often created through outdated cost allocation models that get in the way of sustainability programs.

Figure 2—Theoretical/Traditional Energy Project Financing Model



As is sometimes the case, the obstacle to green and sustainable practice implementation is the inability of the current cost-allocation structure to allow expenditures toward green programs where there are multiple (sometimes competing) groups involved. Institutions must find ways to reallocate costs to take advantage of campus-wide energy use and green programs. It is often left to the facilities professional to make the business case for these initiatives to the business managers. Speaking the language of the business managers can often mean the difference between success and failure of these energy saving and green programs.

The "selling" of these ideas may not be as difficult in the academic community as in the business community. That does not mean that communication with and participation of the academic community is any less important. At Virginia Tech, the facilities group and the energy manager spend a significant amount of time with the various student and academic groups on campus in order to build consensus and momentum toward sustainable practices.

The facilities manager can also introduce a much-needed component to the design and construction process—systems thinking. Systems thinking is the ability look at the entire campus and make energy and sustainability decisions that tie groups of buildings together and make them perform in a more economical manner.

Facilities managers need to be integrated with the design and construction team to assure that design and construction practices lead to facilities that can also be operated and maintained for many years in a safe and economical manner. The integration and partnership piece of the puzzle requires input from a diverse group, including designers, administrative and business managers, academics, end users, front-line trade's staff, and facilities management.

In the academic world, developing sustainability and energy management processes involves three steps:

1. Develop a sound, well thought out **sustainability and energy management policy**.
2. **Get the right people involved** that represent a broad range of interests.
3. Create a **new business model** to allow full use of sustainable and energy savings practices applied over the entire system.

Conclusion

Admittedly, energy programs are just one aspect of sustainable practices. But in a campus setting, it may well be the

most important and difficult practice to implement. The facility group can rarely accomplish the task of getting energy and utility use under control by themselves. It takes buy-in from all parties—students, academic groups, administration, design and construction, and facilities management.

A sound approach to sustainability is to put together a well-developed policy on energy management and get the right people involved. Without the consensus and active participation of all parties, aggressive energy management programs have little chance of success.

It's not just about LEED points—sustainable practices are being undertaken in all areas of facilities management. Over time, the most influential person in sustainability and green buildings may well be the facilities manager—the person with the most influence on the way we operate and maintain our facilities and with the greatest ability to control costs.

Facilities management must also take its rightful place in the design and construction process in order to impart true operations and maintenance experience. If you really want to know how well a facility runs and how efficient it is, ask the facilities management group. They have control over the majority of the operating life of a facility. The type of experience a facilities manager can impart early in the planning or design process can be invaluable in the safe and cost-effective operation of facilities. 🏢



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