

***Integrating Green Practice into your Building
Management Strategy***

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Introduction

Green building management could be defined as a win-win-win solution for building management, owners, and tenants. Applying green principles to building management allows for significant cost savings over time, a unique and relevant marketing strategy, as well as an improved quality of life for building tenants. Although applying sustainability principles to a building might be perceived as an expensive investment, the Leonardo Academy (a non-profit group working on sustainability issues) found the following benefits ensued from pursuing a sustainable building management strategy:

- Lower energy and water costs
- Lower waste disposal costs
- Lower environmental and emissions costs
- Lower operations and maintenance costs
- Increased productivity of building occupants
- Increased health of building occupants
- Higher building valuation (Rule of Thumb: Buildings increase in value eight to ten times the operational savings)
- Positive impacts on the local and global environment from reductions in resource use, emissions, water use, and waste disposal (Leonardo Academy, nd)

This practice guide discusses some of the many ways that building management can explore and implement green management strategies, and offers a wealth of resources for facility owners, managers, and tenants. In addition, it focuses on changes that fall within the realm of building management's responsibilities, thus creating little need for extensive tenant buy-in before moving forward.

There are two different ways of approaching the possible avenues for green building management in an existing commercial property. One approach to analyzing green building management uses the Leadership in Energy and Environmental Design (LEED) rating system for Existing Buildings, a program of the U.S. Green Building Council (USGBC). The consensus-built LEED for Existing Buildings offers a plan for integrating green management practices as part of its process towards certification, in which points are given for each sustainable practice that is applied to an individual building. By accumulating these points, buildings can reach four different levels of certification.

LEED for Existing Buildings addresses energy and water usage, recycling programs, exterior maintenance programs, transportation options, whole-building cleaning and maintenance issues (including chemical use), and systems upgrades (U.S. Green Building Council [USGBC], 2007). Although the LEED requirements come at the problem from a different angle (that of the building itself), the five categories of analysis that are scrutinized by inspectors are also a good method of approaching the various aspects of building management. However, one of the drawbacks of the LEED system, from the point of view of building management, is that it requires extensive tenant buy-in as well as substantial monitoring and tracking mechanisms. Thus, for the purposes of this practice guide, we are going to focus on this issue from the perspective of traditional

building management, in hopes of making the information more useful in real-world application.

The steps contained in this guide can be seen as preliminary changes that could lead to tenant consensus on seeking LEED certification, thereby creating stakeholders out of tenants. As it discusses different areas for improvement, the guide also addresses LEED categories and the resources that are attached to them, but does not use the certification process as its main focus.

An alternative approach might be seen as the ‘low-hanging fruit’ method. In this model, building management selects changes that can be made given their usual sphere of influence. If we look at traditional building management, it is often broken up into four categories. In the first, ***Marketing and Financial***, building managers are responsible for activities such as setting rental rates (which in the case of green buildings may include a premium charge), advertising availability (and here, building management may use their green outlook as a selling point), as well as financial reporting to the owner of the building.

In the second category, ***Tenants and Occupancy***, building managers must find tenants, respond to tenant requests, monitor lease compliance (including any mandated energy-saving measures) and collect rents. The third area of facility management is ***Administration and Risk Management***. While only a few strategies for green management, such as the purchase of recycled paper products and keeping electronic files, are applicable to this portion of facility management, this is where a management company can track how long it takes for these green changes to pay for themselves, offering data to marketing and financial that justifies and enables buy-in by tenants.

The fourth category, and the one with the most opportunities for integrating a green perspective, is ***Facility***, which is the main focus of this guide. This category includes several broad sub-sets. In the first of these, *landscaping* is a great opportunity for using green methods and perspectives. Both water and fertilizer use can be reduced through the use of native plants, and these type of grounds decisions require very little buy-in from the tenants of the building. *Energy* costs are a large part of any building’s expenses, and this is fertile ground for applying green principles. The electrical costs of a building can be reduced through daylighting or adding solar fixtures. For buildings in which this is impractical, simple reductions in costs can come from replacing fixtures with energy-efficient ones, or even just through changing the type of lamps that are used (see Practice Guide # 20, *Energy Efficiency as a Public Priority* for a more detailed analysis of lighting practices). *Plumbing and water conservation* has a wealth of opportunity, including installation of water-saving fixtures and on-demand water heaters. Of course, *heating and cooling* is one of the largest areas for potential savings and environmental benefits, although they are also one of the highest sources of retrofitting costs. Fortunately, this is also the area in which there is the most financing and incentives options for building managers and owners to pursue. In addition, the facility category includes *purchasing*, which can be a great entry-level option for improving the environmental footprint of a building. Making strategic choices for appliance purchases, concentrating on those that

are Energy Star certified, can go a long ways toward making your facility greener. Maintenance and janitorial purchasing is another great inroad into green practices, and can have a substantial benefit in the indoor air quality enjoyed by tenants. Lastly, *waste disposal and recycling* can have a large impact on not only the environmental outlook of a building, but also its bottom line.

While no document of this length can be entirely inclusive, the options listed below offer building management some excellent resources for beginning the process of greening commercial buildings. It is important to note that, due to the overlap of many of the categories as well as the specific point of view of building management, this discussion may not align entirely with the LEED requirements. In addition, since there are many different opportunities contained within each category, this guide focuses on those areas of green management that are easily accessible and require minimal buy-in from tenants, as well as minimal up-front costs (except where the natural aging of a building would lead to equipment updating and replacement).

Landscaping

In the first of these categories, many good inroads to green practice can be found in the LEED requirements for landscaping (including exterior water use). For landscaping, the LEED system gives points for conserving the natural landscape around a building, limiting or eliminating the use of potable water in landscape maintenance, and limiting or eliminating the use of fertilizers and other chemical soil treatments. This is an excellent initial area for green building management, since individual tenants are not as involved in the decision-making process for landscaping. Some practices, such as changing to native plants or xeriscaping (an environmentally friendly form of landscaping that uses a variety of indigenous and drought-tolerant plants, shrubs, and ground cover) can make a substantial difference in the amount of water being used for upkeep.

Research is being done around the country on sustainable plants, allowing management companies to make choices that require little upkeep. An example can be found at the University of Rhode Island, where researchers have developed a list of plants for Zone 6 that have fewer insect and disease problems, require less maintenance, are slower-growing and more dependable, and non-invasive (University of Rhode Island, 2007). Each of the plants on this list would be a better choice for landscaping than current choices, which tend to assume the same plant can be used in New England and Arizona, often requiring substantial help in the form of water, fertilizers, and staff hours in order to survive.

The EPA offers a program called the GreenScapes Alliance, with a variety of tools that enable landscapers to conserve water, make good plant choices, and reuse materials through unique government and industry partnerships. Another useful resource for exploring green landscaping options can be found in the Sustainable Sites Initiative, a partnership of the American Society of Landscape Architects (ASLA), the Lady Bird Johnson Wildflower Center and the United States Botanic Garden.

Although the current LEED ratings do not include substantive ways of examining landscaping, the U.S. Green Building Council is working in conjunction with the Sustainable Sites Initiative, and plans to incorporate their standards and guidelines into the next version of the LEED standards (Sustainable Sites Initiative, 2008). Greener Buildings documents a variety of ways in which building management can conserve water (a subject covered in more depth below) through landscaping, stating that water costs can be cut by one-half to two-thirds simply by replacing turf with xeriscaping plants (Facility Manager's Guide, 2000).

Energy and Atmosphere

Greening a building's energy needs can also range from simple or complex solutions. For instance, building managers can choose to add solar panels or other renewable sources of electricity, or they could purchase green energy if it is available through their local power company. One option is to optimize the use of daylighting (the use of direct, diffused or reflected sunlight to provide lighting for building interiors) in a facility. According to the U.S. Department of Energy, lighting consumes one-fifth of the total electricity generated in the U. S., and of that amount, the commercial sector uses a quarter, making lighting changes an area for significant savings (Divan, 2008).

While most daylighting is integrated into new construction, existing buildings can also incorporate this tactic by conducting a lighting evaluation, then installing skylights and updating windows to take advantage of the available light. Installing more efficient lighting fixtures is another way to lower energy costs with sustainability in mind. Not only do higher-efficiency lamps reduce the amount of energy they use themselves, but in addition, the load on air conditioning systems becomes lower, due to a reduction in the heat produced by lighting. While both daylighting and installing new fixtures and lamps require an upfront investment, over time both strategies can save a considerable amount of energy and money. Information about financing options for extensive refitting such as lighting can be found in Practice Guide # 20, *Energy Efficiency as a Public Priority*.

In addition, a thorough, step-by-step program to implementing energy conservation measures in an existing building can be found in the U.S. Environmental Protection Agency's Energy Star Building Manual (EPA, 2004). This 170 page guide "provides information on proven energy-efficient technologies that can produce energy savings of 35% or greater by following the staged process outlined in the manual," (EPA, 2004). Buildings taking advantage of some of these retrofitting processes can also benefit from some of the incentive programs available from a variety of sources. More information on energy-efficient building retrofit financing can be found in Practice Guide # 21, *Financing Green Building Measures: Mechanisms*.

Plumbing and Water Conservation

In the second of our categories, building managers are responsible for a building's water use. Some of the options in this category can be implemented solely by building

management, but some clearly require the buy-in of tenants or building occupants in order to be successful. However, since this category includes many substantial cost savings for both management and tenants, making the effort is clearly worthwhile for both environmental and economic reasons.

The LEED points system offers a number of ways for building owners to reduce their usage of potable water, ranging from simple to complex. A great resource on this subject can be found in U.S. Housing and Urban Development's working paper "Retrofitting Apartment Buildings to Conserve Water: a Guide for Managers, Engineers, and Contractors." Although the suggestions included are intended for rental housing, many apply easily to all sorts of commercial property. Retrofitting options can be as simple as installing water-conserving plumbing fixtures such as low-flow toilets or showerheads, or as elaborate as installing a greywater system for landscape irrigation or toilet flushing (greywater is recycled from the shower or bath, bathroom sink, or laundry). Replacing high-flow toilets can be an excellent water and money saver for a facility. According to Flex Your Power (2008), California's energy efficiency program, "a commercial facility that replaces a typical existing 3.5-gpf (gallon per flush) toilet with a standard new 1.6-gpf unit could cut its annual water use by more than half and save hundreds of dollars in water costs."

Although the Energy Star program does not specifically label toilets, an associated program of the EPA does certify these fixtures. Toilets bearing the Water Sense labels are certified to meet the EPA standards for reducing water use (see the EPA Water Sense website link in the appendix for a list of brands and style numbers).

On-demand water heaters may also be a great investment for your building. Instead of storing a tank of hot water and using the energy needed to keep it continually hot, these appliances heat water as it passes through a pipe. Substantial energy savings can be realized, however, this method of water heating does have some limitations. It does not work well for multiple uses of hot water at the same time, and thus may not be a good choice for large facilities, although multiple units can be installed. An example of a good use might be an office building, where hot water is used for bathroom sinks and perhaps a small kitchen, or in apartment units where each have an individual source of heated water (Builder's Webservice, 2007).

A more in-depth discussion of these tankless water heaters, along with a comparison of the major brands, can be found at Builder's Webservice (a link is included in the appendix to this guide). In addition, a longer discussion of Energy Star appliances may be found in Practice Guide #20, *Energy Efficiency as a Public Priority*.

Heating and Cooling

Heating and cooling is an area with vast opportunities for savings. Along with great savings, however, there can also be great costs, as well as the need for extensive tenant buy-in. The EPA's guide to Energy Star Buildings (referenced earlier in this document)

can be a great resource in this area, since it begins with simple changes that don't require a huge initial investment.

One of the first steps of the gradual approach advocated in the Energy Star Buildings process is *recommissioning*, in which all of the heating and cooling equipment of a building is tuned up, making whatever changes are necessary to insure that it is working at peak efficiency. This process not only lowers energy costs but also improves comfort and air quality for tenants, without an enormous investment. In addition, it allows a building to adapt to changes that have occurred since its original commissioning.

Also, if a building has updated its small appliances and equipment as well as cleaned and updated lighting systems, the balance of heat versus cooling has probably changed. The guide to Energy Star Buildings lists the following items as low-cost options that could make a substantial difference in energy needs:

The Best Ways To Save

- Calibrate building controls such as thermostats and occupancy sensors.
- Adjust operating schedules to ensure equipment is on only when necessary.
- Check for leaking or improperly functioning steam traps.
- Clean heat exchanger tubes in the condenser, evaporator, and boiler to maintain optimal efficiency (EPA, 2004).

Making these changes lowers not only current costs, but also future maintenance costs, since it insures that equipment is functioning at peak efficiency. While updating equipment is a path to savings, management could also (or as a first step) explore their municipality's options for green power. In these programs, users pay a small surcharge for power that comes from solar, wind, or other renewable sources, rather than from fossil fuels.

Purchasing of Environmentally Preferred Products

Another accessible avenue for integrating green principles into building management can be found in the purchase of environmentally preferred products. These opportunities are frequently cited as examples of 'low-hanging fruit' since many of these are small simple changes that can make a big difference in the overall environment of a building.

Traditional cleaning chemicals are usually petroleum-based and emit volatile organic chemicals which can impact air quality and the health of cleaning staff and other employees. Thus, replacing these chemicals with less-harmful ones can make a substantial difference in indoor air quality. LEED allots points for developing a sustainable purchasing program, which selects items based not on their initial cost, but instead on the energy savings that can be achieved by using them, or, in the case of

cleaning chemicals, the reduction of harmful chemicals in the commercial environment. Green Seal, an independent nonprofit organization which promotes the manufacture, purchase, and use of environmentally responsible products, offers lists of options for a building's cleaning staff. These cleaning products not only are less harmful for the environment of the building itself, but also have reduced packaging or come in concentrated form, thus sending less waste to the landfill as well (Green Seal, 2008).

Another great option is purchasing sustainable lamps for your lighting fixtures. Switching from your current bulbs to a more energy-efficient model may cost a bit more money in the short term, but the vastly longer life of compact florescent and LED bulbs in addition to the energy savings per bulb more than makes up for it over the life of the individual bulb. Another approach is in the purchase of paper goods, both for office supplies and restroom needs. Each of these items is, of course, easier to mandate if the building shares janitorial and maintenance services, but even without centralization, these options could be written into rental contracts in order to improve the level of green certification.

The government's Energy Star program (related to, but different than the Energy Star Buildings program), which rates appliances and fixtures for energy efficiency, is a helpful guide in this process, since it allows management to compare the operating costs before purchasing. There is an extensive list of all sorts of appliances, from water heaters to DVD players, allowing building management to balance energy savings and cost while retrofitting, replacing broken equipment, or installing new.

According to the EPA, all Energy Star certified appliances use 25–50 percent less energy, reduce energy costs without compromising quality or performance, reduce air pollution through burning few fossil fuels, extend product life, decrease maintenance, and offer a significant return on investment. In the 15 years since the institution of Energy Star, the program has grown to cover 35 product categories, and consumers have seen substantial energy savings (Energy Star Report, 2003). A vast amount of further information on Energy Star can be found at the Energy Star website, including lists of brands and models. In addition, all Energy Star appliances and fixtures are clearly labeled as such, which is helpful in the purchasing process.

Pest Management

Pest control, as well, is often handled entirely by building management, making it another easy area to institute green practices. Integrated Pest Management (IPM) is a system that uses minimal amounts of least-toxic chemical pesticides, only in targeted areas and for targeted species. While this type of pest control system does require routine inspection and monitoring, it avoids the large amount of hazardous chemicals that are necessary in traditional pest control. According to the Connecticut Department of Environmental Protection, the primary goal of IPM is to reduce the amounts of pesticides applied by using alternative methods of pest control which may include structural maintenance, sanitation and mechanical or biological control. The EPA offers a more in-depth

description of the steps involved in IPM, along with selected resources for implementation at their website (EPA, 2008). These methods help to eliminate conditions that are favorable to pest infestation, making their survival more difficult.

Interested building managers can use one of several available sample contracts to draw up agreements for integrating IPM into landscaping design and maintenance (Connecticut Department of Environmental Protection, 2007; Rutgers, 1999). In addition, the IPM Institute offers independent Green Shield certification which can be promoted to possible tenants as a further way of proving your commitment to green building management (Green Shield, 2008).

Waste and Recycling

No green building management plan would be complete without a waste reduction and recycling program, since waste removal can add significant cost to a building operator's bottom line. Waste can be reduced in a number of ways, many of which are integrated into earlier versions of this guide. For instance, Energy Star appliances are certified to be durable long-lasting, reducing the number of computers or light fixtures that end up in a landfill. An example can be found in the tankless water heaters discussed previously, which needs to be replaced half as frequently as their tanked counterparts.

Switching to Green Seal cleaning products offers a company not only better air quality and a safer working environment, but also less packaging that ends up in the waste stream. Another option for waste reduction can be found through implementing a Materials Exchange program. In fact, many state and local governments offer these programs already, enabling businesses to pass on their unused building supplies or old equipment. The EPA offers a Business Guide for Reducing Solid Waste that discusses these programs in detail (EPA, 1993).

Also, if your building does not already recycle, now is the time to start. Offering a designated space in the building for recycling storage and sorting is an easy option that makes recycling simple for tenants, and reduces your waste disposal costs. Some localities even offer recycling resources that are targeted to business clientele. Alameda County, California, offers a program called Stop Waste that partners with businesses, providing support and infrastructure intended to vastly reduce the waste stream. While a similar program may not be available in your municipality, recycling is becoming more mainstream, with a variety of options in each community. Often, this information is available through the printed materials and website for your city.

Conclusion

Of course, none of this is the final word on ways to institute green practice into your building management. This guide can do no more than scratch the surface, leaving many fascinating topics such as solar heating, green roofs, deconstruction, monitoring, energy

efficient furnaces, parking structures, and maintenance vehicles for a later time. However, it is enough to show some inroads into making your building more environmentally friendly, and to illustrate the benefits to owners, management, and tenants. For further information, an appendix is provided as a resource guide for green management practices.

Appendix

Selected Resources for Green Building Management

Landscaping

- The Sustainable Sites Initiative: <http://www.sustainablesites.org/report.html>
- EPA Greenscapes Program: <http://www.sustainablesites.org/report.html>
- Greener Building's Facility Manager's Guide to Water Management: <http://www.resourcesaver.org/file/toolmanager/O16F8609.pdf>
- WaterSense Tips for Landscaping: <http://www.epa.gov/WaterSense/pubs/land.htm>

Energy and Atmosphere

- Buying Green Power: <http://www.eere.energy.gov/greenpower/buying/>
- Energy Efficiency as a Public Priority (CEPM Practice Guide): http://cepm.louisville.edu/Pubs_WPapers/practiceguides/PG20.pdf
- Lighting Retrofit Economics: <http://www.lightsearch.com/resources/lightguides/retrofitecon.html>

Plumbing and Water Conservation

- Demand (tankless or instantaneous) Water Heaters: http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12820
- WaterSense-labeled toilets: http://www.epa.gov/WaterSense/pp/find_het.htm

Heating and Cooling

- Recommissioning: http://www.greenbiz.com/toolbox/tools_third.cfm?LinkAdvID=21670

Purchasing

- GreenSeal Cleaning Chemicals: <http://www.greenseal.org/>
- Energy Star Qualified Products: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.

Pest Control

- Integrated Pest Management Principles: <http://www.epa.gov/pesticides/factsheets/ipm.htm>
- Model Integrated Pest Management (IPM) Contract For Commercial Pest Control Services: http://www.ct.gov/dep/lib/dep/pesticide_certification/Supervisor/bidgeneralpestrodent.pdf
- Integrated Pest Management (CDC): <http://www.cdc.gov/OD/ohs/biosfty/bmb14/b4ag.htm>

Waste and Recycling

- EPA Wastewise Program: <http://www.epa.gov/wastewise/>
- Commercial and Office Recycling Fact Sheet: <http://www.mass.gov/dep/recycle/reduce/commrec.pdf>

General Retrofit

- LEED for Existing Buildings: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=221>

- Energy Star Buildings Program: http://www.energystar.gov/index.cfm?c=business.bus_index
- Managing Green Magazine: <http://www.managinggreen.com/>

References

- Brown, Laura A. et al. facility_managers_guide.pdf (application/pdf Object). . Retrieved April 21, 2008, from http://www.amwua.org/conservation/facility_managers_guide.pdf.
- Building Manual : ENERGY STAR. (2004, December). Retrieved April 21, 2008, from http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual.
- Business Guide for Reducing Solid Waste. (1993, November). Retrieved April 21, 2008, from <http://www.epa.gov/msw/pubs/bus-guid.htm>.
- Conneticut Deparment of Environmental Protection. Model Integrated Pest Management (IPM) Contract for Commercial Pest Control Services. . Retrieved April 21, 2008, from http://www.ct.gov/dep/lib/dep/pesticide_certification/Supervisor/bidgeneralpestro dent.pdf.
- Divan, Insiya. Daylighting Strategies Lead to Savings. . Retrieved April 21, 2008, from <http://www.facilitiesnet.com/BOM/article.asp?id=8389>.
- Flex Your Power - Commercial Product Guides. Retrieved April 21, 2008, from http://www.fypower.org/com/tools/products_results.html?id=100139#efficiencybenefits.
- Green Seal. Retrieved April 21, 2008, from <http://greenseal.org/index.cfm>.
- Green Shield Certified. Retrieved April 21, 2008, from <http://www.greenshieldcertified.org/about/>.
- Large-Scale Landscapes | GreenScapes | US EPA. Retrieved April 21, 2008, from <http://www.epa.gov/epaoswer/non-hw/green/lrgscl.htm>.
- Maynard, Brian K. and Marion S. Gold. BUILDING A SUSTAINABLE LANDSCAPE FOR LEARNING. . Retrieved April 21, 2008, from <http://www.ces.ncsu.edu/fletcher/programs/nursery/metria/metria10/sustland.html>.
- Morris, Jim and Deborah Smith-Fiola. Commercial Turfgrass and Landscape Maintenance Publications: Sample IPM Landscape Maintenance Agreement. . Retrieved April 21, 2008, from <http://njaes.rutgers.edu/pubs/publication.asp?pid=FS079>.
- Olson, Stephen et al. Deliver the Green.pdf (application/pdf Object). . Retrieved April 21, 2008, from <http://www.leonardoacademy.org/download/Deliver%20the%20Green.pdf>.

Retrofitting Apartment Buildings To Conserve Water: A Guide for Managers, Engineers, and Contractors. (2002, September). Retrieved April 21, 2008, from <http://www.huduser.org/publications/destech/retrofitting.html>.

Sustainable Sites Initiative. Retrieved April 21, 2008, from <http://www.sustainablesites.org/index.html>.

Tankless Water Heaters | Builders Webservice®. Retrieved April 21, 2008, from <http://www.builderswebservice.com/techbriefs/tankless.htm>.

United States Environmental Protection Agency. (2003, August). [energy_star_report_aug_2003.pdf](http://www.energystar.gov/ia/partners/downloads/energy_star_report_aug_2003.pdf) (application/pdf Object). . Retrieved April 21, 2008, from http://www.energystar.gov/ia/partners/downloads/energy_star_report_aug_2003.pdf.

USGBC: LEED for Existing Buildings. Retrieved April 21, 2008, from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=221>.