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# SUSTAINABILITY—MOVING TO THE MAINSTREAM

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In the United States and, frankly, in the rest of the world, we have been experiencing a run-up in energy prices that shows no signs of abating. We don't know if this will continue but we do know that China, India and other emerging economies are competing for scarce energy resources. In fact, we are now seeing projections that China will surpass the U.S. in energy consumption in a matter of a few years. All of a sudden out of necessity, alternative energy sources, solar, wind, and even nuclear are back on the table. The discussion on sustainability that includes energy, recycling and consumption, in general, is being recast into an economic argument and economics, as we all know, is a powerful force.

Governments are beginning to deal with the issue, and many states and cities are taking the initiative to mandate green building standards for government buildings and for private developments.

We are seeing sustainability take on a power of its own. Last year's film, "An Inconvenient Truth," brought environmentalism into the mainstream. The public is certainly more aware. Why is this pertinent to facility managers? Largely because consumer trends are very often precursors to lagging industrial/business trends. In fact, a recent Zogby survey shows that among Generation Y responders, the environment placed higher than the economy as an area of concern.

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Yet, I think business management is in many ways leading the public by recognizing that environmental stewardship is a worthwhile and economically viable goal in its own right. This is reflected in increasing support for sustainable facilities management practices. More and more, we recognize our responsibility to reduce the environmental impacts of building operations. It is demanded by our employees, customers and stakeholders, not to mention regulators.

So, what we now have is a perfect storm – energy, economics and the environment. The more energy we use, the greater the environmental impact and the greater the cost. So, in a perverse way, the energy price run-up provides an opportunity to promote sustainable building management practices. Top management is more receptive today than they ever have been in the past. The publicity around the topic helps focus everyone on sustainability and places it higher on the corporate agenda. Companies benefit from lower (or at least better managed) costs and efficiencies, as well as from the environmental improvements from decreased energy consumption and reduced pollution.

## A Question of Management – The Future Is Now

As an example of this trend, we are beginning to see a fundamental shift in the strategic approach to energy management. Sustainability is becoming a discussion topic in board rooms. It is moving from the cost side of the ledger and is able to deliver both long-term and short-term financial returns.

For instance, both Microsoft and Google have implemented major (480KW and 1.6MW respectively) solar installations at corporate facilities. Both companies, along with other high tech companies, are addressing

computer systems energy consumption through both software and chip design improvements.

As I write this, there are 70 energy-related pieces of legislation that are up for consideration by Congress. In addition, states, and even major cities, are finding ways to legislate efficiency and sustainability standards that can directly affect building construction operations.

Proactive facility managers recognize that every building system and management decision is affected, if not driven, by energy costs. And, the recent price rise, and continued volatility require constant re-evaluation of past cost/benefit analyses and estimates of future costs and volatility.

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This article discusses energy in the context of green building practices in that it examines the ways that reducing energy costs (hard dollars) advances environmentally friendly practices and how you can use energy as a way to make the case for environmental progress (soft results).

Energy efficiency is, by definition, environmentally friendly. By reducing consumption we are reducing strains on the supply chain, directly reducing costs and generally reducing pollution and other byproducts. This applies as much to consumables as it does to equipment. So, sustainability demands that every aspect of consumption be addressed.

Progressive facilities management dictates a comprehensive view that goes beyond relatively simple economic decisions to include questions of occupant health and productivity, Indoor Air Quality (IAQ) and lifecycle management for equipment and consumables.

## Facilities Equipment

Major building systems offer the most potential for increased efficiency and energy savings. We've been hearing about this for years. However, the equation has now changed. With petroleum costs coming off of record highs and likely to remain highly volatile over the foreseeable future, it makes sense to re-examine earlier decisions.

Energy assumptions in facilities condition assessment studies should be updated. This is a relatively inexpensive and efficient process if you have a recent assessment in hand. If not, it's a worthwhile investment. Additionally, capital planning projects such as equipment retrofits and replacements should be re-examined in light of new energy cost projections. This is particularly beneficial if you utilize capital planning software that allows you to run scenarios at the click of a button. CMMS (Computerized Maintenance Management Systems) rules should also be looked at to see if changes in energy costs and environmental benefits warrant new procedures.

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We tend to think of maintenance in terms of equipment lifecycle, reduced downtime, reduced corrective maintenance and higher productivity. These will continue to be the main focus. However, there are energy benefits and tradeoffs. It's no secret that a well-maintained machine is more efficient. Proper maintenance and the changing of filters or lubricants according to specifications are the basic steps. Monitoring for wasted heat or excessive vibration, and keeping track of all of the common performance metrics also lead to discovering wasted energy and, in some cases, adverse environmental impacts.

The increased cost of fuel should be looked at as an opportunity to justify higher levels of maintenance.

Energy/environmental management demands that an effective predictive maintenance (PdM) program be put in place for all major building systems. Break-fix and even preventative maintenance programs do not have the capabilities to comprehensively analyze past maintenance records, look at system components, and provide the data necessary to develop strategies to address energy and environmental concerns.

Maintenance presents opportunities to increase efficiency by using more advanced components. Synthetic lubricants are more environmentally friendly and can make equipment more efficient. These new products also reduce the environmental impact of waste oil and reduce disposal costs.

The PdM process should be extended to preemptively retrofit or replace inefficient systems in a constant search for reduced energy consumption. For instance, Variable Speed Drives adjust the speed of higher efficiency electric motors and can be 20-70% more efficient. The time to reach ROI for a relatively simple retrofit of this type is substantially reduced in a high-cost energy environment.

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There are other opportunities for savings beyond maintenance. Lighting technologies continue to evolve. Relamping programs and retrofits using reduced wattage T-8 fluorescents or other high-efficiency lighting will have a faster ROI. Motion/occupancy sensors can deliver substantial savings. “Light pollution” should also be addressed. By properly specifying outdoor light fixtures, safe and attractive lighting can be implemented without wasting energy lighting areas that should not be illuminated.

Management should also look at equipment utilization. Is equipment properly sized to the task? Can equipment be cycled off when not in use? Are there dependencies or synergies between equipment that can be used to reduce energy or mitigate environmental impacts? Re-examine power management programs offered by utilities to ensure that you take advantage of the savings. This enables power suppliers to use more efficient generation methods and avoid peak loading.

## Facilities Services

Beyond major facilities systems and heavy equipment it also makes sense to look at cleaning operations, an area that is not necessarily energy intensive but does use a number of chemicals that have to be properly stored, used and disposed.

Traditional cleaning chemicals are generally petroleum based, which goes back to the energy side of the equation and makes their use and disposal problematic. The environmental costs are high. They emit Volatile Organic Chemicals (VOCs) that severely impact air quality and can affect the health of cleaning staff and building occupants.

The industry has made substantial progress (motivated by environmental rather than petroleum consumption issues) in developing viable alternatives. Citrus-based cleaner equivalents are now available. They have come down in price to be comparable and have increased in efficiency to the point where they are now on par or better than petroleum-based products.

The petroleum consumption impact of moving to the new environmentally sensitive alternatives is direct – there is no petroleum in the products. The impact on workers and building occupants is less direct but still significant. Organizations such as Green Seal (http://www.greenseal.org) certify products that meet environmental standards.

There are management approaches, as well, that can reduce energy consumption and improve IAQ. For instance, the tendency is for cleaning staff to overuse chemicals under the mistaken impression that more is

better. This can be harmful to the worker and to building occupants. Most environmentally sensitive cleaners have mixing/dispensing stations that regulate product usage. By employing dispensers and enforcing their correct usage, IAQ and worker health are improved.

Make sure that your building services contractor is informed about the latest cleaning techniques and not only uses environmentally friendly products, but has also updated its operational procedures to properly store, dispense, use and control cleaning chemicals.

Cleaning equipment, such as vacuums, floor scrubbers, sweepers, carpet extractors, etc., also comes into play. In the past, environmental concerns were actually at odds with energy management for some of this class of equipment. HEPA (High Efficiency Particulate Air) filters, which trap smaller particulates, created more load on motors, which consequently consumed more energy. Now, advances in filtering technology and a better understanding of how to maintain the equipment and the need for frequent filter changes have all but eliminated this tradeoff.

Other techniques, such as cleaning carpets as soon as they are soiled, keep things looking fresh and also save energy by reducing the need for frequent area cleaning using large, powered carpet extraction equipment. There are many other management-directed initiatives, such as storing equipment close to the work area and regulating when and how equipment is recharged, that enable facilities to use less expensive and more efficiently produced electricity.

Finally, take another look at your recycling programs. We tend to think of them in terms of waste mitigation but they are also energy management initiatives. In commercial buildings, office waste, such as cardboard and paper, plastics and cans, should be recycled. This can have substantial energy and environmental benefits. In the case of aluminum cans, it takes 95% less energy to use recycled aluminum over virgin aluminum. That is an amazing energy savings.

In industrial settings, recycling commodities, such as copper, are generally considered to be a core business activity. Commodity recycling should be actively managed to reduce waste and to add to the bottom line. In many cases it is both profitable and energy efficient to recycle materials used in the manufacturing process.

## Manage in The New Millennium

There is no question that sustainability will continue to be a growing business concern. Given that world energy demands will continue to grow, it would be shortsighted and irresponsible to fail to plan for increased prices and volatility. It is incumbent upon facility managers to re-examine past ROI assumptions in light of new energy prices. Retrofits and procedural changes that might not have made good business sense in the past may now carry an ROI that makes them far more attractive.

Attack the input side of the environmental equation in order to improve the indoor and overall environment, mitigate the effects of your business consumption and reduce your overall environmental footprint.

It's time to look at sustainability as an opportunity to become more efficient and to address environmental concerns at the same time. It will benefit your company, employees and building occupants.

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