

Optimizing Energy Performance in U.S. Hotels

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ABSTRACT

The hospitality industry has weathered many storms in recent years, including the devastating 9/11 decreases in tourism and business travel, being targeted for terrorist acts abroad, and suffering severe damage in the Gulf Coast following hurricanes Katrina and Rita. Despite these setbacks, the industry has made significant progress on its road to recovery, and there are optimistic predictions of the industry's financial future. At the same time, however, the issue of rising energy costs has come to the forefront and has become a standing topic of discussion among the industry's C-level executives and their engineering managers.

The unique characteristics of hotels offer an opportunity for creative energy efficiency initiatives. Hotel guests are accustomed to having clean towels and linens daily, to taking long, hot showers, and to leaving the lights on and the air conditioning running even when no longer in the room. Despite these factors, leading hotel companies are demonstrating that strategic energy management can cut waste and have a dramatic effect on the bottom line – often resulting in energy cost savings of over 20%.

This paper will evaluate the state of the current marketplace, discuss the impacts of rising energy prices on the hospitality industry, and present various approaches by which hoteliers can save energy and increase profits. Best practices, low-cost opportunities, lessons learned, and effective strategies of high performing hotels will be outlined through case studies. Finally, we will introduce some promising educational tools and resources, as well as innovative utility and state-sponsored energy efficiency programs targeting the hospitality industry.

Industry Overview

Situated at the crossroads of leisure and business – both domestic and international – the hospitality industry is uniquely susceptible to a broad range of impacts on its operations, profitability, and reputation. This sector was the second-hardest hit (after the airlines) by the economic downturn following the September 11, 2001 terrorist attacks, and since that time hotels have been targets of terrorism in locations such as Egypt, Indonesia, Jordan, Israel, and Saudi Arabia. Furthermore, in post-9/11 America, immigration laws have severely hurt the industry's ability to recruit its traditional labor force from other countries (AH&LA). Adding fuel to the fire, international health crises, such as SARS, made a significant impact in Asian (and some North American) hotel markets during 2003. And most recently, the devastation in the caused by Hurricanes Katrina and Rita had significant impacts on the hotel industry in the Gulf Coast, since a large number of conventions and conferences were canceled for months on end (AH&LA).

Owing in large part to such geopolitical and climatic insecurities, the issue of energy prices has assumed a place on the agenda for conversations between C-level executives and hotel operations and engineering managers. As we have seen from a steady stream of news headlines in recent months, continuing volatility in energy markets has led to higher prices in all markets, and given the long road to recovery over the past five years, this added setback is a bitter pill for hoteliers to swallow. The timing is right, then, for hotel owners and managers who have not been

proactive in demand-side energy management to shield themselves against energy price spikes by focusing on efficiency measures – many of which can be implemented at low or no cost. In fact, as we will contend, energy expenditures are, in part, controllable costs in an otherwise uncertain market.

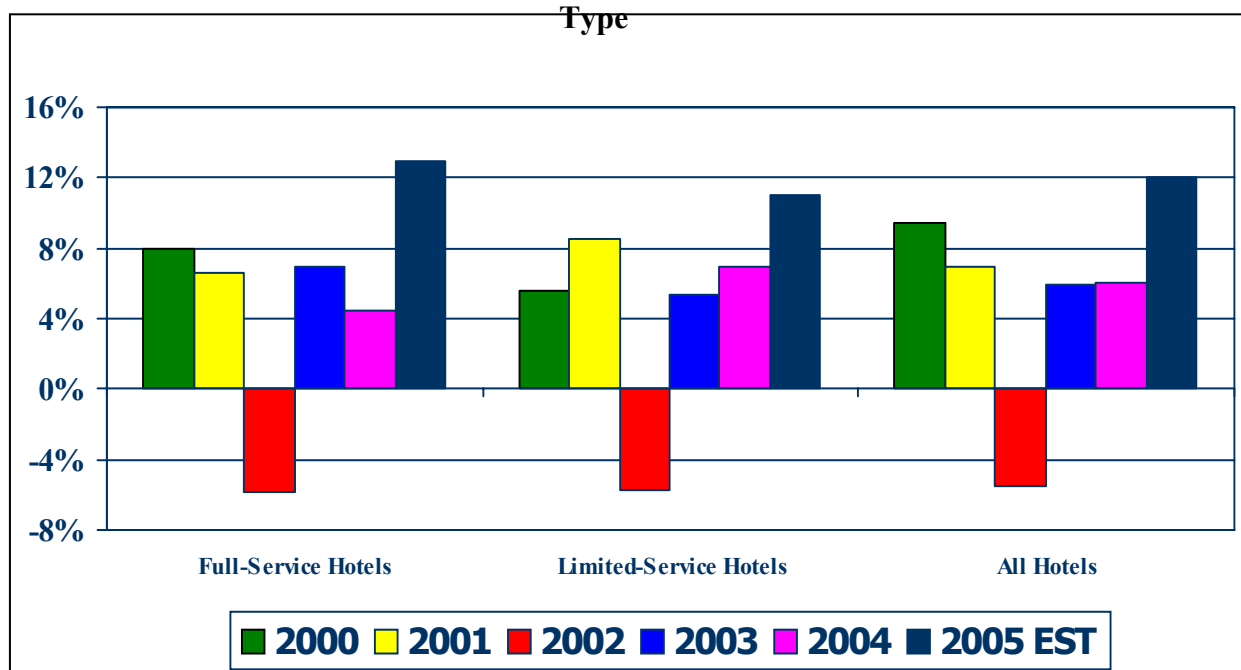
In this paper, we will discuss the current state of the hospitality industry with regard to rising energy costs and the sector-specific difficulties in achieving energy performance. Having contextualized the issue in this way, we will move on to discuss some widely-applicable strategies for hotels to save energy, using case studies to illustrate successful examples. Many of the lessons learned are based on ICF International’s (ICF) experience gained while supporting the US Environmental Protection Agency’s (EPA) ENERGY STAR® Program, and information that is publicly available.

Finally, we will discuss some tools and resources that are available to the industry – including some government and utility-sponsored efficiency programs. Our intent is to establish a context for action and to demonstrate the substantial opportunity that currently exists – both for hoteliers, and the energy services professionals and technical experts, alike, that can help guide the hotel industry toward substantial energy use reductions and cost savings.

Recent Impact of Rising Energy Prices

From an energy standpoint, US hotels spend about 60% of their utility costs on electricity and 18% on natural gas (PKF 2006). The industry generates approximately 8% of the greenhouse gas emissions from the commercial sector. Finally, US hotels spend more than \$900/per room (Brodsky 2005), and roughly \$5.7 billion per year on energy (EIA 1999, 130). Utility expenses have comprised 4.2% of total revenue, on average, for the past thirty years (PKF 2006).

Figure 1. Change in US Hotel Utility Costs by Property Type

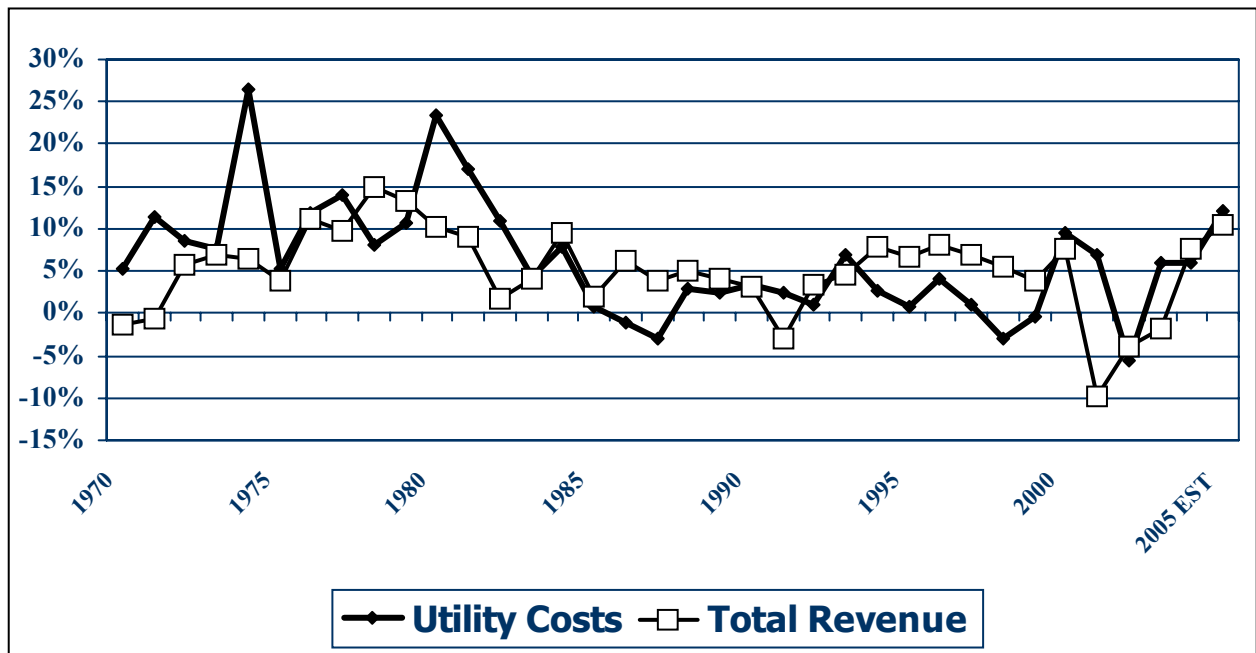


Source: PKF 2006

Hoteliers experienced significant increases in utility costs in 2005 as compared to 2004 (PKF 2006). As demonstrated by Figure 1, on average, hoteliers experienced a 12% increase in energy prices between 2004 and 2005, its biggest single-year price increase since 1981. (PKF 2006) Throughout this difficult time, hoteliers were concerned that Americans would travel less due to high gas prices, which would potentially lead to less leisure and business travel, which would cause occupancies to decline, while rising energy costs would dramatically reduce profits.

However, research for this paper brought to light that in 2005, the industry experienced historic gains in revenue which enabled the industry to absorb increased utility costs. In fact, this record growth in profits, 10.5%, was the biggest single-year increase in revenues in over 20 years. The hospitality industry's ability to endure such significant increases in energy costs becomes apparent when reviewing utility expenses as a percent of total revenue, as seen in Figure 2 (PKF 2006).

Figure 2. U.S. Hotels Total Revenue versus Utility Costs: Annual Change, 1970 to 2005 Est.



Source: PKF 2006

Over the past 35 years, on average, utility costs have equated to 4.2% of total revenue, rarely deviating more than one point since 1970. The real impact of these variations becomes clear when the potential profit lost is evaluated. As of 2005, one percentage point change of utilities as a percent of total revenue would equate to a potential loss or savings of roughly \$170 per available room (PKF 2006). This means that for a 300-room property, the six-percentage point increase from 2004 to 2005 would equate to a profit or loss of \$30,600.

Therefore, while it would appear on the surface that an economic argument for energy efficiency based upon over-all profitability is more difficult to make, a base case for instituting such a program would require an analysis based upon lost revenue had the energy efficiency measures been instituted (i.e., potential savings).

Looking ahead, early predictions show that utility costs will continue to increase, however, the pace of this growth should subside. At the same time, the pace of growth in utility costs will most likely be greater than the pace of growth in hotel revenues (PKF 2006). Therefore, an added opportunity exists to make a case for energy efficiency improvements. Finally, issues aforementioned, such as the volatility in energy markets – things outside the control of the hotelier – will continue to remain a question mark, further underlying the importance of the need for demand-side energy management.

From Obstacles to Opportunities: Successful Practices that Save Energy

Just as the hospitality industry is uniquely positioned in terms of its sensitivity to global political, economic, and social dynamics, hotels also face many challenges and barriers to energy management that are different from those experienced by other types of businesses. Unlike commercial office buildings, for example – where tenants typically have long-term leases at a company level and individuals don't have a choice in the selection of the building where they work, hotel “*tenants*” are transient and they make a choice each time they travel. Hoteliers, therefore, must consistently deliver an experience that is worth repeating. Furthermore, hotel guests expect a certain level of comfort and service; and because they are paying for these, guests will often “get their money’s worth” – whether by taking long, hot showers, having bed linens and towels changed daily, adjusting the heating or air conditioning before they leave to “prepare” the room for their comfortable return, leaving the bathroom light on all night as a nightlight, and/or neglecting to turn off lights when the room is unoccupied. Perhaps hotel guests might be more mindful of energy consumption in their own homes, because they pay the bill. The point is that hotels (for the most part) are places to comfortably spend the night, relax, and enjoy one’s self without the “burden” of considerations such as energy consumption. Having paid their daily rate to stay in a hotel, guests will not want to face any additional “inconveniences” – whether real or perceived.

Before we journey too far down the path of the culture of the American traveler, however, we should note that hotel guests are not assumed to waste energy. In fact, in an age when 64% of the American public recognizes the ENERGY STAR logo (EPA 2005, ES-1), and when more than half of those individuals were influenced at the point of purchase by the ENERGY STAR (EPA 2005, ES-1), “green” and environmentally minded guests comprise a growing segment of the traveling public. Whether hotel guests are energy-conscious or not, though, the challenge for hoteliers and their energy service providers is the same: reduce needless energy consumption and protect the hotel’s bottom line while living up to guests’ expectations of comfort and convenience. In the following pages, we will discuss some tried-and-true strategies and actions for achieving these goals. As the reader will see, we have grouped these strategies into four broad categories for ease of organization. As such, these categories are not meant to be read as a sequenced program for action, but rather as a framework from which to learn examples of successful energy efficiency practices.

Category 1: Use and Properly Operate Cost-effective, Energy-efficient Technologies

Perhaps the most straightforward means of addressing energy consumption in hotels involves cost-effective, energy-efficient technologies. Not only does this approach help to offset the impact of those guests who are less energy-conscious, but it also demonstrates to “green” guests that the hotel is serious about its energy consumption. The Saunders Hotel Group, based in Boston, included this step as part of their energy improvement efforts – outfitting guest rooms with ENERGY STAR qualified refrigerators, clock radios, TVs, and DVD players and equipping hotel offices with ENERGY STAR qualified computers and fax machines. Further upgrades included fluorescent lighting retrofits, installation of motion sensors to turn off lights in unoccupied areas, and the use of automated energy management systems. In 2004, these actions helped the Saunders Group achieve 11% energy savings over 2003. This figure is impressive enough for a single year, but even more so when we consider that the company had already been engaged in energy management initiatives for over ten years – long after some might expect the “low-hanging fruit” to have been picked clean (Saunders Hotel Group 2005).

Other hotel companies have engaged in similar activities with equally impressive results. Marriott International, Inc. has implemented efficiency improvements (such as lighting retrofits, installation of electronic thermostats, LED signs, and central plant upgrades) in over 90 percent of its properties – saving more than 80 million kWh annually (equivalent to almost \$6.5 million at an average cost of \$.08/kWh) (Marriott International, Inc. 2005). The Columbus Hospitality Group invested \$30,800 in similar improvements, resulting in an estimated annual energy savings of \$30,000, or a payback period of just one year (EPA no date [a]). And Hilton Hotels Corporation saved almost \$2.5 million in energy costs in 2000 – a time when average electricity costs were almost 20% lower than current levels in nominal terms (EPA no date [b]; EIA 2004, 259; EIA 2006, 109).

Therefore, these hoteliers have shown that energy-efficient equipment results intangible savings from the moment it is installed – so long as staff is trained to operate it properly – as opposed to the countless unknowns associated with supply-side initiatives. Furthermore, since many of these technologies have impressive payback periods, these energy savings will soon translate into positive entries on the company’s balance sheet. But although the installation of new technologies may be the most immediately accessible aspect of energy efficiency strategies, this activity is just one piece of the puzzle, and must be placed within a broader context.

Category 2: Communicate With Hotel Guests

As previously mentioned, the American traveling public has had a long-standing disconnect between their own actions when staying in a hotel (e.g., taking long, hot showers) and the consequences of those actions (i.e., the hotel’s energy bill). One method for achieving a high level of awareness is the application of an “energy surcharge” to hotel guests’ bills – a practice that became common during the California energy crisis to offset hoteliers’ escalating costs. While certainly an option and certainly justifiable, many guests viewed this surcharge as an opportunity to maximize their energy consumption (e.g., “I’m paying for it in my surcharge!”). And as discussed earlier, hoteliers take great pride in enhancing the guest experience - not inconveniencing their guests. So it is worth inquiring whether there are other means to cultivate energy awareness among guests (while retaining the energy surcharge as a fallback option, if need be).

The Columbus Hospitality Group demonstrated one such alternative (Paulson 2001, personal communication). Even during the California energy crisis, Columbus found no need to

impose a surcharge on guests since the money they were already saving through prior energy efficiency improvements and their ENERGY STAR participation exceeded the typical charges many hotels were imposing. Rather than pass the cost along to the customer, Columbus engaged in a public awareness campaign to alert their clientele of their achievements – eventually receiving national coverage in the *Wall Street Journal*. Instead of simply recouping the cost of rising energy prices, then, Columbus was able to provide, in essence, the opposite to its customers – the avoidance of a surcharge – and was able to reap the publicity and enhanced customer loyalty that followed.

In the absence of such extreme circumstances, however, communications strategies still exist. Many, if not most, hotel companies are currently engaging guests to participate in towel/linen reuse programs to save water and electricity – typically communicated via doorknob hangers or desktop tent cards. Some hoteliers, including Saunders Hotel Group, provide in-room “ECO-channels” or other energy-related public service announcements on guests’ televisions (Saunders Hotel Group 2005). And some companies go even farther, providing guests with “how-to” booklets discussing simple energy-efficient actions they can take (Paulson 2001, personal communication). Recently, the Hilton San Diego Resort provided attendees at the Association of Energy Services Providers annual meeting with fact sheets detailing the considerable energy efficiency efforts they had undertaken at that particular hotel (Prikryl 2006, personal communication). Especially with regard to increasingly energy-conscious guests, these communications may increase loyalty and they may “empower” the guest to contribute – whether by specific actions taken (i.e. re-using towels and linens, switching off lights) or even the mere fact of choosing to patronize an energy-efficient hotel. And as for less energy-conscious guests, to the extent that they are uninformed or unaware of energy efficiency matters – as opposed to willfully negligent – these communications measures may in fact elicit action where none would have resulted otherwise. In this way, guests become part of the solution, rather than a barrier to efficiency improvements.

Category 3: Engage Hotel Employees

Guests are not the only “tenants” of hotels; employees occupying a wide array of job descriptions and schedules also round out the cast of characters that will affect hotels’ energy consumption. These staff members can play a number of important roles with regard to energy efficiency – both in terms of actively promoting efficiency activities to guests *and* working to make sure that the hotel company itself is “practicing what it preaches.” With regard to the former role, the Columbus Hospitality Group encouraged employees to attend an ENERGY STAR training course and other informational sessions on energy management (EPA no date [a]). Following completion of the course, each employee earned an ENERGY STAR lapel pin to demonstrate their knowledge of the subject matter and to be in a position to field questions about the program from hotel guests (Paulson 2001). With regard to the second role, nighttime staff and security guards at the Hilton San Diego Resort are asked to “patrol” hotel offices for any equipment or lights that might have been left on needlessly. When they find an “offending” office, a sticky note with a reminder is left for the office worker to find the next day (Prikryl 2006, personal communication). Such a program provides a simple way to get hotel employees “on board” with any energy management initiatives.

In the hospitality industry, a certain degree of language barriers may exist with regard to housekeeping workforce – which provides a critical link between guests’ actions and energy

reduction outcomes. After all, a towel/linen reuse program can only work if housekeeping staff are properly trained and engaged, and the daily room cleaning may be the “last line of defense” against guests who leave lights, TVs, air conditioning, or heating on unnecessarily. We have found that successful hoteliers often offer tip sheets that describe job expectations in different languages, and to assist in this endeavor, the American Hotel & Lodging Association (AH&LA) working in collaboration with ENERGY STAR now offers tip sheets and other guides in Spanish. Beyond language barriers, however, towel/linen reuse programs have not always been successful because of the fear among housekeepers that the reduced workload will result in decreased hours worked and lower paychecks. Several companies are now working on initiatives to better estimate the number of guestrooms that truly request to keep their linens and sheets each day, and to redirect the housekeepers’ efforts to other areas of the hotel such as the restaurant (General 2004).

Category 4: Establish a Comprehensive Energy Management Plan

Last, but certainly not least, we should discuss the role of a corporate energy management plan and executive-level buy-in. And although we have saved this discussion for the end of the section, it is worth noting that an overarching, strategic approach to energy management underlies all of the practices described above – and can drive the ultimate success (or failure) of any hotel company’s energy efficiency initiatives.

Many leading hotel companies are finding that three specific elements are of key importance in instituting a corporation-wide energy efficiency program: 1) obtaining the commitment and buy-in from the hotel’s corporate management; 2) finding a “champion” within the organization in the organization – who may or may not work at the corporate management level – and giving him or her the responsibility for coordinating and implementing the program; and 3) instituting a continuous approach to energy management that sets goals and tracks and measures progress.

In the case of the Saunders Hotel Group, we see an example of all three elements. Tedd Saunders, co-owner and Executive Vice President of the company, has provided continuous vision, drive, and leadership for his company’s energy improvement efforts since the 1980’s. This has resulted in continuous annual energy performance improvements – even after a decade of effort (Saunders Hotel Group 2005).

The establishment and reiteration of shared goals cannot be underestimated. Hilton Hotels Corporation implemented a comprehensive, top-down plan calling for a five percent reduction in energy use, a five percent reduction in energy costs, and a five percent increase in their ENERGY STAR energy performance rating. By establishing organization-wide standard operating procedures, comparing the performance of different hotels within the Hilton system, and sharing success stories and best practices, the company can provide both the impetus and the streamlining necessary to achieve energy efficiency improvements across a portfolio of more than 500 properties (EPA no date [b]).

Taken together, these four general practice areas demonstrate how considerations of energy efficiency can be integrated into every aspect of the hospitality industry, and how there are multiple loci for action – from the executive suite to hotel employees to guests to vendors and contractors. And while the unique nature of the hospitality industry presents certain obstacles to energy efficiency, we have tried to show that there is a broad array of field-tested opportunities to overcome these barriers. Now that these opportunities have been presented,

however, let us discuss a few tools and resources that hotel companies and service providers can leverage.

Tools & Resources available for Performance Improvement

Utility-sponsored Efficiency Programs

In addition to the government and association-sponsored efficiency programs described above, there are a number of regional and utility programs that offer technical assistance and other energy efficiency resources for the hospitality sector. Although lifecycle costs and a long-term vision are central drivers for successful efficiency outcomes, many organizations are not able to look beyond the barrier of first costs. To combat this, a number of efficiency programs provide incentives and direct benefits to coax companies “off the fence”; below, we mention two in particular that are directed at the hospitality industry.

The New York State Energy Research and Development Authority (NYSERDA) offers a number of programs that can assist New York hotels in achieving their energy efficiency goals. Offered in conjunction with New York Energy Smart’s Hospitality Lighting Project, hotels with fewer than 200 rooms can receive a two dollar rebate for every ENERGY STAR qualified compact fluorescent light bulb (CFL) they buy and install (NYSERDA no date [a]). The list of funding opportunities and benefits programs aimed at hoteliers goes on, including “flexible technical assistance,” a program to help hotels make “smart equipment choices,” assistance in purchasing and installing energy-efficient HVAC systems, and support for building commissioning as well as new building design (NYSERDA no date [b]).

In the West Coast, the California Hotel and Lodging Association (CH&LA) has recently announced a joint program “to deliver energy efficiency savings to its members in the Pacific Gas & Electric (PG&E) service area.” This program, called LodgingSavers, will provide \$3.9 million “to achieve energy savings in the range of 5% to 20% with no reduction, and possible increases, in comfort level for their guests.” According to the press release, eligible projects could “range from lighting retrofits to energy management system ‘tune-ups’...[and will provide] a comprehensive approach designed to address guest rooms, common areas and external spaces.” Also important to note is the fact that, with the addition of LodgingSavers, CH&LA will have provided its members over \$6.15 million in the last four years to pursue increased energy efficiency for their properties (CH&LA no date).

Aside from these particular programs, of course, a number of initiatives exist that are available to anyone in the commercial sector, including hoteliers. For example, twenty-six percent (26%) of the participants in NSTAR’s ENERGY STAR Benchmarking Assistance program are hotels, and many of these have gone on to use NSTAR incentive programs to assist in the implementation of energy efficiency improvements. (Lisauskas 2006, personal communication)

As an additional resource, ENERGY STAR hosts a “Directory of Energy Efficiency Programs” (DEEPS), which can help to find a listing of organizations, by state, that sponsor energy efficiency programs in partnership with ENERGY STAR. This Directory can be found under the “Business Improvement” heading of the ENERGY STAR Web page, <http://www.energystar.gov>.

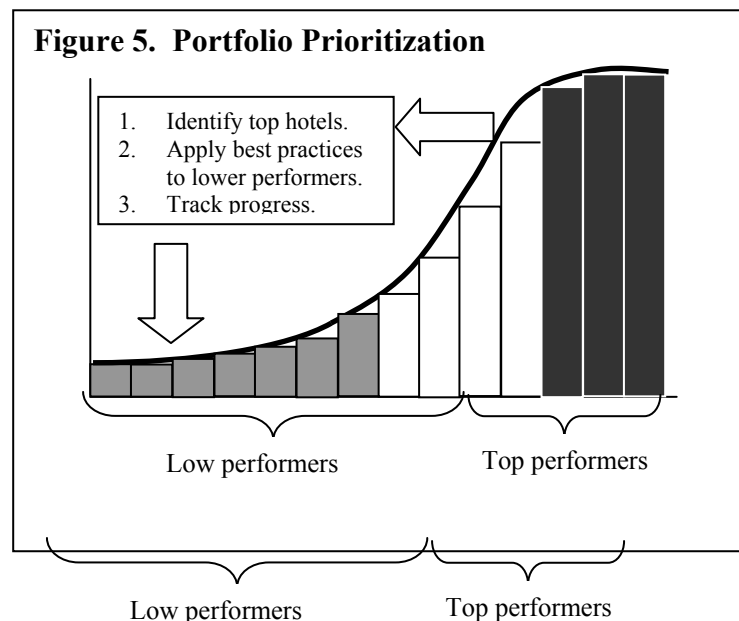
National Efficiency Programs

US EPA's Energy Performance Rating System. In 2001, a new tool was unveiled to the hospitality industry to benchmark energy performance and track progress. The US EPA's energy performance rating system has enabled general managers (GMs) and energy managers to identify high performing hotels, average performers, and those with the greatest potential for improvement. While more sophisticated data tracking software programs are available, no other program offers energy performance benchmark comparisons with weather normalization for five different categories of hotels, ranging from *economy/budget* to *upper upscale*. Subsequently, several data tracking companies have formed partnerships with the EPA to integrate the benchmarking capability into their own data tracking services.



The output of this tool – a one to one hundred rating – has been an empowering piece of information in making the business case to improve energy performance or to quantify progress. Hoteliers have found this tool useful to benchmark their own energy performance, compare internally and externally, and apply for EPA's ENERGY STAR for those hotels operating in the top twenty-five percent. Furthermore, hoteliers who believed they were performing well (but may not have been) have often times taken a closer look at operations and identified new sources of energy savings. Regular tracking has also enabled effective portfolio prioritization. Investment focus is placed on those lower performing hotels, while best practices are pulled from those high performing properties. Taken across a portfolio, hoteliers can compare energy cost relative to energy use in order identify outliers and areas needing additional attention. Table 5 demonstrates this concept.

Some organizations have fostered dialogue among properties, between high-performing and low-performing hotels, regarding O&M or daily operational procedures that take place at each property and that make a difference. Ideally, organizations also go back and ensure these practices are documented in corporate standard operating procedure to maintain the savings that have been achieved and communicate these from one employee to the next.



In 2005 alone, over 2,000 hotels benchmarked their energy performance and over 150 hotels earned the ENERGY STAR – more activity than in any previous year.

The American Hotel & Lodging Association’s Good Earthkeeping Program.

The American Hotel & Lodging Association (AH&LA) partnered with the US EPA to educate hoteliers about the importance and opportunity to improve energy and financial performance through cost-cutting improvements. The program is intended to run for five years with a different issue highlighted each year, energy being the first. Water efficiency, recycling, and other environmental concerns will be promoted in the future. Several service providers have formed the “Good Earthkeeping Alliance”, a group of sponsors that promote the program, invest in the development of the program, and help with outreach and expanding the program to reach more hoteliers.



Summary

In summary, the hospitality industry continues to experience challenges linked to a wealth of external factors. And while the industry cannot control when or how many of these factors will play out – nor how they will affect any given property – leading hoteliers have found that there is at least one effective way to hedge against current and future uncertainties (at the level of individual buildings as well as portfolio-wide). As we have demonstrated, there is a significant opportunity for cost savings when hotel companies make a commitment to energy performance improvement and adopt efficient strategies and practices. Furthermore, hotels that that approach these opportunities at a number of levels – from improving profitability to enhancing guest experience to demonstrating and communicating good corporate stewardship – stand to gain the most. And energy performance improvement is not just a matter of “picking the low-hanging fruit”: companies that are most dedicated to reaping energy efficiency savings have shown that even after pursuing years of energy-efficient opportunities, additional opportunities remain for fine tuning and added savings.

Whether addressing the pressing issue of rising energy prices for the first time, or leveraging past successes to fuel broader adoption of strategic energy management, a significant financial opportunity – and support mechanisms - exist that enables hotels to achieve increasing levels of energy performance. Across the US, various support opportunities have developed and can help hoteliers as they seek to offset the impact of high energy prices. Many resources are available at little to no charge to the hospitality industry, including those offered by EPA’s ENERGY STAR program, utility-sponsored programs with incentives for demand reduction, and organizations with energy-efficient missions or programs.

Additional Industry Case Studies

The following case studies are representative examples of sound hotel energy management on various companies from a variety of sources.

Starwood Hotels:

<http://www.hpac.com/member/feature/2003/0302/0302lembo.htm>

Hyatt:

<http://www.savewater.com.au/default.asp?SectionId=44&ContentId=84&Page=1&SortTag=41>

Hilton Hotels:

http://www.energystar.gov/index.cfm?c=hospitality.bus_hospitality_hilton

Columbus Hospitality Group:

http://www.energystar.gov/index.cfm?c=hospitality.bus_hospitality_columbus

Fairmont Hotels:

<http://oee.nrcan.gc.ca/publications/infosource/home/index.cfm?>

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