

High Performance Hospitality

Sustainable Hotel Case Studies

By

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Erb Institute

For Global Sustainable Enterprise

University of Michigan

Sustainable Conservation

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Foreword

Let us eliminate the phrase "green construction" from our lexicon. Let us talk instead of "smart building," "high efficiency building," "high-performance building," or simply "the future of building." Certainly, that is not going to happen immediately. The term "green" remains far too ubiquitous and salient, even in 2008. However, the future of the construction industry is clear. It is the creation of buildings that use less energy and less water, and are healthier places to work, play, live and rest. But, do not think of green building as a moral or even an environmental issue. Think of it as a market shift.

The signals of this market shift are clear. Energy prices are steadily increasing – more than $100 per barrel of oil, and a price for carbon soon to add to that staggering figure. Water price increases also are looming on the horizon – the American Southwest has lived with this burden for years and the Southeast is now learning about the fragility of a so-called secure water source. The fact is that buildings use 71% of this country's electricity, 39% of its overall energy, and 12% of its water. And yet, our building codes have not kept pace with the reality that we need to use these resources more efficiently. For every unit of gross domestic product (GDP) we create in the United States, we use 50% more energy than the European Union and Japan use for the same GDP unit. While that is due, in part, to the sheer size of our country and to the costs required to ship materials across it, it is also an indication of how badly we build our buildings.

This does not mean that the opportunity does not exist for companies to reap benefits in the absence of regulation. When Andreas Schlaepfer, head of Internal Environmental Management at Swiss Re, was charged with the task of making his company's buildings more energy efficient, he was surprised to find that, "If you've never focused on energy efficiency before, achieving a 30 percent reduction is simple."

And the market is responding.

- **Customers** want green buildings. While single family housing starts fell 14.7%, and sales of lumber and construction materials fell 12% between December 2005 and December 2006, makers of green building products reported increasing sales. According to a 2007 study by Forrester Research, 12% of American consumers would pay extra for consumer electronics that use less energy or come from a company that is environmentally friendly.
- **Employees** want green buildings. According to another 2007 study, 80% of young professionals are interested in securing a job that has a positive impact on the environment, and 92% give preference to working for a company that is environmentally friendly. Among MBA students, 75% from top schools are willing to accept a salary that is lower by between 10% and 20% to work for a "responsible" company.
- **Financial markets** want green buildings. Goldman Sachs, Bank of America, and Citigroup are just three of the many companies that have announced multi-million dollar set asides for investments in green buildings and energy-efficient technologies. In 2006, the total United States venture capital investment devoted to clean energy companies reached $2.4 billion, over 9% of all venture capital spending.
- And, the **construction industry** wants green buildings. The nation's largest green building conference, GreenBuild, has witnessed a steady increase in attendance that reflects its growing importance: from 4,000 in 2002 to 22,000 in 2007. What used to be a conference of smaller companies offering hard-to-find products is now populated by major corporations such as Siemens, General Electric, Turner, Trane, and Skanska. These companies are drawn by market returns. The reality here is that if you are in the construction industry, you have to be in the green building segment.

This means that, whether you are an engineer, architect, contractor, designer, or owner; or whether you are in the home building, hospital, commercial, retail, manufacturing, or hospitality sectors, you have to do it, too. The economics of the market signal are here. The market demand is here. The future of green construction is now.

This report focuses on the hospitality market segment. Not an insignificant piece, the hospitality industry is the third largest retail industry (after automobiles and food) in the United States, generating annual revenues of $133 billion in 2006 and spending $3.7 billion in energy to do it. But, the hospitality industry is not immune to the demands of the green market shift. Nor is it denied the

opportunities to be gained by embracing that shift. As this report shows, there are financial benefits in green buildings, both in construction and operations. Among these pages, you will find evidence that energy-efficient hotel lighting alone could save $133 to $777 million annually. Opportunities in water management could yield additional savings of 25% to 30% over business as it is currently operated. And using less toxic materials in both construction and operations creates a healthy indoor environment that customers and employees will find attractive.

If you are a hotel operator, owner, or developer, and you do not recognize these benefits, you are leaving money on the table. Your customers are beginning to ask for it. Your workers will have more allegiance if you do it. And most of all, your competitors will steal your market-share if they do it before you do.

This report lays out a solid case that dispels any preconceptions about the costs and benefits of high performance buildings. However, it is not just another advocate's plea. Based on real case studies, this report is a solid analysis, from a business perspective, of the financial rationale for thinking differently about the infrastructure and operations of the hotel industry. It is grounded work. Industry readers should use it as a guidepost en route to where the future of the hospitality industry is going. If you do not, your competitors will.

Andrew J. Hoffman
Holcim (US) Professor of Sustainable Enterprise
University of Michigan

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Executive Summary

At the beginning of this century, the high performance building movement began to gain nationwide attention and momentum, starting with institutional and commercial development and, more recently, with hospitality development. Membership in the United States Green Building Council (USGBC), a national non-profit organization committed to expanding sustainable building practices, has grown dramatically. The Council's Leadership in Energy and Environmental Design (LEED®) rating system has been adopted nationally and internationally as the *de facto* high performance building standard.

High performance hotels, especially those that are designed, constructed, *and* operated sustainably, use energy, water, materials, and land much more efficiently and effectively than hotel buildings that are simply built to code. High performance hotels capitalize on the opportunity to enhance efficiency in the hotel market – a market that traditionally has not been concerned with its environmental impact. High performance hotel developers, owners, and managers create healthier working, playing, and resting environments with more natural light and cleaner air. These buildings improve occupant health, comfort, and productivity. When developers build in an environmentally sustainable manner, they increase profit margins and create a differentiated product that is increasing in demand. Hotel owners and managers save money by reducing the costs of operations and maintenance and by increasing employee productivity.

Nevertheless, across North America, misconceptions about high performance building abound. Many people still believe that high performance hotels are not financially feasible and that there is no consumer demand for them. Others believe that specific hotels can not achieve high performance because of those buildings' geographic location, prevailing climate, or corporate brand. There are still others who believe that high performance practices will have a negative effect on the guest experience. And, some believe that high performance practices can not be successful when developers, owners, and management companies are distinct entities.

This report dispels these misperceptions. The case studies alone demonstrate how high performance hotels can be financially feasible. The report features examples from across the North American continent and demonstrates how different companies and organizations can benefit from the design, construction, and operations of environmentally sustainable hotels. The hotel case studies reveal a variety of high performance financial and environmental benefits, as well as the concerns of developers, owners, and managers for their employees and for society at large. The key finding in this report is that a hotel's financial drivers, property oversight, location, brand, and size are not inhibitors of successful high performance practices, and that wide application is feasible. The case studies in this report affirm that high performance hotels are thriving in North America and that those hotels are experiencing a positive consumer response to environmentally friendly features.

Case Study Matrix

		MID RATE		CONVENTION CENTER			LUXURY		
		San Francisco, CA	Revere, MA	Adelphi, MD	Airlie, Virginia	Vancouver, WA	Kohala Coast, HI	Banff, Alberta, CANADA	San Francisco, CA
	Page Number	33	53	73	89	107	127	145	161
Key Topics	Site – Brownfield Redevelopment		●						
	Site – Historic Landmark Preservation				●			●	●
	Site – Stormwater Management			●		●			
	Materials and Resources	●	●	●		●			
	Waste Management	●	●		●	●		●	●
	Energy Efficiency	●	●	●		●	●		●
	Water Efficiency	●	●	●	●		●		
	Indoor Environmental Quality	●	●	●	●	●		●	●
Advantages of Green Development	Lower Operating Costs	●	●	●	●	●	●	●	●
	Less Negative Environmental Impact	●	●	●	●	●	●	●	●
	Product Differentiation	●			●	●			
	Education	●	●		●	●	●	●	●
Initial Implementation Phase	Design Phase	●	●	●		●			
	Construction Phase	●	●	●		●			
	Operations	●	●		●	●	●	●	●
Certification	LEED	●		●		●			
	Green Seal – Certified and Pending	●			●	●			
High Performance Champion	Developer		●			●			
	Owner		●	●	●		●		
	Management Company	●	●					●	●
Rating	Two Diamond		●	●					
	Three Diamond	●			●	●			
	Four Diamond						●	●	
	Five Diamond								●
Location	Urban	●				●			●
	Rural				●		●	●	
	Suburban		●	●					
Size	1–300 Rooms	●	●	●	●	●			
	301–600 Rooms						●		●
	601–900 Rooms							●	

User Guide

This report is a starting point to help interested parties learn more about environmentally friendly construction and operations for hotels. While each individual case study in this report may not be directly applicable to all new hotel projects, the key "lessons learned" in each case are widely applicable. One objective of this report is to evoke serious thought and discussion regarding the advantages and disadvantages of sustainability within the hotel industry. We hope that such discussions will lead to more environmentally friendly hotel construction and renovation projects, and business operations practices in the future.

The hotels featured in this report were selected because their cases successfully demonstrate high performance construction and/or operations. Additionally, the cases show that high performance sustainable development can be both practical and achievable. This report can be a tool for the hotel developer or owner who is designing and building a hotel from the ground up, just as it can be a tool for the hotel manager who is operating an existing hotel.

To summarize, this report can be used as a guide to learn why some practitioners have created sustainable hotels, understand how sustainable hotels achieve success, and gain insight into what features and practices are feasible. It is not a comprehensive report on all sustainable hotels, nor does it assess whether hospitality or tourism is or can be sustainable. The report does, however, assume that hotels will continue to be built, renovated, and operated.

The report is divided into four complementary sections:

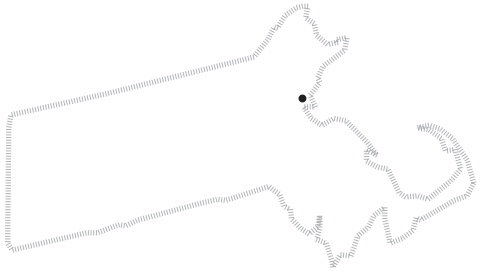
Research Background – This section details the following elements: current hospitality industry trends; definition of high performance hotels; the existing market for high performance hotels; perceived barriers to high performance; and research goals and methodology. The information in this section is based on a review of high performance hotel literature available at the time of publication and on interviews with industry professionals.

Key Findings – This section presents the key findings from our research regarding high performance hotel best practices, the business case for high performance hotels, lessons learned from high performance hotel practitioners, and opportunities for industry improvement.

Case Studies – This section shares the unique story behind each high performance hotel. The detailed cases describe stakeholder advantages and practical applications of high performance hotel design, construction, and operations. The case studies are grouped by category – mid rate, conference center, and luxury – to help the reader find the cases most relevant to his or her situation. A standard design template is used in all of the cases, facilitating the identification of areas of interest and points of comparison.

Resources and Contact Information – We intend for this report to assist in the expansion of a high performance development resources network. Wherever possible, we provide resource and contact information for high performance features and for the developers, owners, managers, architects, and contractors of the projects covered. In the fourth section, the Appendices contain additional resource information, including a summary of certification programs for high performance hotels, a checklist of metrics and key performance indicators, a summary of the advantages of high performance hotel construction and operations, and a glossary.


Comfort
SUITES
MARGARITAS



Revere, Massachusetts

Property	The Comfort Inn & Suites Boston/Airport 85 American Legion Highway, Revere, Massachusetts 02151
Contact Information	http://www.comfortinn.com/hotel-revere-massachusetts-MA051?amp;promo=gglocal
	(781) 485-3600
Hotel Category	Branded, Mid Rate (Select Service)
	Comfort Inn & Suites by Choice Hotels
Property Oversight	Developer: Old Bayside Partners LLC
	Owner: Saunders Hotel Group (SHG)
	Management Company: Saunders Hotel Group
Gross Square Feet (GSF)	Eight stories above grade; no basement
Number of Guest Rooms	208 rooms
Construction Type	New construction
Date Completed	September 2000
High Performance	• Site
	• Materials and Waste Management
	• Energy
	• Water
	• Indoor Environmental Quality
	• Education
	• Performance Measurement
Awards and Certifications	AH&LA Environmental Hotel of the Year
	Boston Green Tourism, Charter Member
	British Airways Tourism for Tomorrow Prize
	Choice Hotels Exceptional Environmental Awareness Award, 2002
	Ceres Company
	Climate Neutral accommodations (Cool Rooms) certified
	Co-op America, member
	Energy Star Partner of the Year
	Green Hotel Association, member
	Skal International Ecotourism Award
	NWF (National Wildlife Foundation) Corporate Excellence Award

Comfort Inn & Suites Boston/Airport

Opened in September 2000, the Comfort Inn & Suites Boston/Airport is located near Boston Logan International Airport and is managed by the Saunders Hotel Group (SHG). The Saunders Hotel Group was an early pioneer of high performance operations starting from innovations implemented at the Park Plaza in 1989. SHG has been able to take the lessons learned at the Park Plaza, and later at The Lenox, and apply them to the Comfort Inn & Suites franchise in Revere, Massachusetts. SHG built the Revere property from the ground up over an abandoned municipal landfill. The hotel has deftly been able to balance high performance operational practices with Comfort Inn & Suites corporate brand standards. The Comfort Inn & Suites Boston/Airport is an excellent case study in effective team collaboration, high performance operations, performance measurement, education, and outreach.

Background

The Comfort Inn & Suites Boston/Airport is located near Boston Logan International Airport and is managed by the Saunders Hotel Group (SHG). Tedd Saunders leads EcoLogical Solutions, a sustainable consulting practice that he created as an outgrowth of environmental work with SHG. While growing up, Mr. Saunders enjoyed going on family camping trips and had developed a broad appreciation for the natural world. His mother was a holocaust survivor and raised her family with a "no waste" mentality. Mr. Saunders' father has a genuine "sense of wonder" as described by Rachel Carson in her book of the same name. This parental combination strongly influenced Mr. Saunders' commitment to corporate social responsibility.

The idea for sustainable operations took shape at the Park Plaza Hotel in Boston, which SHG managed from 1976 to 1996. At one million square feet, the Park Plaza was the largest family owned and operated hotel in the United States. The Park Plaza also had the largest private laundry in the city. Tedd Saunders evaluated their operational practices and found ways to cut their operating expenses by reducing energy and water consumption as well as the waste stream. SHG has been able to take the lessons learned at the Park Plaza property and apply them at other hotels in the company's portfolio, including The Lenox and the Comfort Inn & Suites franchise in Revere, Massachusetts. The Revere property opened in September 2000.

The lessons learned at other portfolio hotels heavily influenced SHG's approach to the construction of its eight-story Comfort Inn & Suites. An energy management system with infrared motion sensors, cooling towers, an ozone laundry system, low-flow hardware for plumbing fixtures, and efficient window glazing all were specified in the construction documents. They were cost effective, and they helped to reduce SHG's impact on the environment while lowering operational expenses. In addition, SHG built the Revere property from the ground up, constructing a steel and concrete edifice over an abandoned municipal landfill. According to the United States Green Building Council (USGBC), rehabilitating environmentally damaged sites reduces pressure on undeveloped land. This also has created a rapport between SHG and the local municipality.

Comfort Inn & Suites Boston/Airport meets both SHG's mission and Choice Hotels' branding criteria (with some operational waivers granted). It meets and exceeds guest expectations, as demonstrated by having won Choice Hotels' gold medal for excellence in every year the hotel has been in operation. At the same time, the hotel offers guests an opportunity to learn about environmentally sustainable practices, both at the hotel and in their own homes. Not only has the Comfort Inn & Suites Boston/Airport avoided sprawl by undertaking construction on previously underdeveloped land, it has also reduced energy and water consumption and takes pride in a sustainable education program that reaches out to staff, guests, the local community, and many businesses and educational groups. The hotel's Green Team, an interdisciplinary group comprising various staff, meets monthly to measure sustainability progress and identify new areas for improvement.

The Comfort Inn & Suites Boston/Airport is an excellent case study in effective team collaboration, high performance operations, performance measurement, and education and outreach.

Slowly but surely, energy awareness and recognition of climate change have helped green hotel activities mushroom. This is an inherently beneficial business approach – over time it will become standard. Not only is it the right thing, but it is good business – sustainable hotels reduce operating costs and build support, team spirit, and customer loyalty. I don't know of any other business strategy that can achieve all of that at the same time.

Tedd Saunders, *Co-Owner*, The Lenox and Comfort Inn & Suites Boston/Airport
President, EcoLogical Solutions

Organization

Project Team

The project team consists of the property oversight group – the developer, owner, and management company. In this case, the property oversight group were all from the same parent company, although they represented different subsidiaries.

Contact Information

Below is contact information for the project team.

Developer	Old Bayside Partners LLC http://www.old-bayside.com
Owner	Saunders Hotel Group http://www.saundershotelgroup.net
Management Company/ General Manager	John Mitchell Saunders Hotel Group http://www.saundershotelgroup.net JMitchell@ComfortInnBoston.com
Environmental Sustainability Consultant	Tedd Saunders EcoLogical Solutions http://www.ecological-solutions.net tsaunders@ecological-solutions.net

Developer: Old Bayside Partners LLC; Jeff Saunders, Gary Saunders, and Steve Bodi

High Performance Qualifications: Old Bayside had no specific requirements for high performance development, but did look for properties that other developers usually overlook. For example, brownfields are not typical acquisition candidates because remediation is often costly and time consuming. However, development on brownfields conserves undeveloped land and this is better for the environment.

Owner: Saunders Hotel Group; the Saunders family

High Performance Qualifications: SHG specialized in high performance hotel operations primarily because of its long relationship with EcoLogical Solutions.

Management Company/General Manager: John Mitchell, Regional Manager for the Saunders Hotel Group

High Performance Qualifications: Mr. Mitchell had no prior high performance construction or operations background.

Managerial Structure

The Comfort Inn & Suites Boston/Airport has a relatively flat organizational structure and minimal hierarchy. The Saunders family is very much involved and is on site regularly. This access to top management makes it easier to promote new ideas and implement changes. While the focus on environmental sustainability at the Comfort Inn & Suites Boston/Airport seems to be driven from the top down, the hotel's management team actually makes sure staff from all business areas serve on the Green Team. This is part of an overall approach which encourages employee involvement and appears to improve morale, increase the quality of operations, and reduce employee turnover.

Figure 1 represents the reporting structure at the Comfort Inn and Suites Boston/Airport for the administrative and managerial positions only.

Figure 1: Managerial Structure

Green Team

The hotel has an active Green Team that meets monthly to discuss 15–20 items that relate to the progress of its sustainability initiatives as well as opportunities for improvement. The team has representatives from each of the hotel's key groups. Tedd Saunders from EcoLogical Solutions helps lead the meeting and brings in external knowledge as needed.

Staff Training and Compensation

The Comfort Inn & Suites Boston/Airport requires minimal sustainability training but, when it is needed, management focuses on employees in housekeeping, sales, and reservations, as well as on front desk and reception staff, so they can respond to guest questions and concerns. Management personnel at the hotel do not have to transition existing housekeeping staff to work with new products, because Green Seal–certified products have been used since the hotel opened. According to Omar Zenon, the operations manager, "The staff is not reluctant, primarily due to the fact that the hotel has been around for five years. So, it is no longer a new concept and it is not an issue. Also, it is easier, safer, and better for cleaning."

The front desk staff, receptionists, and reservationists have been trained to answer guest questions regarding the hotel's high performance program. If the front desk staff does not have the answer to the guest's concern, they take the question to the right person and then get back to the guest. The hotel also has an "eco" bulletin board in the back-of-house office space to help employees learn how to reduce their environmental footprints, both at the office and at home

At the Comfort Inn & Suites Boston/Airport, the general manager's compensation is based in part on gross operating margin and the incumbent has a significant incentive to keep costs low. Environmentally sustainable operations help to achieve this goal and have helped motivate all management staff. Guests also motivate staff through the Choice Hotels' staff recognition program. Choice Hotels offers Platinum, Gold, and Silver employee awards that are based on guest scores for service (with a rating of 60% or above).

The Comfort Inn & Suites Boston/Airport is a relatively flat organization and employees stay with the family business over the long-term. For example, there are members of the housekeeping staff who have been there since the opening of the hotel in 2000. According to one staff member,

> *Everyone is willing to go above and beyond. We are all motivated to help with the hotel because this is our second home, or maybe it is our first home – because we spend so many hours here.*

The hotel's management recognizes the needs of each staff member and assigns roles appropriately to keep individuals motivated regarding their high performance efforts. The most eco-friendly staff member receives the annual Shining Star award. Another incentive includes the monthly housekeeping award for a staff member who goes above and beyond his or her job responsibilities. The award is a day off with full compensation. The management offers this award in recognition of the fact that the staff is impacted the most by new decisions and changes, and by implementing programs and testing products. The Saunders family also offers the opportunity for a four-year scholarship at Newbury College for the children and grandchildren of Comfort Inn & Suites Boston/Airport employees.

Community Outreach and Education

The Comfort Inn & Suites Boston/Airport encourages staff members to volunteer with community greening efforts outside of work, as well as during in-house staff volunteer days. A number of managers and staff members volunteered at the Revere Beach and Franklin Park cleanup projects.

Construction and Operations

Table 1 summarizes the most prominent among the high performance features of the Comfort Inn & Suites Boston/Airport construction and operations.

Table 1 **HIGH PERFORMANCE CONSTRUCTION AND OPERATIONS HIGHLIGHTS**

1. Site	• The hotel has three compressed natural gas (CNG) airport shuttle vans, and participates in a carbon offset program. • The hotel was built on a brownfield site that required environmental remediation.
2. Material and Resources, and Waste Management	• The hotel uses biodegradable hot cups for take-out coffee and tea. • Housekeeping staff use Green Seal certified cleaning supplies throughout the hotel. • Pool cleaning employs an ionization process, dramatically reducing chlorine use. • Bulk amenities and refillable dispensers are located in all guest bathrooms. • The hallway renovation used recycled content carpeting. • Food sorting for composting takes place in both the kitchen and dining area. • The Comfort Inn & Suites Boston/Airport recycles paper, rigid containers, printer toner cartridges, batteries, and cell phones.
3. Energy	• The hotel has installed Vendor Miser's motion sensors for vending machines that save 57% of the vending machine's energy use. • Motion sensors in the guest rooms control thermostat settings. • There is compact fluorescent lighting throughout the hotel. • The HVAC cooling towers, fans, LED signs, and efficient windows help to decrease the hotel's overall energy use.
4. Water	• The ozone laundry system uses cold water and environmentally friendly disinfectants. • Low-flow bathroom fixtures include toilets, showers, and faucets.
5. Indoor Environmental Quality	• Recent renovation: All hallways have been painted with low volatile organic compound (VOC) paint and Rug Institute–certified carpet and padding. • Recent renovation: All hallways have been upgraded with new carpet and wall coverings made with low VOC adhesives.

1. Site

The Comfort Inn & Suites Boston/Airport is an airport hotel built in the suburban setting of Revere, Massachusetts. The hotel is not accessible by public transportation and can only be reached by private automobile or a hotel shuttle. From an environmental standpoint, this is a limitation, because it does not promote mass transportation. However, three of the hotel shuttle vans run on compressed natural gas (CNG) and only one van runs on petroleum. Additionally, the Saunders Hotel Group is considering the purchase of carbon credits through TerraPass to offset the carbon emitted by the 30-minute shuttle service cycle between the hotel and the airport. This would cost the hotel approximately $2,800 annually to offset 300 tons of CO_2.

It is important to note that the Saunders Hotel Group preserved greenfields by building on a brownfield site that was originally zoned for industry. This is a significant sustainability feature, because building the hotel did not consume natural spaces and SHG made the land useful – land that would have been otherwise less valuable. The site was previously a municipal landfill. In order to develop the land for constructing a hotel, the site had to be capped. This ensured that previous contaminants would not harm human beings or the atmosphere.

2. Materials and Resources, and Waste Management

Comfort Inn & Suites Boston/Airport's interior design and operational practices help minimize use of new resources and materials and also reduce the waste stream from the hotel.

Interior Design

Although vinyl wall covering is used throughout the hotel, it has been installed with low volatile organic compound (VOC) adhesives. In addition, the rolled Origins carpets, manufactured by the Shaw Carpet company with recycled content, also have been installed with low VOC adhesives. The majority of the wood throughout the hotel is a laminate.

Choice Hotels recently required the Comfort Inn & Suites Boston/Airport to meet the parent company's standards by upgrading the bed sheets to a 200 thread count fabric. The hotel found that the higher thread count actually lasts longer. The hotel typically replaces the bed sheets every six months to a year and uses the retired sheets as cleaning rags before discarding them.

Operations

From a materials and resources standpoint, most of the sustainable initiatives affect the day-to-day operations of the Comfort Inn & Suites Boston/Airport. The hotel composts food scraps from the buffet breakfast, uses biodegradable hot cups instead of Choice Hotels' standard Styrofoam, and is in the process of getting a waiver from Choice Hotels to use organic fair trade coffee. The hotel intends to source this coffee from Earth Share, a company that donates the proceeds of its sales to environmental causes.

For cleaning the swimming pool, the hotel has implemented an ionization process that uses electric ions instead of chlorine to take pollutants out of the water. The hotel uses Rochester Midland cleaning supplies and Enviro-Care products for daily guest room cleaning. These cleaning products are purchased in bulk (one to five gallons) and are Green Seal certified to extend the life of fabrics and reduce health hazards for employees.

A dispensing system in the back of the house issues concentrated liquids that can be diluted with water on site. A room attendant typically has three days [worth] of shower gel (cleaning four showers each day) without having to refill.

Omar Zenon, *Operations Manager*, Comfort Inn & Suites Boston/Airport

Signage in the hallways encourages guests to use the wicker recycling baskets. The hotel also recycles paper, rigid containers, printer toner cartridges, batteries, and cell phones from its back-of-house operations. In addition, to reduce waste, the hotel sought and received special permission from Choice Hotels to purchase refillable dispensers for bulk soap, shampoo, conditioner, and lotion. This has eliminated the cost of 220,000 individual amenity bottles each year.

To measure its performance, the Comfort Inn & Suites Boston/Airport solicits comments from guests specifically about environmental initiatives, using comment cards made from 100% post-consumer recycled paper. The hotel staff post their responses to guest comments, showing that they actually pay attention to guest suggestions. Every time the hotel orders a ream of paper, the paper company plants a tree.

3. Energy

At the Comfort Inn & Suites Boston/Airport, energy efficiency is primarily the result of operational equipment and technology that was installed when the hotel was built and during subsequent ongoing renovations. As mentioned earlier, in the Background section, SHG's approach to the Comfort Inn & Suites Boston/Airport construction was influenced by lessons learned at other hotels. SHG had years of operating experience with the hotels in its portfolio and was able to apply that experience because the Comfort Inn & Suites Boston/Airport was SHG's first ground-up construction project.

Operations

The Comfort Inn & Suites Boston/Airport helps guests conserve energy by using occupancy sensors installed in the guest rooms. These sensors activate or deactivate the thermostat by detecting the presence or absence of the guest. Each room is individually zoned and has its own thermostat for the guest to control within a range of 65–85°F. Almost all of the light bulbs throughout the property are compact fluorescent, which also contributes to energy savings.

SHG has installed an innovative energy-efficient feature, known as Vendor Miser, for the soda vending machines. The system controls the display lighting with motion sensors while keeping the beverages refrigerated. The decision to install this system was not difficult to make, because the payback timeframe for energy savings was only two years, with an annual 67% reduction of energy consumption over traditional machines.

Although the Comfort Inn & Suites Boston/Airport was not built according to specific high performance building standards, such as USGBC LEED (Leadership in Energy and Environmental Design) criteria, SHG incorporated features in both the building's core and shell to make the hotel highly efficient. In the building's core, the HVAC system uses roof cooling towers that inherently consume less energy than compressors do while cooling air. In the shell of the building, SHG installed rigid insulation efficient windows, compact fluorescent light bulbs, LED exit signs, and fans to reduce energy consumption. The roof is a white reflective rubber membrane that also contributes to the building's energy conservation program by reflecting the sun's heat away from the building. However, the roof requires cleaning for maximum efficiency.

4. Water

The hotel's design allowed for water-saving innovations.

Construction

SHG added low-flow water fixtures to the guest rooms and public restrooms in the initial design phase of the project to reduce water consumption. The equipment rates are: toilets at 1.6 gallons per minute, showers at 2.5 gallons per minute, and faucets at 1.5 gallons per minute.

The hotel achieves most of its water conservation through the ozone laundry equipment and the bathroom low-flow water fixtures. SGH has installed an ozone laundry system by Ozotech Inc. to conserve both energy and water. The machine is operated with cold water and the ozone acts as a disinfectant.

As a result, SHG saves heat energy (by using cold water) and conserves water (by reusing it). The hotel washes guest room linens and towels with this system. However, the hotel also provides coin-operated machines for washing personal items. Dry cleaning typically is sent off site.

5. Indoor Air Quality

At the time of the building's construction, the indoor environmental quality–enhancing features at Comfort Inn & Suites Boston/Airport were operational. Since then, additional steps have been taken to improve the indoor air quality, specifically during a recent hallway renovation project.

Operations

In order to improve the air quality in the hallways, the hotel used paints and adhesives with low VOC emissions. The adhesives included those in the carpet and in the wall covering. The renovation improved the indoor air quality and became a good marketing tool for SHG.

Business Case

Market Positioning and Consumer Response

The hotel is a Comfort Inn & Suites franchise, and the brand's parent company, Choice Hotels International, creates the standards for brand positioning and communication. Examples of the standards set by Choice Hotels include website content, guestroom layout, coffee brand, mattress quality, and online guest satisfaction surveys. Choice Hotels sets these standards to create a consistent brand image across all Comfort Inn & Suites hotels.

The Comfort Inn & Suites Boston/Airport attracts a variety of guests. A significant amount of the hotel's traffic is the result of its proximity to Boston Logan International Airport. The hotel has contracts with major airlines to house flight crews during layovers, as well as passengers from cancelled flights. The hotel offers a park-and-fly program for guests flying in and out of Logan Airport. Tour groups and leisure travelers visiting Boston on a more modest budget also tend to stay at this hotel. The hospitality business in this area is highly competitive, with a number of full-service hotels nearby (Courtyard, Hampton Inn, and Hilton). The Comfort Inn & Suites Boston/Airport must be able to maintain contracts and ensure repeat business through excellent customer service.

Few of the hotel's guests overtly seek out an environmentally sustainable hotel, but the Comfort Inn & Suites Boston/Airport is finding that Northern European and British consumers and travel agencies are more aware of environmental issues and appreciate the hotel's efforts. Upon their arrival, the majority of the guests are unaware of the hotel's commitment to sustainability. In order to keep the format and information consistent with other hotels in the chain, the Choice Hotels' website does not allow the Revere hotel to advertise its environmentally sustainable features. However, the hotel staff promotes a number of programs to educate guests once they are in the hotel. There are several environmental conservation posters and educational signs displayed throughout the hotel. For example, the men's restroom on the first floor has a sign stating that urinals consume 40% less water than is consumed by low-flow toilets. The hotel also places educational cards in guest cars that offer environmental tips on how to reduce gas usage on the road.

The "Tread Lightly" box placed at the front of the hotel lobby encourages guests to recycle old athletic shoes and offers a room discount based on the size of the shoe donated. This recycling box was designed by local art school students and helps communicate the hotel's commitment to sustainability. The sneakers are recycled by Nike into safe turf for playgrounds. There is an eco-suggestion box by the elevators that encourages guests to suggest ideas for improving the hotel's environmental performance. The bulk soap and lotion dispensers in the bathrooms are the environmentally sustainable features most noticed by guests, and they are often complimented in the remarks found on the guest comment cards.

The hotel's greening efforts do not seem to have resulted in a price premium, nor have they attracted major new business. However, the hotel has received a large amount of publicity; the hotel handles an average of three calls per week from journalists. The hotel's efforts also have resulted in awards from Energy Star, NWF, and British Airways, among others. The hotel is currently helping lead Boston Green Tourism, which is working with the Massachusetts Lodging Association, the mayor's office, the convention bureau, and others to make Boston a green destination known worldwide for its urban ecotourism leadership.

Why High Performance Construction?

LEED certification was not as popular at the time of Comfort Inn & Suites Boston/Airport's construction and the hotel was not built to any specific green construction standards. SHG did, however, install equipment that would result in energy and water savings. Since the developer, owner, and management company are all the same entity, they had a shared vision of creating a hotel that would run efficiently and be a green model.

The decision to build on a brownfield site requiring minimal clean-up helped the hotel save money on construction costs. Since it was a brownfield site, SHG was able to purchase the land for less than they would have spent on a non-brownfield site. Additionally, SHG obtained an Alternative Use License (AUL) that allowed them to build a hotel on the site as long as they capped the land. This saved time in the construction schedule, because they did not have to remove the soil and treat it, or perform an in situ remediation. We are unable to quantify the exact benefits due to confidentiality issues.

Why High Performance Operations?

The Comfort Inn & Suites Boston/Airport operations are considered high performance because they result in cost savings and because they benefit the hotel's employees and guests. Environmentally friendly operations are very important to SHG and are manifested in every aspect of the facility, including the formation of a Green Team and the educational signage throughout the hotel.

The hotel's operations incorporate both innovative operational practices as well as common industry practices. Leading innovative examples include the bulk amenity dispensers in the guest rooms (instead of single amenity containers) and the ionization pool-cleaning system instead of a chlorine system. The bulk dispensers save the hotel almost 220,000 individual amenity bottles annually. The ionizing pool-cleaning system had a two-year payback by replacing cleaning chemicals with a one-time purchase of electrodes.

Common industry practices at the hotel include the use of washable linens and curtains (washing is cheaper than dry cleaning) and the use of recycled paper for office printing.

In addition to the bulk amenity dispensers and the ionization pool cleaning system, the hotel has a few other practices with obvious benefits for hotel guests and staff. For example, environmentally sustainable cleaning products are much nicer for hotel staff because they are less abrasive and do not pollute the air. Recycled-content toilet paper and napkins are items that guests can see. These products are cost neutral.

Advantages of High Performance Construction and Operations

The Comfort Inn & Suites Boston/Airport has implemented high performance operations and has installed equipment to save money through reduced product costs and operating expenses. The Saunders family also believes it is important to run the hotel this way for the benefit of guests and employees.

The hotel's decision to install water conservation technologies in the construction phase of the project saves the hotel money during the operations phase. For example, the ozone laundry system has capital costs of $36,000 with a payback of two years. The utility costs savings include a 25% reduction in water consumption, chemicals, sewage output, and electricity. There is an 86% reduction in hot water usage.

More cost savings occur with efficient energy equipment. Vendor Miser, the vending machine lighting sensor, cuts energy costs by $189 annually and only cost $165 to install.

Less tangible but nonetheless important advantages are guest comfort and awareness, and employee comfort and productivity. By installing efficient equipment and by employing high performance operational practices, the hotel benefits guests and employees with a comfortable and healthy environment where they can identify with environmental responsibility. This has significant potential for increasing both employee retention and customer satisfaction.

Table 2 highlights the financial benefits of high performance construction and operations at the Comfort Inn & Suites Boston/Airport.

Table 2 **FINANCIAL BENEFITS OF HIGH PERFORMANCE CONSTRUCTION AND OPERATIONS FEATURES**

High Performance Feature	Capital Cost	Payback Period	Benefits
Ozone laundry system	$36,000	Two years	A 25% reduction in water consumption, chemicals, sewage output, and electricity consumption; an 86% reduction in hot water usage.
Vendor Miser	$165	Less than 1 year	Saves electricity usage by $189 annually.

Table 3 is a summary of high performance hotel construction and operation advantages realized by the property oversight stakeholders – developer, owner, and management company.

Table 3 **STAKEHOLDER ADVANTAGES SUMMARY**

Developer	Owner	Management Company
The developers had lower project land costs because they acquired a brownfield site that was originally designated for industrial use. They built the hotel by obtaining an Alternative Use License (AUL). The site did not require major cleanup and there was no adverse impact on the construction schedule.	The owners have created an environment where staff at all levels are encouraged to contribute ideas to the high performance program. The program's success and international visibility creates higher staff retention and morale.	The management team has created an environment where staff at all levels are encouraged to contribute ideas to the high performance program. The program's success and international visibility helps create higher staff retention and morale.
	Energy Star certification and environmental awards are third-party verifications that the Comfort Inn & Suites Boston/Airport has high operating efficiency and quality environmental programs. These credentials help to promote the hotel to guests and staff.	Energy Star certification and environmental awards are third-party verifications that the Comfort Inn & Suites Boston/Airport has high operating efficiency and quality environmental programs. These credentials help to promote the hotel to guests and staff.
	Reduced operating expenses equate to higher profits. Innovations include: • Vendor Miser vending machine motion sensors reduce energy consumption by 67%. • In-room occupancy sensors cut heating and cooling costs. • Bulk toiletry dispensers for soap, shampoo, and lotion save 220,000 individual amenity bottles annually. • Low-flow bathroom fixtures that reduce water costs. • Cooling towers reduce heating, ventilating, and air conditioning (HVAC) costs. • An ozone laundry system has a payback of two years, has saved on hot water consumption and sewage bills, and has dramatically reduced usage of chemicals.	Reduced operating expenses equate to higher profits. Innovations include: • Vendor Miser vending machine motion sensors reduce energy consumption by 67%. • In-room occupancy sensors cut heating and cooling costs. • Bulk toiletry dispensers for soap, shampoo, and lotion save 220,000 individual amenity bottles annually. • Low-flow bathroom fixtures that reduce water costs. • Cooling towers reduce heating, ventilating, and air conditioning (HVAC) costs. • An ozone laundry system has a payback of two years, has saved on hot water consumption and sewage bills, and has dramatically reduced usage of chemicals.

Best Practices and Conclusions

As mentioned earlier, The Comfort Inn & Suites Boston/Airport is an excellent case study in effective team collaboration, high performance operations, performance measurement, and education and outreach.

The following best practices implemented at the Comfort Inn & Suites Boston/Airport have been identified as industry best practices for environmentally high performance construction and operations:

- **Food Composting**
- **Compressed Natural Gas Shuttle Vans**
- **Ozone Laundry System**
- **Vendor Miser**
- **Green Team**
- **Sharing Best Practices with Overall Brand**

The hotel's management team believes that sustainability cannot be accomplished without the assistance and guidance of others. Successful sustainable design depends on the commitment of all members of the team, including the guests. The hotel's Green Team continues to monitor operational practices to identify environmentally sustainable initiatives that offer a return on investment to the hotel. The Green Team continues to be a leader in the industry as well as in the community, educating guests and working closely with the Boston Chamber of Commerce to improve Boston's record of environmental responsibility.

It is most cost effective to accomplish initiatives using in-house resources whenever possible (if the expertise is there).

John Mitchell, *General Manager*, Comfort Inn & Suites Boston/Airport

Walking Tour

Comfort Inn & Suites Boston/Airport

Building Exterior/Entrance

- Notice the airport shuttle van – three out of the four vans use compressed natural gas to run the engines. In addition, the Comfort Inn & Suites Boston/Airport purchases carbon offset credits from TerraPass to offset the emissions from van travel.

Lobby

- Notice the "Tread Lightly" box placed at the front of the hotel to collect sneakers that will be recycled into flooring for playgrounds. The hotel offers a discount based on the size of the shoe donated (size 8 = $8 nightly discount). The container was designed in the shape of a running shoe by local Boston art school students. This recycling box demonstrates the depth of the company's commitment to sustainability.

- Now look up. Wow, that is a big fan! The lobby seating area ceiling reaches up to the second floor, and this area is directly across from the entrance. As a result, this design has led to loss of heat in the central lobby (heat rising and escaping) during the winter months. The large fan circulates the warm air downward and remedies this problem.

Breakfast Buffet Area

- In this area, tent cards on each table explain how to separate food wastes properly so that the Comfort Inn & Suites Boston/Airport can compost scraps appropriately.

- In addition, the hotel received special approval from its parent company, Choice Hotels, to purchase biodegradable disposable hot cups (in addition to reusable glasses and ceramic mugs) instead of the standard Styrofoam cups.

- Also, notice all the awards and recognition plaques the Comfort Inn & Suites Boston/Airport has received since its opening. These awards and plaques are displayed throughout the lobby. Additional educational materials can be found in the elevator as well as in every guest room.

- Take a look at the vending machines behind the buffet area. Are the lights on or off? Each vending machine has been equipped with a Vendor Miser to control the machine's energy use. If the motion detector senses movement, the machine turns its lights on. When no guest accesses it for several minutes, it "powers down" to conserve energy. Whether the machine's lights are on or off, it continues to keep beverages refrigerated.

Pool

- Just before you put on your swim trunks, check out the guest comment station and let the hotel know what you think about their environmental initiatives. It is worth noting that the comment cards are printed on 100% post-consumer recycled paper.

- Rest assured that when you do go swimming, the Comfort Inn & Suites Boston/Airport uses a non-toxic pool cleaning process. The ionization process employs electric ions instead of chlorine to clean the water.

Guest Rooms

- On the way to your room, check out the wicker recycling bins in the hallway. Signs just above the bins tell guests what they can and cannot recycle.

- The hotel washes linens on site, using an ozone laundry system for disinfecting. Ozone uses only cold water and has no toxic side effects. In addition, the ozone system eliminates some water consumption.

- Next, turn on your television and find the EcoChannel. The owners of the hotel produced a five-minute educational video communicating the mission, objectives, and future of green hotels. This and other entertainment videos run 24/7 for free.

- Finally, step into your bathroom. There you will notice bulk amenities for soap, shampoo, conditioner, and lotion. Using bulk containers eliminates the need to purchase and dispose of 220,000 individually packaged amenities each year. It also allows the hotel to improve the quality of the actual amenity products with the saved purchasing and disposal costs.