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Is Money Spent on Indoor Environmental Quality Worthwhile for Hoteliers? Dr. Diana Weighs In



By Diana Driscoll

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We're learning to Go Green Gradually[®]. By reducing our energy consumption, reducing our water usage, and perhaps creating some of our own energy through geothermal or solar thermal products, we've seen the immediate improvements in our profits. Then, suddenly, we're hit with "Indoor Environmental Quality" – also known as "IEQ". I am pleased to see that this often overlooked environmental concern is now garnering the attention it deserves. How did we forget this? Have we been taking a CATNAP* (defined at the end of the article)?

Basically, we've been primarily focused (and for good reason) on improving our energy consumption. It is now time to take a close look at this previously orphaned topic, relatively ignored under the plethora of energy specification attainment.

How can IEQ help our bottom line, we ask (we are, after all, successful business people, not only involved in the green movement for the sake of philanthropy). Can our air quality and acoustics make a difference in our business? Is it worth the trouble, for example, to use "green" cleaners, knowing that staff training and breaking old habits will be a must?

As an eye doctor and LEED AP, B,D + C, I am in the unique position of digging through both the medical jargon and "LEED-speak". As such, I performed a basic review of the studies to date, and am eager to share what I have learned with you. We all want to know



First, it is important to know that IEQ involves many facets of indoor comfort. The WBDG (a program of the National Institute of Building Sciences) includes "indoor air quality (IAQ), and focuses on airborne contamination, as well as other health, safety, and comfort issues such as aesthetics, potable water surveillance, ergonomics, acoustics, lighting, and electromagnetic frequency levels." This may seem complicated at first, but let's break it down into the elements that may have the greatest immediate impact.

Increased Air Quality:

Can we increase our guests' and staffs' health and productivity by increasing the air quality in our hotels?

Most of us have heard of "Sick Building Syndrome" (SBS) – when building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified. We've also heard of "Building Related Illness" (BRI) – used when symptoms of a diagnosable illness are identified and can be attributed directly to airborne building contaminants (as described in Asthma and Allergy Foundation of America). But do these conditions pertain to our hotels?

Cited Causes of SBS include:

- **Inadequate ventilation:** ASHRAE recently revised its ventilation standard to provide a minimum of 15 cfm of outdoor air per person in non-smoking areas. ASHRAE is attempting to balance energy consumption with an adequate IAQ. If you have an existing hotel, an engineered study of ventilation will give you all of the information you need to make adjustments as needed.
- **Chemical contaminants:** Research clearly shows that V.O.C.'s (volatile organic compounds) can cause chronic and acute health effects at even low concentrations, and many V.O.C.'s are known carcinogens. This is why LEED standards address V.O.C.'s as found in adhesives, carpeting, upholstery, manufactured wood products, copy machines, pesticides and cleaning agents. Your "green" advisor can assist with low or no V.O.C. options for your hotel. GreenSeal.org can provide all of the details you need.



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- **Biological contamination:** These include bacteria, molds, pollen and viruses. Unfortunately, hoteliers are all too familiar with the history of hotel-borne Legionnaire's Disease, and as such, must be vigilant in testing our cooling towers and indoor decorative fountains.

Examining the effects of poor IAQ and allergies and asthma, William J. Fiske, P.E. and Member of ASHRAE states,

"The scientific literature reports statistically significant links between prevalence of allergy and asthma symptoms and a variety of changeable building characteristics or practices, including indoor allergen concentrations, moisture and mold problems, pets and tobacco smoking. The reported links between these risk factors and symptoms were quite strong."

How strong are these links? In many studies, mold or moisture problems in residences were associated with 100% increases in lower respiratory symptoms indicative of asthma. This is just one reason why you will want to be vigilant at your hotel for moisture problems. One picture of mold at your hotel on TripAdvisor can be a blow to your hotel's reputation – one that is difficult from which to recover.

Daylighting, Biophilia and Lighting Controls:

When we "daylight" our hotels, we are bringing a bit of the outdoors, indoors. This relates to "biophilia" – literally, a love of nature. The term "biophilia" was coined by Harvard biologist Edward O. Wilson, Ph.D, when he argued that humans have an innate affinity for nature, loosely tied in with evolution.

As explained by Judith Heerwagen, Ph.D,

"People will fight to keep biophilic features" as she describes the competition in commercial buildings for offices with views to the outdoors. In workstations without views, you'll often find biophilia in the form of potted plants, images of nature, and nature-focused screen savers."

One strong belief is that people are happiest and most productive with good "daylighting." Provide them with windows and the ability to control the level of their task



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the window to check out the view, and if there is a terrace, squeal in delight (well, perhaps only I squeal)? Humans tend to gravitate toward this touch with nature. But what does science tell us?

In a landmark study published in 1984 by Roger Ulrich, Ph.D., patients recovered from gall bladder surgery more quickly (2.5 days sooner, on average) and required less pain medication if they had a view of trees outside their window, versus the view of a brick wall. Views of nature appear to reduce our pain levels, likely through stress reduction, distraction, and the elevation of serotonin. Sunlight exposure increases the body's stores of serotonin – a neurotransmitter that inhibits pain pathways in the central nervous system (think "feel good, happy juice").

We also see increased school performance in LEED-certified schools. The average school today is 42 years old, built during the time when some believed that windows would be distracting to students. Proper daylighting (without glare), however, has shown to actually increase students' attention and performance. The Heschong Mahone Group, Inc. in its most recent study of daylighting in schools, found statistically significant evidence that access to views through windows in classrooms improves student performance by 5 – 10%. Add an improvement in acoustics, and tests scores improve an average of 18%.

According to the Green School Initiative,

"The study by the Heschong Mahone Group, covering more than 2,000 classrooms in three school districts, indicated that students with the most classroom daylight progressed 20% faster in one year on math tests and 26% faster on reading tests than those students who learned in environments that received the least amount of natural light."

Can we extrapolate these shocking findings to our hotel staff? Obviously, many more studies are being conducted, but initial estimates indicate that the increase in productivity resulting from improvements in ventilation will likely be offset by the increase in energy costs needed to achieve these changes. Daylighting and lighting control, however, identifies a 13.2% increase in productivity, a 25% reduction in absenteeism and 69% lighting energy savings following a lighting retrofit (PP&L / Romm



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And potential profits? The CBPD (Center for Building Performance and Diagnostics) team has identified nine studies linking effectively designed daylighting and daylight control with 8.6 – 60% reductions in annual lighting energy consumption. Emerging studies on the effectiveness of mixed-mode HVAC, which balances natural ventilation and mechanical air conditioning, are demonstrating 39.6 – 75% reductions in annual HVAC energy consumptions

Thermal Comfort:

We are sensitive to the needs of our hotel guests for individual thermal comfort in their rooms. The same awareness needs to carry over to the thermal comfort of our staff. This involves both general thermal comfort (temperature, humidity levels and air velocity) and local comfort (which varies with clothing and activity level). Fisk (2002) reported that temperature differences may impact the speed or accuracy of workers in tasks such as keyboarding and reading speed by 2% to 20%.

For thermal comfort standards, including humidity control, please refer to ASHRAE Standard 55 – 1992, Addenda 1995 (at ASHRAE.org). By following such guidelines, you'll see fewer staff members either so cold that they can not use a keyboard, or so warm that they can't think clearly. Interestingly, we usually find both types of people in the same room. Take a look at these general guidelines and see if you can't minimize the back-of-the-house fighting over the thermostat.

The Center for Building Performance and Diagnostics (CBPD), after identifying eight case studies and including the cost of individual temperature and comfort controls, found that the individual productivity gains for 3.5 – 36.6% yield life cycle benefits with ROI's of 23 – 205%.

Acoustic Privacy and Comfort:

Developing a hotel to include good acoustics is no stranger to hotel developers, and must be considered in all areas of the hotel – from the front desk (can your staff hear while on the telephone?) to the restaurant and bar (and surrounding areas), the guest rooms, laundry, pool, conference rooms, and areas adjacent to the elevators.



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Poor acoustics can lead to unhappy staff members.

Life Cycle Cost Analysis:

An excellent study conducted by The Construction Management School of Planning, Design and Construction at Michigan State University (May 2009) provides us with a Life Cycle Cost Analysis of Occupant Well-Being and Productivity in LEED Offices. In this study, they analyzed three things:

- The first costs related to attaining LEED IEQ credits
- Changes in the occupants' well-being and productivity
- The life cycle benefits as compared to full costs

Their study determined that life cycle benefits far exceed the incremental costs, indicating economically viable investments. However, many developers and hotel owners do not plan to hold their hotels for life. Instead, hoteliers must be able to find the "low hanging fruit" and begin with the changes that have the greatest impact with the fastest ROI.

Fortunately, there are many options for hoteliers to improve upon the IEQ of their hotels, with a rapid return on investment. As many hotels and hotel flags are "going green", I believe it is essential to pencil out these changes and begin to go "green" for our health, the health of our staff and guests, and for our profits. This may mean developing a hotel above and beyond code requirements. With our knowledge of green options growing, the cost of green products dropping, and the inclusion of tax deductions, utility rebates and local incentives, building and retrofitting above code may not be more expensive than a more traditional build.

It is my belief that the days of developing buildings to code are over. Or, as beautifully put by Barry Katz,

"Building to code basically means not breaking the law by the narrowest margin possible. My favorite description of this is known as the



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Dr. Diana Driscoll, LEED AP B, D + C ("green" specialist in Building, Design and Construction) works with hotel developers on both their social media presence and their LEED, Energy Star, and other sustainability efforts. As CEO of Ridgeline Hospitality, LLC, and the founder of HotelRescue®, she heads up a team of experts to offer immediate assistance to hoteliers in this tough economic climate. Her message? "Go Green Gradually®!"

Philanthropy plays a large role in her work, as does public speaking and writing.

Diana Driscoll, CEO, LEED AP, B,D+C

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