



Sustainability in Hotels

Opportunities and Trends Shaping the Future of Hospitality

About the Urban Land Institute

The Urban Land Institute (ULI) is a global, member-driven organization comprising more than 44,000 real estate and urban development professionals dedicated to advancing the Institute's mission of providing leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 80 countries.

The extraordinary impact that ULI makes on land use decision making is based on its members sharing expertise on a variety of factors affecting the built environment, including urbanization, demographic and population changes, new economic drivers, technology advancements, and environmental concerns.

About the ULI Greenprint Center for Building Performance

The ULI Greenprint Center for Building Performance is a worldwide alliance of leading real estate owners, investors, and strategic partners committed to improving the environmental performance of the global real estate industry. Through measurement, benchmarking, knowledge sharing, and implementation of best practices, Greenprint and its members strive to reduce greenhouse gas emissions by 50 percent by 2030. On an ongoing basis, Greenprint also endeavors to demonstrate the correlation between environmental performance and enhanced property value. Learn more at uli.org/greenprint.

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About the Cornell Hotel Sustainability Benchmarking Index

The Cornell Hotel Sustainability Benchmarking (CHSB) index is a collaborative initiative aimed at developing hotel industry–specific benchmarks for energy, water use, and carbon emissions. ULI Greenprint has partnered with CHSB since 2016, for volume 7 of the annual *Greenprint Performance Report* and every subsequent annual performance report since. This partnership allows Greenprint to expand the hotel benchmarks provided in annual performance reports and provide a more accurate view of hotel industry performance.

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Introduction

ULI Global Chief Executive Officer Ed Walter



W. Edward (Ed) Walter
Global Chief Executive Officer
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I'm pleased to present *Sustainability in Hotels: Opportunities and Trends Shaping the Future of Hospitality*, a new addition to ULI's overall body of work promoting the creation of vibrant, sustainable communities worldwide.

As *Sustainability in Hotels* demonstrates, embracing resource-efficient and resilient development practices is good for business as well as communities. Sustainable design is what the market wants—younger and older generations place a high priority on green and sustainable development in how and where they live, work, and play. It's also what cities want and need, as they seek to become more resilient, competitive, and livable. This strong demand is compelling ULI to stay at the forefront of this movement, demonstrating the positive economic and environmental impacts of sustainable community building.

Through our Center for Sustainability and Economic Performance, ULI has several programs in place to advance our work, including the Greenprint Center for Building Performance, which is a global alliance of leading real estate owners, investors, and strategic partners committed to improving the environmental performance of the real estate industry. Greenprint produced this report, which explores how the hospitality sector is incorporating sustainable building practices. And while the hospitality sector tends to receive less attention regarding sustainability than most others, *Sustainability in Hotels* shows that sustainable practices have become essential to remaining competitive in this highly competitive sector of the industry.

As the former chief executive officer of Host Hotels and Resorts, I can attest to this. Sustainability in hotel development is not a short-term trend; it is a lasting change. From small boutique hotels to large resorts, *Sustainability in Hotels* provides an impressive collection of case studies, such as Host's energy conservation program, as well as insights from 25 leading hotel owners, developers, and investors, including members of ULI's Hotel Development Product Council. This publication is a fine example of lessons learned and best practices that can inform and be replicated in other projects.

Sustainability—in hotels and all areas of real estate—has staying power because it's about doing well by doing good. Clearly, ULI members are leading this movement with work that is making a meaningful impact in communities worldwide.

Executive Summary

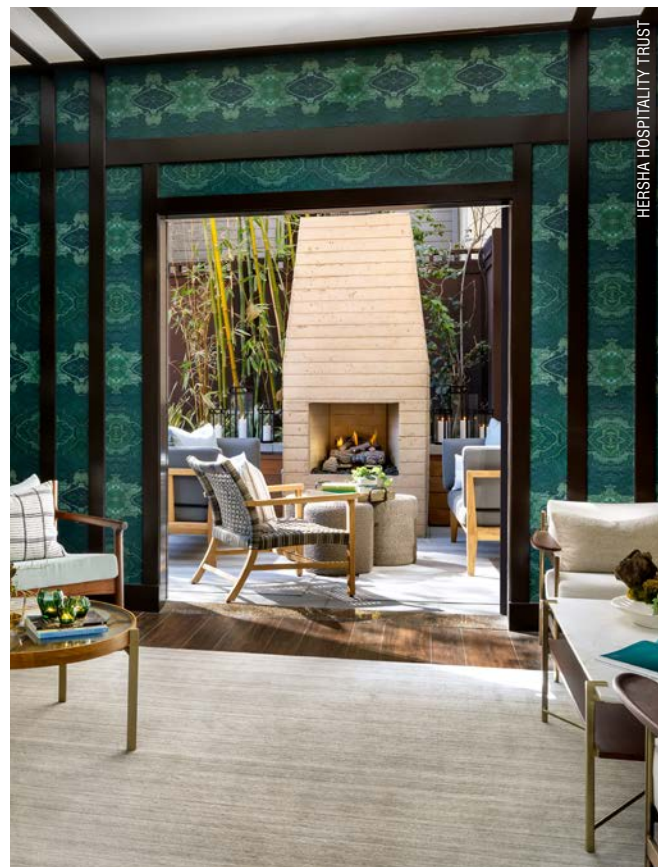
This report assesses the state of sustainability in the hotel sector, identifying best practices in energy efficiency, water conservation, and waste reduction; highlighting industry trends to watch; and finding solutions for obstacles to sustainability, with a goal of accelerating the market's move toward a more sustainable and impactful future.

“The conversation around climate change and changing hotel guest demographics helped the global hotel industry recognize that sustainability is a smart business decision that can elevate the guest experience and strengthen financial returns.”

— **Toni Alexander**
President and Creative Director,
InterCommunications, and Chair, ULI Hotel
Development Council

- Of commercial buildings, hotels are among the highest per square foot energy and water users. Hotel carbon emissions vary by geography, with hotels in Asia generally producing more emissions per occupied room than hotels in Europe and the Americas, and across all countries, full-service hotels produce more carbon emissions by occupied room in comparison to limited-service hotels. However, opportunities for improvement are available across all hotel types and can add substantial value to a hotel's bottom line.
- Hotels pay utilities directly and directly recoup all savings from efficiency improvements, resulting in one of the strongest business cases for sustainability in the commercial real estate industry. In addition, guest satisfaction, city policies (both regulations and incentives), internal sustainability goals, and increasing investor interest drive sustainability improvements in hotels.
- Hotels that implement sustainability initiatives see immediate returns, but much of the hotel industry is leaving valuable operational and technical opportunities for savings and efficiency on the table. For example, MetLife has implemented a direct digital control (DDC) energy management system project, yielding an 18.5 percent reduction in energy costs (\$238,733) in the first year, and Host Hotels & Resorts has implemented a high-efficiency boiler, saving New York City hotel \$2.2 million a year.

- Opportunities exist for any hotel to improve efficiency and sustainability while also achieving significant financial benefits—and this report lays out some ways to do it, including in-room lighting and HVAC retrofits, renewable energy installations, replacement of water fixtures, and on-site composting.
- The hotel industry faces a number of unique challenges in executing on sustainability improvements, including a lack of utility data, complicated ownership models and structures, and concerns about improvements disrupting the guest experience.
- Upcoming trends for the hotel industry highlighted in the report showcase strategies that leading owners are implementing to gain a competitive edge and future-proof their businesses, including modular construction, sustainable materials selection, guest room technology, and an increased focus on health and wellness.



Hersha Hospitality Trust's Ambrose Hotel in Santa Monica, California, was the first hotel in the nation to receive the U.S. Green Building Council's LEED-EB Silver certification.

Hotel Industry Primer

The global hotel industry comprises about 184,000 hotels containing almost 17 million rooms, a number that has increased 17.7 percent from 2008 to 2018.¹ According to the National Association of Real Estate Investment Trusts, in the United States the hospitality sector accounts for about \$1.5 trillion of the estimated \$15 trillion in total commercial real estate. Although the total value of this sector is less than office, retail, multifamily, health care, and other specialty property types, the value per square foot is the second highest of all property types, behind only the health care sector. ULI's annual report *Emerging Trends in Real Estate® 2019* classifies hotels as a well-performing sector with development prospects expected to increase, even as most other major commercial property types anticipate a decline. In particular, midscale hotels were identified as the subtype with the highest investment and development prospects.²

State of the Hospitality Market

With a strong U.S. economy, consumers looking to spend money on travel have driven continued increases in hotel bookings and gross revenues with hotel gross bookings totaling \$185 billion in 2017.³ In 2019, demand is expected to outpace supply, with average daily rates (ADR) and revenue per available room (RevPAR) both expected to increase 2.4 percent from the previous year. Even with these strong indicators, the number of new hotel rooms under construction is decreasing, as challenges to new development increase, including rising material costs, labor shortages, and concerns about a slowing real estate market.⁴

The outlook for international hotels is also positive, with strong demand from investors in Asia as the region looks to developing tourism markets and sees continued growth in tourism from China's middle class.⁵ In Europe, the hotel sector is still seen as a generally good investment and development prospect.⁶

From 2014 to 2019, about 70 percent of global hotel investments were made by general investors with diverse portfolios.⁷ Private equity investments and real estate investment trusts (REITs) constituted the majority of 2018 transactions, with a notable increase in portfolio acquisitions

instead of single-asset purchases. Foreign investment is also strong in the hotel sector, with cross-border investment increasing 18 percent to \$4.5 billion from 2017 to 2018.⁸

Hotels have several possible ownership structures, but generally they are owned by an asset manager or REIT and operated by a hotel brand. The structure and role of hotel brands are also changing; top hotel brands control less than one-third of global hotel rooms in 2019, and industry experts expect to see a continued focus on the acquisition of hotels offering unique experiences.⁹ Hotel brands looking to capitalize on experiential travel are even introducing new brands to meet niche segments of the market, like Moxy hotels, Marriott International's affordable, millennial-focused, and experience-driven brand. Also driving growth for brands is increased franchising, with franchised rooms at three U.S. hotel chains increasing 40 percent from 2014 to 2018.¹⁰

“Increasing tourism in both developed and developing markets is keeping the hotels sector on investors' radar screens.”

— *Emerging Trends in Real Estate® Asia Pacific 2019*



Consumer interest in travel continues to rise, with hotels seeing increases in average daily rates and revenue per available room.

The Role and Breadth of Hotel Sustainability

The United Nations World Tourism Organization estimates that hotels account for about 1 percent of global emissions, a number that is only expected to increase as the industry continues to experience growth and demand. To stay within the 2 degree Celsius threshold agreed upon by the Paris Climate Accord, research from the International Tourism Partnership indicates that the hospitality industry will need to reduce emissions 66 percent by 2030 and 90 percent by 2050.¹¹

Like other asset classes, hotels interested in improving their efficiency can start with the “low-hanging fruit” measures that reduce operating costs. Opportunities to improve energy, water, and waste efficiency are widely available for hotels of all types, through operational changes such as utility benchmarking and temperature setpoint adjustments, as well as technical updates like high-efficiency water fixtures or LED lighting installations. Many hotels have also adopted initiatives that allow guests to make a sustainable choice during their stay; travelers around the world can now forgo daily towel and bed linen changes, thereby reducing energy and water used for laundry in exchange for brand points.

Further, some hotels invest in larger capital projects to achieve even greater energy and water savings. Investments in high-efficiency energy management systems, HVAC retrofits, or on-site renewable energy require longer project planning and more overall effort. Achieving projects of this magnitude requires strong collaboration between owners and operators but can pay long-term dividends for hotels in utility savings and guest comfort. For specific project profiles on large capital projects, complete with energy and cost savings, see the “Technical Best Practices” section of this report.

However, sustainability in the hotel sector is about more than just energy and water efficiency: the focus on guest health and wellness has increased across all hotel types. Guest interest in local experiences has led hotels to create stronger ties to the community by offering local recommendations for restaurants or by hosting community events. For resorts, protecting the surrounding natural environment and biodiversity is key to placemaking and providing a high-quality guest experience.

Hotels have also taken a leading role in mitigating the social impacts of the larger tourism and hospitality industry by developing policies around forced labor and human trafficking for their properties and the larger supply chain. Because hotels are sometimes an unwitting location for these activities, hotel brands are developing awareness training for employees and guests, creating public awareness campaigns, and providing services to victims of these crimes.

Many in the industry noted that these sustainability programs have not come without some pushback from hotel workers, who for example see linen reuse programs that reduce energy and water costs as a path toward job uncertainty—because hotels cannot predict the amount of cleaning work to be done each day—or even job loss as automation across all industries continues. Recently, a few hotel chains have even seen hotel worker strikes to protest this uncertainty and other grievances. With hotels already concerned about rising labor costs, ensuring strong hotel workforce development will need to be a key consideration going forward.

The Business Case for Hotel Sustainability

As for all other commercial real estate property types, the biggest driver of sustainability initiatives in the hotel sector is the potential to improve an asset’s net operating income. Hotels are a unique asset in that they reap all utility savings from sustainability projects directly to their bottom line, without having to share those savings with tenants. To ensure hotel operators are also committed to efficiency, some owners pay out a percentage of total savings from an operator’s efficiency project as an incentive.

“Sustainability efforts, both in construction and operations, speak to the character and development quality of a hotel property, and a responsible developer recognizes both the need and the benefits that come with going green.”

— Jim DeFrancia
Principal, Lowe Real Estate

Additional drivers helping hotel owners recognize the value of sustainability and motivating them to take action include the following:

Meeting changing guest expectations: According to a survey of 72,000 Hilton guests, around 33 percent said they prefer hotels with environmental and social programs. Among guests younger than 25, that number jumped to 44 percent. To meet guest expectations about sustainability and attract younger and more environmentally aware customers, hotels are now going beyond basic efficiency measures by incorporating recycled materials into guest rooms and looking into renewable energy. Brands like 1 Hotels and Six Senses promise not just a luxury guest experience but also a sustainable one.

Complying with increasingly relevant government regulation: Because the global real estate sector accounts for about 40 percent of global emissions, countries and cities with climate mitigation plans have passed both regulatory requirements and incentives to drive the market toward increased efficiency and reduced carbon emissions.

- **Regulations:** In the United States, hotels in many major cities are subject to mandatory utility benchmarking and other building-focused sustainability legislation. New York City's new building emissions legislation, passed in April 2019, sets carbon dioxide equivalent (CO₂e) emissions targets for all building types (for hotels: 9.87 CO₂e per square foot by 2024 and 5.26 CO₂e per square foot by 2030¹²). In the United Kingdom, Environmental Performance Certificate (EPC) minimum requirements will apply to existing leases in 2020, requiring properties to post a rating (ratings A through G, with A being most efficient) certificate based on their emissions performance in comparison with similar property types and setting a minimum EPC rating of E to be able to rent. Many hotel leases are long term and so most underperforming hotels have not yet required retrofits to meet minimum standards and continue operating, but they will likely need to consider upgrades in the near future.

- **Incentives:** Many U.S. cities have developed incentives for real estate to “go green” that also apply to hotel properties. In Nashville, Tennessee, developments that achieve Leadership in Energy and Environmental Design (LEED) certification (or another green certification) in the central business district can obtain a density bonus that scales with the stringency of the certification. In Nevada, casinos and hotels were already starting to see the savings from energy and water efficiency measures, and the addition of a property tax abatement for LEED- or Green Globes–certified properties led Nevada to rank sixth in per capita LEED space in 2017; owners in the area continue to look for new opportunities in sustainability, moving on to renewable energy projects and other innovative technologies to continually improve their efficiency.

In some cases, new developments require approval from the community or city council, who can often be sensitive to change. Even without sustainability requirements, sustainable features are a strong way to ease community concerns about development, decreasing time spent on approvals and improving project viability.

Even the potential for new regulation such as mandatory carbon trading has hotels paying attention and managing hotel assets with that potential future in mind.

Achieving internal sustainability goals: Recognizing the strong financial return of sustainability programming, many in the hotel industry have set internal goals for reducing their impact on the environment. Most major hotel brands have publicly available reduction goals and publish annual sustainability reports. For example, Hilton is committed to cutting emissions 61 percent by 2030 (goal in line with Paris Climate Accord) and Marriott is committed to reduce carbon intensity 30 percent by 2025. To ensure that their emissions reduction targets are in line with climate science (and will meet the goals of the Paris Climate Accord), hospitality organizations are also starting to set science-based targets for their sustainability goals. In 2019, nine companies, including MGM Resorts International, Hersh Hospitality Trust, and Wyndham Worldwide corporation, have committed to setting these targets, and seven, including Hilton, Host Hotels, and Las Vegas Sands, have already had their targets set and approved.



The pool at the Courtyard by Marriott Nashville Airport.

Hotel brands and owners are also joining international organizations with collective goals for the industry that provide best practices, sharing opportunities to further industry progress and scale solutions. For example, the International Tourism Partnership (ITP), a collaborative international membership organization for hotel industry leaders and stakeholders, offers a platform to share ideas and build relationships to meet four goals around youth employment, water, carbon, and human rights. By 2015, ITP’s corporate membership had a collective reach of over 24,000 properties, more than 3.5 million rooms, and 1.5 million employees in over 100 countries worldwide. In the United States, the U.S. Department of Energy’s Better Buildings Challenge is a group of companies, including hotel owners and operators like Las Vegas Sands Corp., MGM Resorts International, and Loews Hotels & Co., who commit to improving the energy efficiency of their portfolio by 20 percent over 10 years; it creates a community for sharing strategies and results.

Matching future interest from investors: Hotel owners, particularly those with diversified portfolios, noted limited investor interest in hotel sustainability. According to those owners, investors appreciate hearing about what has been done on sustainability, particularly European investors, but they have received minimal direct requests. However, hotel owners do expect that to change and cited potential questions in the future as something that would drive future decision-making.

One unexpected result from this research was that a desire for traditional green certifications, like LEED, was not a major driver for energy efficiency and sustainability projects,

“A practical and effective sustainably forward hotel experience connects with the guests in a way they will appreciate to support the need to live more consciously and well. At the same time, owners and operators can save both environmental and economic resources with proper thought and execution in the areas of development, design, procurement, construction, and operations.”

— John Hardy
President and Chief Executive Officer,
The John Hardy Group

unless it was to achieve a local incentive. Green certifications can be a real challenge for some properties, especially at resort assets, because their more remote locations mean limited potential for public transportation, reducing the total number of points or credits an asset can achieve. However, a few certifications, like the Green Key award, were created specifically for the hotel and tourism industry. Further, green certifications are considered very helpful in securing group business, such as corporate travel and conferences, as corporations look to “green” their entire business.

Developers should also be sure to pay attention to sustainability opportunities during design and construction before hotel owners consider responsibility for utility costs and capital expenditures. Market drivers like government regulations are highly applicable to the development community and as more hotel owners develop sustainability goals, they will be looking to purchase assets that align with their priorities.

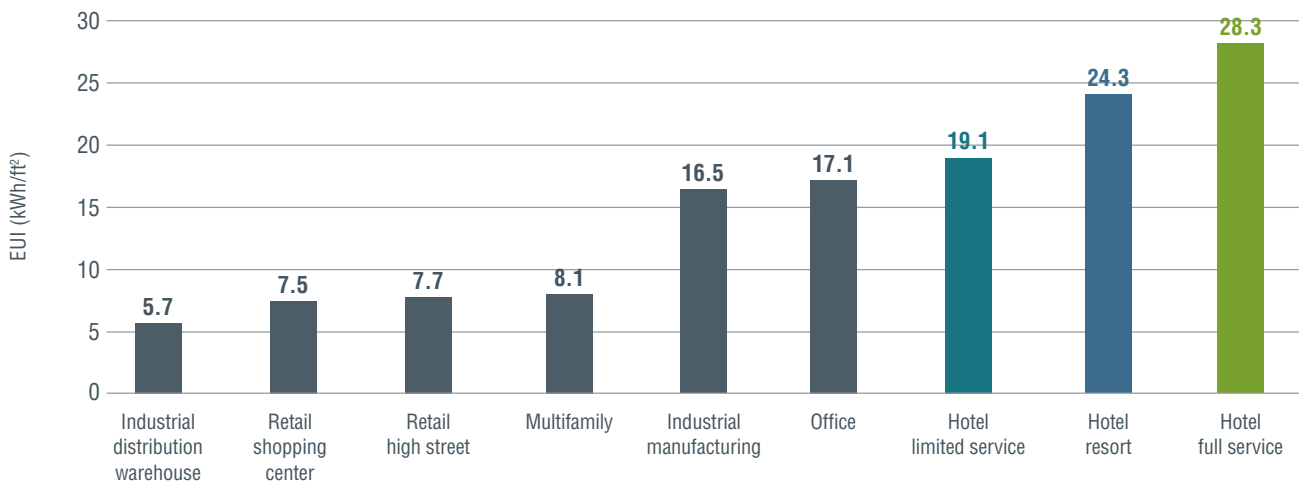
How Is the Hospitality Industry Performing on Sustainability?

To understand the opportunities for improvement, it is first important to see how hotels are currently performing and identify where improvements can add value. The following charts highlight current energy, water, and emissions by area or occupied room in hotels of different service levels and across different countries.

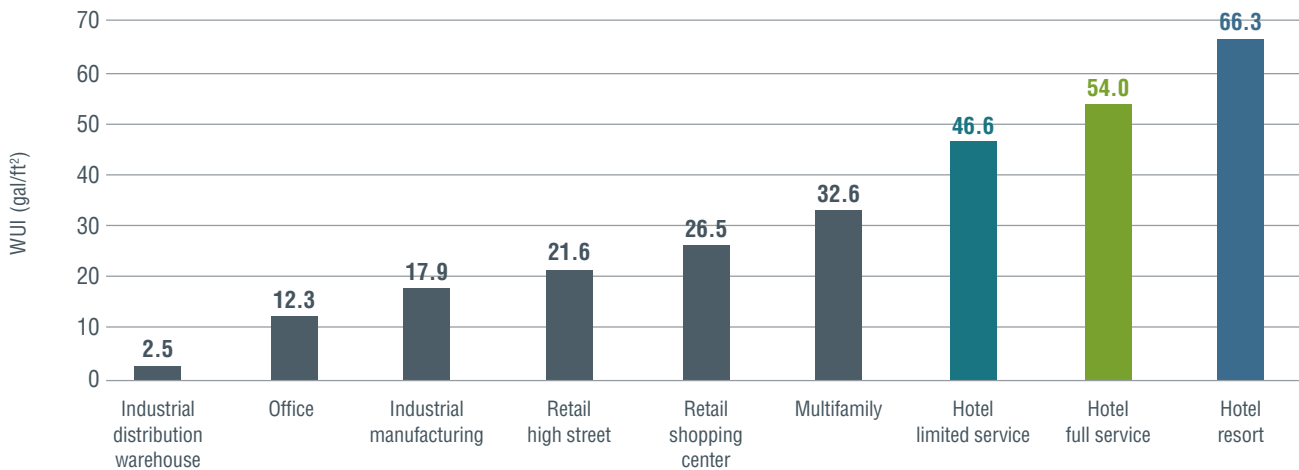
ULI Greenprint has partnered with the Cornell Hotel Sustainability Benchmarking (CHSB) index to present a comprehensive hotel sustainability performance benchmark for this report and each year's annual *Greenprint Performance Report*. The CHSB index is a global collaborative initiative aimed at developing hotel industry-specific benchmarks for energy use, water use, and carbon emissions. The combined Greenprint and CHSB data from 2015 through 2017 are presented here.

With 24-hour 365-day operations, hotels are some of the highest per square foot energy and water users. The graphs presented here show energy use intensity (EUI) and water use intensity (WUI) across three hotel types: full service, limited service, and resort.

2017 GREENPRINT PORTFOLIO MEDIAN ENERGY USE INTENSITY



2017 GREENPRINT PORTFOLIO MEDIAN WATER USE INTENSITY

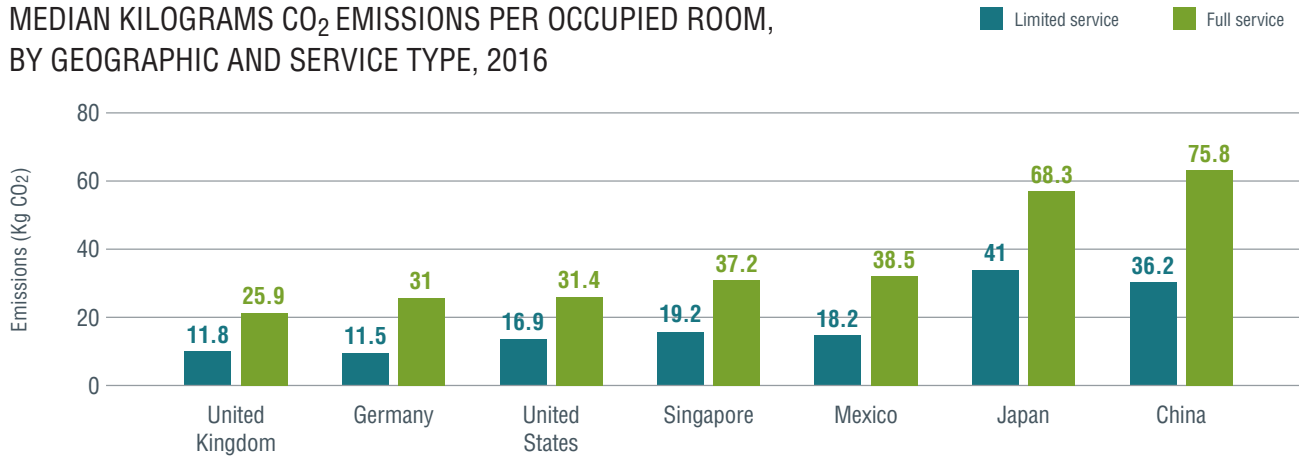


Sources: Hotel-specific benchmarks come from the Cornell Hotel Sustainability Benchmarking index. All other property-type benchmarks come from the ULI Greenprint data set.
Note: Cornell Hotel Sustainability Benchmarking index data from 2016.

Hotel carbon emissions vary by geography, with hotels in Asia generally producing more emissions per occupied room than hotels in Europe and the Americas. Across all countries, full-service hotels

use more energy and produce more carbon emissions by occupied room compared with limited-service hotels, which provide fewer amenities and therefore require fewer resources.

MEDIAN KILOGRAMS CO₂ EMISSIONS PER OCCUPIED ROOM, BY GEOGRAPHIC AND SERVICE TYPE, 2016



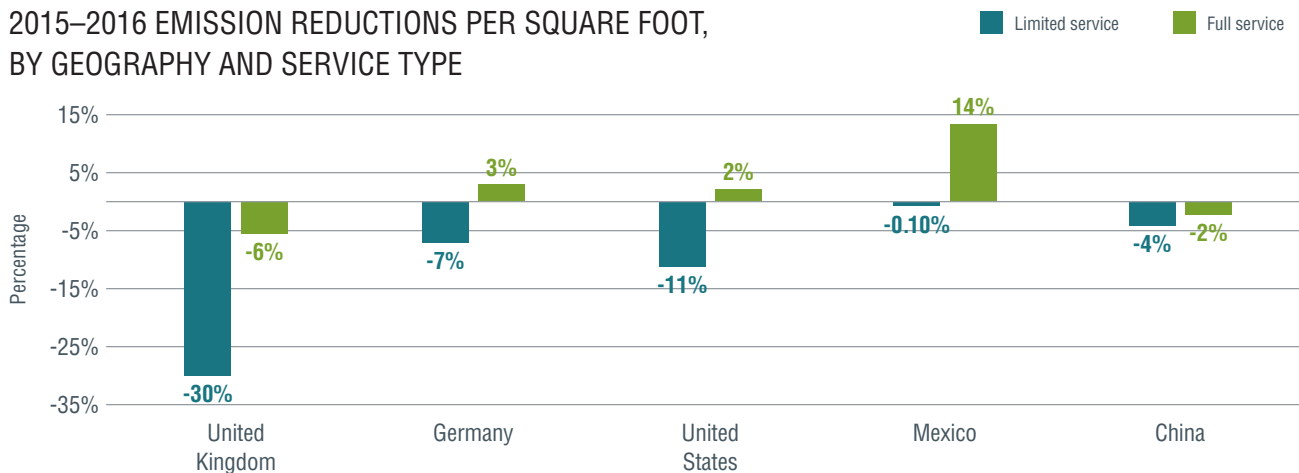
Source: Hotel-specific benchmarks come from the Cornell Hotel Sustainability Benchmarking index.

Note: Resort data are not available for 2016 emissions by country.

In year-over-year performance, from 2015 to 2016, most limited service hotels achieved emissions reductions, while full-service hotels achieved mixed results. Although some may expect full service hotels to invest more in sustainability, it is likely more low-cost, high-efficiency opportunities remain in limited service

hotels, which may have taken longer to adopt low-hanging-fruit sustainability initiatives (such as the transition from CFL to LED lighting). Because limited-service brands offer fewer services, their energy use data are less likely to fluctuate, thereby allowing the hotels better insight and analysis to identify opportunities for reductions.

2015–2016 EMISSION REDUCTIONS PER SQUARE FOOT, BY GEOGRAPHY AND SERVICE TYPE



Source: Hotel-specific benchmarks come from the Cornell Hotel Sustainability Benchmarking index.

Note: Data from resort, Japan, and Singapore properties not available for 2015–2016 year-over-year data.



A common method of energy and water reduction is for hotels to offer guests the opportunity to reuse towels and linens instead of replacing and laundering them daily.

“The best practice of yesterday was measuring your sustainability performance. The best practice of today is benchmarking that performance and putting forth a plan to reduce it. The best practices of tomorrow will be more comprehensive and require collaboration among hotel developers, owners, operators, and brands to embed sustainability across the entire project life cycle, digging into the details and finding competitive opportunities. It is an exciting time for the hotel industry as we look for new ways to improve performance by considering things like plastics and waste.”

— Eric Ricaurte
 Founder and CEO, Greenview

Finally, using sustainability to drive value is not just relevant to high-end resorts. Assets across all hotel subtypes and in all markets can find value in improving their performance. Energy benchmarks can help owners better understand the potential energy and cost savings associated with improving a building’s performance. For example, the potential savings from a building climbing from the 75th percentile of performance to the median, or from the median to the 25th percentile, can present owners with both an achievable goal, because at least 25 percent of that building’s competitors are

already achieving that next level of performance, and big cost savings potential. It also helps owners quantify the financial value of making that performance improvement.

The table shows how significant these potential cost savings can be for hotels when they improve performance from one quartile to the next. Although all hotel subtypes can achieve savings from efficiency, hotels in areas with high energy costs and high usage, such as resorts, stand to save the most and see the greatest increase in asset value.

EXAMPLE BENEFITS OF IMPROVING HOTEL SUSTAINABILITY BY ONE QUARTILE

Building subtype	Average commercial cost of electricity per kWh ^a	ΔEUI from 75th percentile to median (kWh/ft ²)	Potential annual cost savings	Increase in asset value ^b	ΔEUI from median to 25th percentile (kWh/ft ²)	Potential annual cost savings	Increase in asset value
Full service	\$0.11	7.9	\$43,450	\$565,755	10.2	\$56,100	\$730,469
Limited service	\$0.11	5.7	\$31,350	\$391,386	5.4	\$29,700	\$370,787
Resort	\$0.11	8.2	\$45,100	\$640,625	10.2	\$56,100	\$796,875

Note: Figures are a sample 50,000-square-foot hotel.

a. Cost/kWh from February 2019 EIA, https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a.

b. U.S. average cap rates from CBRE, https://www.cbre.us/research-and-reports/US-Hotel-Cap-Rate-Survey-H2-2018?utm_medium=email&utm_source=ExactTarget&utm_campaign=HOTEL+H2+2018+NA+Cap+Rate+Survey&utm_content=https%3a%2f%2fwww.cbre.us%2fresearch-and-reports%2fUS-Hotel-Cap-Rate-Survey-H2-2018.



Sustainability Opportunities Driving Value

Sustainability opportunities in the hotel sector can be broken into two major types:

1. Operational

Strategies and governance decisions that improve efficiency.








2. Technical

Retrofits that upgrade technology or equipment at a hotel to improve efficiency.

Operational Best Practices

The best practices highlighted in this section of the report are collected from conversations with more than 25 hotel industry stakeholders with strong success achieving sustainable

hotel operations. These efficiency opportunities increase an asset's net operating income right from the start by reducing operating costs.

Best Practice	Benefits
 <p>Consider sustainability during project design.</p>	<p>Even if you are a developer or planning a short-term hold, incorporating sustainability at the outset of a project is always the least expensive and provides the best lifetime return on investment.</p>
 <p>Incorporate sustainability into hotel renovations.</p>	<p>Hotel guest rooms are regularly updated and renovated to maximize room revenue. Integrating sustainable features, like healthy materials, LEDs and lighting controls, or efficient bathroom fixtures, improves an asset's environmental performance with minimal business disruption.</p> <p>In addition, property improvement plans (PIPs) are often required in branded hotel transactions to bring a hotel into compliance with brand standards. Including sustainable design features in PIPs can ensure capital investments in sustainability and is easier to accomplish as part of a larger upgrade project.</p>
 <p>Select architects, project managers, and other stakeholders with expertise in sustainability.</p>	<p>Experienced team members can help support sustainability goals by providing technical expertise on what has been previously successful and identifying financing opportunities, reducing the risk of delays or confusion over innovative technology and design features.</p>
 <p>Collect and analyze energy, water, and waste data to track performance. If a project occurs, be sure to measure the specific performance benefits as well.</p>	<p>Performance data help prove the financial and environmental benefits of sustainability initiatives and projects. In addition, results from data analysis help owners identify low performers, determine when to retrocommission equipment, and develop targeted improvement opportunities that yield greater savings. These data can also help in marketing and asset valuation.</p>
 <p>Owners and operators should work together to align goals and maintain communication about sustainability opportunities.</p>	<p>By aligning sustainability goals, owners and operators find it easier to identify the right projects and implement them in a timely manner.</p>
 <p>Develop the hotel workforce. Investments in the "heart of house" can include staff development opportunities and considerate back-of-house design.</p>	<p>Involving on-site staff in sustainability is key. As the boots on the ground, they are the first to notice operational inefficiencies and waste, like water leaks. Investing in staff also reduces turnover and can improve overall guest experience.</p>
 <p>Identify partner organizations that can support sustainability programs.</p>	<p>Hotel owners and operators can participate in numerous organizations to help educate staff, identify best practices, or support specific sustainability initiatives that reduce waste.</p>

Example Partner Organizations

Clean the World is a nonprofit that works with hospitality companies to recycle leftover soap and redistribute to communities around the world to improve sanitary conditions.

Hotel Owners for Tomorrow is an initiative among the hotel community in Asia to advance sustainability by building awareness and creating a platform for discussion.

Polaris works to disrupt human trafficking by leveraging data and technology to identify perpetrators and partners with hotel companies to raise awareness and provide services to victims.




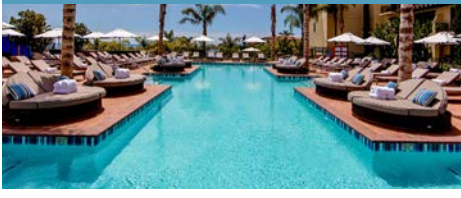




International Tourism Partnership is a collaborative international membership organization for hotel industry leaders and stakeholders that offers a platform to share ideas and build relationships to meet the following goals: (1) Collectively affect 1 million young people through employability programs by 2030; (2) Embed water stewardship programs to address water scarcity; (3) Embrace and encourage science-based targets; and (4) Raise awareness of human rights risks, embed human rights into corporate governance, and address risks in the labor supply chain and during construction.

U.S. Department of Energy's Better Buildings Challenge is a government initiative for companies, including hotel owners and operators, to commit to improving the energy efficiency of their portfolio by 20 percent over 10 years and creates a community for sharing strategies and results.

Technical Best Practices

A wide range of technical energy, water, and waste best practices can be implemented in hotel assets, from low-hanging-fruit measures to higher-cost capital investments. The following

examples showcase not just innovative sustainability upgrades to consider, but also how sustainability has added real value to the bottom line.

Best Practice	Benefits
 <p>ENERGY</p> 	<p>Upgrades to energy systems in a hotel can result in strong operational savings and increased guest comfort.</p> <p><i>Case studies in this section from Hersha Hospitality Trust, Host Hotels & Resorts, and MetLife.</i></p>
 <p>WATER</p> 	<p>Retrofits to in-room and laundry water fixtures can reduce utility costs, both water and natural gas (used for hot water).</p> <p><i>Case studies in this section from Clarion Partners and MGM Resorts International.</i></p>
 <p>WASTE</p> 	<p>Reducing waste generation and improving waste diversion provide strong returns by reducing labor costs and waste hauling costs.</p> <p><i>Case study in this section from Grand Hyatt Singapore.</i></p>
 <p>ENVIRONMENTAL</p> 	<p>Preserving the natural environment around a resort hotel enhances the guest experience and ensures compliance with local policy.</p> <p><i>Case study in this section from Terranea Resort.</i></p>



ENERGY

Host Hotels & Resorts Inc installed a 500-kilowatt solar photovoltaic system at the Fairmont Kea Lani, Maui.

According to the U.S. Department of Energy, the hospitality sector spends over \$7 billion on energy each year,¹³ an average of \$2,196 per guest room and 6 percent of total operating costs. HVAC and lighting are responsible for around 45 percent of energy use (32 percent HVAC and 13 percent lighting), with office equipment representing around 14 percent and refrigeration another 10 percent,¹⁴ providing a wide range of opportunities to improve the efficiency of a hotel’s technology and equipment.

According to the *Green Lodging Trends Report 2018*, which surveys 4,544 hotels across 61 countries, the most common energy efficiency practices were energy tracking (almost

100 percent of respondents), digital thermostats in the guest rooms (80.4 percent), occupancy sensors in the guest rooms (80.2 percent), and LED light bulbs (82 percent).

“Through a strategic approach to energy efficiency, a 10 percent reduction in energy consumption would have the same financial effect as increasing the average daily room rate (ADR) by \$0.62 in limited-service hotels and by \$1.35 in full-service hotels.”

— U.S. Environmental Protection Agency
Hotels: An Overview of Energy Use and Energy Efficiency Opportunities, 2007, page 1



HERSHA HOSPITALITY TRUST

OWNER

Hersha Hospitality Trust

OPERATOR

Various

LOCATION

Portfolio-wide

KEY SUSTAINABILITY FEATURES

Portfolio-wide LED lighting and guest room environmental management systems

VALUE ADDED

Strong operational savings and improved guest comfort

Hersha Hospitality Trust is a U.S. real estate investment trust that owns and operates 48 upscale, lifestyle, and luxury hotels totaling 7,644 rooms in urban gateway markets and coastal destinations including New York, Washington, D.C., Boston, Philadelphia, South Florida, and select markets on the West Coast. Hersha Hospitality Trust's sustainability initiatives are administered through its signature EarthView® program, which aims to capitalize on innovative opportunities that create both operational savings and long-term value through social and environmental impact.

Proposed sustainability initiatives at Hersha undergo a rigorous analytical process to ensure they demonstrate a positive impact on the triple-bottom-line, as follows:

- **Financial impact:** Demonstrate a positive short-term return on investment by reducing costs, mainly through utilities and waste, which are one of Hersha's largest controllable operating expenses;
- **Environmental impact:** Reduce the hotel's impact on the environment through decreased energy use and greenhouse gas emissions; and
- **Social impact:** Improve wellness and levels of engagement for communities, guests, and associates.

LED lighting and guest room energy management systems (EMS) are two projects that met Hersha's requirements and have been implemented across the portfolio over the last four years, saving Hersha's hotels over \$1,500,000 annually in utility costs with under 2.5-year payback periods.

A single hotel using these initiatives can significantly reduce its energy use and cost, as exemplified by Hersha's Ambrose Hotel located in Santa Monica, California. This hotel was the first in the nation to receive the U.S. Green Building Council's LEED-EB Silver certification. The installation of LED lighting and guest room EMS throughout the hotel has led to a reduction of total electricity use by over 25 percent, or nearly \$30,000 in savings annually.

More recently, Hersha has begun the rollout of efficiency technology for laundry, resulting in a reduction of water use for laundry by 70 to 80 percent. In addition, Hersha is in the process of adding to its total on-site renewable energy through the installation of solar photovoltaic systems at applicable hotels across its portfolio.



The Ambrose Hotel's installation of LED lighting and guest room EMS reduced electricity use by over 25 percent annually.

“These building upgrades, along with other sustainability-focused amenities at Hersha’s hotels, such as electric vehicle charging stations, locally sourced food at restaurants, and complimentary bike rentals, not only create significant savings for our portfolio, but also draw guests to our hotels and restaurants.”

— **Matthew Lobach**
Director of Sustainability, Hersha Hospitality Trust

Through the efficiency efforts of EarthView, from 2010 to 2018, Hersha has achieved a 15 percent reduction in energy use per square foot, a 41 percent reduction in greenhouse gas emissions per square foot, and diverted 25 percent of waste from landfills, saving \$11 million across Hersha's portfolio since 2010.

“The EarthView program has created \$65 million in additional portfolio value and contributed 50 basis points to our EBITDA margin, demonstrating that being active stewards of our environment and our communities is key to running a successful business.”

— **Bennett Thomas**
Senior Vice President of Finance and Sustainability, Hersha Hospitality Trust



THE FAIRMONT

OWNER
MetLife

OPERATOR
Fairmont Hotels
& Resorts

LOCATION
Washington, D.C.

KEY SUSTAINABILITY FEATURES
Data tracking and optimized energy management system

VALUE ADDED
Aligns with commitment to sustainability, improves guest satisfaction, provides strong cost savings

After purchasing the Fairmont Washington, D.C., and noting a spike in utility costs, the MetLife and Fairmont team quickly rallied to roll out a comprehensive Capital Improvement Master Plan that embeds sustainability improvements into the overall mission statement and mindset of Fairmont associates. This strategic plan ranged from the immediate implementation of no- and low-cost operational improvements to the sequencing of several major renovation projects, including the replacement of the cooling towers as well as other aging mechanical equipment/systems and a hotel-wide LED lighting retrofit. These efforts have already started to pay off with quantifiable reductions in utility costs, despite an unusually cold winter season, increases in city fees for electricity infrastructure costs, increased water rates imposed by the District for infrastructure repairs, and increased occupancy rates.

After replacing the poorly functioning, aged mechanical control system with a new state-of-the-art DDC energy management system, the hotel was able to automate the sequence of operations for the mechanical, electrical, and plumbing systems. (See table.)

Measure	Value
Changed the chilled water system from a constant volume use to a variable volume use	Saves energy from start/stop use of pumps, as well as wear and tear.
Incorporated a demand-based-ventilation sequence for all major air handling units, which reduces energy load on the central plant	Helps systems correlate to actual hotel occupancy and planned use of the ballroom, meeting rooms, and prefunction spaces.
Incorporated a building pressure-control sequence to ensure the building remains in a neutral to positive pressure	Better manages how much outside air is required, which reduces energy spent on heating outside air during winter and cooling outside air during summer.
Invested in utility monitoring and submeters	Real-time data and alerts help the hotel identify errors or consumption spikes before the problems inconvenience the guests or cause costly damage and help the engineering team create effective operating schedules.



FAIRMONT WASHINGTON, D.C., GEORGETOWN

MetLife’s smart sequencing of energy conservation measures continues to pay dividends by reducing energy use and costs while also increasing system reliability.

After several major initiatives were completed in 2017, the Fairmont experienced a clear reduction in energy use. In 2017, annual energy savings reached 18.2 percent (1,987,815 kWh) and annual costs were reduced by 18.5 percent (\$238,733). In 2018, even with an increase in occupancy, the savings continued, with an additional \$74,000 reduction in energy costs.

These types of improvements not only boost hotel utility performance and reduce operating costs to increase asset value, but they also support guest comfort and satisfaction and increased electrical and mechanical system reliability. This also highlights the Fairmont’s commitment to sustainability and aligns with other sustainability programs on site, including a green roof, complete with beehives producing local honey, and food waste composting.

“MetLife purchased Fairmont Washington, D.C., Georgetown, in December of 2014, and planned and implemented a renovation in a very short period of time. We engaged designers and construction teams with a goal of finalizing the project by the presidential inauguration in January of 2017. The project’s goals were to enhance the guest experience, the hotel’s position as the largest luxury group hotel in the nation’s capital, and to enhance its sustainability program by reducing energy consumption.”

— **Bill Webster**
Director of Hotel Asset Management, MetLife



HOST HOTELS & RESORTS

OWNER

Host Hotels & Resorts

OPERATOR

Various

LOCATION

Portfolio-wide

KEY SUSTAINABILITY FEATURES

On-site decentralized and renewable energy

VALUE ADDED

Utility savings in areas with high energy costs



HOST HOTELS & RESORTS INC.

The Phoenician, a Luxury Collection Resort, installed 600 kilowatts of solar power through a power purchase agreement.

Host Hotels & Resorts, Inc. is the world's largest lodging real estate investment trust and one of the largest owners of luxury and upper-upscale hotels with 93 properties totaling 52,000 rooms. Host continually evaluates investments in proven sustainability technologies and collaborates with operators and managers to adopt industry best practices that improve environmental performance and enhance asset value.

Over the past four years, Host has invested over \$210M in engineering projects with sustainability attributes and energy & water-saving ROI projects. As a result of these investments, Host expects annual savings of approximately \$30M, equating to a 14% cash-on-cash return and approximately \$320M in enterprise value.

“Host’s industry-leading Corporate Responsibility program leverages our unprecedented scale and integrated platform to enhance the value and profitability of our owned hotels through sustainable investments and business practices.” – Mike Lentz, Executive Vice President, Development, Design and Construction at Host Hotels & Resorts.

Host has invested over \$40M in decentralized energy generation including solar photovoltaic (PV) systems, a fuel cell plant, cogeneration facilities, and on-site steam-to-gas system conversions. To support continued progress toward its science-based greenhouse gas emissions target, Host established a renewable energy target of 30 percent of the company’s total electricity consumption by 2025.

Solar installations: Host has installed 2MW of on-site solar PV systems at \$6.3M, leveraging \$4.8M in incentives and depreciation benefits, resulting in \$610,000 in annual cost savings and 1,800 metric tons in associated annual emissions reductions. Current solar installations include:

- 500-kilowatt solar PV system at the Fairmont Kea Lani, Maui
- 598-kilowatt solar PV system at the Hyatt Regency Maui Resort and Spa
- 290-kilowatt solar PV system at the Andaz Maui at Wailea Resort
- 600-kilowatt solar PV system at the Phoenician, a Luxury Collection Resort

Phase two expansions are approved at both the Fairmont Kea Lani and the Hyatt Regency in Maui. Host is evaluating additional opportunities in Hawaii, California and Washington, DC.

Host continually investigates non-renewable alternative opportunities in decentralized energy generation to drive reductions in emissions and energy costs, as well as increase building resilience.

Fuel cell: Fuel cells use chemical energy from a fuel source to produce energy without emissions and reduce risks of handling and storing other battery materials like battery acid or diesel fuel. In 2017, an 840-kilowatt fuel cell utilizing natural gas was installed at Sheraton San Diego Hotel & Marina, generating roughly 7 million kilowatt hours of energy, including waste heat that is used to heat the pools, and over \$270,000 of annual savings.

Cogeneration: Cogeneration is the simultaneous production of electric power and heat from a fuel-fired engine or turbine, maximizing efficiency and reducing overall energy usage. At the New York Marriott Marquis, Host has begun design on an \$18.3M investment in a 3.9MW cogen system leveraging \$7.4M in local incentives, tax credits and depreciation benefits, that is projected to save approximately \$1.9M in annual utility costs. Host has previously invested in two cogen plants within its current portfolio, including the New York Marriott Downtown and The Logan, Philadelphia. These projects had a combined investment of approximately \$4M, annual savings of just over \$1M and have been performing in accordance with expectations.

Steam to gas: At the New York Marriott Marquis, Host invested approximately \$11.8 million in a high-efficiency steam boiler plant, which allows the facility to self-generate steam for on-site use and disconnect from the district steam system. It was Host’s third property with steam-to-gas conversion following the completion of projects at the Sheraton New York Times Square Hotel and San Antonio Marriott Riverwalk. These three steam conversion projects are estimated to save approximately \$2.2 million in annual utility costs, reduce emissions by 5,790 metric tons, and eliminate reliance on less efficient, high-cost district steam utilities.

Completed renewable and distributed energy projects within our portfolio are estimated to save over 7,500 metric tons of CO₂ emissions and generate 9.1 million kilowatt hours of energy annually, the equivalent of the annual electricity use of 1,300 homes.



WATER

With pools, laundry, landscaping, and full bathrooms all using water, hotels have great potential to reduce their water consumption.

Water use in hotels accounts for about 24 percent of total utility expenses¹⁵ and 15 percent of total water use in commercial and institutional real estate in the United States. Within hotels, the largest water users are bathroom fixtures, laundry, landscaping, and kitchens.

According to the *Green Lodging Trends Report 2018*, the most common water conservation practices are regular water tracking (98 percent) and low-flow toilets (75.6 percent). Efficient faucets and showerheads were less common (68.2 percent and 69.7 percent, respectively); however, because high-efficiency bathroom fixtures use at least 20 percent less water, hotels that have yet to implement these fixtures are leaving savings on the table.¹⁶



CLARION PARTNERS

OWNER

Clarion Partners

OPERATOR

Various

LOCATION

Portfolio-wide

KEY SUSTAINABILITY FEATURES

Portfolio-wide water reductions through high-efficiency bathroom fixtures and linen reuse

VALUE ADDED

Water savings and opportunity to engage guests on sustainability while ensuring luxurious guest experience



CLARION PARTNERS, LLC

Clarion Partners is a U.S. real estate investment manager with over \$50 billion in total assets under management, including 55 hotel properties comprising more than 8,000 guest rooms across 25 states. During a renovation program over the past five years that includes upgrades to LEDs across 190 U.S. hotels, installation of in-room thermostats, use of Energy Star equipment, and building automation systems, the company also undertook a replacement of bathroom fixtures across its hotel portfolio.

- Toilet replacements reduced water use from as much as three gallons per flush (GPF) to 0.8 GPF, resulting in an average annual savings of \$9,000 per hotel. Today, more than 90 percent of the hotels in the Clarion portfolio have low-flow toilets.
- Faucet aerators reduced annual water consumption by an estimated 91,000 gallons, resulting in \$1,000 average annual savings per hotel.
- Showerheads were replaced across 95 percent of the hotel portfolio, with fixtures reducing water consumption from 2.5 gallons of water per minute (GPM) to 1.75 GPM. These replacements achieved an average annual savings exceeding 500,000 gallons of hot water, which represents \$5,550 of water savings and \$1,700 of natural gas savings for a total of \$7,250 of annual savings per hotel.

Showerheads play an important part of the guest experience in hotels, so when undertaking this replacement, Clarion partnered with Kohler to compare two of its leading water-efficient products, one using 2 GPM and another using 1.75 GPM. Several asset managers and hotel managers tested both products at their homes, and surprisingly, the water coming from the lower-flow showerhead felt stronger than the higher-volume choice, saving money and ensuring a high-quality guest experience.

Across the Clarion Partners hotel portfolio, water-efficient fixtures are a key part of the larger sustainability strategy.

REPLACING THE TOILETS, FAUCETS, AND SHOWERHEADS



SAVES AN INDIVIDUAL HOTEL IN THE CLARION PORTFOLIO

\$17,250 PER YEAR

To save additional water and energy, Clarion also offers towel and linen reuse programs at 100 percent of hotels, allowing guests to reuse towels, providing linen changes every fourth night of a stay, and then changing all towels and linens when a guest checks out. To support program success, Clarion encourages hotel personnel training to ensure they do not replace towels that are not left on the floor. To some surprise within the hotel industry, this option was quickly embraced by hotel guests as a small way to engage in energy conservation, and resulting estimates of annual energy and natural gas savings are about 25 percent.

“Implementing sustainable practices that help our environment while ensuring guest comfort shouldn't have to be mutually exclusive. Hotels host millions of travelers annually, so we have a real opportunity to not only demonstrate that we are taking quantifiable action to improve our planet, but we are doing so in ways that complement the guest experience.”

— **Chuck Lathem**
Managing Director, Clarion Partners



MGM NATIONAL HARBOR

OWNER

MGM Resorts International

OPERATOR

MGM Resorts International

LOCATION

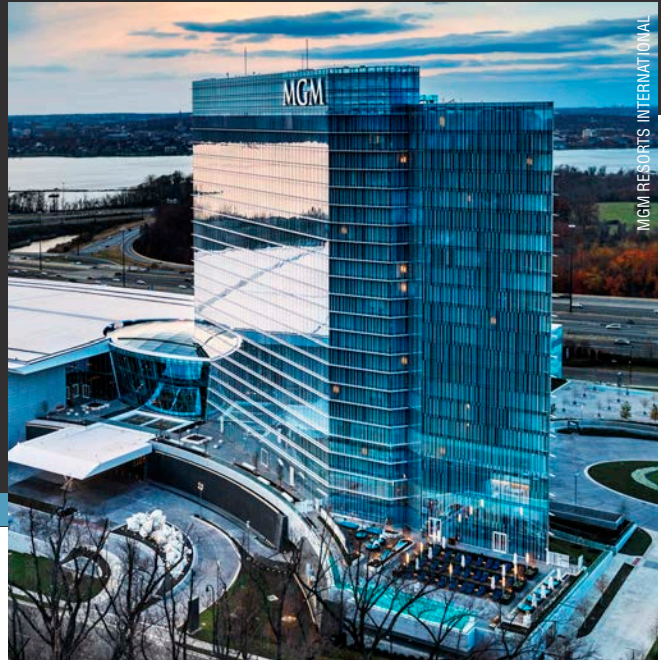
National Harbor, Maryland

KEY SUSTAINABILITY FEATURES

Strategies that reduce and reuse water consumed on site

VALUE ADDED

Reduction in water consumption that achieved utility savings and assisted the development in achieving LEED Gold certification



Using best practices to reduce and reuse water, MGM National Harbor was able to reduce its water consumption far below a design baseline.

MGM Resorts International is a global entertainment company with national and international locations featuring best-in-class hotels, casinos, conference venues, and arenas. One of the company's recent developments, MGM National Harbor, opened in 2016 as a 3 million-square-foot waterfront resort with a 23-story, 308-room luxury hotel and 50,000 square feet of convention space. For its range of environmentally minded design elements, the development achieved LEED Gold certification.

A project team experienced in conserving water at MGM's Las Vegas properties decided to prioritize water conservation as a focus at MGM National Harbor. The property achieved water consumption of 45 percent below design baseline by incorporating multiple water conservation features, including the following:

- **Water efficient fixtures:** High-efficiency fixtures such as automatic faucets in sinks, low-flow toilets and shower fixtures. These fixtures result in the savings of more than 34 million gallons each year. This volume of savings is equivalent to the usage of 676 average U.S. households annually and is enough water to fill 52 Olympic-sized swimming pools.
- **Rainwater harvesting:** The roof is designed specifically to capture rainwater that is then treated and stored in a 700,000-gallon water cistern. This rainwater is used as an alternative to municipal water for landscape irrigation, for flushing toilets back of house, and to supplement the water needed for cooling towers.
- **Landscaping:** Landscaping design incorporates native and adaptive plant species and intelligent irrigation technologies.
- **Stormwater management:** A park designed and developed adjacent to the resort helps manage stormwater on site, preserving water quality in the Potomac River and Chesapeake Bay.

These water efficiency efforts are part of a larger environmentally conscious design strategy at MGM National Harbor, including one of the largest privately operated combined heat and power plants in the Washington, D.C., region, a building management system to track energy use and alert staff if there are opportunities optimize energy use, and 28 electric charging stations to encourage low emission vehicles.

“As one our latest LEED Gold-certified destinations, MGM National Harbor visibly and elegantly infuses environmental innovation into the core architectural design of the resort. MGM now has over 20 million square feet of LEED-certified resorts, and we are committed to continuing to build and operate in the future, with people and planet in mind.”

— **Yalmaz Siddiqui**
Vice President, Corporate Sustainability,
MGM Resorts International



WASTE

With diverse streams of waste from restaurants, guest rooms, and common areas, waste management is a key consideration for hotels.

From on-site restaurants to guest rooms, hotels produce a large amount of waste. In the United Kingdom alone, hotels produce 289,700 metric tons of waste each year, and over one-quarter of that waste is food (79,000 metric tons).¹⁷

According to the *Green Lodging Trends Report 2018*, the most common waste management practices are regular recycling in common areas (75.6 percent), reusable food service materials (75.5 percent), and no newspaper delivery to guest rooms (79.5 percent). Other low-effort opportunities that are less common include recycling bins in guest rooms (only 53.1 percent) and waste data tracking (only 56 percent).¹⁸

Unfortunately, China's recent import restriction on certain recyclables like mixed paper and plastic has many in the hotel and larger real estate industry concerned about the market. As the price for recycling increases, some hotels are already considering doing away with their programs altogether or are being required to get more creative with reducing waste.



GRAND HYATT SINGAPORE

OWNER

Private investors

OPERATOR

Grand Hyatt

LOCATION

Singapore

KEY SUSTAINABILITY FEATURES

Food-waste management

VALUE ADDED

\$74,000 in annual cost savings

Waste is a big concern in Singapore, with limited space available for landfills. At the Grand Hyatt Singapore, 4,000 to 5,000 meals are served daily, generating about 1,000 kilograms (2204.6 lbs) of food waste. Working with experienced partners and a \$250,000 grant from the National Environment Agency, the hotel installed a food-waste management and recycling system. Waste from nine different sources within the hotel is transported to a digester that converts 100 percent of the hotel’s food waste for the day into about 300 kilograms of pathogen-free organic fertilizer for the hotel’s landscaping.

This infrastructure saves the Grand Hyatt about \$74,000 (S\$100,000) annually in waste haulage costs, operational expenses, and garbage bags, resulting in a payback period of less than three years.

The culinary team has taken further steps to reduce waste at the Grand Hyatt Singapore, including the following:¹⁹

- Each meal prep station has a food-waste bin.
- Waste from banquets is brought back to the kitchen and manually sorted.
- The hotel maintains records on past groups that allows it to find information on previous services and adjust future services to reduce food waste.
- Excess food is chilled and donated to local community organizations.



Smart waste management strategies at the Grand Hyatt Singapore include an on-site digester that reduces waste sent to landfill.

“For every \$1 invested in food waste reduction, there was an average \$7 in operating cost savings.”

— *The Business Case for Reducing Food Loss and Waste: Hotels, Champions 12.3*



ENVIRONMENTAL

Preserving the ecosystems surrounding hotels and resorts ensures that guests can continue to enjoy natural beauty for years to come.

Hotels, particularly resorts, consider the natural environment a key asset in attracting guests and work hard to minimize their impact on the surrounding land to preserve natural processes, provide guests the opportunity to connect with nature, and help with local approvals.

According to the *Green Lodging Trends Report 2018*, participation in local conservation and biodiversity protection is considered an established practice in hotels (56.7 percent); however, they are still working on communicating conservation efforts to guests (43.2 percent).²⁰



TERRANEA RESORT

OWNER

Lowe Real Estate

OPERATOR

JC Resorts

LOCATION

Rancho Palos Verdes,
California

KEY SUSTAINABILITY FEATURES

Preservation of native ecosystems and stormwater management

VALUE ADDED

Beautiful setting that offers guests the opportunity to connect with nature

Since its inception, Terranea has remained committed to minimizing its environmental footprint by integrating transparent ecofriendly practices throughout the resort, including—but not limited to—those that protect open space, improve wildlife habitats, enhance local water quality, and reduce waste in guest rooms. Today, Terranea occupies only one-quarter of its 102-acre site, allowing guests to enjoy more than 75 acres of natural landscape.

“Terranea Resort is dedicated to protecting the valuable coastal resources that define the Palos Verdes peninsula and make this singular destination one of the most valued natural locations in the world.”

— Terri A. Haack
President, Terranea Resort

Terranea’s native plant palette features coastal species indigenous to Palos Verdes and the Channel Islands. Non-native plants were replaced with indigenous ones locally cultivated and grown by the Palos Verdes Land Conservancy to reinforce biodiversity and treated using pesticides and fertilizers that are organic or pose no residual effect on the environment. Approximately 45 mature trees, over 50 years old, were carefully boxed and preserved during construction and then replanted throughout the site. More than 60,000 tons of onsite stone from development and construction was also quarried, crushed, and used on site under roads and walkways.

Stormwater is channeled through a series of wet ponds and vegetated wetland channels called bioswales for natural irrigation and water treatment, enhancing water quality while serving as a habitat for native avian species. First-flush rainfall collection systems called storm filters also reduce and treat runoff of



TERRANEA RESORT

At Terranea Resort, guests can connect with nature while staying at a resort that is committed to protecting open space and implementing ecofriendly practices.

pollutants. The resort works hard to maintain ocean water quality and has never received any environmental compliance complaints or citations in its 10 years of operation. In addition, monthly water-quality tests continue to carry an A+ rating.

The preservation of this natural setting allows guests to explore its unique ecology and embrace environmentally friendly practices through a variety of exciting conservation education programs such as tracking whale migrations and spotting the endangered El Segundo Blue butterfly. All four sparkling resort pools on the grounds boast saltwater treatment in lieu of a fully chlorinated system, a process that is both environmentally friendly and healthier for pool users. Terranea’s commitment to sustainability since its inception led to the resort winning the Platinum Leader in Sustainable Tourism Award for 2018 by National Geographic Traveler.

“It takes 21 days to break a habit. Therefore it is important to have buy-in from at least one person in each department to keep the energy up and sustainability at the forefront. Persistence is key—never give up.”

— Lauren Bergloff
Sustainability Leader, Terranea Resort

Why Aren't Hotels Taking Advantage of These Opportunities?

According to many industry experts interviewed for this report, hotels are behind on sustainability when compared to peer buildings in office space. Numerous sustainability opportunities can add value to hotel properties, but hotels lack sufficient resources for sharing best practices resources and market uptake. Even with a strong business case for sustainability, the hotel industry is not taking enough notice of potential operational or technological upgrades. Possible reasons for this industry-wide lag are discussed in the following sections.

Numerous Owner/Operator Structures Create Obstacles in Scale and Goal Alignment

The wide range of owner and operator models in the hospitality industry creates challenges to scale solutions across varying structures. Such models include the following:

- REIT/investment manager owns the hotel and provides the capital expenditure funds, while a brand operates the asset to its brand standards.
- The hotel owner and operator pays a fee to a well-known hotel brand for use of its name and brand standards in the franchise model.
- Private owner or hotel brand owns and operates the hotel.
- Resort “condotels,” where a developer builds a hotel, the hotel is maintained by an operator brand, units are sold, and purchasers agree to pay monthly upkeep fees. Owners also have the opportunity to rent their units to nightly guests through the hotel operator.
- Alternative lodging companies like Airbnb that help connect travelers with local neighborhoods, which provides a marketplace for property owners to rent spaces to hotel guests, or Sonder, which directly offers and manages guest apartments for rent in nonhotel settings.

To meet niche lodging opportunities, brand operators are also spinning off new brands, fragmenting the market even more. With so many stakeholders involved in hotel ownership and management, challenges can exist in aligning goals and scaling projects across portfolios. Increasingly, owners and operators have their own sustainability goals, but it can be hard for hotel owners to align their internal goals for returns with operator brand standards. For example, some hotel

owners interested in bulk in-room toiletries to reduce plastic waste and unused product have run into issues with brand standards that still require individual guest soaps.

However, as owners continue to see the financial returns from efficient operations and operators find more brand value in implementing sustainability programs, more opportunities arise to work together. Hotel owners interviewed for this report found that regular meetings and coordination between the owner and operator are key to ensuring alignment on sustainability. For hotel owners working with multiple brands, identifying which brands they work with most can help in achieving scale. In addition, holding regular meetings between these groups ensures that project ideas can come from anywhere: the brand, the owner, or on-the-ground operations teams.

Lack of Data and Verification Reduces Potential for Future Opportunities

The common saying, “you can’t manage what you don’t measure” holds true for hotels. Collecting environmental performance data and benchmarking over time can help properties locate outliers and track progress toward sustainability goals, but not all hotel owners are collecting this information. Beyond benchmarking, these data are also important to show measurement and verification of how sustainability improvements affect hotel finances.

Using performance data to make decisions requires substantial staff time for analysis, ensuring equipment is functioning properly, and identifying new opportunities; however, without data, there is no way to prove project success, making it difficult to pitch new ideas, market results, or incorporate improvements into appraisals.

Sustainability Initiatives Are Not Balanced with Guest Expectations

Hotels are a competitive business, so sustainability initiatives or projects at a hotel cannot be a detriment to the guest experience. The additional cost savings from reduced water consumption are not worth guest unhappiness with a subpar shower experience. Sustainable materials do not always

hold up well to constant use, and complicated water or HVAC fixtures can frustrate guests looking for comfort and convenience while away from home.

However, many in the hotel industry see sustainability and community initiatives as a strong opportunity to enhance the guest experience. Careful consideration of fixtures is key to ensuring balance between guest expectations and sustainability.



Careful consideration of fixtures and in-room technology is key to ensuring balance between guest expectations and sustainability.

Trends Shaping the Future of Hospitality

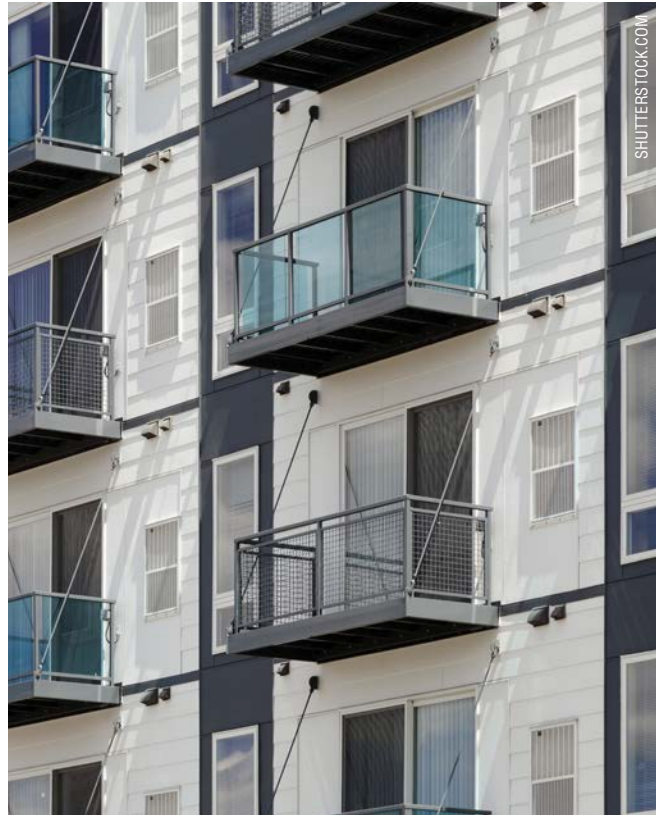
With strong growth in the hotel market, hoteliers are looking to implement new and innovative trends that cut costs, enhance the guest experience, and differentiate them in the marketplace. There are a number of opportunities to consider, but modular construction, sustainable materials selection, guest room technology, and an increased focus on health and wellness are some of the most commonly referenced.

Modular Construction

Industry insiders view modular construction as the next big trend in hotel design and construction across multiple hotel price points. Modular construction uses prefabricated and identical modules, built off site in a controlled environment. These modules are then brought to the construction site formed into a unified structure. This technique helps developers by reducing construction time, minimizing waste, and standardizing quality across assets. This improves the sustainability of a hotel since off-site construction uses up to 69 percent less energy, reduces waste from construction up to 90 percent, and uses modules that are often recyclable, so the hotel is sustainable throughout its entire life cycle.

Hotel brands such as Citizen M and Pod Hotels are specialists in this type of development and have built modular hotels in space-limited cities like New York and London. Other larger brands such as Marriott International are also moving into this space with plans to build a 26-story modular hotel in New York City, the tallest of that construction type in the world.

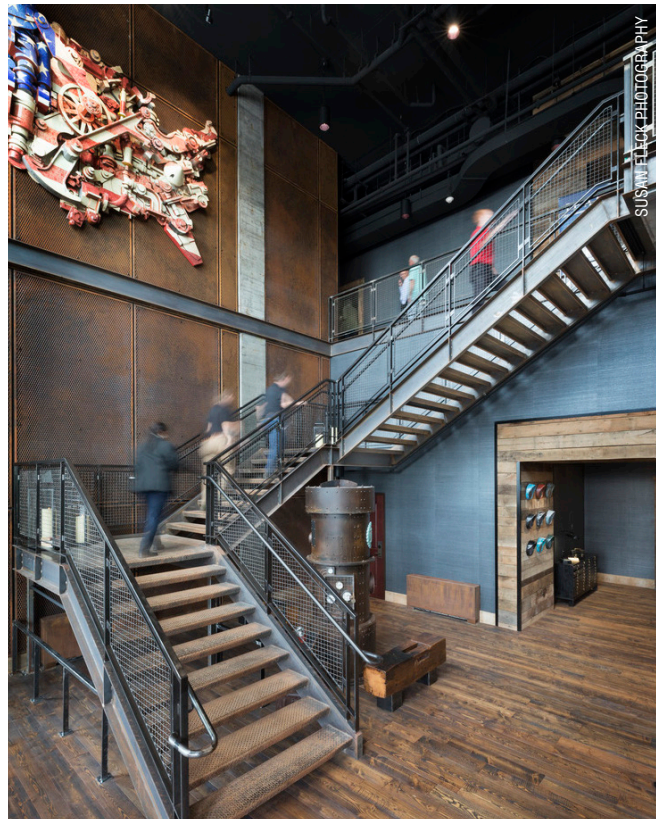
Although modular hotels are currently in operation, they are still a new idea with a few challenges to work out. One risk is that currently only a limited number of modular manufacturers exist globally, and many of them are new to the hotel space. However, once a developer streamlines the construction process, the construction of modular hotels will continue to get even more efficient.





SUSAN FLECK PHOTOGRAPHY

RATIO Architecture's Ironworks Hotel in Indianapolis features repurposed industrial cranes from a defunct ammunition factory in a new 120-room boutique hotel to highlight the area's manufacturing heritage.



SUSAN FLECK PHOTOGRAPHY

An open and industrial-looking stairwell, complemented with local art, entices guests to take the stairs to the property's restaurants instead of using the elevator.

Sustainable Materials Selection

Because hotels renovate guest rooms every five to seven years, many opportunities exist to incorporate more sustainable options, from fixtures to furniture. These choices not only improve sustainability by reducing the total embodied carbon (carbon created during manufacture, transportation, and construction of a building material) at a property, but also support guest health and wellness by reducing the off-gassing of volatile organic compounds (VOCs). Reused or locally sourced materials also support placemaking, tying guests to the local environment and creating a more community-focused experience.

Moreover, sustainability-related items that a guest can see or use, like a recycling bin or recycled materials, are key for communicating sustainable choices made at a property and offer guests the opportunity to make environmentally friendly choices. Hotels are also working to remove unsustainable items from their supply chain to support their sustainability goals and meet changing consumer preferences. For example, plastic straws have gained significant media attention as a large source of waste that can harm wildlife, pushing

consumers to look for alternatives and cities to ban their use. Numerous hotel brands have already removed plastic straws from their properties and are testing paper and bamboo alternatives, including Four Seasons, Marriott International, and Hyatt Hotels. At Marriott alone, this change eliminates the use of more than 1 billion plastic straws and 250 million drink stirrers per year.

Smart Guest Room Technology

Today's hotel rooms offer guests the most personalized and user-friendly experience ever. Guests are now able to check in, book on-site experiences, and control room technology using phone or tablet apps. Most guest rooms contain individual HVAC controls that allow guests to set the temperature to their comfort and help hotels ensure they are not unnecessarily heating or cooling a space when guests are out of the room. Occupancy sensors and motorized window coverings can also assist hotels in increasing personalization while reducing excess energy use. Going a bit further, some hotels are experimenting with other tech-focused amenities like voice assistants and in-mirror televisions or workout stations.



THE SINCLAIR

OWNER

Sinclair Holdings LLC

OPERATOR

Marriott Autograph Collection

LOCATION

Fort Worth, Texas

KEY SUSTAINABILITY FEATURES

Power-over-ethernet (PoE) fixtures, high-wattage LED lightbulbs, digital electricity, digital mesh used as highly accurate occupancy sensor, lithium ion battery for emergency backup power

VALUE ADDED

50 percent energy reduction from traditional hotel, decreased labor costs, decreased material and infrastructure costs, faster construction time, no electrical permitting costs



SINCLAIR HOLDINGS LLC

At the Sinclair, a historic redevelopment hotel set to open in the summer of 2019, Sinclair Holdings uses numerous innovative technology applications in the hotel room that help guests personalize the room to their preferences and save energy. Instead of traditional alternating current (AC) fixtures, the Sinclair uses PoE technology to bypass electrical infrastructure and utilize direct current (DC) power, saving energy and removing the need for electrical inspections. Seeing the potential, the Sinclair then moved to convert the in-room motor shades, electric mirrors, lights, minibars, and all other fixtures to be powered by PoE technology. To power the fixture switches, digital electricity pulses packets of energy throughout the hotel, pulsing DC energy at a rate of three watts of energy, 300 times a second. These changes required some additional work with vendors, but the switch to using PoE fixtures has led to a 50 percent savings from traditional AC fixtures. Digital electricity is a Class 2 power, making it safe to be handled by a non-electrician and removing electrician labor costs and electrical conduits. This technology also provides a substantial amount of power over long distances while using small, noncopper cables (18-gauge wire instead of metal-clad cables), reducing internal infrastructure costs and total construction time with fewer permitting requirements.

Numerous hotels have occupancy sensors, to achieve maximum efficiency. The Sinclair uses a virtual mesh network with Bluetooth nodes that are disrupted by water signals in the human body, instead of traditional sensors that work from motion or heat. The mesh network helps the hotel know if a guest is in the room, even if the guest is sleeping. Then when a guest leaves, all technology in the room can be turned off, reducing energy waste. Upon the guest's return to the hotel, the fixtures can be restarted and set to the guest's specific preferences. With all these features, the Sinclair is a true smart building, where all the instruments can communicate without additional instruction, creating a seamless guest experience.

The Sinclair's innovative use of technology reduces operating costs and creates a personalized guest experience.

Finally, local policies around emergency backup power for hotels usually require a backup generator with a set amount of fuel to ensure that life-safety systems always have power. These systems require regular maintenance and use, so to remove the need for using diesel fuel on site, Sinclair Holdings went directly to LG's battery division to find a new solution. After testing the battery in South Korea and receiving UL certification, the Sinclair will be the first hotel to replace a traditional diesel generator with a lithium ion battery for emergency backup power.

“Sustainability was never the ultimate goal of this project. We simply took existing technologies from many different partners and put them together in a way that made sense to us. What we achieved from that effort was instant communication to every single device, significant improvements in energy efficiency, and a safer building.”

— Farukh Aslam
President, Sinclair Holdings

Heightened Focus on Health and Wellness

Beyond a traditional gym or spa, hotels are exercising their creativity by improving their health and wellness offerings for guests. As wellness spending continues to increase, hotels are seeing the value. The Global Wellness Institute estimates that international wellness tourists spend 53 percent more per trip (about \$1,528 per trip) and domestic wellness tourists spend 178 percent more per trip (about \$609 per trip) than a traditional traveler. Innovative hotel brands are offering rental workout gear, providing in-room fitness amenities, and offering organic local foods. Westin's focus on wellness opportunities has increased the RevPAR room index almost eight points. At Hilton, the "Five Feet to Fitness" guest room concept provides fitness equipment in hotel rooms in a range of Hilton-branded properties at a variety of price points and is expected to produce strong returns because these concept units are priced 20 percent above normal room rates.²¹



Delos, an organization focused on elevating health and wellness in real estate through research-based innovations, has created a "stay well" room concept that incorporates healthy features into room design with a goal of providing better relaxation, from blackout shades and aromatherapy to cleaner water and air from advanced purification systems, and circadian lighting that promotes natural body rhythms from smart and personalized lighting. Interest in these features is not region-specific as hotels from Las Vegas to Orlando and Richmond to Boston have developed rooms that meet this standard.

Hotels that implement desirable health and wellness features help guests continue healthy behaviors from home or introduce them to new concepts that they can take back, personalizing the guest experience and strengthening the overall value proposition and brand loyalty.



LIMELIGHT HOTEL SNOWMASS

DEVELOPER

East West Partners in partnership with Aspen Skiing Company and KSL Capital Partners

OWNER/OPERATOR

Aspen Skiing Company

LOCATION

Snowmass Base Village, Colorado

KEY HEALTH AND WELLNESS FEATURES

On-site fitness, multiple on-mountain and village activities, local foods, views of nature

VALUE ADDED

Appeals to a wide range of guests interested in nature and healthy activities



EAST WEST PARTNERS

At the Limelight Hotel Snowmass, a 53-foot-tall climbing wall encourages guests to get active.

Climate change is already threatening ski resorts across the globe, lowering snowfall amounts and shortening ski seasons. In Colorado, ski resorts have taken notice of these risks and strategies for mitigating them by becoming leaders in hotel and resort sustainability. In addition to connecting guests with nature, these resorts are ideal for promoting healthy and active lifestyle opportunities, making these destinations a top choice for both winter and summer.

“One of the core values of the Aspen Skiing Company is environmental sustainability,” says Alinio Azevedo, managing director and COO, the Little Nell Hotel Group. “The Limelight Hotel embodies this value through its design and numerous sustainability initiatives. As a company, we understand the importance of our natural environment and the positive and restorative impact it can have on the health and wellness of our guests. This serves as a driving force for us to continue to be stewards for sustainability in the hospitality industry.”

East West Partners is leading the \$600 million revitalization of Snowmass Base Village with Colorado-based partners Aspen Skiing Company and KSL Capital, including the development of a new 99-room Limelight Hotel Snowmass with 11 whole ownership residences. “We’re striving to have the entire Snowmass Base Village project achieve LEED Neighborhood certification and have already achieved the highest level of the Cordis Certified Healthy designation,” says Andy Gunion, East West Partners’ managing partner on the Snowmass project. “This proves that a hotel can promote guest health and wellness while still optimizing efficiency.”

The Cordis Certified Healthy designation for the Limelight Hotel Snowmass examined items such as connectivity, play spaces and workout facilities, materials, noise management, and more. Specific initiatives that promote guest health and wellness include:

- A transit station in Base Village, as well as great pedestrian access. (A subsidized bus pass program encourages employees to leave cars at home.)

- Access to opportunities for guests to get active, including Colorado’s highest indoor climbing wall, an ice rink, and skiing and hiking trails. (The ice rink uses the heat rejection from the process of making ice on the rink to efficiently power the snow melt around the Base Village.)
- Prioritization of daylighting and views of nature.
- Reusable water bottles offered at the front desk as well as filtered water filling stations located throughout property.
- Use of a local delivery company to source food products directly from regional farms.
- Low-emitting materials, including all adhesives, sealants, paints, coatings, flooring, composite wood, and insulation.
- Electric vehicle charging stations installed in the parking garage.
- Operable windows in guestrooms.
- Elimination of plastic straws from the restaurant.
- All to-go containers and disposable drinkware converted to compostable products.
- A high-performance building envelope with continuous exterior insulation.
- Design of HVAC and advanced utility metering and building automation system (BAS) optimized for efficient occupant control of heating, cooling, and electrical systems.
- No smoking within 25 feet of building.
- Heating energy provided by the Base Village central plant with high-efficiency condensing boilers.
- Cooling energy provided by the Base Village central plant with chillers and cooling towers that allow free cooling when cooler outdoor temperatures allow.
- Overall building energy use that is 18 percent below energy code (IECC) minimum standards.
- Use of an energy recovery ventilation (ERV) system for the entire building, warming fresh air with building waste air.

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