

# THE DAVID LAWRENCE CONVENTION CENTER: HOW GREEN BUILDING DESIGN AND OPERATIONS CAN SAVE MONEY, DRIVE LOCAL ECONOMIC OPPORTUNITY, AND TRANSFORM AN INDUSTRY

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## INTRODUCTION

*When the David L. Lawrence Convention Center in Pittsburgh was completed in 2003, it was one of largest green buildings in the country. Its success proved that sustainability principles could be integrated into a breathtaking and high-performing design. Using almost a decade of performance data, this study, led by evolveEA, was commissioned to understand the level of building performance and the return on the initial investment in sustainability. With input from Carnegie Mellon University's Center for Building Performance and Diagnostics, CJL Engineering, and Civil and Environmental Consultants, the Buildings-in-Operation (BiO) study demonstrates that:*

- 1. investment in high performance systems can yield direct savings and improved sustainability operations and maintenance practices;*
- 2. green building projects can accelerate broader organizational sustainability efforts;*
- 3. green buildings can create major benefits for a region, including additional commerce and an increased uptake of green building design and;*
- 4. high performing projects can affect their industry standards by setting a standard for future design and construction, but also by facilitating a culture of best practice sharing, benchmarking, and peer comparison.*

*Publicly-owned facilities such as stadiums and convention centers are capital-intensive structures in both their construction and their operation. Because of this, large-scale public facilities need to compare upfront investment in high performance design and construction to the expected return on the investment (ROI) over the lifespan of the building. There are many challenges to understanding ROI in these circumstances. For example, these civic structures often have dynamic use patterns with*

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conflicting indicators of success, (e.g., days without events may lower energy usage but those days do not generate revenue.) In addition, civic structures often operate as a “loss leader,” or a facility that isn’t profitable itself but that attracts visitors and money to a region. This requires that return on investment be measured against larger regional returns.

It is in this context that Pittsburgh initiated the design and construction of a new convention center in the early 1990s. Eight years later, the Public Auditorium Authority of Pittsburgh and Allegheny County (now called the Sports and Exhibition Authority), the Southwestern Pennsylvania Convention Center Design Commission, and a number of regional foundations created a design competition that would become the first design competition for a public facility since H. H. Richardson designed the highly acclaimed Allegheny County Courthouse in the 1880s. With the support of the partners, a regional nonprofit, the Green Building Alliance, led the efforts to include green design in the competition criteria, resulting in the selection of the winning design by Raphael Vinoly.

Upon its completion in 2003, the David L. Lawrence Convention Center (DLCC) received a Gold level certification from the U.S. Green Building Council’s Leadership in Energy and Environmental Design for New Construction (LEED-NC) green building rating system, making it the world’s largest green building and the first LEED certified convention center in the world. This pursuit was leveraged through a multimillion dollar foundation grant that came with the condition that the facility would be reviewed to understand the effectiveness and value of green design. With eight years of available operational data, the Heinz Endowments commissioned this post-occupancy evaluation to quantify specific benefits and costs of designing and building a green building and to provide recommendations for the Sports and Exhibition Authority and SMG World (the building operator) to continue improvements (Case Study for the David L. Lawrence Convention Center, 2012).

Among its findings, the study found that the investment in green building certification and high performance systems has been recouped through annual operational cost savings at the DLCC. It also found that the DLCC’s leadership in sustainable practices has given it a competitive advantage. The increased business due to this leadership has positively impacted both direct and indirect regional spending and has catalyzed an industry across the country. The DLCC’s commitment to sustainability has been an explicit attraction for many high-profile events, including the U.S. Green Building Council’s Greenbuild Conference and Expo (2003) and the G-20 Summit (2009). In fact, the DLCC’s success has been a contributing factor in raising the standards for sustainable practices in the convention industry, as evidenced by the soon-to-be-released APEX/ASTM Green Meetings and Events Standards.<sup>1</sup>

<sup>1</sup><http://www.conventionindustry.org/StandardsPractices/GreenMeetings/APEXASTM.aspx>

*Some highlights and achievements as a result of the DLCC BiO investigation, completed in early 2011, can be summarized as follows:*

- *The Business Case for Sustainability: The investigation built a strong business case that clearly defined the value of its sustainability initiatives and galvanized organizational support for future investments. The team showed that from 2006 to 2010, marketing of the facility's green features attracted "green-seeking events" that brought \$143 million in spending to Downtown Pittsburgh, and \$12.5 million in revenue directly to the Convention Center.*
- *LEED for Existing Buildings Certification: The investigation guided the efforts that culminated in LEED Existing Building Operations and Maintenance (EBOM) Platinum certification, continuing the building's leadership by being the first EBOM Platinum certified convention center in the world.*
- *Strategic Marketing Development: Bolstered by the strength of the business case, and informed by careful review of visitor perception and industry best practices, the investigation developed a strategic plan for leveraging the convention center's efforts into increased business and improved environmental performance.*
- *The study leveraged the DLCC's sustainability communications program, or greenfirst (g1), as a fulcrum for transformative regional change. By partnering with its local service providers or value chain, the facility's g1 program can be used to brand the entire city as a green event destination, while greening the practices of the hotels and restaurants that its guests frequent.*

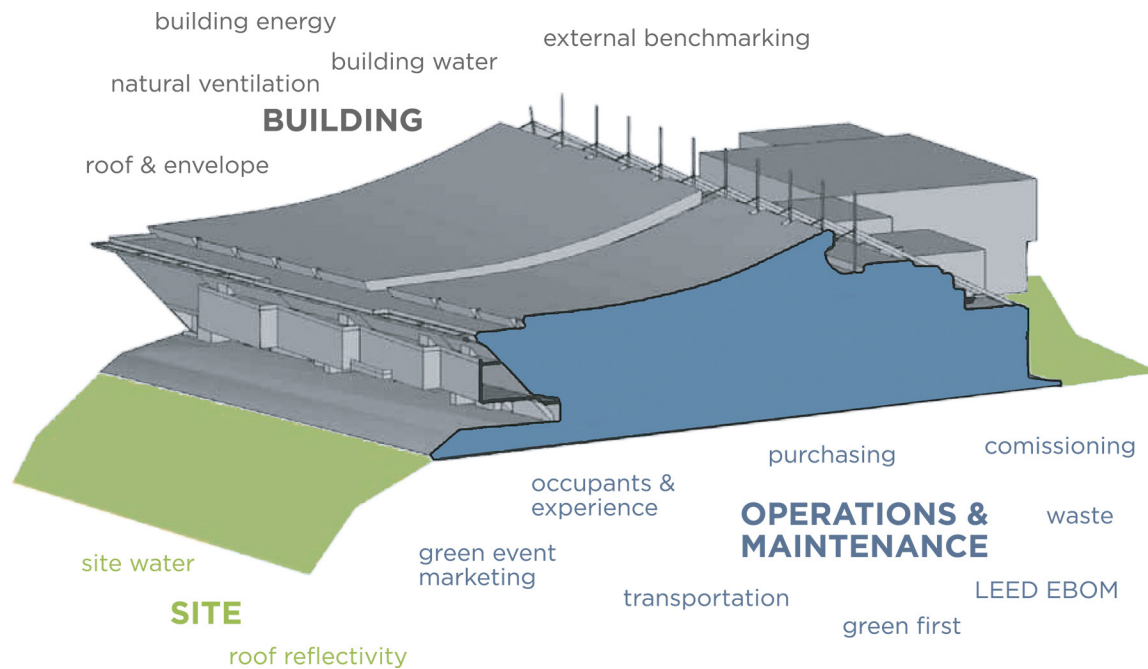
## **KEYWORDS**

high performance design, green conventions, LEED certified convention center, civic structures and urban centers

## **I. INVESTMENT IN GREEN & HIGH PERFORMANCE BUILDING DESIGN AND CONSTRUCTION CAN LEAD TO SIGNIFICANT OPERATIONAL SAVINGS**

Among its innovations, Vinoly's signature design integrated systems to provide both performance and delight. The winning scheme included three major systems that were uncommon in best practices of convention center design—daylighting of the expo hall, natural ventilation, and on-site water treatment. Taking a cue from the sweeping cable bridges adjacent to the center, Vinoly created a unique swooping structure using a similar cable structure. This allowed for the integration of daylighting and natural ventilation into the structural expression of the building and created the largest column-free exhibit space in the country. Large south-facing clerestory windows allowed the exposition floor to be operated without electrical lighting. Intake louvers drew air from the north facing river side of the building to provide natural ventilation and cool or warm air during the swing seasons. In addition, the design accommodated a blackwater treatment plant that processed and recycled toilet and sink water for nonpotable uses such as the flushing of toilets.

**FIGURE 1.**



A major part of this study was to understand the efficacy of these systems through a post-occupancy analysis, or Buildings-in-Operation (BiO) Study. In addition, the study included quantitative and qualitative assessments of operational issues such as transportation, waste, purchasing, and occupant comfort. Commissioning, internal greening efforts, and existing data collection were also examined. This information was compiled for submission for LEED for Existing Buildings Operations and Maintenance certification, which the facility achieved in 2011 at the Platinum level.

### **Energy Conservation**

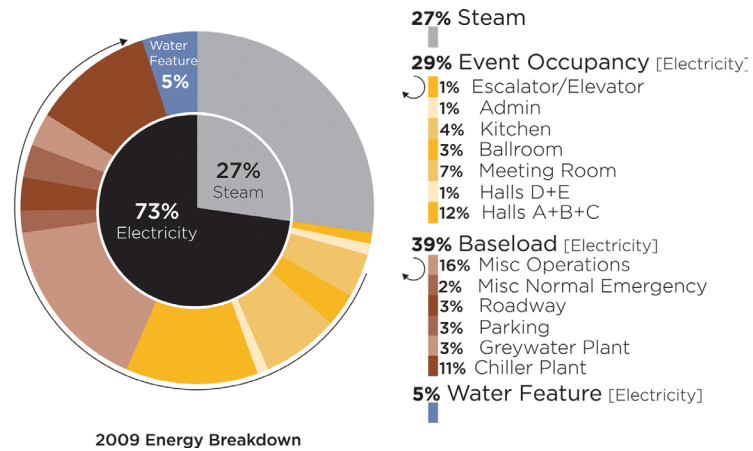
The study began with an energy audit as the first step in developing an Energy Master Plan. The Energy Master Plan allowed the SEA to evaluate and prioritize potential Energy Conservation Measures (ECMs) and pursue potential funding sources. The building systems reviewed as part of this process included air handling systems; pumps; building automation system (BAS) controls; natural ventilation; chiller plant; steam heating system; interior and exterior lighting; kitchen equipment; conveyance systems; IT/AV systems; blackwater treatment; water feature; and service hot water. In addition, renewable energy opportunities were identified for potential future implementation.

The investigation identified energy saving measures that were projected to result in over \$400,000 in annual energy savings. Additionally, the investigation quantified a savings over a traditional building of over 20,000,000 kWh since 2005, which is equivalent to a savings of over 15,000 tons of CO<sub>2</sub> emissions.

### **Findings**

In general, the DLCC's building systems were originally designed to be energy efficient and the study found that they have been diligently operated by SMG and DLCC staff to minimize

**FIGURE 2.**



energy usage. Many of the Energy Conservation Measures were achieved through the replacement of the high use, high maintenance, or low efficiency systems. Improvements were significant with highly efficient technologies such as LED lighting and control systems that were unavailable or not cost effective at the time of construction.

The facility immediately implemented the majority of the ECMs, many prior to the completion of the study. Two recommendations, back-of-housing lighting retrofits and winter chiller shutdown, were estimated to result in a potential annual electrical energy reduction of over 1 Million kWhs, or approximately 7% of annual electrical use. DLCC is also repaired faulty natural ventilation dampers, which was estimated to reduce annual heating energy losses by an estimated 10%, equal to \$54,000–\$65,000 annual heating costs.

**TABLE 1.**

Potential ECMs	Annual Energy Savings	% of total 2009 annual energy usage	Estimated Annual Utility Savings	O+M Savings	Initial Cost	Payback (yrs)
Natural Ventilation Louver Repairs	1,863–2,262 MMBTU	2.6%–3.3%	\$54,000–\$65,000	n/a	\$100,000–\$150,000 <sup>2</sup>	2–3
BAS and Controls Corrective Action	3,783 MMBTU	5.5%	\$94,000	n/a	\$250,000–\$400,000	2.5–4.5
Chiller Shut Down in Winter Months [IDF/MDF]	550,000–650,000kWh	2.7%–3.2%	\$55,000–\$65,000	n/a	\$150,100 <sup>3</sup>	2–3
Capacitor for Power Factor Correction	n/a	n/a	\$84,000	n/a	\$305,000	3.6
Parking Garage Lighting Upgrades	192,002 kWh	1.0%	\$18,298	\$5,367	\$155,955	6.5
Internal CC Lighting Upgrades	484,469 kWh	2.4%	\$46,169	\$2,400	\$335,942	6.9
Water Feature Lighting	528,500 kWh	2.6%	\$50,369	\$42,680	\$725,663	7.8

<sup>2</sup> & <sup>3</sup> Estimated implementation cost in 2011 dollars. Does not include contingencies or design fees.



**TAKE AWAY:** *Energy efficiency is not a one-time, one-size-fits-all pursuit or investment. In addition to constantly monitoring equipment to ensure performance, it is also important to occasionally monitor the latest equipment offerings for increased efficiency. Historically, the DLCC has operated the facility extremely efficiently given the installed equipment. Many of the proposed efficiency investments have resulted from the advancement of technology that offers increased efficiency in a cost-effective manner.*

### **Waste Reduction Strategies**

The investigation included an in-depth audit of the DLCC waste stream. The objectives of the audit were three-fold: to determine the composition and quantities of waste being generated (by weight or volume) according to event type and timeframe, to document and measure the current status and effectiveness of existing waste management systems, and to identify opportunities for improving waste management strategies and systems at the DLCC. The investigation identified waste flows within the building, and performed three separate waste sorts that reviewed the representative waste flows for pre-event waste, post-event waste, and during a food-heavy event.

### **Findings**

In 2009, the DLCC diverted 49% of its waste and was third in performance behind the leaders, who had 64% and 80% waste diversion rates in 2009. However, the DLCC created less than one half of the waste in comparison to its benchmarking cohort due to aggressive source reduction policies, giving it top rank in the most important waste metric.

The investigation found that diversion rates exceeding 70% are possible, but are a function of labor hours and cost. The study identified opportunities to save \$40,000–\$65,000 annually through further waste diversion, identification of new recycling outlets, advanced source reduction, and front-end sorting that maximizes visitor engagement and minimizes back-of-house waste sorting. The study found that the system could be optimized for labor, cost, or waste reduction/diversion, but these factors could be in conflict. For example, to reach the next level of waste diversion, materials like visqueen or plastic wrap need to be baled and sold on the recycling market. Due to the lack of demand and low market rates, maximizing the DLCCs diversion rate by baling the material would increase labor costs without a justifiable way of selling the materials.

**TAKE AWAY:** *Among sustainability leaders in the convention industry, waste management has become not just an imperative for attracting green-seeking events, but a point of competition with other facilities. Unfortunately, the metric that is generally accepted across the industry, diversion rate, only tells half of the story. Reducing the amount of waste a visitor creates is environmentally preferable to diverting the waste once it is produced. Identifying the proper metrics is key to allocating resources to meet sustainability goals.*

### **Indoor Environmental Quality**

Indoor environmental quality, including user satisfaction with daylight, views, acoustics, and air quality, is critical for the success of a convention center since the space is essentially what is being purchased. High-quality spaces entice visitors to stay longer and can result in higher vendor sales at events. High occupant satisfaction can also increase the likelihood of an event rebooking or returning on a regular basis.

As part of this analysis, quantitative measurements of the DLCCs thermal, air quality, lighting, and acoustic environments were taken. Qualitative user satisfaction data was also gathered through surveying of visitors and staff in the DLCC exhibit halls, ballroom, meeting rooms, and offices. Field measurements of environmental conditions and user comfort and satisfaction are very climate and activity dependent. For this reason, measurements were taken during four different events, spanning three seasons—summer, fall (similar to spring), and winter. The exhibit halls were evaluated in three seasons, with surveys from vendors and visitors. The ballroom and offices, which are less affected by the daylighting and natural ventilation systems, were surveyed in one season with attendee and staff surveys. Meeting rooms were measured in two seasons, summer and fall, and meeting attendees were surveyed.

### **Findings**

The overall indoor environmental quality and user satisfaction at the DLCC was extremely high. Carbon dioxide levels, particulates, and total volatile organic compounds were found to be at excellent levels in all seasons. Temperatures in many of the spaces were found to be too low in both the summer and the winter, reflecting a potential overuse of air conditioning in the cooling months, and an issue with the natural ventilation system in the winter months. Extremely high levels of user satisfaction and perceived indoor environmental quality were found in the spaces directly adjacent to the Allegheny River, suggesting the effects of “Biophillic Advantage”<sup>4</sup> of the river views.

**TAKE AWAY:** *To measure IEQ and visitor satisfaction properly, it is important to collect “hard” environmental data (i.e. temperature, humidity, etc.) to compare to the more subjective visitor data. Understanding the relationship between these objective and subjective measures is important to improve the user experience.*

### **Transportation**

Transportation of employees, exhibitors, and attendees to and from a convention center is one of the largest environmental impacts of the facility. An in-depth audit of the transportation patterns of DLCC’s stakeholders was undertaken to understand current behavior and opportunities for improvement.

Three employee surveys were administered to understand employee transit choices and the percentage of the weekly employee trips to and from DLCC that fall under the “alternative transportation” category. Attendees from five events were surveyed to understand how exhibitors and attendees traveled to and from the DLCC, the effectiveness of transportation options and communications, and potential opportunities for improving public transportation usage.

### **Results**

**Employees:** During the survey period, approximately 37% of the employee commuting trips were taken on alternative transportation (busses, walking, or biking). As a result of the investigation, the DLCC implemented programs to increase alternative transportation use, including competitions, incentives, and carpool information sharing among employees.

**Visitors:** Survey results show that the majority of respondents found public transportation options around the DLCC to be moderately to extremely adequate, which is not surprising given its central downtown location. However, the DLCC’s *communication* of these

<sup>4</sup>A term coined by E.O Wilson that suggests that there is an instinctive bond between humans and other living systems.

options was found to be less than adequate. For visitors unfamiliar with the city, communicating transportation options and highlighting public transit are important to help them navigate and to reducing each event's environmental footprint. As a result of this study, the DLCC created a Transportation Communication Campaign both onsite and online that helps visitors find the bus and walking routes to popular destinations.

**TAKE AWAY:** *Transportation is one of the largest environmental impacts of any organization, especially travel-intensive convention centers. Taking simple steps like educating stakeholders about transit options, identifying key walking and bus routes, providing adequate signage, and working with local businesses and travel bureaus to ensure shuttles are set up at proper times can significantly reduce an organization's travel footprint.*

### **Sustainable Purchasing**

Purchasing offers an opportunity to improve sustainability performance, support a growing market of sustainable products and services, and provide a very visible example of a facility's sustainability commitment. This analysis has measured the effectiveness of the DLCC's existing sustainable purchasing policies to identify opportunities for improvement. The investigation examined the DLCC's purchasing practices and provided recommendations for improving the already high-performing facility's practices in the categories of ongoing consumables, durable goods, facilities and alterations, and food purchases.

### **Findings**

The investigation found that the DLCC had strong purchasing performance in the categories of ongoing consumables, durable goods, renovation materials, and cleaning supplies. However, since no formal sustainable purchasing policy existed, one was formalized as part of this study.

Food service was found to be a large amount of the DLCC's purchases, yet it was more difficult to directly affect since food choices are typically outside the direct control of the facility or the food vendor and are driven by the event's budget, vision, and number of visitors. The investigation proposed:

- Challenging the broadline food provider and all other suppliers to provide green options as standard options for food that has broad application, such as fair trade coffee.
- Negotiating lower mark-ups for sustainable options so premiums are not multiplied.
- Using choice editing to make green products a baseline purchase (i.e. coffee, hot dogs).
- Adding seasonal menu items and marketing them early in the event client engagement process.

**TAKE AWAY:** *Organizations that are large, regional consumers of goods and services like convention centers have the ability to influence the performance of their facilities, as well as the organizations that sell the goods and services to support them. Organizations with great purchasing power need to educate their supply chain on key sustainability criteria and expected performance metrics.*

## **II. APPLYING THE THEORY OF GRAVITATIONAL ASSIST TO GREEN BUILDING PROJECTS: HOW GREEN BUILDINGS CAN CATALYZE ORGANIZATIONAL CULTURE CHANGE**

In the paper "Building Up to Organizational Sustainability: How the Greening of Places Transforms Organizations" (Mondor, Deal and Hockley 2013), green building projects are described as a *gravitational assist* to the transformation of organizational culture to include



concern for holistic sustainability. Similar to the way a planet provides gravitational assist to reorient and accelerate a spaceship's travel, the knowledge gained through a green building project can provide the momentum to reorient and accelerate an organization's commitment to sustainability, often deeply affecting an organization's culture.

Organizations often encounter issues of sustainability at a tactical level, such as a building project, before they experience a larger strategic shift towards sustainable practices. This is especially true for organizations that rely on their physical facilities for their operations, like the DLCC. Neither the Sports and Exhibition Authority nor SMG World had made commitments to sustainability prior to the building's construction in the early 2000s. At the time of the study's conclusion in 2011, both organizations had made significant commitments to environmental practices and had sought external validation through environmental certifications or rating systems.

The "Gravitational Assist" paper presents three factors that motivate an organization to adopt sustainability principles: regulatory or quantitative forces, external or competitive forces, and internal or cultural forces.

### ***Regulatory or Quantitative Forces***

**Organizations are influenced by regulatory forces or material or quantitative forces.** Regulatory forces often have the force of legislation or rule systems that bring even the most reticent of organizations to conversations on sustainability. However, those gains are often fragile and can be lost when the regulatory force is lifted. Quantitative influences are also influential as they can motivate organizations to save energy, money, or other observable metrics. The study found this to be true at the DLCC, where regulatory forces such as funder requirements and quantitative issues like an emphasis on operational cost savings were both concerns. The ongoing application of these forces via reporting requirements and incentives contributed to the creation of ongoing cycles of improvement for both SEA and SMG long after construction was completed.

The DLCC was required to incorporate sustainability concerns into the building by a regional foundation, the Heinz Endowments, that provided significant funding in the form of grants and loans to augment the design and construction processes. The foundation also provided "regulatory" influence by requiring periodic reporting of sustainability-related efforts post construction, and by offering possible loan forgiveness if the investment was deemed to have a positive impact (this study was commissioned by the Heinz Endowments to quantitatively assess the efficacy of their financial contributions to the design and construction).

To continue those cycles, the study recommended the establishment of a publicly released annual report that quantifies data such as energy performance, GHGs, and other sustainability indicators. The DLCC's annual report will help cement the ongoing improvement cycles with transparency and public engagement and will strengthen DLCC's competitive position in the market.

### ***External or Competitive Forces***

**Organizations can be motivated to adopt green principles by external or competitive forces.** The investigation found that market differentiation was one of the strongest motivating factors for the DLCC to expand its initial sustainability narrative. The facility was the nation's first LEED rated convention center and hosted the second annual USGBC conference in 2004, staking its claim as the greenest convention center in a market that was still

emerging. Despite the early success, the viability of deep green investment in facilities was yet to be proven as the nationwide market had not developed. The facility was tasked with building the market for green hospitality while simultaneously crafting its own position within that market.

The study found that VisitPittsburgh (Pittsburgh's Travel Bureau) and SMG track "green seeking events," or events where sustainability was a factor in the selection to book the DLCC. In 2004, 5% of the DLCC's events were asking about green credentials. Four years later in 2008, this number had grown to 23%. This represents a 4.5% annual increase in green seeking events—a validation that high performance facilities were indeed functioning as a market differentiator, and a trend that if continued, will mean that 100% of the convention market would be asking for green events by 2025. Although this may seem unreasonable, new industry standards for green events will effectively raise the baseline event practices to a level currently considered appropriate for "green seeking" events.

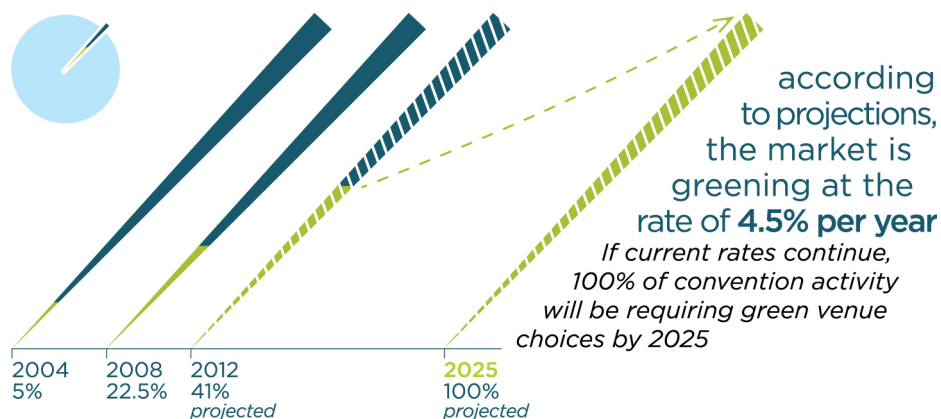
To support this external effort, the DLCC created a program called "GreenFirst" or g1. GreenFirst was both an internal cultural program to think of "green first" and was the core of the sustainability-focused marketing effort and the external brand.

This investigation reviewed the visibility and efficacy of this program using stakeholder surveys and interviews, and benchmarking data from other sustainability leaders in the industry. The study also evaluated the impact of a typical event, looking at a high level life cycle assessment and supply chain adoption of sustainability initiatives to determine how market position could be strengthened or inhibited.

During this process, three things became evident. First, convention centers aren't just marketing their facilities; they are marketing their "destinations," which include the local sights, entertainment, and hospitality. Second, activities that happen outside the direct control of the convention center, including hospitality related services (i.e., hotels and restaurants) constitute a significant portion of the typical event's environmental impact. As a result, the DLCC's clients would benefit from greener practices and lessened environmental impact. Lastly, the DLCC and its regional partners, such as restaurants and hotels, would benefit from

**FIGURE 3.**

### THE GROWING MARKET SHARE OF GREEN CONVENTIONS



a robust green hospitality network that attracts more business. By orchestrating this network, the DLCC can be influential in raising regional capacity and attitudes towards sustainability.

**The third major factor that motivates an organization to pursue sustainable practices is its cultural narrative or internal forces.** This is perhaps the most interesting phenomena resulting from the highly acclaimed building design—both SMG and SEA attribute the building’s foundational green building narrative as being instrumental to the robust green practices throughout the organization. While the building’s publicity and external marketing continually reinforced its green identity, the internal practices had to support this market position. To do so, the g1 program also had an internal component that identified ways that employees and guests could adopt environmentally friendly behavior. This ranged from back of house protocol for waste management to prizes for employees who were “caught” doing something environmentally friendly.

In interviews of employees and management who had worked in the building since its opening, the study established that the sustainability narrative from design and construction created a mandate to operate in a similar manner. The investigation surveyed guests, employees, and management and found a great deal of awareness and alignment on core principles. For example, 100% of employees knew about the program and what it covered. Surveys showed that employees had a high level of knowledge about the green practices of the facility and even found that the majority of employees reported partaking in similar green practices in their own home. However, the study found that many employees did not think that their colleagues were committed to the principles, indicating a gap in the communication of each person’s role in the organizational commitment.

## Findings

Organizations who have made robust commitments to sustainability, like SMG World and the Sports and Exhibition Authority, have to constantly consider their regulatory or quantitative pressure points, their external or competitive position, and their internal culture of sustainability. The study proposed a realignment of the g1 program, and worked with the DLCC management to develop a strategic plan with two main goals:

1. To increase the amount of business that is coming into DLCC and the local community
2. To improve the overall efficiency and environmental performance of the facility and its events.

Although distinctly different, these two goals are not mutually exclusive. One depends on the other, as illustrated by the increasing percentage of DLCC’s revenue that is generated by green-seeking events. If done properly, the organization could pursue both goals simultaneously, and moving toward one would inherently pull the organization closer to the other. The study outlined a strategic approach to bring both of these goals to fruition:

1. Unify the communications about the DLCC’s sustainability initiatives under the g1 brand;
2. Build a robust network of hotels, restaurants, and local service providers that are interested in pursuing sustainability and provide them an incentive for doing so by adding them to a list of “Preferred Sustainable Service Providers” or the “g1 Network” to be distributed to all green seeking event attendees;

3. Create a Green Event Menu and reach out and educate all clients about internal and external sustainability options early in the sales process and facilitate the communication of these choices to their event visitors;
4. Hire a sustainability coordinator. Given the extremely strong financial justification for pursuing sustainability, it was shown that the addition of one average “green-seeking” event would be enough to cover the salary requirements;
5. Identify and track key performance indicators for business and environmental improvement in an annual report, including those that Increase Business and Improve Environmental Performance, both g1 strategic plan goals

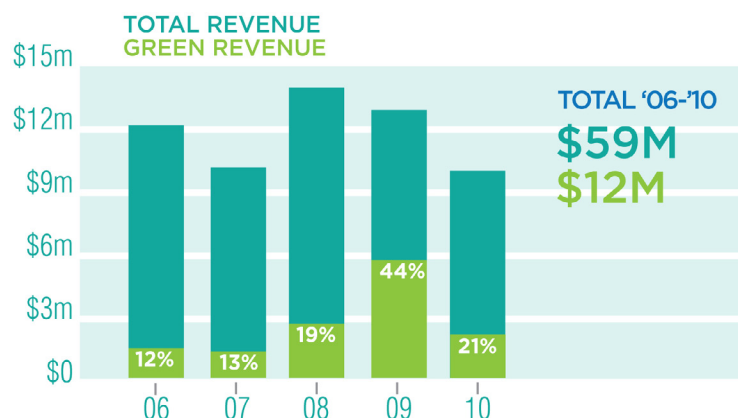
At the completion of the study, many of these recommendations had been adopted, including the creation of an Annual Report, the hiring of a Sustainability Coordinator, and the pursuit of the g1 Network with the local hotels, restaurants, and destinations.

### III. THE DLCC HAS IMPACTED BOTH DIRECT AND INDIRECT REGIONAL SPENDING AND WAS A MAJOR CATALYST FOR REGIONAL GREEN BUILDING LEADERSHIP

Like many large scale civic structures such as stadiums and arenas, convention centers are rarely profitable themselves but are considered to be loss leaders that attract business to their regions and communities. According to VisitPittsburgh, the DLCC generated more than \$673 million in direct local spending to Pittsburgh businesses from its opening through 2010, much of which has resulted from events attracted by the DLCC’s sustainability focus. Like many convention centers nationwide, the DLCC is crucial to Pittsburgh’s economic development and is an economic funnel for Pittsburgh businesses and organizations.

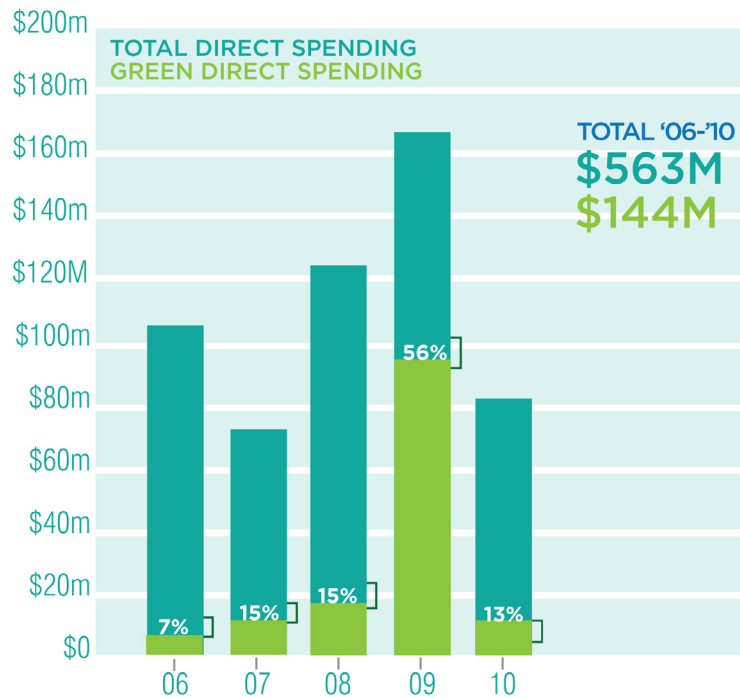
#### *Findings: Expanding The Business Case for Sustainability at the DLCC*

The business case for green building is typically made on operational metrics such as savings in annual energy costs, and in some cases may be expanded to building life cycle issues. Because convention centers almost always operate at a loss, the study expanded the business case to include a broader investigation of economic impact. In addition to the utility cost savings that have been and continue to be generated by the DLCC’s efficient design, the study evaluated the facility’s sustainability pursuits in relation to increased bookings and business.



**FIGURE 4.**

**FIGURE 5.**



From the beginning of 2006, through the end of 2010, the DLCC hosted 94 “green seeking” events, accounting for \$12.5 million in revenue (20% of total revenue).

This is especially interesting when contextualized within the amount of direct spending that these events brought to regional business. An analysis of VisitPittsburgh’s records showed that the DLCC’s “green seeking” events contributed at least \$143 million in direct spending (26% of total) to local businesses, a number that dwarfs the revenue to the facility. Given that VisitPittsburgh only tracks direct spending for large events, and many green events are not large enough to generate this estimate, it is projected that this number is significantly larger.

### ***Findings: Extending Influence Beyond the Building***

The study noted the tremendous opportunity to improve environmental performance, not just internally, but within its local value chain of service providers. Hotels, restaurants, and other service providers that DLCC visitors patronize, directly benefit from its commitment to sustainability—to the tune of \$143 million over four years—and account for a significant portion of each event’s environmental footprint. Given that location of the facility and sustainability of operations are key selling points for convention planners, all stakeholders involved stand to benefit from a robust network of local service providers that are able to deliver truly sustainable events and accommodations.

This influence can be seen both regionally and nationally. The need for a sustainable value chain was embraced by the local USGBC chapter, the Green Building Alliance, which is leading the establishment of a Downtown 2030 District to help building owners meet the rigorous sustainability targets of the 2030 Challenge. The DLCC is both a founding member of the district and a significant contributor of knowledge in the pursuit of energy and water savings among its downtown partners.



Transformation has also come nationally and internationally with the APEX/ASTM Environmentally Sustainable Meeting Standards. In the standards, the Convention Industry Council has included both Accommodations and Destinations as two of its nine sectors to focus on when holding a green event and has defined “green seeking” event criteria that could be used for future comparisons across the industry.

#### **IV. TRANSFORMING AN INDUSTRY THROUGH “COOP-TITION”: BEST PRACTICE SHARING AND BENCHMARKING PERFORMANCE COMPARISON**

High performing projects can affect their industry by setting standards for future design and construction and by facilitating a culture of benchmarking that encourages sharing of best practices. The concept of benchmarking, a term commonly used in the design, construction, and building operations industry, involves comparing building performance against industry standards and best practices. Commonly used benchmarking metrics such as square feet of office available, parking spaces available per employee, space ratings (Class A), and cost per square foot are often used to evaluate real estate.

While all of the aforementioned aspects are important when evaluating a building, it is important to expand the performance areas to include operation costs and potential valuation. Building owners need to ask questions such as: Can a building produce fresh air and a high-quality indoor environment? How much does a building’s energy cost relative to other comparable buildings? What is the relative efficiency of the mechanical systems? Too often, we do not evaluate our buildings across these crucial criteria; and as a result tenants, owners, students, and even taxpayers pay higher costs for maintenance, operations, and reduced productivity.

Unfortunately, our understanding of a building’s operational and life cycle costs are rarely considered. This lack of information leads to an inability to manage a building as an asset worthy of investment. To fully understand any commercial-scale property, owners and operators must use less common, but crucial, metrics such as energy, water, or air quality performance while simultaneously comparing the performance of such metrics to other comparable facilities. Those efforts in tandem can provide a plan for the future and allow for actionable improvements. A building or portfolio owner/operator that doesn’t actively monitor energy use can be fairly compared to a car company that’s builds vehicles without ever measuring miles per gallon.

As a green building early adopter in the convention industry, the DLCC catalyzed a green building movement among convention centers. Since its inception, more than 20 have been LEED certified and over 50 are pursuing certification. This study generated the most in-depth benchmarking database of convention center sustainability performance; tracking and sharing this information on an ongoing basis represents a serious opportunity for the DLCC to not only understand and improve its operations, but to help other convention centers do the same.

#### ***Method***

The survey was administered from October 2010 through February 2011. Over 70 facilities were invited to participate in the process, with 14 thoroughly submitting information. Many of the cohort participants were asked to participate because they publicly promote sustainability initiatives or policies or because they were in a collaborative tier of aligned facilities. The surveys were administered from October 2010 through February 2011. The surveys

focused on eight different categories including: Facility and Space Types; Staff; Energy Usage; Indoor Environmental Quality; Water Usage; Transportation; Waste; and General Sustainability Initiatives.

### **Findings**

This study gathered specialized knowledge of convention centers and their complex business models. It has identified key market drivers and areas of growth, impact areas, opportunities for improvement, and industry best practices. With evidence showing that convention planners are increasingly demanding green facilities, the study demonstrates how to use sustainability to improve environmental performance, leverage cost savings, and attract more events. As outlined in the benchmarking report, leading convention centers are:

- Building the business case for sustainability initiatives
- Pursuing certifications such as LEED
- Tracking greenhouse gas emissions
- Performing industry benchmarking
- Implementing internal and external communications strategies
- Refining waste minimization
- Implementing sustainable purchasing
- Exploring alternative transportation
- Testing indoor environmental quality

The DLCC found this data to be helpful to prioritize its initiatives to maintain industry leadership. For example, the DLCC performed 20% better than the cohort average for energy efficiency, which helped make the business case for lighting, HVAC, and controls retrofits to maintain and potentially improve this position. The study also found that the DLCC was performing quite well with its waste management practices

The benchmarking also helped identify opportunities for industry leadership. Greenhouse gas emissions have been established as one of the most important metrics for measuring an organization's environmental performance, and although many convention centers are now competing to be the most sustainable, only one was found to be tracking and reporting its emissions. This study made the DLCC and its competitors aware of this inconsistency, and multiple facilities, including the DLCC are now tracking this very important metric.

In addition, the study suggests that the benchmarking could be leveraged through “coop-tition” that promotes friendly competition among leading convention centers seeking to gain sustainability accolades. It is also a vehicle for sharing of best practices that accelerate sustainability commitment through social norming and peer sharing. The idea of “coop-tition” has been shown harness the best of the term's two root words, competition and cooperation, and has multiple national models of success, including Sustainable Pittsburgh's Green Workplace Challenge, 2030 Districts like Pittsburgh's district, as well as Energy Star based competitions.

### **CONCLUSION**

As a result of the BiO investigation and benchmarking effort the David L. Lawrence Convention Center was able to make immediate investment and facility upgrades, leading to significant energy cost savings and a strategic understanding of relative performance in comparison

to peers across the country. Doing so has enabled the DLCC to reduce operating costs and shrink its environmental impact, all the while significantly increasing the number of events hosted and revenue generated.

This type of study is not common, and positions the DLCC for even greater operational success, cost savings, and future business. It also places the DLCC in a unique position to use the knowledge it has gained through this process for the greater good of the convention industry, and the communities in which the industry operates. The investigation was more than a case study of a single-building; it can serve as a demonstration for other projects about how to systematically approach similar evaluations of high performance buildings, and gain multiple types of organizational value. Sharing the process and the results of the investigation furthers the David L. Lawrence Convention Center's legacy as a sustainability leader.

