Museums, Environmental Sustainability and Our Future

A Call to Action from the Summit on Sustainability Standards in Museums 2013

American Alliance of Museums

and the PIC Green Professional Network

Contents

Entire report edited by Ellen Hirzy.

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Preface and Acknowledgments

PIC Green's Sustainability Standards in Museums initiative began when a number of museum professionals formed an ad hoc group to address areas in the United States Green Building Council's Leadership in Energy & Environmental Design (LEED) program that collided with museum practices or discounted alternative approaches. We quickly realized how important it was to address other developing standards programs, and our group began to expand its focus from LEED in museums to a broader assessment of how to develop museum-specific guidance where current standards fall short. We launched this more comprehensive initiative with the Summit on Sustainability Standards in Museums, a daylong gathering on May 21, 2013, during the American Alliance of Museums (AAM) annual meeting in Baltimore.

Two individuals were particularly helpful in creating the form and momentum for this group and this summit: Roger Chang, LEED AP, principal and director of mechanical engineering and sustainability at Westlake Reed Leskosky, and Shengyin Xu, LEED AP BD+C, institutional sustainability specialist at the Minnesota Historical Society. I am grateful to them for their energy, enthusiasm and scientific knowledge; they provided a balance to this undertaking that it sorely needed, and they promise to be leaders in the implementation of standards for the field.

I am also grateful to those from outside the museum field who participated in this summit and who have demonstrated a willingness to work with the field to help us manage this conundrum responsibly *and* elegantly.

Sarah Sutton, *LEED AP EBOM*

Sustainability with a capital *S* is woven throughout the DNA of public collecting institutions. Collections are to be maintained in perpetuity, rendering the idea of sustainability fundamental to institutional missions. But museums still need to encourage and share with each other their specific and often unique experiences of implementing day-to-day sustainability. Environmental sustainability within museum facilities is perhaps the largest shared category of daily sustainability for museums to discuss as a field. The sheer variety of metrics and methods for measuring performance suggests that if any standards could be promoted to the field, they would come about only after vigorous discussion and the sharing of actual experiences.

Therefore, we applaud our PIC Green Professional Network colleagues for organizing the first Summit on Sustainability Standards in Museums. PIC Green looks forward to the conversations that will result from distribution of this white paper, as well as to subsequent dialogues that will occur regularly at future annual meetings.

Ed Malouf, *Content Design Collaborative LLC*
Don Meckley, *Museum of Contemporary Art, Chicago*
Co-Chairs, PIC Green, 2013–2014

Thank you to our peer reviewers for their comments on this report: Don Meckley, director of production and facilities, Museum of Contemporary Art, Chicago; Adam Meltzer, director of operations, Arts:Earth Partnership, Los Angeles; and Patrick Kociolek, professor and director, University of Colorado Museum of Natural History, Boulder. Their thinking improved the document and spurred us to work to rally benchmarking museum energy use as a future aspect of this type of field communication.

Introduction

"As a record and a call to action, this white paper is not a document to be read and set aside. Instead, it asks you to engage."

With leadership from the American Alliance of Museums, the museum field is united around shared standards of excellence. But today, there are no shared standards on environmental sustainability for museums. These standards have enough of a presence in other fields that they have come to affect the museum world. Over the next few years that presence will expand, and museums will choose—collectively or independently—how to react. We may choose to recognize the value of shared standards, or we may choose to leave each museum to decide among many separate standards. We may choose to write a few standards that are specific to museums, or we may create a whole system of our own. Or we may decide to avoid developing standards altogether. Our other options include developing a new Museum Assessment Program category for sustainability or simply encouraging sustainable practices and inviting museums to select cafeteria style from existing standards. But the bottom line is, if the museum field doesn't *say* what we prefer, we will be *told* how to practice sustainability.

To deepen and broaden field-wide discussion of this critical issue, more than 100 professionals from all types and sizes of museums gathered for the Summit on Sustainability Standards in Museums at the 2013 American Alliance of Museums Annual Meeting in Baltimore. Organized by the PIC Green Professional Network, the summit had a complex purpose: to assess the museum field's experience with, response to and appetite for environmental sustainability standards. Organizers and participants aimed to:

- promote a working familiarity between museums and various sustainability standards groups
- suggest how an assessment of the value of sustainability standards for museums might occur
- recommend next steps in the field's work on environmental sustainability in museums

Regardless of the form that a set of sustainability standards could take, a deeper understanding of the field's needs and expectations for such a program is needed. This discussion must be nationwide, carried on at every type of museum, and done in

conjunction with colleagues in other fields who can both inform and inspire our work. Ultimately, summit organizers seek larger ongoing outcomes for the 17,500 institutions in the museum field in the United States, including:

- a deeper understanding of sustainability standards and metrics for designing, building and operating museum facilities
- more informed choices for using, or not using, the metrics for museum planning and operations
- increased comfort and efficiency in using the metrics for the benefit of museums

The summit began with presentations by building industry experts who introduced current standards used broadly in the United States. Museum professionals then talked about their experiences with sustainability metrics in their institutions. The day concluded with a moderated discussion that yielded conclusions and suggested next steps for the possible development of sustainability standards for museums.

With this white paper, we invite you to join in the ongoing dialogue about the most effective ways to make our institutions' buildings and practices more sustainable. In it we summarize the wide-ranging but intensive summit discussion; present options for developing museum sustainability and recommend next steps; and share information about current standards programs and different ways in which museums have applied them to their own sustainability efforts. Two appendices offer essential definitions and a timeline tracing the development of museums' interest in sustainability issues. As a record and a call to action, this white paper is not a document to be read and set aside. Instead, it asks you to engage. We hope that you will share it with others, discover new resources for and approaches to your work, and use it to contribute to reducing the negative environmental impacts of museums.

Related Annual Meeting Sessions

The Summit on Sustainability Standards in Museums included three sequential AAM Annual Meeting sessions that laid the groundwork for a shared understanding of standards and metrics; placed them in the context of real-world situations in museums; and invited a larger discussion about challenges, implications, aspirations and next steps.

Part 1: Where Are We?

This session focused on the current use of common U.S. sustainability metrics, notably LEED (Leadership in Energy & Environmental Design), U.S. Green Building Council; Living Buildings; Sustainable Sites; Green Globes; and the Environmental Protection Agency's Energy Star program. Representatives discussed the origin of these programs, the purpose and application of their systems, and the benefits and challenges of adapting their metrics to museums.
For more details, see page 24.

Part 2: What We've Been Doing

Representatives from several museums shared their experiences in working with standards programs, including the impetus for starting a sustainability metrics program; which standards program they selected and why; and the lessons learned for their institutions. The goals of this session were to provide examples of standards at work in museums and to show the benefits and limitations of programs that were not designed with museums in mind.
For more details, see page 38.

Part 3: Deciding Where We Want to Go

The third session was an open discussion, moderated by Laura Roberts, to review the day's discoveries, talk about the opportunities and limitations of current systems, and share hopes for sustainability in the future of museums. A culminating question was posed: What are the next steps to advance the field toward greater sustainability through the use of standards and metrics? Part 1 of this white paper explores this question more deeply.

The Summit Discussion

"Are we looking for a standard or a shared moral principle?"

—Sandra Vecchio, architect and summit participant

Those who are working toward more sustainable museums give deep consideration to the question Sandra Vecchio posed, and others: Can sustainability standards be adopted without a basic agreement about why we want and need them? Do we share a collective concern for sustainability? Do we all envision the ideal museum that is in perfect ecological balance with its systems, bioregion and community? Do we have the leadership to guide us through these choices and changes? Such a shared vision is unlikely, but that may not matter as much as the journey will, as we strive to improve our practices toward greater efficiency and use of resources.

A number of other factors motivate museums to explore sustainability standards, including the perpetual need for cost savings. Implementing green practices requires upfront costs but also results in saving resources and thus can make good business sense. In addition, the shifting values of our audiences, communities and other stakeholders compel museums to be responsive to expectations that we will operate on sustainable principles. Internally, staff, volunteers and board members may also be asking whether

A general session at the AAM Annual Meeting and MuseumExpo. Photo by Cable Risdon.

operations and programming reflect sustainable values, be they environmental, economic, social or all of the above. While every institution is unique in its approach to sustainability, the need for smarter operational practices is universal. But can we go so far as to say that we are willing to set up and adhere to field-wide standards?

Summit participants spoke passionately, positively and practically. One of the greatest advantages as a field is our deep creativity. Museums are full of educators, designers, engineers, scientists, artists, historians, futurists and planners. If we draw upon the energy, ingenuity and expertise of our community—and add that to what we can learn from experts in other fields—we can define and solve any problems that may stand in our way to a greener future.

The ultimate question posed at the summit was, *What would museum sustainability standards look like?* While we do not yet know the answer, it is fair to say that some level of shared desire for measurability and accountability already exists. Summit instigator and green museums expert Sarah Sutton stated that the gathering was just the beginning of the conversation about a field-wide standards program, but it was also the next step in a discussion that should be second nature by now. Nowhere during the summit or in this white paper did we need to explain the dire consequences of ignoring the real threats to the earth's inhabitants, biodiversity, climate or stable future. If museums are to move from simple awareness of issues to concrete and measurable actions, we must accept our own power in this process.

Yet there are real challenges and barriers to implementation and success. Summit participants expressed concern about several key issues:

- **Resources:** Where will the funds, time and expertise to implement a standards program come from at both the national and the institutional levels? Will designating resources for sustainability pull funding from other functions?
- **Standards and best practices:** As a field, do we have the ability and the protocol in place to agree on what best practices would look like?
- **Leadership:** Are leaders of our institutions and associations ready to carry sustainability standards projects forward?

Resources

The topic of resource availability was discussed and demonstrated in various ways. First, the very presence of more than 100 museum professionals at the summit spoke to a dedication to greener institutions, whether through voluntary efforts by individuals or organizational commitment to the green teams and sustainability staff positions that are becoming more common in museums. The fact that museums across the nation have

found ways to implement green building practices, operations, programming and investing indicates a field moving in the right direction.

But for all the amazing work going on at the institutional level, a field-wide commitment is needed to define standards and provide a framework for research, training, compliance and recognition. Many professional associations have some form of green team and/or a tool kit that provides valuable resources for members and others. PIC Green's Sustainable Operations Tool Kit (pic-green.net), for example, provides links to useful websites, articles, resource lists and case studies that offer ideas and solutions.

Standards and Best Practices

The concept of a neat, fixed set of standards and best practices appears black and white in concept, but is much messier in actual application. Museums are so diverse in terms of mission resources, location, facilities, collections care needs, lifecycle, etc., that creating a single set of voluntary standards and best practices is an ever-present challenge—as is maintaining a program that effectively evaluates a museum against them. New issues and new thinking are also continually impacting practices and standards, and we must keep up. How sustainability standards and best practices—and related evaluation programs—will be used also impacts decisions to be made: Will they be used to encourage museums to improve, regulate and evaluate an organization for recognition purposes? AAM has the experience—from almost 45 years of running accreditation and assessment programs—and expertise in PIC Green, to take a leadership role in shaping the future of defining and measuring excellence in sustainability.

Leadership

The critical need for leadership exists at every level. We have the attention of AAM leadership, affirmed Elizabeth Merritt, founding director of the Center for the Future of Museums and a summit participant. She discussed the national association's commitment to and role in museum sustainability leadership.

Individual institutions that have begun to reassess the impacts

The Toledo Museum of Art's Paul Bernard and Carol Bintz have spearheaded the museum's green initiatives. Photo by Andrew Weber.

they have on communities, the environment and resources did so through the commitment of leaders and engaged staff. While institutional grassroots organizing for green teams and other initiatives are effective at bringing about change, the real change in values, planning and practice will come from the top. CEOs communicate the vision for sustainability, COOs carry it out and CFOs track how it can become an embedded institutional framework. Museum leadership teams are working through a new model that values resiliency and the triple bottom line. For museums this means recovering from and weathering financial turmoil, understanding that a valued asset is people and making sustainability mission driven.

Concerns Unique to Museums

Standards must be developed organically from within the museum field. While we should not re-create the wheel, we must be mindful of what is unique about museums. This is where the challenge of common language and agreed-upon practice comes in.

All museum departments use resources, some more than others, and in ways we usually do not think about. Museums with climate-controlled storage and galleries require more energy than those that do not have such stringent temperature and humidity guidelines. Aquariums, botanical gardens and zoos certainly use more water than, say, a historic house or art museum.

Building size, the number of floors, geographic location and the volume of visitors welcomed every year are just some of the many factors that affect resource consumption. While some of these issues cannot be resolved simply, we have to look logically and holistically at how institutions are run. Any alterations to "business as usual" affect people, take effort and time, and sometimes require financial backing.

At the deepest level, the uniqueness of museums lies in stewardship—the collection, preservation and conservation of art, material culture, natural history collections, and live plants and animals. Summit participants voiced their concerns about the impact of certain sustainability measures on collections care. Threats to the stability of objects may come from building climate controls, lighting systems, architectural design, outdoor- and indoor-generated air pollutants, collections management supplies and procurement, and disposal and waste management. The range of collections in our institutions' care makes sorting through these issues difficult. Live collections further complicate the stewardship and sustainability balance, with greater needs for water and energy to maintain facilities.

For those caring for cultural collections, the greatest concerns are temperature and relative humidity. Collection managers around the world have been engaged in this

conversation for many years. The American Institute for Conservation of Historic and Artistic Works (AIC) has established interim guidelines for relative humidity for most types of cultural materials (45–55 percent/±5 percent daily drift) and temperature (59–77 degrees Fahrenheit/± 4 degrees daily drift). Barbara Heller, chief conservator at the Detroit Institute of Arts and chair of an AAM Annual Meeting session on balancing collections needs and building energy consumption, says these parameters allow for slow seasonal gradients, but she also cautions that we do not know whether a change from the 50 percent/70 degree standard will realize energy efficiency improvements and maintain the integrity of collections care.

A major challenge is the multitude of variables in building types, climatic regions (13 climate zones just within the U.S.) and collection types. Cultural materials (including the buildings that house them) require different environmental conditions based on their composition, condition, use and treatment history. The relationship among exterior environmental factors and interior environmental conditions, humidity, temperature and agents of deterioration must be assessed and addressed, along with additional means of prevention and risk management.

The question remains: How can we balance good stewardship of collections, buildings and the planet? Heller and others on the panel say this question may be easier to answer if we acknowledge that the 50 percent/70 degree standard is not a foolproof formula for all collections, in all conditions, at all times, but instead a simplified convention that can be easily applied and understood by collections managers, operations staff, architects and builders. A class of controls can be used to establish set points for collections, recognizing that some objects will require special accommodations, visitor comfort might be a determining factor for temperature, and microclimates and other passive measures can be used to protect sensitive collection materials.

"There is no denying that a measure of sustainability must now be incorporated into our conservation endeavors. Given financial and time pressures, habit, and evolving opinions regarding tolerable conditions for collections, conservators must consider not only the interaction of materials and environment to the art and artifacts we treat, but also the production, use, and disposal of materials employed in our work."

— AIC, Sustainability Resources, 2013

We may not have a choice when it comes to addressing sustainability issues. The reality of tighter building codes, energy efficiency rules and regulations, and the changing nature of building and operations products will likely have profound implications for building operations. Entire industries are changing rapidly around us, whether we know it or not. Our choices are also limited by environmental changes in regional temperature regimes, seasonal shifts, increasingly extreme weather events, water accessibility and sea level rise, which are all having an impact inside and onsite. Just ask any horticulturalist about changes in plant, animal and insect life cycles and migrations, and there can be little doubt that climate change is occurring.

Issues of environmental justice should also be on our minds, as museums are vital parts of local and global communities. The choices we make about how we operate and staff our buildings can have consequences for local populations. Financial investment choices can have impacts around the world if our money is not in socially conscious funds. Purchasing decisions—from cleaning supplies to fair-trade coffee in the café—have unseen implications here and abroad. Finally, while not of immediate concern in North America, there are global security and safety threats as resources dwindle and availability shifts. Being aware of these issues requires diligence but will become more important as global human ecology continues to change.

But the truth is, we do have a choice. The changing context in which museums operate goes beyond the practical, regulatory and ecological realities mentioned above. As

Architects designed the new Pérez Art Museum Miami, located on the edge of Biscayne Bay, to accommodate flood risk. Photo courtesy of Herzog and DeMeuron.

summit participant and green museums leader Elizabeth Wylie suggested, a conversation about sustainability standards is also a conversation about people's values and behaviors. Wylie questioned whether "we are measuring practices or values. Are we measuring processes and outcomes and/or behaviors and impacts?" From these questions, the conversation took a more philosophical turn.

Summit participants talked about how we can overcome our disconnection from nature. How can we shift the emphasis from constraints and restrictions to abundance and resiliency, such as nature itself provides? How do we move from good intentions to real action? What can we draw on from our colleagues in environmental education, not just for our visitors, but for ourselves?

We can take several key steps, based on the 1978 UNESCO Tbilisi Declaration on the role, objectives and characteristics of environmental education:

- **Awareness:** As museum professionals we inherently know and want to know about the world around us. The key is to avoid myopic thinking and stagnation in our silos.
- **Knowledge:** Do we know what we need to know about what makes a museum sustainable? Do we know where to obtain this information?
- **Attitudes:** We need to reflect on how we feel about ourselves, our jobs, our institutions and the role we play in contributing to environmental problems and solutions. Does our attitude lean toward responsibility or apathy?

In an effort to eliminate single-use water bottles onsite, the Detroit Zoological Society installed water bottle refilling stations. Photo courtesy of Detroit Zoological Society.

- **Skills:** Museum professionals are good at learning, training and improving our practice. To implement sustainability standards we need a strong support system for research, benchmarking and communication.
- **Empowerment:** Without the confidence about what we know and can do, nothing will happen. Leadership must step in at every level, from implementing staff training to developing nationally recognized standards of excellence. Everyone must feel that they are empowered and that their actions matter.
- **Action:** Ultimately the goal of any environmental education process will lead to some form of action, from simple behavioral changes in our daily lives to active participation in a field-wide effort to make museums more sustainable institutions.

Insights and Takeaways

The summit's final session was designed to bring the presentations and discussions together into a summarizing conversation. Laura Roberts moderated the session and provided these framing insights to sum up the day:

- **Flexibility** is key to developing museum sustainability standards.
- For standards to succeed they must be **integrated** into what we do.
- We can't develop standards without **shared values**.
- As museums we have a **stewardship obligation**.

Throughout the day, summit presenters and participants spoke in both specific and general terms. Details about existing standards and metrics and how they are already being implemented by museums show us that a set of standards for our field is easily within reach. More broadly, the summit points to opportunities as well as limitations. But if we harness the energy and creativity already present among ourselves, we can overcome the challenges.

The day set a hopeful tone for the future. By being flexible and open to experimentation, innovation and even failure, we can solve short-term obstacles to finding common language and agreed-upon best practices. Like all other standards of excellence for museums, sustainability standards must be embedded in the way we operate our institutions. We already share the value of stewardship. Now we must extend this to stewardship of the planet's resources and environment.

Options and Next Steps for Museum-Focused Sustainability Standards

Asking museums to be more sustainable suggests that we know what *more sustainable* means. Without standards, metrics, audits, baselines and targets, it is not possible to truly gauge progress toward greener institutions. We must decide whether these standards are to be generally accepted, voluntary benchmarks or technical standards that are vetted and adopted by the field. To continue moving the conversation forward, this section outlines some options for adopting museum sustainability standards; recommends elements of sustainability standards; identifies roles for museum-related associations and funders; and recommends next steps.

Option 1: Adopt an Existing Standards System

Each of the existing sustainability standards systems is shaped by different needs, outside forces and stakeholders (see page 24 for more about these systems). For most of the systems, museums were not part of the development process or thought of as target users. Yet over the years, individual museums have adopted these systems to varying degrees, and the standards programs managers have increased their engagement with museums and their professional organizations. By attending the summit, these representatives showed their commitment to continuing the exchange and responding to the unique needs of museums. It is up to us, however, to continue pushing these conversations.

Most often, LEED has provided guidelines for new building and reconstruction projects for more than 150 museums nationwide. Hundreds of museums use the U.S. Environmental Protection Agency's Energy Star and Portfolio Manager, with still more adopting these tools every year. While not yet widely known in our field, Green Globes, the Living Building Challenge and SITES are being used by more museums.

Here are some pros and cons of adopting an existing standards system for the museum field:

Pros

- The system already exists; we don't need to re-create the wheel.
- The system is tested; we don't need to work out all the kinks.
- The system has experts; there are already people working on it.
- The system provides a common language.
- The system has been adapted by other industries and individual museums.

- The system takes into account issues such as changing rules, regulations and building codes.
- The system means less work for museum professionals; once it is selected, system managers add museums to their connections.
- The financial risk for museums is low.
- This option asks the simplest question: Which standards system works the best for museums?

Cons

- One size does not fit all; museums come in so many varieties that it may be hard to adopt a single approach.
- The system may not be flexible; museums have unique needs, most notably for collections care, so a balanced approach for climate control and lighting is needed.
- The system does not yet have museum-based metrics, baseline data and specific tools, so time and resources are needed to support this research. Who will do this?

One example of how museums could adopt an existing system involves the Energy Star program. Noting the difficulties of applying a general standards program to unique functions of museums, Energy Star could be modified to embrace these differences. By creating a museum industry partnership, EPA could provide unique resources and training to museum staff to help them better manage natural resources like energy and water. This partnership would encourage museums to benchmark their building data online, helping to aggregate museum data in EPA's Portfolio Manager. These data would eventually become a baseline for museum performance. Once enough data has been gathered, EPA would release a museum Energy Star score: a random sample of data from museums across the United States through the distribution of a survey (with energy data submitted via Portfolio Manager).

Option 2: Use Criteria from Multiple Standards Systems

With several sustainability standards in existence and conceivably more being developed, it might be possible for the museum field to choose a variety of approaches to meet the unique needs of museums and to offer flexibility. Each system provides different ways to set standards, use metrics and seek certification. Some are more focused on the building, while others take into account the whole site. Some offer more aspirational goals, while others are strictly data driven. Here are some pros and cons of creating a core set of standards for museums based on standards from several systems:

The Indianapolis Museum of Art's 100 Acres includes a lake, woodlands, wetlands and meadows. Photo courtesy Indianapolis Museum of Art.

Pros

- There is a lot to choose from; the systems provide a depth and breadth of criteria.
- The systems have experts; there are already people working on them.
- The systems are tested; we don't need to work out the kinks.
- The systems take into account issues such as changing rules, regulations and building codes.
- The unique needs of museums can be a priority—for example, lighting or collections care balanced with energy use.

Cons

- Too many options could make for an unwieldy patchwork.
- Pulling from different systems does not easily provide a common language.
- Selection of the options requires a lot of work by the museum field, and then ongoing support will be needed to keep a museum-focused system coordinated.
- This option would require considerable financial support and other resources to manage information and process sharing.
- It would also require good cross-system communication and collaboration.
- Competition between systems exists.

Option 3: Develop a New Museum-Specific Standards System

Given the unique requirements of museums (inside and outside), especially in the areas of collections care, developing a museum-specific set of sustainability standards may be one approach. This option has several benefits and challenges:

Pros

- A museum-specific system can be tailored to museums' needs.
- It can create a common language and solidarity of purpose.
- It can build on the strengths of existing systems.
- It can build on the experiences, expertise and leadership of museums already engaged in sustainability standards.

Cons

- A museum-specific system requires an intense amount of work, oversight and ongoing management.
- It requires considerable funding for upfront and ongoing program management costs.
- It requires a major commitment among leadership in the museum field, discipline-based associations and other key stakeholders.
- It requires a long time horizon for planning and implementation.

Option 4: Adopt Functional, Not Departmental Standards

Within museums we tend to break down processes by department: exhibitions, collections, administration and so on. Most existing standards systems and associated regulations, however, approach the metrics by type of data, function and outcome, such as:

- energy efficiency
- waste reduction
- emissions reduction
- water conservation
- locally sourced materials
- fair trade practices
- sustainable investment strategies

The pros of such functional standards include:

- Data are collected institutionally.
- Data can be compared with national and other industry benchmarks.

- Goals can be set institutionally, allowing for tradeoffs between departments or sites.
- Goals can be set incrementally and in phases.
- All departments can use a common language.
- There is synergy in working together across departments to achieve institutional goals.

In addition, this approach would allow for field-wide research, benchmarking, training and promotion. There are many national and global initiatives that museums can participate in if we can approach our sustainability work by outcome. A drawback, however, is that it requires managing horizontally, which is not common across departments or sites.

Option 5: Add Sustainability Standards to the Characteristics of Excellence for U.S. Museums

AAM has developed a set of core standards for U.S. museums that includes seven broad categories: public trust and accountability; mission and planning; leadership and organizational structure; collections stewardship; education and interpretation; financial stability; and facilities and risk management. Within each category are outcome-oriented standards that are adaptable for museums of all types and sizes. At present, however, none of the standards directly addresses environmental sustainability. The question for the field is, Should they?

Standards, as AAM defines them, "are directly informed by the field. They are filtered through the dialogue, debate and data generated by our excellence programs, professional networks, conferences and seminars, national studies and relationships with other museum service organizations. We recognize the great diversity of the museum field and the importance of the ethical codes, standards and best practices developed and issued by various discipline/interest-specific museum associations. Taken together, they work in concert to ensure museums hold themselves accountable to their peers and their publics."

The core standards form the basis for AAM's Pledge of Excellence, which asks museums to operate ethically and according to field-wide standards and practices. By adding sustainability standards to the Characteristics of Excellence and Pledge of Excellence, AAM can deepen its support of PIC Green's Sustainability Standards in Museums Initiative, thereby strengthening the museum field's commitment to greening our institutions.

Option 6: Add Sustainability to the Accreditation Process

Adding sustainability standards to the museum accreditation process would deepen museums' responsibility and accountability for adopting best practices for greener

institutions. This option could be designed in two possible ways: 1) by adding standards to the Characteristics of Excellence as discussed above, and/or 2) by adding a new element to the core documents that are reviewed during the accreditation process.

Both options would require broad-based support from the museum field and may face some of the challenges discussed earlier: finding common language, agreeing on best practices, and achieving an acceptable balance between collections care issues and operational standards. These options will require intensive research by and on behalf of AAM and the Accreditation Commission. This approach suggests a long time horizon to build sustainability standards into the process, but time is not on our side when it comes to solving environmental challenges. In addition, as noted at the summit, a one-size-fits-all approach can't work because the museum field is so diverse.

Other drawbacks to adding sustainability requirements to the accreditation process include:

- Developing the requirements would be a time- and resource-intensive effort.
- It may be challenging for smaller museums or those with fewer resources.
- The requirements would need regular updating to reflect current building industry standards, codes and technology changes.

The benefits of inserting sustainability standards into the accreditation process are both practical and philosophical. It would make a serious statement about the museum field's commitment to sustainability and to society's need to address environmental, economic and social welfare issues. For institutions, standards would clarify and codify best practices and metrics. Sustainability accreditation standards would be the common language we are seeking.

Essential Elements of Museum-Focused Sustainability Standards

Summit participants and leaders in the environmental sustainability field for museums concluded that whatever approach is selected, museum-focused sustainability standards program must have six characteristics:

1. Voluntary but incentive driven

Already, programs that are part of the Continuum of Excellence, including accreditation, are voluntary, and when museums commit to seeking recognition for their work, the incentive is both public and peer recognition. Industry standards with ratings systems and certificates also build in motivations that are symbolic and public. With environmental sustainability standards, there may be additional incentives, such as rebates, credits and tax breaks.

2. Stepped or tiered so that achievement over time is possible

Summit participant Katherine Freygang suggested a matrix that offers Good/Better/Best stages so that institutions can start small, work to achieve goals over time or simply acknowledge that for some standards, good will be good enough. A comparable approach can be found in the STEPS program of the American Association for State and Local History, in which each standard is tiered as Basic/Good/Better, allowing for flexibility and phased improvements.

3. Adaptable and flexible for all types and sizes of institutions

The need for flexibility because of the wide range of museums—from a tiny one-room historic schoolhouse to a 400,000-square-foot science center—is a topic that came up many times during the summit. Standards must be pliable but still capable of reaching the same goals, including energy efficiency, waste reduction, and water conservation.

4. Institution-wide

The sustainability movement is based on a holistic approach that combines the needs of our planet and its people as well as the economy. For museums, sustainability standards would obviously include green building and operational strategies, but they should also take into account human aspects, including the welfare of staff and community and the local and global impact of financial decision making and investments.

5. Rooted in science and data driven

Extensive research and approved practices already exist on nearly every aspect of sustainability, from HVAC efficiency to waste water recovery. In collaboration with partners in the building industry, universities, researchers and other allied fields, museums can adopt and adapt these standards. Summit participant Shengyin Xu from the Minnesota Historical Society offered that the data can be used in several ways to meet short- and long-term goals as well as to influence behavior change.

6. Consistent and transparent

Jessica Rinaman from the Balboa Park Sustainability Program cautioned that as a field and at the institutional level, there is the need for common nomenclature about the standards. Metrics can provide a shared vocabulary for framing problem solving and sharing experiences in a way that allows transferability. But training will be needed in all departments of an organization.

The Role of Professional Associations

Another essential element in developing museum sustainability standards is the role of professional associations. State, regional and national organizations as well as discipline-specific groups must agree on what their roles will be. Many of them already have made a commitment to sustainability. Greater communication and collaboration will strengthen these individual efforts.

For AAM, what resources can be committed to enhance the work of PIC Green and to support field-wide research, benchmarking, training and standards implementation? How might standards fit into AAM's Museum Assessment and Accreditation Programs or Heritage Preservation's Conservation Assessment Program?

Elizabeth Merritt, founding director of the Center for the Future of Museums, suggested that the role of AAM is also to be the consensus builder. She reminded summit participants that AAM fosters the development of generally agreed-upon standards that represent what all good museums should do in a way appropriate to their mission and circumstances—not the pinnacle of what is possible. In this context, sustainability standards would need to be broad and applicable to museums of all kinds and sizes, as well as voluntary, achievable and flexible. Attaining a platinum level of standards adherence for every museum in every aspect is not realistic.

The Role of Funders

Funders and sponsors have increasingly required grant and donation recipients to adopt emerging best practices and new levels of transparency. If more funders begin to recognize the need for environmental sustainability practices, they would also help drive the need for adopting field-wide standards, much as funder expectations for evaluation and measurable outcomes have increased and are now the norm. In addition, funding sources (particularly federal and state agencies) that do offer grants, rebates and other incentives for sustainability initiatives can have an impact on the wider philanthropic community by raising the bar for what is expected of our institutions.

What Can You Do?

As a call to action for museum professionals, institutions and professional associations, here are some recommended next steps:

Who	What
Museum Professionals	• Learn as much as you can about metrics. • Encourage the formation of a green team at your museum. • Provide feedback on PIC Green's Sustainable Operations Tool Kit (see page 34).
Institutions	• Sign the Green Museums Accord and follow its suggested steps. • Form a green team. • Conduct a sustainability audit. • Set short-term and long-term sustainability goals. • Train and empower staff. • Share your story. • Publish funding partnership examples.
Professional organizations	• Determine what your discipline knows and doesn't know about metrics in your area of expertise. • Support research initiatives. • Encourage communities of practice. • Report back to your colleagues at PIC Green.
State and regional associations	• Host conversations about the issues and report back to PIC Green. • Partner with state energy offices. • Advocate with funders.
National associations	• Collect feedback from multiple sources. • Partner with other associations. • Advocate on the national level. • Set a timeline for developing a museum sustainability standards program. • Support the standards development process financially and professionally.

Existing Sustainability Standards

A variety of standards and metrics prescribes and measures the sustainability of buildings and sites from construction and renovation processes through operations and maintenance; to some degree, they also relate to the interpretation of sites. The programs described here—adapted from Summit on Sustainability Standards handouts—are used in the United States to varying degrees of popularity, adoption, adherence and achievability. They also cover a spectrum from highly technical and practical to aspirational. With the exception of the Sustainable Sites Initiative and Arts:Earth Partnership, none were developed to suit the unique needs of cultural institutions such as museums, yet all have been adopted over the past decade by hundreds of museums, historic sites and other similar institutions.

This section also includes the Green Exhibit Checklist and the PIC Green Sustainable Operations Tool Kit. The checklist focuses on a specific aspect of museum functions, but its metrics also apply to other functions and can be seen as a model from which museum sustainability standards could be developed. The tool kit provides a comprehensive framework for the unique set of functions in museums and related institutions.

Presenters at the summit were asked to explain why and how the systems were developed and continue to evolve, share lessons learned along the way and provide illustrations of the systems in practice. They were also asked what they would like to learn from our field to enhance what they can do for museums in the future.

The following summaries are adapted from the Summit on Sustainability Standards handouts.

Living Building Challenge Project

living-future.org/lbc

It is time to move beyond Platinum to the level of the Living Building. Imagine buildings that are built to operate as elegantly and efficiently as a flower. Imagine a building that is informed by the eco-region's characteristics, generates all of its own energy with renewable resources, captures and treats all of its water on site, and uses resources efficiently and for maximum beauty.

The Living Building Challenge is a green building certification program that defines the most advanced measure of sustainability in the built environment possible today and acts to diminish the gap between current limits and ideal solutions. Projects that achieve this level of performance can claim to be the "greenest" anywhere and will serve as role models for others that follow.

Metrics

The Living Building Challenge project certification process for projects pursuing Full Certification or Petal Recognition (Net Zero Energy Building Certification follows a slightly different process) is intentionally straightforward and fosters an environment of support and collaboration. A project's path from inspired vision to inspirational achievement consists of three steps: Registration, Documentation/Operation and Audit/Certification.

The Center for Sustainable Landscapes at the Phipps Conservatory and Botanical Gardens is designed to generate all of its own energy while treating and reusing all water captured on-site. Photo by Paul g. Wiegman.

In the Living Building system, projects must meet 20 performance Imperatives, or performance requirements, in the following categories:

- Site: Limits to Growth, Urban Agriculture, Habitat Exchange, Car-Free Living
- Water: Net Zero Ecological Water Flow
- Energy: Net Zero Energy
- Health: Civilized Environment, Healthy Air, Biophilia
- Materials: No Red-Listed Materials, Embodied Carbon Footprint, Responsible Industry, Appropriate Sourcing, Conservation and Reuse
- Equity: Human Scale and Humane Places, Democracy and Social Justice, Rights to Nature
- Beauty: Beauty and Spirit, Inspiration and Education

All of the Imperatives must be attained. For the energy and water standards, the building must meet the performance requirements for a minimum of 12 months of continuous occupancy. Projects can achieve three types of certification: Full Certification, Petal Recognition or Net Zero Energy Building Certification.

Origin

Jason McLennan, founder and CEO of the Living Building Challenge, is the mastermind behind the standard. He believes that the evidence about the dangers of climate change is highly compelling and that environmental problems are directly linked to human resource use—specifically, that the building industry is responsible for damage to the environment. Furthermore, the rate of change and the potential for catastrophic disasters are imminent threats, but no group, government, community or organization is doing enough to address or mitigate the dangers. There is some public awareness, but McLennan feels it is not enough. Based on all these concerns, the Cascadia Green Building Council released the Living Building Challenge to provide a signal for the green building industry challenges ahead.

Presenter: Lorraine Tunis Doo
Ambassador, Living Building Challenge Project

Sustainable Sites Initiative

sustainablesites.org

The Sustainable Sites Initiative (SITES) provides a comprehensive rating system for sustainable design, construction and maintenance of built landscapes. A sustainable landscape gives back by helping to clean the air and water and by enhancing the natural environment through valuable ecosystem services.

A 4,000-square-foot lagoon at the Center for Sustainable Landscapes is populated with native fish and turtles. Photo by Paul g. Wiegman

Sustainable Sites products are designed to achieve the following results:

- Elevate the value of landscapes by outlining the economic, environmental and human well-being benefits of sustainable sites.
- Connect buildings and landscapes to contribute to environmental and community health.
- Demonstrate how the built environment mimics natural processes.

- Provide performance benchmarks for site sustainability.
- Link research and practices associated with the most sustainable materials and techniques for site development construction and maintenance.
- Provide recognition for high performance in sustainable site design, development and maintenance.
- Encourage innovation.

Metrics

Prerequisites and Credits are organized into nine sections that follow the process of site development and can guide an integrated design team through the project phases. The Initiative directs project teams to review and consider all the benchmarks at the beginning of the process, rather than waiting until the pertinent stage of development.

1. Site Selection
2. Pre-Design Assessment and Planning
3. Site Design: Water
4. Site Design: Soil and Vegetation
5. Site Design: Materials Selection
6. Site Design: Human Health and Well-Being
7. Construction
8. Operations and Maintenance
9. Monitoring and Innovation

There are a total of 200 points, with certification at the Platinum, Gold, Silver and Certified levels.

Origin

The Sustainable Sites Initiative Rating System encompasses seven years of work by dozens of the country's leading sustainability experts, researchers, design professionals and scientists, as well as public input from hundreds of individuals and dozens of organizations during two open-comment periods.

The three partners of SITES (U.S. Botanic Garden, Lady Bird Johnson Wildflower Center and American Society of Landscape Architects) worked closely with the U.S. Green Building Council (USGBC) to learn from their experience in developing LEED and follow their model. Steering and technical committees that included practitioners, academics and government scientists worked to develop the guidelines.

In 2012, after a two-year pilot phase that involved more than 150 projects, 30 experts refined the sustainable benchmarks for soil and vegetation, water, human health and

well-being, and materials selection. These subcommittees worked with the technical foundation for the Guidelines and Performance Benchmarks.

USGBC has incorporated many guidelines and performance benchmarks into new iterations of the LEED Green Building Rating System, and the Green Building Certification Institute (GBCI) will serve as the third-party certifier and credentialing organization. SITES will open for public enrollment through GBCI in the future.

Presenter: Holly H. Shimizu
Executive Director, U.S. Botanic Garden

Energy Star and Portfolio Manager
U.S. Environmental Protection Agency

energystar.gov

Energy Star is a voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency. Through Energy Star, the U.S. Environmental Protection Agency (EPA) works with owners and managers of commercial buildings to help them strategically manage their facilities' energy performance, cut energy use, lower utility bills and reduce greenhouse gas emissions. An important part of this effort is EPA's recognition of top performance.

Metrics

EPA offers several ways to earn recognition for top performance or improvement at the individual facility level, including the prestigious Energy Star certification. To achieve this certification, buildings must be independently verified to perform among the top 25 percent of similar buildings nationwide. On average, Energy Star-labeled buildings use

The Toledo Museum of Art converted its first gallery to LED lighting in Octover 2013 for the temporary exhibit "Fresh Impressions: Early Japanese Modern Prints." Photo by Andrew Weber.

35 percent less energy and generate 35 percent less greenhouse gas emissions than their peers, making them an important part of the fight against climate change.

EPA offers benchmarking tools to achieve energy efficiency goals. Portfolio Manager is EPA's online energy management and tracking tool, which allows you to measure and track the energy and water performance of any building over time. Portfolio Manager has 18 broad categories and, within those, more than 80 primary functions, including museums, aquariums and zoos.

Origin

The Energy Star program was established by EPA in 1992 under the authority of the Clean Air Act, Section 103(g), which directs the EPA administrator to "conduct a basic engineering research and technology program to develop, evaluate, and demonstrate non-regulatory strategies and technologies for reducing air pollution." In 2005, Congress enacted the Energy Policy and Conservation Act, establishing "at the Department of Energy and the Environmental Protection Agency a voluntary program to identify and promote energy-efficient products and buildings in order to reduce energy consumption, improve energy security, and reduce pollution through voluntary labeling of or other forms of communication about products and buildings that meet the highest energy efficiency standards."

Under EPA's leadership, American consumers, businesses and organizations have made investments in energy efficiency that are transforming the market for efficient products and practices, creating jobs and stimulating the economy. Now in its 20th year, the Energy Star program has boosted the adoption of energy-efficient products, practices and services through valuable partnerships, objective measurement tools and consumer education.

Presenter: Andrea Schnitzer
National Program Manager, Energy Star

The LEED-certified Ruth Lilly Visitors Pavilion is located on the Indianapolis Museum of Art's 100 Acres site. Photo courtesy Indianapolis Museum of Art.

Leadership in Energy & Environmental Design (LEED) U.S. Green Building Council

usgbc.org/leed

LEED, or Leadership in Energy & Environmental Design, is transforming the way we think about how buildings and communities around the globe are designed, constructed, maintained and operated. Comprehensive and flexible, LEED is a green building tool that addresses the entire building lifecycle by recognizing best-in-class building strategies.

At its core, LEED is a program that provides third-party verification of green buildings. Building projects satisfy prerequisites and earn points to achieve different levels of certification. Prerequisites and credits differ for each rating system, and teams choose the best fit for the project. Today, more than 54,000 projects are participating in LEED, comprising more than 10.1 billion square feet of construction space.

Metrics

Within each LEED credit category, projects must satisfy prerequisites and earn points. The number of points the project earns determines its level of LEED certification.

Main credit categories

- Sustainable sites credits encourage strategies that minimize the impact on ecosystems and water resources.

- Water efficiency credits promote smarter use of water, inside and out, to reduce potable water consumption.
- Energy and atmosphere credits promote better building energy performance through innovative strategies.
- Materials and resources credits encourage using sustainable building materials and reducing waste.
- Indoor environmental quality credits promote better indoor air quality and access to daylight and views.

There are two bonus credit categories: Innovation in Design or Innovation in Operations credits, which address sustainable building expertise as well as design measures not covered under the five LEED credit categories; and Regional Priority credits, which address regional environmental priorities for buildings in different geographic regions.

LEED rating systems generally have 100 base points plus six Innovation in Design points and four Regional Priority points, for a total of 110 points (LEED for Homes is based on a 125-point scale, plus 11 Innovation in Design points). Each credit is allocated points based on the environmental impacts and human benefits of the building-related impacts that it addresses. Projects achieve certification if they earn points according to the following levels:

- Certified: 40–49 points
- Silver: 50–59 points
- Gold: 60–79 points
- Platinum: 80+ points

Origin

In 1993, Rick Fedrizzi, David Gottfried and Mike Italiano established the U.S. Green Building Council. Their mission was to promote sustainability in the building and construction industry. That April, representatives from approximately 60 firms and a few nonprofit organizations met in the board room of the American Institute of Architects for the council's founding meeting. It was there that ideas were first aired for an open and balanced coalition spanning the entire building industry and a green building rating system.

Today, the U.S. Green Building Council's constituency includes builders and environmentalists, corporations and nonprofits, elected officials and concerned citizens, and teachers and students. Since its unveiling in March 2000, the LEED green building certification system has singled out commercial, institutional, and residential projects noteworthy for their stellar environmental and health performance in both the United States and abroad.

Green Building Initiative
Green Globes

thegbi.org/green-globes/

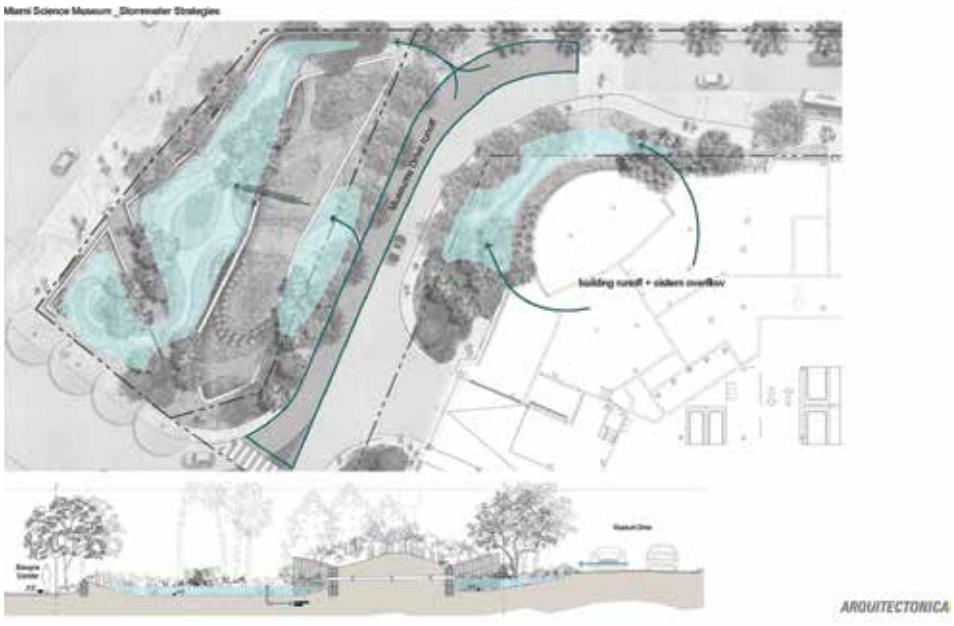
Green Globes is a green building guidance and assessment program that offers a practical and affordable way to advance the environmental performance and sustainability of a wide variety of building types. Designed for existing buildings, the Green Globes Continual Improvement of Existing Buildings (CIEB) program includes:

- Comprehensive environmental assessment protocol
- Online software tools that speed and simplify assessment
- Best practices guidance for green construction and operations
- Qualified assessors with green building expertise
- Rating/certification system

Metrics

The assessment areas for this program include:

- Energy: performance, efficiency, management, CO_2, transportation
- Water: performance, conservation, treatment
- Resources: waste reduction, recycling
- Emissions: boilers, water effluents, hazmat
- Indoor environment: air quality, lighting, noise
- Environmental management: EMS documentation, purchasing, environmental awareness



Plans for Miami's Frost Museum of Science include strategies for managing stormwater. Image courtesy Arquitectonica GEO.

A total of 1,000 points are awarded in these areas. The Green Globes system provides higher levels of achievement based on the number of points a building acquires. Buildings that achieve 35 percent or more of the 1,000 points possible are eligible for a certification of one, two, three or four Green Globes.

A third-party assessment is required for a Green Globes rating and certification. After meeting the eligibility requirements listed above, existing buildings may seek a Green Globes certification and rating for their environmental sustainability and achievements.

Origin

The Green Building Initiative (GBI) is a nonprofit organization whose mission is to accelerate the adoption of building practices that result in energy-efficient, healthier and environmentally sustainable buildings by promoting credible and practical green building approaches for commercial construction.

GBI was conceived as a way to bring green building into the mainstream by helping local home builder associations (HBAs) develop green building programs modeled after the National Association of Home Builders' (NAHB) Model Green Home Building Guidelines. While developing a strategic partnership with the NAHB, an opportunity emerged to bring a Web-based, interactive learning tool developed in Canada to commercial builders in the United States. In late 2004, the GBI finalized an agreement to bring the Green Globes environmental assessment and rating tool into the U.S. market.

Presenter: Erin Shaffer
Vice President, Federal Outreach, Green Building Initiative

Green Exhibit Checklist

exhibitSEED.org

The Green Exhibit Checklist (GEC) is a tool to evaluate the environmental sustainability of exhibits. Its goal is to inspire exhibit teams to plan exhibits with environmental considerations in mind.

The Metrics

The Green Exhibit Checklist awards points in each of five key strategies for reducing the environmental impact of exhibit production. A sixth category awards points for innovation in the design and construction of the exhibit, encouraging exhibit teams to strive for new and creative solutions to reduce environmental impacts.

1. Reduce new materials
2. Use local resources

3. Reduce waste
4. Reduce energy consumption
5. Reduce toxic emissions
6. Innovation

Ratings are awarded for the total score: Platinum (20–24 points), Gold (15–19), Silver (11–14) and Bronze (8–10).

Origin

In 2007, designers at the Oregon Museum of Science and Industry (OMSI) looked to the LEED standards for buildings to try to create a similar scoring system for exhibits. LEED assesses a numerical score for the environmental sustainability of building construction. However, the LEED system has many categories that do not apply to exhibits and involves complex calculations that seemed overly complicated for busy museum professionals. The exhibit designers and production staff worked together to try a simpler approach. They created the current scoring system, which is designed for easy assessment. Just by walking through the exhibition, you can instantly score it based on simple observations.

Since its creation, OMSI has used the GEC to assess past exhibit builds and to set sustainability goals for future projects. The GEC is also being used by museums around the country. OMSI offers the Green Exhibit Checklist on exhibitseed.org, along with examples of completed GECs.

OMSI developed the exhibitSEED website with input from local and national museum industry and design advisors as a place for exhibit and museum professionals to find resources for developing, designing and building more sustainable exhibits. The site was created from an interactive science museum perspective, but the museum hopes the information will be valuable to exhibit professionals specializing in all types of museums.

Presenter: Kari Jensen
Senior Exhibit Developer, Oregon Museum of Science and Industry

Sustainable Operations Tool Kit
AAM PIC Green

pic-green.net/sustainable-operations-tool-kit/introduction/

The Sustainable Operations Tool Kit is a resource in development that focuses on solutions for greening day-to-day museum operations. It will be flexible and updatable, focusing on practical tips that can be customized and easy to implement by organizations of any size or operational model.

Tool Kit Worksheet

The tool kit includes a worksheet tracking system (in pilot form). Each worksheet tab corresponds to a specific focus area, such as Water, Energy or Materials, and offers resources and initiatives for consideration. Each Initiative has a tracking area for a Goal Start Date and a Goal Finish Date. These areas correspond to each action, such as Initiation, Launch, Implementation and Culture Change. By using the Goal Start and Finish Dates, an institution can track progress in each focus area.

Tool Kit Categories

- Building and Construction
- Collections
- Energy
- Event Planning
- Exhibitions
- Facilities
- Food Service
- Gardens & Landscapes
- Graphics
- Green Museums Accord
- Green Teams
- Information Technology
- Lighting
- Paper
- Recycling
- Water

Origin

The Sustainable Operations Tool Kit was conceived to help the National Children's Museum become more sustainable in the operation of its new building in National Harbor, Maryland. PIC Green is now working to enhance and develop the tool kit into a premier resource that museums may consult for a wide range of green operations practices.

While the Tool Kit began as a joint project between the National Children's Museum and PIC Green, it is evolving. Led by PIC Green board members Veronica Szalus, the museum's director of exhibits, and Stephanie Shapiro of the Smithsonian Institution Office of Advancement, the vision for the tool kit is to become a robust industry-wide resource.

PIC Green presented the tool kit concept in a Solutions Lounge at the AAM Annual

Meeting in Minneapolis in 2012. Positive feedback and suggestions from attendees have been incorporated into the current rendition. With an aim to be Web-based, simple and accessible, PIC Green is working to make the tool kit as effective as possible and seeks feedback from colleagues.

Green Business Certification for Cultural Institutions Arts:Earth Partnership

artsearthpartnership.org

Arts:Earth Partnership (AEP) is an official green business certification for cultural facilities, theaters, museums, dance studios, art galleries, performing arts companies, concert venues and individual artists. Certified artists and facilities form a coalition collectively committed to achieving environmental sustainability.

AEP works with arts organizations to expand their mission to include sustainability and to harness the immense creativity, innovation and leadership within the cultural sector to help solve the issues around pollution, climate change and the preservation of our precious natural resources.

Metrics

AEP certification encompasses eight areas of operation:

1. Energy Efficiency: lighting, HVAC, plug loads
2. Water Efficiency and Urban Runoff: water usage
3. Operations and Culture
4. General Practices: recycled paper content, purchasing policies
5. Solid Waste: recycling, waste reduction strategies and implementation
6. Chemical Use and Pollution Prevention: hazardous waste disposal, green cleaning
7. Transportation: multimodal transportation tracking, lower emissions
8. Landscaping: water conservation

AEP offers arts organizations, cultural institutions and individual artists a concise framework for identifying and implementing practical and attainable green administrative, operations and maintenance practices. AEP has recently signed a memorandum of agreement with the City of Los Angeles to be the official green business certification for arts and cultural organizations. The same arrangement has been made with the City of Santa Monica, making AEP the world's first arts and cultural green business certification.

Origin

Arts:Earth Partnership is a nonprofit, pro-environment organization based in Los Angeles. Its mission is to provide cost-effective ways for the thousands of organizations behind arts and cultural facilities to measurably enhance their energy efficiency and decrease their environmental footprint. AEP's certification was developed out of the need for organizations that lack time, money and labor to go through more intense processes to become more sustainable and still take positive steps and move in the right direction.

AEP's cofounders are Justin Yoffe and Joel Shapiro, who used the Electric Lodge as an incubator and a lab for teaching other institutions how to get on and stay on a path to sustainability. Using the certification document as a guide, in language the arts sector can understand, the assessor guides facility representatives through the process of green certification.

Contributor: *Adam Meltzer*
Director of Operations, Arts:Earth Partnership
(This contributor was unable to attend the summit and submitted this information for inclusion in the list of standards programs.)

Case Studies

Balboa Park Sustainability Program
Balboa Park Cultural Partnership

bpcp.org/program/bpsp

"As a collaborative body of 27 unique arts and cultural organizations, we are incredibly proud of what the partnership between our facility managers, utility company, community organizations and trade professionals has accomplished. We believe it's a unique model for achieving the green museum ideal and will continue to share our best practices as a coordinated effort to increase sustainability of museums around the world."

—Peter Comiskey, Executive Director, Balboa Park Cultural Partnership

The Balboa Park Sustainability Program's (BPSP) purpose is to educate, measure, promote and implement sustainability best practices in Balboa Park, a 1,200-acre urban cultural park in San Diego. Established in 2008, the award-winning BPSP continues to advance solutions that will help protect park resources and strengthen economic viability, while enhancing visitor experience and enjoyment. BPSP is a collaborative effort among the Balboa Park Cultural Partnership, the City of San Diego and San Diego Gas & Electric (SDG&E). This collaboration is supported by an alliance of partnership members, park stakeholders and sustainability experts.

The Trigger

Four actions laid a crucial foundation for our sustainable future:

1. **Support of BPCP from the board of directors:** The sustainability program developed from existing programs with support from the board of directors and funding from our local utility company, SDG&E.
2. **Monthly meetings of facility staff:** "Lunch and learns" bring together Balboa Park facility staff and sustainability partners to share best practices and discuss solutions.

3. **Energy audits:** This practice created a sustainability to-do list, identified incentives and calculated savings.
4. **Funding for energy-efficiency projects:** Using energy audits, we applied for and received more than $2 million in federal funding to implement more than 30 energy-efficiency projects in 15 member institutions.

Benchmarking and Metrics

LEED: Balboa Park's historic landscape is home to three LEED-certified existing buildings. Detailed feasibility studies and audits identify the current state of our members' buildings from the perspective of the U.S. Green Building Council's LEED for Existing Buildings: Operations and Maintenance rating system. We have boldly set a goal to achieve LEED certification of 10 buildings in Balboa Park.

Energy Star Portfolio Manager: In partnership with SDG&E, we were the first to institute collective tracking of 19 cultural institutions' energy use through Portfolio Manager. Our building managers use this tool to compare energy use, understand trends and identify faulty equipment. Measurement is the catalyst to understanding consumption, which influences the priority of projects.

Capturing Carbon Footprint: We captured our office's carbon footprint with the Climate Registry's Greenhouse Gas Inventory. In addition, M.B.A. students from Point Loma Nazarene University prepared a carbon footprint baseline for 13 institutions that is beneficial in sharing our story.

Lessons Learned

Share what you know and what you don't. We found that collaboration and mentorship go a long way on any budget and resource supply. Benchmarking metrics can seem like a foreign language, so it's best if you know a good sustainability translator. Partnerships with local utility companies and vendors helped us identify project synergies and cost savings from the experts. We share our story with community organizations and look for unique win-win partnership opportunities.

Understand the organizational culture. It's tough to educate an entire staff, but if you know the right entry points, it is possible—and the results will show. We continue to educate all levels of staff about green practices and explain why it makes business sense. Meetings with department heads help us understand their needs, spread our message and build support. With the goal to institutionalize sustainability into organizational culture, the shift has to be convenient and simple, with ongoing monitoring through a feedback loop.

Continuing the Journey

The foundation and trust we built are essential to our future success. The Balboa Park Cultural Partnership aims to register and certify 10 buildings under the LEED rating system, which will distinguish us as having the highest concentration of LEED-certified cultural institutions in an urban park. The process will be documented through a resource guide in the hope of extending our story into transformative steps for museums around the world to learn from the San Diego model.

Presenter: Jessica Rinaman
Sustainability Manager, Balboa Park Cultural Partnership

Cooper-Hewitt, National Design Museum
National Design Triennial: Why Design Now?

cooperhewitt.org

The Cooper-Hewitt, National Design Museum's 2011 National Design Triennial exhibition "Why Design Now?" explored how the design world addresses human and environmental issues.

Benchmarking and Metrics

In 2009, the Oregon Museum of Science and Industry (OMSI) created a Green Exhibit Checklist (see page 33), adapted from LEED. Currently there is no LEED certification for exhibitions, but the OMSI standard was a perfect opportunity to create a design that reflected the exhibition's message. I convinced the designers to apply the standard.

"Why Design Now?" was the first time a Smithsonian museum had integrated sustainability into an exhibition. One of the biggest challenges was incorporating Smithsonian fire safety standards into material selections. There are many sustainable materials on the market, but we can only use those that comply with strict life safety codes.

Our solutions included the following strategies:

- **Reduce and modularize:** We used modular carpet tiles instead of platforms to delineate display areas, and planar furniture with standardized heights and simple joinery to reduce the amount of material used in construction and shipping. Portable, freestanding stanchions allowed flexible configuration. Concrete blocks used for stanchion weights were intended to be sourced locally at travel venues, reducing shipping weight.
- **Reuse and simplify:** Single sheets of Acrylite instead of cases were used for wall-mounted projects. Projects traveled within their own frames or mounts. UltraTex

panels, pocketed at top and bottom for cable mounting, were easily rolled and lightweight for shipping. Existing hardware and equipment were used to hang signage elements. The exhibition design can be re-created at other venues using locally sourced materials.

- **Use sustainable materials:** All furniture was constructed using Medite FR, made of 100 percent postindustrial recycled wood. Recyclable FLOR Fedora carpet tiles, composed of 80 percent postconsumer recycled fibers, were returned to FLOR after the exhibition. UltraTex U230 fabric, compostable and made from 100 percent organic plant fiber, was used for all printed graphics. Acrylite FF, with up to 75 percent preconsumer reclaimed acrylic, was used for case hoods, decks, protective covers, frames and the title sign. PlyCorr recyclable corrugated cardboard, with over 50 percent postconsumer waste content, was used for object labels and didactic text panels. Concrete blocks used for stanchion weights were made locally of locally sourced materials. Finishes used on furniture were zero-VOC. A prototype LED fixture was tested in one gallery as preparation for our renovation project.
- **Produce a sustainable exhibition catalogue:** The exhibition catalogue was printed using FSC-certified paper by an FSC chain-of-custody printer using soy-based inks, fully recyclable shrinkwrap and recycled wood pallets to ship the books. Carbon credits were bought to make the project carbon neutral.

The exhibition rated Silver according to the OMSI checklist. Given that global CO_2 levels have topped 400 ppm for the first time since humans appeared, we need to get a real grip on our industry's contributions to climate change. Exhibitions have significant environmental impacts, so we need to be much more rigorous when developing them. LEED-rated buildings are meant to last for decades. Building exhibitions is like building houses and then tearing them down several times a year.

Lessons Learned

- Increase industry savvy. Invite professionals to teach museums how to do this right.
- Make sustainability an integral part of how exhibitions are conceived and executed.
- Move sustainability from the fringes into the mainstream of all museum operations.
- Widen the accepted range of relative humidity and temperature. The Tate

Museums, the Victoria & Albert Museum and other British arts organizations are already leading the way in this area.

Continuing the Journey

Since "Why Design Now?" our museum has committed to the following changes:

- using high-quality, reusable cases in our new gallery experience
- seeking LEED Silver certification for our renovation
- strengthening our internal practices

Presenter: Jocelyn Groom
Head of Exhibitions, Cooper-Hewitt, National Design Museum, New York

Haas-Lilienthal House
San Francisco Architectural Heritage

sfheritage.org

The Haas-Lilienthal House, a pristine 1886 Victorian mansion with most of its contents intact, was designed by renowned Victorian architect Peter Schmidt for members of the Haas and Lilienthal families, who were among the city's most prominent early residents. Listed in the National Register of Historic Places in 1973 and designated a San Francisco Landmark in 1975, it is an exuberant example of the Queen Anne style.

Owned by San Francisco Architectural Heritage, the house recently conducted an eco-charette and adopted a sustainability management plan with an ambitious goal of Gold or better using LEED for Existing Buildings: Operations & Maintenance.

Benchmarking and Metrics

Many fantastic historic buildings have been certified with LEED for Existing Buildings, such as the U.S. Treasury Building in Washington, DC (1842), the Wrigley Building in Chicago (1920) and the Empire State Building in New York (1931). One of the more remarkable projects currently underway is the greening of the Haas-Lilienthal House.

A guiding premise of the sustainability management plan is that the house should meet energy and sustainability goals while preserving its historically significant features. For this traditional structure, the project evaluation was initiated by identifying and leveraging the original design features that contribute to the management of heat, air and light in the building. Each recommendation was evaluated against whether it could save energy and material resources while respecting character-defining elements.

The project began to take shape in 2010 when a new executive director came on board. Realizing that the "house museum" that housed San Francisco Architectural Heritage's

headquarters needed much work and that the mission of both were not really connected despite the fact that Heritage owned and occupied it, the board began reconsidering the mission during a comprehensive strategic planning process. A primary goal that came out of this process was to green the house to improve the resource use of the site, broaden the audience of the organization and prove that a house museum can have continued relevance in our culture. The board hired the architectural firm BAC/A+P to conduct eco-charrettes and develop a sustainability management plan to test this premise. The plan states, "While the board of Heritage has targeted LEED Gold, there is the potential that the projects could be 'stretched' to reach the goals of net zero." This is exciting news and only the beginning of a long-term project to make the Haas-Lilienthal House a model for exemplary sustainability practices.

Continuing the Journey

As the board raises the funds to start the rehabilitation in 2014, the team has worked closely with USGBC to spread the story through workshops across the country in collaboration with the Empire State Building, to show that both the smallest and biggest buildings in the country can all go green.

Presenter: Barbara A. Campagna, FAIA, LEED AP BD+C
Principal, BAC/A+P

Additional Contact: Mike Buhler
Executive Director, San Francisco Architectural Heritage

Minnesota Historical Society

mnhs.org

"The Minnesota Historical Society is committed to sustainable practices throughout all aspects of its operation, and aims to promote sustainability in its educational and research activities. It will encourage environmental and sustainable best practice throughout the institution and will demonstrate its commitment to continual improvement and innovation in all aspects of environmental management and sustainability."

—MHS Green Team, Institutional Policy on Sustainability, March 11, 2009

The Trigger

The sustainability effort at the Minnesota Historical Society (MHS) began with a voluntary staff team—the Green Team—who attempted to implement sustainability strategies in their departments and sites. The team solidified around a funding opportunity that allowed them to hire a sustainability specialist to guide and track sustainability throughout the organization.

Benchmarking and Metrics

One of the early challenges of the MHS Green Team was determining how to prioritize the most effective strategies. The team struggled to identify the best use for limited funds, paving the way for the use of sustainability metrics. A consistent system for measuring sustainability would not only establish priorities, but be a means to monitor progress and share common targets throughout the organization. Greenhouse gas (GHG) emissions were chosen as that metric because of the wide scope and availability of literature, consistent protocols and tools. With GHG emissions, the MHS tracks energy, waste, water, paper and travel. In addition, there are opportunities to benchmark with other organizations, such as those companies that report to the Global Reporting Initiative.

The GHG emissions metrics are calculated from monthly utility bills across all 26 historic sites, ranging from modern museums of 500,000 square feet to historic houses of 2,000 square feet. By normalizing GHG figures for size and occupancy, the MHS is able to benchmark within the organization and set priorities based on the most cost-effective and environmentally sound strategies.

The first sustainability audit from 2010 proposed more than 75 strategies, ranging from short-term repairs and operational changes to staff engagement projects and larger system upgrades. The estimated savings in energy, waste and water will reduce GHG

emissions by 15 percent and save more than $1.8 million in utility bills in the next five years. The metrics also reinforce the significance of sustainability on the historic program missions, and as such, more than 80 percent of the strategies have been supported by various departments and funding sources. Following the concept "what gets measured gets done," the MHS has found a means for integrating sustainability metrics into a history organization.

In hindsight, while the metrics are an important facet of accomplishing sustainability at the MHS, other key issues also need to be addressed at the agency level to facilitate the integration of the metrics into operational decision making. Understanding the role of cost-accounting mechanisms can open up opportunities for capturing savings from sustainability initiatives. Our sustainability program is a result of a funding opportunity; however, that funding does not extend to funding implementation. Tying sustainability initiatives to cost accounting will not be a means for accountability in funding, but a means to make sustainability programs self sufficient.

In addition, the metrics ultimately require process change throughout the organization. Without the right shepherding of process change, metrics alone will not become part of the organizational culture. We continue our effort to truly integrate sustainability, but it is a long process that is just beginning. We are working with other departments, strategic priority teams and members to embed the idea that sustainability is "More for the Mission."

Continuing the Journey

Reducing environmental impact and increasing cost savings is a continuous process. As a result of the first sustainability audit, the MHS will save a significant amount in utility bills, but that is only a one-time savings. We must continue to raise the bar on sustainability performance and target continual improvement, including engagement of various stakeholders and audiences in the sustainability process through exhibits and educational programs. In addition, a commitment to sustainability means moving beyond cost savings to developing an institution-wide policy that supports significant operational changes. These commitments are the Green Team's next steps to integrating sustainability into organizational culture, and sustainability metrics plays a significant role in this journey.

Presenter: Shengyin Xu, LEED AP BD+C
Institutional Sustainability Specialist, Minnesota Historical Society, St. Paul

Monticello
Thomas Jefferson Visitor Center and Smith Education Center

monticello.org

"Where a new invention promises to be useful, it ought to be tried."

—Thomas Jefferson

Thomas Jefferson valued progress and innovation. He was a tireless inventor. We also know that Jefferson was a collector, with a great passion for books in particular. He would have appreciated the challenge that museums face today in using innovative technologies that yield energy-efficient, sustainable buildings while ensuring that collections are carefully preserved in controlled environments.

The Trigger

A few years ago, we took on a complex task that Jefferson would have understood: engineering for the new Visitor Center at Monticello. We sought to create a comfortable, sustainable environment as well as a building that would "sit lightly on the land"—Jefferson's pristine mountaintop setting. We used a variable air volume system and also incorporated energy recovery ventilation with enthalpy wheels that was demand controlled. But Monticello presented another opportunity for innovation. Members of the Thomas Jefferson Foundation, which operates Monticello, were interested in geothermal technology, an approach they felt Jefferson would have embraced. Innovative yet organic, it optimizes use of the land. Geothermal eliminated the need for a cooling tower or condensers, which is an important consideration for a historic site that must minimize noise and maintain sightlines.

We designed a closed-loop geothermal system, which required drilling bore holes down through granite along the site. We were able to backfill with local river stone rather than grout. The pipes are set in water that moves through the aquifers, providing a highly efficient heat transfer. Although geothermal technology is unusual for a museum, it is working very well at Monticello. It is saving water and energy, and it was a critical part of the LEED Gold certification for the new Visitor Center.

After the Monticello project, we continued to look for energy-saving strategies and incorporated them into the historic National Academy of Sciences in Washington, DC. These approaches—which would also be appropriate for museums—included solar thermal for domestic water heating; photovoltaic cells in skylights to generate electricity,

improve the solar heat gain coefficient of the glazing and reduce sunlight radiation; steam condensate heat recovery to reduce steam consumption; and a dedicated heat-recovery chiller to reduce the work of the main chillers and limit steam consumption for heating hot water.

Presenter: Todd Garing, Vice President
Mueller Associates, Inc., Baltimore

Natural History Museum of Utah

nhmu.utah.edu

"We aspire to lead by example demonstrating the viability of sustainable choices in our new building and in our operations."

—Natural History Museum of Utah Sustainability Statement

Scientists at the Natural History Museum of Utah study the past to understand pattern and process, with the belief that this knowledge provides a basis for people to make informed decisions that affect the future. The philosophy of sustainability is a fundamental framework for evaluating such choices.

The museum provides opportunities for students and visitors to better understand their interactions with the natural world and provide a framework for individual and community decision making.

The Trigger

With the leadership of the museum's curators, the Natural History Museum of Utah (NHMU) adopted sustainability as a key value and developed its sustainability statement in the early 2000s, well before building programming or design was begun. As a result, sustainability was a primary consideration throughout the process of building the new museum, which opened in 2011.

Benchmarking & Metrics

When we selected our programming architect and interpretive planner in 2003, sustainability was a stated goal for the project. At the time, there were very few LEED-AP credentialed designers, so we did not require that credential. LEED-AP credentials were a selection criterion when we chose the building architect and exhibit designer in 2005, the building contractor in 2006 and the exhibit fabricator in 2007.

The state of Utah implemented high-performance building standards (HPBS) in 2006 that required new public buildings to meet what were then called LEED Bronze standards for energy efficiency. Later the HPBS were raised to the equivalent of LEED Silver. Although the state did not require it, we chose to work to meet LEED certification, which goes beyond energy efficiency to include a variety of sustainable standards.

Through the design and construction phases, the owner-architect-contractor (OAC) teams for the building and exhibits reviewed progress toward LEED quarterly. The LEED checklist was used as the benchmarking tool. When the construction bids came in lower than expected, the first elements we added back into the project were those that would increase sustainability—pervious paving and recycled concrete, for example. At every decision point during construction, sustainability was a consideration in making the choice. Even after construction began, when new sustainable opportunities opened up—such as funding for photovoltaics through the American Recovery and Reinvestment Act—we pursued them.

Sustainability also was an important concept in the interpretive content. A sustainability trail and an energy trail wind through the galleries connecting exhibits with pertinent content. A kiosk shows visitors in real time how much energy the rooftop solar panels are generating relative to the energy the building is using. An entire gallery, Utah Futures, is dedicated to simulations that invite groups of people to make decisions to build future communities, encouraging sustainable choices. We trained volunteers to give architecture tours focused on sustainability.

The entire team of designers, contractors and owners (the last is a complicated group consisting of the museum, the University of Utah and the state of Utah) were committed from the outset to work collaboratively to maximize the sustainable features of the project. The building and exhibits have been awarded LEED Gold certification by the USGBC. Our greatest challenge has been balancing the high standards that museums require, particularly with respect to narrow temperature and humidity ranges, with LEED standards.

Continuing the Journey

We continue to seek ways to improve the sustainable features of the building, exhibits, operations and programs. A staff green team implements policies that encourage sustainable behaviors of staff and visitors and sustainable purchasing choices. We are conducting a large-scale exhibit evaluation that has shown, for example, that some visitor groups use Utah Futures effectively while others find the learning curve too steep; in summer 2013 we evaluated how well visitors are grasping sustainable concepts. Working with the university and state, we are seeking ways to replace more coal-generated energy with sustainably derived energy. We partner with the university's Sustainability

Center on programming for the public, and we generate programs of our own focused on sustainability.

Presenter: Sarah George, Executive Director
Natural History Museum of Utah, Salt Lake City

Wagner Free Institute of Science of Philadelphia

wagnerfreeinstitute.org

"Preservation is inherently green. We believe that architectural preservation and environmental conservation are two sides of the same coin."

—Susan Glassman

The Wagner Free Institute of Science is a National Historic Landmark natural history museum built during the Civil War. It preserves a view of 19th-century science at the moment that the theory of evolution changed our understanding of the world. We actively teach contemporary science while using the past to shed light on important issues in the present. No subject has as much potential to powerfully combine those two aspects of our mission as conservation of the environment. By incorporating sustainability in our capital projects and operations, we take our teaching about environmental issues outside the classroom to let visitors and students learn from how we actually do things in the museum, the questions we ask and the challenges we face—such as upgrading a historic heating system to be more energy efficient or trying to preserve butterfly wings in a room filled with natural light.

The Trigger

In 2000 we began a multiphased restoration of the Wagner's Victorian building. After completing two major projects in 2004, we applied for funding to plan for the next phase of work: replacing our 140-year-old metal roof and repairing the original skylights and elegant iron-and-wood trusses in our exhibition hall. A planning grant from the Heritage Investment Program (now the Heritage Philadelphia Program) funded by the Pew Charitable Trusts brought together a team of architects, engineers and architectural conservators to assess the roof. The grant also supported a retreat for the project team, key staff and board members with a LEED-certified engineer who reviewed the LEED application process with us and analyzed the potential for LEED certification of the roof project.

After careful consideration, we decided to delay pursuing LEED certification. Concerns about costs and the investment of staff time for recordkeeping were factors, as was the

need to complete the process within a five-year period. Most significant was the incompatibility of LEED with our commitment to the highest standards of architectural preservation. We focused instead on crafting a sustainability strategy that incorporates LEED goals where they mesh with our preservation priorities and that supports our effort to maintain the exceptional integrity of the Wagner's ensemble of historic building, collections furniture and exhibit. Since 2006, green design and sustainability goals have been integral elements of our strategic plan and of the long-range building restoration program.

Benchmarking and Metrics

Although we tabled pursuit of LEED certification, the LEED retreat was instrumental in establishing sustainability as a key institutional goal and in developing consensus among our consultants, staff and board about how to infuse that aim into our strong preservation ethos. The LEED checklist outlined the types of activities we could undertake and provided a framework for working toward sustainability goals. We began with simple, low-cost, high-impact changes that have significantly affected maintenance practices. Measures such as expanding the recycling program, replacing incandescent bulbs and starting a storm water management program were undertaken by our site manager with low to no start-up costs and have been embraced enthusiastically by the entire staff (who proudly recite our recycling stats: waste is down 72 percent since June 2007!). At the same time, sustainability has been integrated into planning for capital projects and is considered in tandem with our preservation goals.

Lessons Learned

We're glad we made the decision to postpone certification so we can stay focused on our preservation and operating priorities without the pressure of the certification deadline. But we still hold LEED as a goal because it confers an official status to the program. Moreover, we believe it is the architectural counterpart to the environmental concepts that we teach in our building. Since we held our retreat in 2006, sustainability and green design have made enormous strides. The National Trust for Historic Preservation released guidelines for sustainability in historic buildings in 2011, the same year that the Wagner received the Sustainability in Historic Preservation Award from Preservation Pennsylvania for an energy-efficient upgrade of its historic heating system. And green projects continue since launching the sustainability program in 2006, including:

- Recycling: recycled 72 percent (26,076 pounds) of the total waste stream since June 2007
- Lighting: replaced all incandescent bulbs with LEDs and compact fluorescents
- Windows: gasketed/weatherstripped windows throughout the building
- Storm water maintenance program: installed rain barrels and drip irrigation systems; doubled the size of street tree pits and added 1,100 square feet of permeable lawn
- Garden: created an outdoor classroom with pollinator and native species plantings fed by storm water
- Transportation: installed bike racks to facilitate bike travel
- HVAC: re-engineered the historic steam heating system to achieve environmental sustainability while being sensitive to historic fabric
- Electric/lighting: overhauled the Wagner's aging electrical system and improved lighting
- Roof: restored the roof, including the arched trusses and original skylights
- Education: shared results through public lectures, site tours, programs and publications

Presenter: Susan Glassman, Executive Director
Wagner Free Institute of Science of Philadelphia

Moving Forward

The conversation at the summit was the culmination of years of work by institutions and individuals who have taken large and small steps to make their museums greener. By pooling the collective wisdom, expertise and inspired leadership of these museums—along with the wealth of knowledge from the larger environmental community, building industry and others—we can, must and will find an agreeable path to sustainability for our field. Sustainability standards for museums are within reach if we want them.

Afterword

The American Alliance of Museums (AAM) is proud to help bring this significant report to the entire museum field. We urge all museums, regardless of type or size, to consider the issues and questions its authors raise, as together AAM and its Professional Networks nurture excellence and establish standards and best practices for our field.

Standards and practices must continually evolve in response to the changing environment in order to remain relevant. Sustainability is one of the issues that will now enjoy greater visibility in our standards and excellence programs. The hard work of PIC Green and everyone involved in the Sustainability Summit has set the stage for the next phase of the conversation: determining the best strategy to bring this goal forward.

This report is also vital because it highlights the extensive work museums are already doing in the areas of sustainability and the environment. From the outstanding conservation efforts being undertaken by our zoos, aquariums and gardens, to research on climate change underway at natural history museums, to the creation of new models of sustainable and energy-efficient architecture by a wide range of institutions, the museum field is at the forefront of this effort.

But this is not surprising. Museums are uniquely positioned to take the long view, and through scholarship, education and civic engagement, create a better world for generations to come. All of us at AAM are grateful to the members of PIC Green and we salute their diligence in preparing this report. We look forward to supporting its important efforts to establish environmental and sustainability standards in the years ahead.

Ford W. Bell, DVM
President, American Alliance of Museums

Appendix **A**

Essential Definitions

Museum: For the purposes of this white paper, an educational institution that contributes to the public by collecting, preserving and/or interpreting the things of this world. Museums include every type of institution, from art museums to zoos. Museums are operated by nonprofits, for-profits, colleges, universities and at every level of government, and they come in all sizes.

Sustainable: Meeting the environmental, economic and social needs of the present without compromising future generations' ability to meet their own needs. For museums, the term can encompass supporting larger efforts in their communities or even larger global efforts. Operationally, it can mean building and managing facilities to minimize ecological impacts and developing investment strategies that are environmentally and socially conscientious.

Resilience: An ecosystem's ability to recover from disturbance. Increasingly, it is becoming clear that sustainability cannot be reached without resilience. The weaker the system is, the harder it is for it to recover. The economy provides a corollary.

Standards: Agreed-upon criteria by which an industry measures quality and ensures consistency. AAM further defines these as the generally accepted levels of attainment that all museums are expected to achieve. The systems of standards described here focus on such aspects of sustainability as building design and construction, energy use, resource use and waste management. Some of the standards programs highlighted here also refer to standards that are not easily quantifiable, such as beauty. Whether the standards are tangible or intangible, a level of agreed-upon success and attainment must be established. Standards may be broad or technical, depending on the needs of the industry and the desired outcomes.

Several fields, such as botanical gardens and zoos, have specialized standards, metrics and practices that are unique to these types of institutions. The discussion here takes inspiration from their work and encourages broad collaboration with these allied institutions.

Criteria: Individual principles or measurements on which a standard is based. In the case of sustainability standards, the criteria are likely based on best practices in the larger sustainability field.

Metrics: Measurements that allow for quantitative performance comparisons and can be used to determine satisfaction of criteria. Metrics are data driven and supported by extensive research and available evidence such as energy bills, weather data, waste hauling records, purchasing reports and material data sheets.

Best practices: According to the American Alliance of Museums, commendable actions and philosophies that demonstrate an awareness of standards, solve problems and can be replicated. Museums may choose to emulate them if appropriate to their circumstances.

Museum sustainability standards: While not yet in existence, these standards would incorporate best practices from the green building industry and landscape management along with best practices unique to museum functions, such as collections management behind the scenes and in the galleries. Standards may include sustainable financial management and attention to sustainability issues related to staff, audience, the community and the larger global population.

Appendix **B**

Sustainability in Museums Timeline

1970 The first Earth Day celebration is held.

1971 *Museums and the Environment: A Handbook for Education* reports on an AAM survey of U.S. museums about their role in educating the public about human ecology. The report contains a brief introduction to the science of ecology and major environmental issues, suggests exhibit and programming ideas, and outlines survey results. Of the nearly 600 museums that responded, 73 percent stated that they were offering or planned to offer programming about environmental issues.

1972 The ICOM Conference on Museums and the Environment is held in France.

1974 Coyote Point Museum for Environmental Education (now CuriOdyssey), created as the nation's first museum dedicated to environmental education, opens its new building in San Mateo, California.

1987 The *Report of the World Commission on Environment and Development: Our Common Future* is published and defines sustainable development.

1990 The ICOM Conference on Museology and the Environment is held in France.

1992 The United Nations Conference on Environment and Development is held in Brazil.

2002 The World Summit on Sustainable Development is held in South Africa.

2004 The Mark Twain House and Museum in Hartford, Connecticut, is the first museum in the nation to attain LEED certification.

2005 The Association of Children's Museums launches greenexhibits.org.

2006 The California Association of Museums forms its Green Museums Initiative Committee.

2008 PIC Green Committee is formed by the American Alliance of Museums.

2009 The California Association of Museums and the American Alliance of Museums develop the Green Museums Accord, an institution-wide pledge to be environmentally responsible.

2012 PIC Green conducts a Sustainability Tracking Survey; of the 30 respondents, a majority (64 percent) indicate that their organizations participate in a sustainability program or practice.

2013 The Summit on Sustainability Standards in Museums is held in Baltimore.

American Alliance of Museums

Champion Museums. Nurture Excellence.

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