

WHY WE ALL SHOULD CARE:

**BUILDING A CASE FOR
SUSTAINABLE DESIGN IN MUSEUMS**

**ELENA GUARINELLO
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GEORGE WASHINGTON UNIVERSITY
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“Architectural design is unavoidably a kind of crystallized pedagogy that instructs in powerful but subtle ways.”
-David Orr (Nature 137)

As the centennial celebration of the American Association of Museums (AAM) approaches in the next six months, it is appropriate to examine the challenges and opportunities in the century ahead. The growing deleterious effects of human impact on the earth assure that living in a sustainable fashion will be (and already is) of paramount concern. The varied definitions and applications of sustainability range from land and water use to driving patterns. For our purposes, sustainability can be defined as meeting the needs of the current generation without compromising the needs of future generations. With a sense of relevancy to the public at the core of their work, museums are in a unique position to address and model sustainability.

While the museum profession has extensively addressed other 21st century challenges, such as diversity and social responsibility, the notion of environmental responsibility and sustainability are still nascent. With the growing trend of sustainable design, often called “green” design, in the field of architecture and the recent explosion of new museum construction (Morris 30-35), it is not surprising that museums are exploring sustainability via building and exhibit design.

Cast by David Orr, Simon Guy, and Graham Fowler as having not only ecological, but also civic, cultural, ethical, and moral dimensions (Nature 4; 76, 84-85), sustainability has potential relevance for museums as varied as natural history, history, and art museums. However, children’s museums and nature-related museums have taken the lead in capitalizing upon this potential and therefore, comprise the large majority of recent and current sustainable design projects (see Appendix A). These include expansion and renovation projects, new

building construction, exhibition design, and exhibition content. Although each of these areas is rich and ripe for analysis, this paper will primarily focus on exhibition design and content.

An examination of these projects will illustrate the ability of sustainable design to produce well-designed exhibits, meet museums' educational goals, provide visitor comfort, and create new competencies in the design field. Additionally, by identifying the climate behind the development of sustainable museum exhibits and the tools currently available, I will propose sustainable exhibit design as a model through which all museums can begin to experiment with addressing environmental responsibility.

Sustainable design and what it looks like in museums

As previously mentioned, sustainability is living in a balanced fashion - economically, socially, and environmentally- that meets the needs of current generations without compromising the needs of future generations. With regards to design, sustainability is not just about using eco-friendly materials, nor is it a new building style; rather, “[sustainable design] represents a revolution in how we think about, design, construct, and operate buildings” (COTE). With the transformative and symbolic power of architecture and design, good sustainable design requires more than the application of energy-saving (e.g., living roofs) or energy-producing (e.g., photovoltaic cells) features. The design should integrate and reflect the ethical values of sustainability, creating a product that communicates aesthetically with people while building richer connections between users and the natural world.

The following explains facets of sustainable design and their applications in recent museum projects.

Sustainable design...

...is about choices in products and energy.

By its very nature, design requires using products and energy. The key to sustainable design is the conscious choice about which products and forms of energy remove the least amount of the earth's resources and use those resources most efficiently. This includes selecting products, such as highly renewable bamboo, as Madison Children's Museum (MCM) did in the creation of *Hmong at Heart* (Greenexhibits.org), and using materials with a high recycled content, such as the recycled carpet that will appear in Brooklyn Children's Museum's (BCM) expanded building (Pearson). In terms of energy use, the Children's Museum of Pittsburgh includes climate control elements to reduce power consumption (Lowery); BCM will harvest solar energy through photovoltaic cells; and Chicago's Notebaert Nature Museum's green roof insulates the building and reduces stormwater runoff ([The Notebaert Nature Museum](#)).

...combines new and old technologies.

David Orr, a leading scholar on ecological design and education, notes "ecological sustainability is rooted as much in past practices, folkways, and traditions as in the creation of new knowledge" ([Ecological](#) 31). The American Institute of Architects corroborates that sustainable design "[uses] the best of ancient building approaches in logical combination with the best of new technological advances" (COTE). For example, MCM's *First Feats* exhibit employs straw and bale walls and BCM is installing sophisticated CO₂, occupancy, and daylighting sensors to control air ventilation and lighting throughout the building.

...depends upon and encourages human behavior.

Sustainable design goes beyond its own constructions when it promotes the type of incremental human behavior upon which sustainability ultimately depends. By incorporating sustainability into their institutional culture via physical features and/or formalized documents, museums publicly communicate their commitment to a sustainable lifestyle to staff, the museum profession, and the public. When the expanded BCM opens its doors in 2007, it will include bike racks, staff showers, and public transit signage to encourage both staff and visitors to reach the museum via low-energy means (Greenexhibits.org). MCM adopted a Sustainability Mission in 2004 (Greenexhibits.org); Coyote Point Museum in San Mateo includes “we think ‘green;’ we practice and teach environmental stewardship,” as one of its “core values” (Coyote Point Museum); and the Notebaert Nature Museum developed a three-year strategic plan entitled “Think Green” (Kociolek, Hamilton, and Bell). Although these measures do not alone change human behavior and it can be, as John Robinson, Manager of Exhibits at MCM, admits, “a tough sell,” commitment to the process is a vital part of embracing sustainability. As Robinson notes, “we should be modeling these kinds of ideas for the community and for ourselves and staff.”

...is cost-effective.

Professional organizations, such as the American Institute for Architects (AIA), U.S. Green Buildings Council (USGBC), and The Kresge Foundation widely acknowledge the cost-effective nature of sustainable design and many museums bear this out. For example, Brooklyn Children’s Museum’s geothermal heating and cooling system and photovoltaic cells are estimated to save the building’s owner, the City of New York, \$103,000 per year in energy costs (Pearson; Brooklyn Children’s Museum). The \$116 per square foot that MCM spent in producing *First Feats* in-house was in the lower end of their average \$100-\$160 per square foot (Baker and Robinson 4). Although the front-end costs are often higher for these projects,

operating expenses and the unquantifiable social and environmental savings outweigh these initial costs over time.

Internal factors make sustainable design a logical choice in children’s museums and nature-related museums

The content areas and missions of children’s museums and nature-related museums make incorporating sustainable design practices a natural progression for these institutions. For example, with commitment to conservation efforts as part of their traditions, it is logical that the California Academy of Science ([California Academy of Science](#)) and the Bronx Zoo’s Lion House chose to employ sustainable design in their new buildings ([Office of Sustainable Design](#)). The former even declares on its website that “the Academy has an opportunity- as well as a responsibility- to be a resource-efficient or “green” building.” In a similar vein, Chris Siefert, Children’s Museum of Pittsburgh’s project manager states “It’s [the new green building] a natural extension of our mission” (Lowery).

In addition to a commitment to future generations, children’s museums’ educational programs often use cheap, recyclable materials, and there are many existing exhibits (e.g., Providence Children’s Museum’s *LandFULL!*) that address the benefits and practices of recycling. Building upon these past traditions and fueled by a prevailing consciousness of the role of their missions,¹ nature-related museums and children’s museums have a strong position from which to explore sustainable design and provide a valuable model for other museums.

Children’s museums are even further vested in sustainable design because of the health and developmental needs of young children (Olds 170; [Greenexhibits.org](#)). Although health is an important factor for all visitors, children’s growing bodies and their close interactions with

¹ Madison Children’s Museum, Brooklyn Children’s Museum, Children’s Museum of Pittsburgh, and California Academy of Science all publicly indicate their missions as central reasons for “going green” ([Greenexhibits.org](#); Kociolek, Hamilton, and Bell).

exhibit components, makes health an important consideration for children's museum exhibits. Improvements like natural lighting, fresh air ventilation, and the selection of nontoxic materials (e.g., organic dyes, low-VOC paints) are part and parcel of constructing healthy exhibit spaces. Furthermore, with use of natural materials and other exhibit components that establish connections with the natural world, children are exposed to "the sensory nourishment...on which they thrive" (Olds, 16).

Sustainable exhibits function as teaching tools- in design and in content

The following case studies demonstrate that museums can effectively utilize sustainable features as demonstrative and didactic tools in meeting their exhibit's and/or museum's educational goals. MCM's early childhood exhibit, *First Feats*, created expressly to stimulate the development of infants and toddlers, is a prime example of the former (see Appendix B). Child care design specialist, Anita Rui Olds, notes that the patterns of familiarity and difference that nature provides are comforting for children and that "when children feel comfortable in their physical surroundings, they will venture to explore materials or events around them" (9). This is exactly the type of inquisitive behavior that children's museums seek to engender. *First Feats'* application of natural materials and naturalistic design creates a comfortable and sensory-rich environment, which enhances the exhibit's goal of "support[ing] children's physical, emotional, and social development" (Baker and Robinson 4). Without interpreting the effects of sustainable design in *First Feats*, MCM allows the elements of the exhibit to speak for themselves and influence visitors through positive visceral responses to the space (Robinson).

On the other hand, the Notebaert Nature Museum and the Coyote Point Museum both incorporate didactic content into, respectively, *Extreme Green House*, and *Green Dollhouse*

Exhibit (see Appendices C and D). Both of these exhibits use the familiarity of a home environment to connect kids with the concept of humans' every-day relationship to and dependence upon the environment. In *Extreme Green House*, thematic spaces, such as Bacterial Bathroom and Digestive Dining Room, also address how children can take positive actions in their own homes. These messages are reinforced with an educational programming like "Cookin' Up Conservation" with its "recipes for eco-friendly cleaning methods using ingredients found in your kitchen cabinets!" ([The Notebaert Nature Museum](#)). Coyote Point's exhibit showcases dollhouses made by professional and student architects as part of a competition to demonstrate ingenuity in green building techniques. The exhibit also includes interpretative pieces and interactives such as "Make Your Own Green Dollhouse," which itself is stocked with "green materials" ([Green Dollhouse Project](#)). Although neither institution is explicit about their own use of sustainable design in creating the exhibition components, the interpretive aspects of these cases use didactic material to model the museum's environmental ethic and sense of responsibility.

Other case studies use both demonstrative and interpretative methods to incorporate sustainability into their exhibit's message. For example, Brooklyn Children's Museum will capitalize upon the energy efficient features of its building with an exhibit entitled *Rooftop Energy Adventure* (see Appendix E). Among other features, the exhibit's components will allow kids to explore how energy is harvested from the sun, wind, and gravity ([Greenexhibits.org](#), [Brooklyn Children's Museum](#)). The visibility of the roof's photovoltaic panels and interpretative signage that will be placed throughout the new museum will enhance the demonstrative value of the building itself.

This combination of demonstration and interpretation is certainly a potent way to advance the importance of sustainability to the public. However, it is important to note that in some cases, such as *First Feats*, an interpretative component may not be appropriate to the exhibit's goals. Also, improving current structures, such as installing a living roof on the Notebaert Nature Museum, illustrates that constructing a new building is not a requirement for adding sustainable design features. These are important distinctions for other museums considering incorporating sustainable design.

How sustainable design can affect the design field and exhibition process

Sustainable design not only enhances educational goals and reflects environmental responsibility, the practice can also help develop new competencies in the design field. The decision to incorporate sustainable design into an exhibit and/or building usually means that consultants (i.e. architects, engineers) with specialized knowledge in green design need to be hired for the process. Patrick Hamilton of the Science Museum of Minnesota urges his colleagues to use their projects to “push the envelope,” creating demand for continued technological and design innovation. In another example, MCM has formalized this process by requiring contractors to adhere to their “Sustainability Guidelines for Contractors” (Greenexhibits.org). As museums create increased demand for these services, they introduce practiced green designers to particulars of exhibit design and practiced exhibit designers to the particulars of sustainable design, thus fostering a mutually beneficial learning process.

Fortunately, methods and results characteristic to sustainability in the architecture and design fields are appropriate to many museums' working culture and exhibition process. The innovative and creative thinking of sustainability often requires a team approach to design (Orr

Nature 130, 141), which mirrors the museum field's increasing use of exhibition development teams of designers, educators, curators, and sometimes marketers.

Perhaps the best example of a natural intersection between the work of sustainable design and the work of museums is imagination and creativity. For example, the wind sculpture linking the two buildings of the Children's Museum of Pittsburgh "allow[s] the building to achieve a synthesis of art and architecture, one that is a playful, mysterious, and inventive expression of green design" (Lowery). These adjectives also perfectly describe the Museum's primary users, children, and their curiosity about the world. In this example, sustainable design moves beyond materials and energy solutions to produce compelling, creative, and symbolic design. Despite its inherent risks, the chance to fully embrace creative solutions is an exciting notion for all involved in sustainably designed museum projects.

How the practice of sustainable design can be extended in the museum field

As demonstrated, integrating sustainable design practices, whether in subtle or overt ways, can produce well-designed museum exhibits and buildings, improve visitor comfort and health, reflect environmental responsibility and relevancy, and provide opportunities for creativity and innovation. The case studies cited show how this process has manifest itself and is continuing to evolve in those museums. Understanding the conditions that have aided these museums is instructive for museums interested in adopting sustainable practices.

Much like any new endeavor undertaken by a museum, external factors are as important as the museum's own internal resources. With the growing awareness of sustainability and shared social responsibility to ameliorate human impact on the earth, recent efforts of government and community groups offer support to the museum community. Madison's

progressive, eco-minded community, and groups, such as Sustain Dane, creates a locally receptive and supportive environment for MCM (Robinson). New York City's Office of Sustainable Design (a division of Department of Design and Construction) provides advice for green projects and is currently managing approximately 25 such projects in 2005. The Notebaert's living roof received significant financial support from Illinois Environmental Protection Agency and the Illinois Department of Natural Resources and was also supported by Mayor Daly's vision of a green Chicago (The Notebaert Nature Museum; Kociolek, Hamilton, and Bell). *Green Dollhouse Exhibit* counts Sustainable San Mateo, the AIA's San Francisco and San Mateo chapters, and the Northern California Chapter of USGBC among its many partners. As they think about adopting sustainable design practices, museums should assess the local resources available.

In addition to potential local resources, other tools exist to support sustainable design projects. As a funder, and thus an important influence in the nonprofit world, The Kresge Foundation recently entered its second year of encouraging sustainable design through their Green Building Initiative's Planning Grants. Kresge also offers "green building workshops designed for nonprofit organization executives interested in the subject" (Green Building Initiative). More generally, in absence of standard building codes that encourage innovation and require environmental concern (Orr Nature 131), USGBC's LEED certification system provides a rubric for benchmarking a project's successes and gaining public recognition.² Although LEED certification is not a requirement for a green building, their standards are a good starting point for understanding the elements of sustainable design. The AIA also offers guidance to

² The LEED (Leadership in Energy and Environmental Design) Green Building Rating System[®] is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.

prospective builders with their publicly available document, “Writing the Green RFP: Sustainable Design Language for Consultant Requests.”

These formal standards are supplemented by resources specific to sustainable design in museums, which are evolving primarily from a process of peer support and collaboration. Both InterActivity (the Association of Children’s Museums’ annual conference) and annual conferences of the Association of Science & Technology Centers have hosted workshops focusing on sustainable design. The Association of Children’s Museum’s award of a Promising Practice Replication Award, funded by MetLife Foundation, to support MCM’s development of the Greenexhibits.org website further bolsters the spread and development of peer knowledge. Greenexhibits.org and more informal collaborations and discussions amongst museum professionals are essential pieces in the process of building critical mass in the field.

Although there has been less visible momentum in the museum field at large, there are encouraging signs for the potential of sustainable design in all museums. For example, in response to Greenexhibits.org, MCM receives calls from zoos and botanical gardens and, as John Robinson anecdotally notes, sustainability has been growing in popularity “not just in the children’s museum field, but the museum field in general.” A few exhibits with sustainable content are beginning to crop up in art museums as well (see Appendix A). Significantly, with the stipulation that they will award grants to nonprofit organizations without environmental-focused missions, The Kresge Foundation presents an incentive for institutions, such as non-children’s or nature-related museums, to contemplate sustainable design (Planning Grant). Perhaps as New York City’s first LEED-certified museum and with its executive director, Carol Enseki, on AAM’s Board of Directors, Brooklyn Children’s Museum can raise the bar for other cultural institutions in New York City and elsewhere.

However, it would be foolish not to acknowledge that barriers exist in encouraging museums of all disciplines to seriously consider sustainable design. There will undoubtedly be board members who fret over initial high costs; there will be conservators who will have specialized concerns about their collections; there will be establishment museums (e.g., The Met) unaccustomed to taking cues from children's museums. Nonetheless, as public institutions, museums have an obligation to address environmental responsibility.

Exhibit design is a viable way for a museum to begin experimenting with sustainable design. Exhibits are a medium through which museums can acquire, via trial and error, the accumulated knowledge that is an essential ingredient of sustainable design (Orr Nature 9). The ability to test ideas in their exhibits has been an important aspect of both MCM and California Academy of Sciences' sustainability initiatives (Robinson; Kociolek, Hamilton, and Bell). Furthermore, the exhibit process can clarify institutional strengths and weakness, thus informing any future plans of more extensive organizational change.

Incorporating sustainability into museum work is an incremental process. Yet, as more and more museums make commitments to sustainability, whether through exhibit design or using eco-friendly cleaning products, they will more fully exemplify the model institutions the public expects them to be. With care, concern, and deep respect for both humans and the planet upon which they depend at its core, the sustainability ethic and practice belongs in museums. It is time for museums to embrace environmental responsibility with the same gusto with which they pursue social inclusion and responsibility. In fact, environmental responsibility is itself a social responsibility.

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APPENDIX A:

A sampling of current sustainable design projects in museums

This appendix provides a backdrop for the cases discussed in this paper and also illustrates new developments and potential directions for the concept of sustainability in the museum field.

Expansion & Renovation Projects

Boston Children's Museum
Brooklyn Children's Museum
Bronx Zoo Lion House
Children's Museum of Pittsburgh*
The Notebaert Nature Museum, Chicago*
Queens Botanical Garden Administration Building
Weeksville Historical Society, Brooklyn

New Building Projects

California Academy of Sciences
Children's Museum of Naples
Madison Children's Museum
Natural History Museum of Los Angeles County

Exhibit Design

Brooklyn Children's Museum
Children's Museum of Naples
Children's Museum of Pittsburgh
Madison Children's Museum
Santa Fe Children's Museum

Exhibition Topics

Brooklyn Children's Museum

- Rooftop Energy Adventure, expected 2007

Coyote Point Museum, San Mateo, CA

- The Green Dollhouse Exhibit, September 4 – December 3, 2005

Cranbrook Art Museum, Michigan

- Living Light on the Land: Prototypes for Sustainable Architecture and Design, June 4-September 25, 2005

Museum of Art and Design

- Beyond Green: Toward a Sustainable Art, February 2 – May 7, 2005

Museum of Modern Art

- Groundswell: Constructing the Contemporary Landscape, February 25–May 16, 2005

* indicates a completed project

Exhibition Topics cont.

National Building Museum

- Big & Green: Toward Sustainable Architecture in the 21st Century, January 17 – June 22, 2003
- The Green House: New Directions in Sustainable Architecture and Design, Opening May 2006

Notebaert Nature Museum, Chicago

- The Green Roof
- Extreme Green House

Santa Fe Children's Museum

- Earthworks

APPENDIX B:
Photos from Madison Children's Museum's *First Feats* Exhibit



image credits: <www.greenexhibits.org/dream/exhibits_mcm_first_feats.shtml>

APPENDIX C:
Photos from Notebaert Nature Museum's *Extreme Green House*



image credits: <www.naturemuseum.org/index.php?id=115>

APPENDIX D:
Photos from Coyote Point Museum's *Green Dollhouse Exhibit*

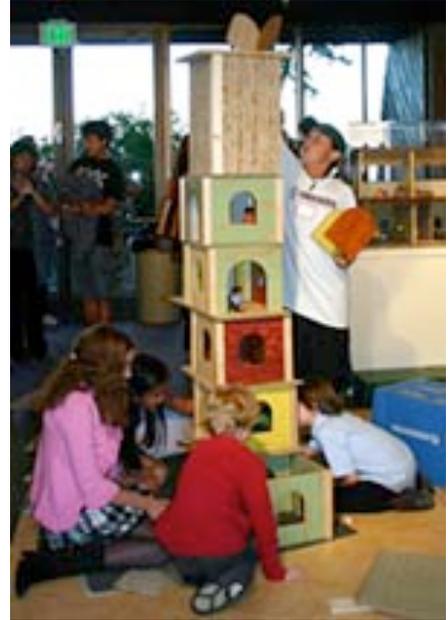


image credits: <www.recycleworks.org/greenbuilding/greendollhouse.html>

APPENDIX E:
Drawings for Brooklyn Children's Museum's *Rooftop Energy Adventure* Exhibit

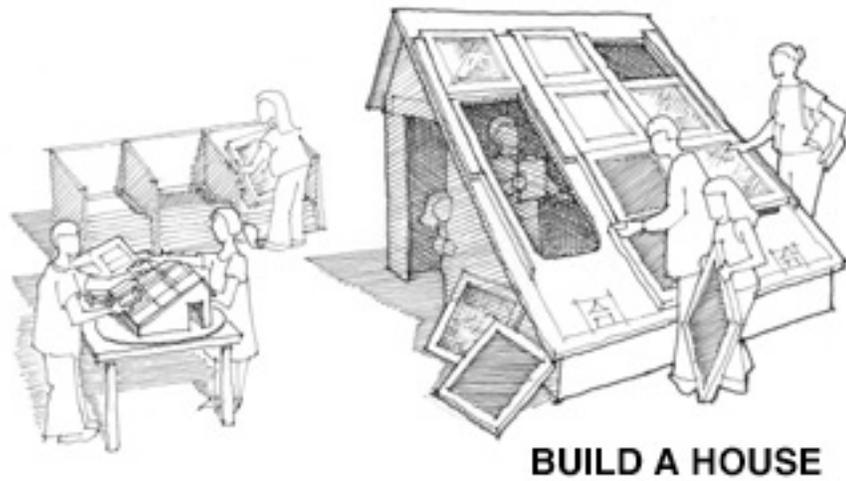
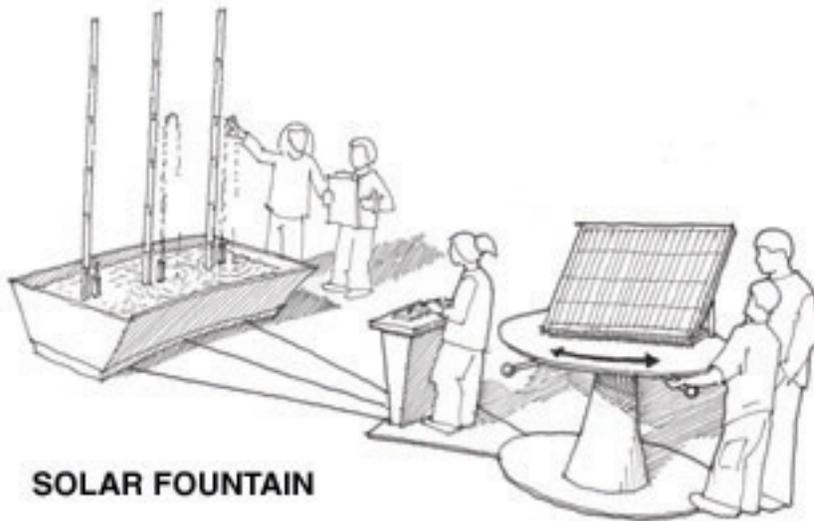


image credit: http://www.greenexhibits.org/dream/exhibits_bcm_case_study.shtml