



Museums,

Natural Leaders in Green Design

by Peter Kuttner FAIA

Peter Kuttner FAIA is President of Cambridge Seven Associates, Architects and Exhibit Designers and Director of the American Institute of Architects. He may be contacted at pkuttner@c7a.com.

Whose Responsibility Is It Anyway?

A national focus on sustainable design consumes us today, and for good reason. Growing acceptance of the real scientific evidence on climate change, the obvious degradation of the environment around us, and now the global financial imbalance have made us all aware of how tenuous and unsustainable our lifestyles have become. Buildings today consume enormous amounts of energy, add to greenhouse gasses, and impair our health. The arguments for high performance buildings that leave a minimal carbon footprint are not unique to museums. The incentives for smart buildings that reduce energy consumption hold true for any building.

However, within the museum world the conversation about green design seems to have taken on additional dimensions. Do museums have some special responsibility to be sustainable? I believe that deep within the mission of almost every museum—to create an aware populace, to educate our children and the public, to preserve our heritage, and to engage in social issues—we find a conviction that museums have an important role to play. While as museum professionals we want to convince ourselves that we have bottom-line rationales, based on life-cycle costing and rate of payback for energy efficient strategies, it is really our belief about the inherent “rightness” of this position that motivates museums today.

A Decade of Quiet Change

As an architect of a certain age I well remember the hot-water solar roofs and wood-burning stoves of the 1970s, but those were adopted by few museums. Since our firm first designed the New England Aquarium in 1962, we’ve

had long experience with aquariums and natural history museums *teaching* visitors the importance of conservation and global stewardship. However, we are now keenly aware that over the years our buildings and exhibits just talked the talk. Now the powerful message is for museums to walk the walk.

The first project that really opened my eyes to the admitted cliché of “walking the walk” was *Earthworks*, an immersive participatory learning environment in Kansas City developed in the late 90s. Designed by Berkebile Nelson Immenschuh McDowell (BNIM), its big sustainable gesture was to locate itself in a 50 million square foot subterranean cave, left over from limestone mining in the 1900s. A naturally controlled climate, with the insulation of being underground, it hit you in the face that there were new ways to do things. In that cave *Earthworks* created five different ecosystems interpreting soil, prairie, pond, cave and forest. The green decision to go underground gave them the perfect opportunity to create complete, yet cost effective, totally immersive environments.

BNIM went on to create the *Deramus Education Pavilion* as a gateway to the Kansas City Zoo in 1999, combining exhibition and education in a sustainable building. The building did simple, obvious things like taking advantage of the site’s solar orientation. It was the first time I saw a museum building with simple operable windows, letting cross ventilation through. Most striking was the fact the structure was made completely of salvaged or sustainably managed wood products.

Closer to my home in New England, in 2003 the ECHO Lake Aquarium and Science

Do museums have some special responsibility to be sustainable?

Center in Burlington, Vermont, became the state's first LEED (Leadership in Energy and Environmental Design) certified green building, and I believe New England's first LEED certified museum (and as they point out, the only lake aquarium in the United States with LEED certification... the bragging rights are diverse). I was most impressed with the impact going green in real life had on their exhibition storyline. ECHO developed an energy and environmental quest for guests to take, highlighting their visible green interventions. Called the "E2 Quest" it served as a scavenger hunt for visitors, and also gave them a take-home for improving the environment outside the museum.

Sustainable Design Metrics

The LEED rating system is described elsewhere in this issue, and it is important to note that LEED has been an enormous success in the past decade. It seems to have tapped into the public's competitive spirit. Unfortunately, many of the early criteria of the LEED system were difficult to meet cost effectively in a museum project. The early system was geared more to an office building, which made sense. Speculative offices are a dominant building type across the country, consume enormous amounts of energy, and are frequently done as inexpensively as possible. Museums can and do address all of the same LEED categories, but with mixed success. While all building types can incorporate recycled materials and green operational methods, or water efficiency and indoor air quality, others techniques are more problematic.

Museums often have problems with natural light, whether for protecting collections, controlling animal environments, or creating

audio-visual environments. Similarly, the environmental systems for heating and cooling have higher standards in museums, often exacerbated by humidity and outside air restrictions. Few museums can handle operable windows, the first big green move in an office building. With so many museums located near concentrations of people, even the site category can be difficult, whether because there are few choices for orientation on a tight urban site, or because the museum is in an existing building.

Today the rating system is evolving, and accommodating these concerns. Boston Children's Museum, recently redesigned by our firm, is Boston's first LEED Gold Museum, and it was able to do quite well in the "innovation and design process" category, where teaching about sustainability is a big benefit for museums. The design was able to make many aspects of the building into green experiences for the children, by stepping the building mass to make BCM's green roof accessible, using operable exterior walls for both natural ventilation and larger activity areas, or even providing low-volume gray-water toilets. The museum is now following up with displays to interpret the building, as well as a "Green Trail" program, using the building as curriculum.

There are now LEED categories for renovations and interiors, and in many cases a museum addition or a new wing can be certified on its own merits. Above all, the LEED rating has proven to be a badge of achievement, and proof of a commitment to sustainable design. It is a metric important to board members, donors, and to the governors, mayors, and legislators in our communities. Even museum members see it as a point of pride.

Museums can and do address all of the same LEED categories, but with mixed success.

(continued from page 23)

Recognizing the Role Museums Play

The museum world is already a driving force in the green movement, and we can hold our heads high. Last year at AAM in Denver, I pointed out in a presentation on “Green Museums” that our institutions, and our fellow non-profits on the formal side of education, often win the lion’s share in sustainable design awards. Each year, for the past 13 years, my other organization, the American Institute of Architects (AIA) has recognized the top 10 green projects in the country. Our national Committee on the Environment (COTE) looks to the overall sustainability of the project, which might include the building’s LEED rating. However, it also looks to the quality of the design and the impact on society.

Of the 10 awards given out this year, museums or visitor centers won half! The Yale University Sculpture Building and Gallery in New Haven, CT; the Queens Botanical Garden Visitor Center in Flushing, NY; the Pocono Environmental Education Center in Dingmans Ferry, PA; the Discovery Center at South Lake Union in Seattle; and the Aldo Leopold Legacy Center in Wisconsin were all recognized. Clearly, most of these museums have an environmental focus in their institution (though not all), but I believe it is the *educational* aspect of their mission that really drives them to a responsible position on environmental stewardship.

In fact, if you add in the non-profit educational projects, the total comes to nine out of ten! The Nueva School Hillside Learning Complex in Hillsborough, CA; the Cesar Chavez Library in Laveen, AZ; the Lavin-Bernick Center at Tulane in New Orleans, LA, and the Garthwaite Center for Science and Arts at the

Cambridge School of Weston, MA demonstrate the commitment of educational institutions to sustainable design. The observation our panel made in Denver last spring is that, in spite of limited resources, it is precisely those institutions that might claim cost premiums as a reason to step back, that are fully embracing the responsibility and the opportunity to go green. At a minimum, museums wisely see their buildings as integral to their business. They are in this for the long haul, unlike a developer who might flip a project before it’s even completed. As a result, many of the arguments about life-cycle costing resonate for museums. Their boards can make decisions that may save energy, materials, and costs over the long-term, instead of short-sighted decisions based on first costs.

Integrating Architecture, Exhibitions, and Sustainable Design

Although today’s green movement is in its second decade, for many years environmentally conscious considerations in the design process have been considered as add-ons, treated as an additional budget line item. Frequently the line would be held until reckoning day, when the board would decide whether the museum could “afford” to be sustainable. However, when done correctly, the principles of sustainable design are an inherent part of the overall design process. Innovations in environmental approaches can inform the design of a new museum as equal partners with all the other aspects of design, such as determining the appropriate quality of space, resolving visitor circulation, or providing the appropriate museum support facilities, to name just a few. Each critical consideration informs the others, and when done correctly, the museum reflects the best synthesis of it all.



A close-up of the front of the new California Academy of Sciences building by Renzo Piano. Courtesy of California Academy of Sciences. Photo ©Tim Griffith.

The story of exhibition design has an interesting parallel to green design. In far too many cases, the design of the building is based first on a dramatic architectural vision, with little notion of the exhibition experience the visitor is expected to encounter. Like green features, the exhibitions are often relegated to come later. Apparently those architects are convinced that the museum patron will remain stunned by the splendor of their new entry or their atrium design, and that this afterglow will carry them through the subsequent galleries. Unfortunately, there are many cases where content dependent museums such as science centers, children's museums, aquariums, or specialty museums, spend much of their time and budget on the architectural entry and lobby, leaving black box galleries for the exhibitions out back. Often this is done in the name of flexibility and change. Even worse, when cost escalation threatens, as with green features, the exhibition budget will feel the hit.

As a design firm integrating both architecture and exhibition design, my office believes that the exhibition narrative is as central to the design as the architectural program. When the architecture is considered from the inside out, from the perspective of the visitor, the exhibition concept can provide the catalyst that the architecture can exploit. A richly

considered visitor experience can be beautifully orchestrated by a sympathetic architecture. Now sustainable design is also a critical part of that mix, and it must work at every level, from the exhibitions to the architecture. Like individual exhibitions, green considerations need to grow from the inside out, from individual decisions about the entire project. Natural light, temperature, acoustics, and ventilation can all be harnessed to make the building and experience memorable, as well as green.

A Recent Outstanding Example: California Academy of Sciences

My fascination with the California Academy of Sciences' new building stems from the way that all three concerns—architecture, exhibition design, and sustainability—have so clearly contributed equally to an outstanding new project. CAS modestly bills itself as the “greenest museum in the world.” In spite of this marketing hubris, I find it is a meaningful example of how a commitment, from the outset, to sustainable design, can create a spectacular design precisely because of its “greenness,” and not in spite of it. While granted it is not an inexpensive project to use as an example, CAS is out in front in many ways. The architecture, by Italian architect Renzo Piano, grows organically both from

The Museum world is already a driving force in the green movement, and we can hold our heads high.