

Adaptation, Mitigation, Innovation: Greening the Exhibition Experience

by Tim McNeil

The Sustainable Revolution

"These are the salad days of sustainability. We are coming to the end of the industrial revolution and entering the beginning of the sustainable revolution" (Werbach, 2008).

When I consider all that has been accomplished in the name of environmentalism over the past decades, I feel encouraged. I can look to the clean air act, the clean water act, progressive green building codes, as well as rapid advances in alternative energy production and fuel technology. Yet, I doubt many of us can truly say that the world is no longer facing an environmental meltdown (literally) due to increased CO2 emissions, the sheer volume of waste, and the harvesting of our natural resources. We've come a long way in uprooting the seeds that were sown during the industrial epoch of the nineteenth century. The big question remains "Is it too little, too late?"

Museum and exhibition design standards and practices are beginning to adopt various philosophical approaches to try to address these environmental issues. These range from making the existing design process better (adaptation); to reducing harmful design processes in the first place (mitigation); to rethinking the design process and approaching it from an entirely different perspective (innovation). The following two exhibition projects, the third in progress, will define these strategies further.

Environmental Adaptation: The NRDC Environmental Action Center

In 2000 I was invited to work with the environmental advocacy group the Natural Resources Defense Council (NRDC) on the design development of an environmental action

center and exhibition space. The center now occupies the first floor of their Santa Monica office, a green building that was awarded one of the first platinum LEED (Leadership in Energy and Environmental Design) certifications from the USGBC (U.S. Green Building Council). The renovated structure personifies the latest in state-of-the-art green design and construction. It was a heady time for green building at the beginning of the new millennium, and the project exemplified the growing pains associated with the early days of LEED certification and code compliance. Costs for construction at that time were 30% higher than for a conventional building, and finding a qualified contractor and engineering firm that could navigate the stringent recycling and integrated systems for energy production and water treatment took time. Newer green materials and products were in their infancy and unknown quantities. I recall the frantic re-writing of the local building code to allow for the installation of waterless urinals, and when the newest low VOC (Volatile Organic Compound) paint wouldn't adhere successfully to the recycled drywall because the two had rarely come into contact and been tested in the field. The NRDC was determined to lead by example. Many greener buildings have followed, but the NRDC building established a benchmark, and was for a period the greenest building in the nation.

The design of the exhibition space did not have to follow the green guidelines employed in the rest of the building. However, a LEED point was awarded for innovation in the design process because of the educational significance of the exhibitions. The opportunity to explore materials, products and alternative design methodologies was extremely appropriate, and one of the first forays into greening the

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exhibition design process.

The center connects visitors to several key environmental issues and the work of NRDC. A retail area and on-line e-activism zone join five informative and interactive exhibitions that range from the threat to our oceans, toxins, global warming and green building. Interpretive signage scattered throughout the center explains the green features of the building, and a ceiling



The sound dome used for this global climate change exhibit at the NRDC Environmental Action Center was one of the many items made from scrap materials from the fabricators shop. Courtesy of Tim Street-Porter.

mounted environmental time line documents the origins of the modern environmental movement to present day. The center was one of the first exhibition spaces to use a touch screen kiosk to tell the green building story. The kiosk accessed real-time building performance data and conveyed this information using easy-to-understand animated graphics. This data captured how much energy was being generated by the photovoltaic array, how natural light was harvested in the office spaces, and how much water was conserved through the grey water filtration system. Comparisons were then made with a conventional building to demonstrate the environmental and long-term cost advantages. (The concept of collecting and presenting building data has since been expanded upon by the Lucid Design Group and others; see <http://buildingdashboard.com/>.) Green product options were limited at the time, yet the exhibition furniture and components excelled for using recycled, non-toxic, and salvaged materials. Examples of these include:

- Agrifiber and formaldehyde free substrates (wheat particle board and green MDF)
- Plastic lumber (recycled soda bottles and saw dust)
- Honey-comb panel board (recycled paper)
- Salvaged wood, metals and plastics
- Aluminum with a high recycled content
- Low toxic paints and stains
- Carpet with a recycled content.

Findings from the NRDC project: relevant ten years later:

1. The cost of recycled exhibition materials and green products continues to be greater than their conventional counterparts, although increased demand and competition are now bringing down the price.
2. Collaborations with other organizations

and individuals who share environmental concerns can help fund museum exhibitions and programming. Patagonia clothing produced a line of products for the NRDC store, Southern California Edison supported the green building kiosk, and actor Leonardo DiCaprio supported the e-activism zone.

3. Green products can be hard to find and have a short shelf life. I don't mean that they won't last long—most perform as well if not better than their conventional counterparts—but often manufacturers will not support a flagging product. Several great products used on the NRDC project are unfortunately no longer on the market. As the specifiers of products we must support growth in this area.

4. It is important to collaborate with an exhibit fabrication team that is willing to explore the process, use their inventory of leftover materials in innovative ways, and test the behavior of recycled materials. Fortunately, the list of qualified exhibit fabricators with experience in building green exhibits is growing.

5. Visitors are interested in environmental issues, want to be informed about the steps taken to green an exhibition or building, and are eager to learn how they can become involved.

6. Design aesthetic and functionality do not have to be compromised when constructing a green exhibition as long as you pay attention to all the details.

7. Energy efficiency has become a dominant factor in the museum and exhibition environment.

8. It's not enough to use recycled materials and specify products that are simply less bad. We need to look at the process by which they are made, what they are made



GreenStop at the UC Davis Design Museum, continued the "green" theme with a ribbon-like highway design made from a biodegradable vinyl. Courtesy of Barbara Molloy.

from, and how they can be designed for longevity and multiple uses (McDonough and Braungart, 2002).

Environmental Mitigation: Eco-Exhibitions at The UC Davis Design Museum

"Sustainability is like teenage sex—everybody says they're doing it but no one really is. And those who are doing it aren't doing it very well" (Makower, 2008).

The Design Museum at the University of California, Davis launched an ambitious 2007-08 series of eco-exhibitions that introduced a range of work by designers at the forefront of sustainable and green design.

Peace Begins Here (September–December, 2007) was based on an inspirational book of artworks by Chen Design Associates entitled *Peace: 100 Ideas*. **GreenStop** (January–March, 2008) exhibited twenty-eight concepts from an international competition to design a self-sustainable and "off the grid" roadside rest stop along Route 99 in Tulare County, CA. **Fashion Conscious** (May–July, 2008) featured the work of twenty-eight designers, and explored sustainability and how it relates to the current clothing market, from the environmental impact of eco-friendly textiles to the re-evaluation of industrial manufacturing.

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The **GreenStop** exhibition was printed on a biodegradable vinyl using eco-solvent inks. Skeptical that the vinyl would biodegrade, UC Davis fashion students extended its life and made bags from the material to raise funds for their annual fashion show.

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Environmental goals for the series of eco-exhibitions were derived from experiences with the NRDC project. However, rather than focusing predominantly on green material use, this venture set out to develop an ongoing strategy for implementing green initiatives and documenting their budget implications. The UC Davis Design Museum serves as a research and teaching laboratory in the university's design program, and the eco-exhibitions were intended to evaluate products and ideas in a formative manner.

The design museum's green initiatives can be summarized in three main categories: reducing waste, green materials and products, and saving energy:

1. Reducing Waste

Exhibition construction can account for up to 70% of a museum's consumption of materials, with typically only 25% of it recycled. The temporary nature of most exhibitions mean a significant amount of raw materials is used for building new walls, display furniture, and exhibit components. Quick turnover and a lack of storage space result in few of these materials being salvaged; the majority are sent to landfill where they can take years to decompose.

Designers are perfectly positioned to enact change and "close-the-loop." Reuse or recycle materials through local non-profit or city run programs. Better still, "reduce." Don't buy it or build it unless you have to. Extend the longevity

of a product, loan it, or give it to another museum. Create a robust, flexible, modular exhibit display system designed to be repurposed and reconfigured multiple times. Use screws and fasteners rather than glues, so that at the end of an exhibition's long life, components can be easily separated, made into something else, or safely recycled. As with many environmental decisions a greater financial investment up front will pay dividends in the long term (similar to investing in photovoltaic panels for your home). Glass may be more expensive, but it is an environmentally better choice than acrylic for protecting objects because it is less toxic to manufacture, recyclable, and longer lasting.

2. Green Materials and Products

Once you've navigated your way through the green washing, there is a growing array of green products applicable for the exhibition environment. Contemporary museum conservation practices honor what environmentalists call the "precautionary principle". That is, to seek out the safest alternatives when making choices ranging from purchasing products to shipping and treating objects. Instead of asking, "how much harm will be allowed?" those who care for collections ask, "How little harm is possible?"

This methodology guided the design museum's selection of materials and products. The eco-exhibitions used alternatives to wood building supplies, such as renewable agricultural by-products made from wheat chaff, and particleboards made from recycled papers. Construction materials including recycled steel, aluminum, and drywall consume large quantities of energy when they are manufactured. Environmental health concerns are linked with the petroleum-based chemicals

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used in large format inkjet prints, direct application vinyl lettering, cleaners, paints, glues, laminates, carpets and finishes. Even when dry or installed, these products continue to release toxins that are trapped in an indoor environment. Museum artifacts require case interiors that are free from harmful contaminants; shouldn't the visitors who come to see them on display deserve the same? The design museum used non-toxic paints, biodegradable vinyl substrates, eco-fabrics made from recycled soda bottles, natural ingredient cleaning products, 100% post consumer waste papers, and low solvent or vegetable based inks. Many of the specified products used in the design museum can be found at the project wiki site greendesignwiki.com.

3. Saving Energy

Museums are already in the conservation business. Extending this to energy use is a natural fit.

The United States continues to be the world's largest per capita source of carbon dioxide, the chief heat-trapping gas that causes global warming. Encouragingly, investment in alternative energy sources has grown exponentially, and there is a move from supply to managing demand and reducing electrical use. Exhibition environments are twenty-four hour operations that consume large amounts of electricity. Elaborate heating and cooling systems regulate temperature and humidity levels for artifact preservation. Complex lighting systems provide quality color rendering for optimum viewing at a safe intensity for any artifacts that are sensitive to light. An array of newer, more energy

efficient lighting technologies including LEDs (Light Emitting Diodes), CFLs (Compact Fluorescent Lights), and metal halide offer the conservation benefits of less heat, reduced ultraviolet rays, and a longer life. However, the promise of these technologies remains unfulfilled, since the light quality and intensity control does not match that of an incandescent-halogen track system, the mainstay of most exhibition environments (watch this space!).

Climate control within the exhibition environment is an area of intense debate. Some conservators regard the standards developed in the 1970s as excessive and wasteful for today's energy conscious world (Henry, 2007). Not surprising when you consider that a few objects can dictate the climate of a large exhibition space when others require far less stringent controls. Reliable ways to target objects' specific needs are now available with accurate and portable ways to measure humidity levels. This opens up the door to greater localized exhibition climate control and reusable microclimate casework. There is resurgence in green building practices, using natural forms of heating and cooling that eliminate the need for artificial climate control. Ultimately, energy efficient climate and lighting systems coupled with a greater control over localized exhibition areas (dimers, sensors and controls) are the best way to save energy as well as reduce carbon dioxide and consequently cost. The eco-exhibitions succeeded in accomplishing the following:

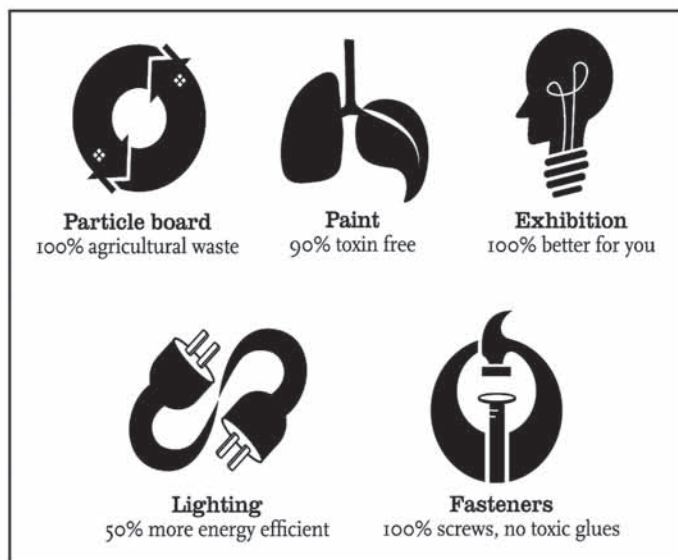
- Exhibition modularity and furniture reuse

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- Testing green products and materials
- Printing on recycled or reused materials
- Reducing waste
- Creating a low toxin environment
- Interpreting green initiatives through signage
- Maintaining a high-level design aesthetic and exhibition experience
- Reducing electrical energy consumption
- Cost efficiency and savings
- A project wiki site to capture the research.



Interpretive signage, based on extensive prototyping, informed visitors about the green initiatives at the UC Davis Design Museum.

Environmental Innovation: The San Francisco EcoCenter

"The sustainability brigade are insane to think we can save ourselves by going back to nature; our only chance of survival will come not from less technology, but more" (Lovelock, 2008, p. 2).

The San Francisco Department of Environment is currently undergoing a redesign of its

downtown EcoCenter. SF Environment is responsible for helping the city of San Francisco reach its very ambitious waste diversion, renewable energy, and climate goals. The redesigned EcoCenter will have educational displays and engaging exhibitions on local, national, and global environmental issues ranging from alternative transportation and energy efficiency, to waste disposal and green building. The center will serve as the mechanism to build collaborations with residents and governmental organizations, and the space will also be used for community meetings, workshops, and environmental film screenings and talks. The EcoCenter is representative of an increase in both corporate and non-profit museum-like visitor centers devoted solely to environmental issues. We are destined to see many more. These projects represent an avalanche of potential work for exhibition professionals in the near future, geared to fostering sustainable behavior and shaping the public's perception of environmental issues and strategies.

The EcoCenter project seeks to explore a new paradigm for designing, fabricating, and operating an exhibition space. At the core of this approach is zero waste and energy neutrality. Many of the green initiatives for the EcoCenter build on the two previous projects I have described, but rather than aiming for low/mitigating solutions it is striving for zero tolerance/innovative solutions. All of the exhibit components will come from salvaged products and materials such as used office furniture and the renovated space. Any new products will be manufactured ethically without producing toxins, subscribe to LCA (Life Cycle Analysis), and be sourced locally to reduce carbon emissions.



Dynamic signage (easily updated LED message panels) on the building façade of the San Francisco EcoCenter will convey statistical data about the city's environmental accomplishments.

The building's reliance on renewable energy sources will power lighting, heating, cooling and dynamic LED graphics on the structures facade. Natural light and natural cooling will be maximized, and artificial light minimized, through operable windows and energy efficient lighting sources. The exhibitions will be portable and infinitely flexible so that they can be easily reconfigured, updated and taken on the road to community events. User-friendly, cost-friendly, and eco-friendly, the EcoCenter ultimately strives to embody green aesthetic and functional excellence. These are ambitious goals that require a high level of ingenuity and the environmental infrastructure of San Francisco to implement.

The Sustainable Future

With all this talk—some might say hype—about going green it's easy to get jaded. With a struggling economy and budget concerns, is this really a priority? It's clear that our efforts have to focus more on improving currently flawed products and practices (such as energy intensive lighting and climate control, and non-reusable exhibit components) rather than simply using new green products and materials. Our approach should formalize what many of us do already--that is doing more with less. Of the three sub categories I cited for the UC Davis project, two of them, reducing waste and reducing energy, have a direct correlation with saving money. The third, green materials and products, remains a financial nut to crack. Manufacturing costs for many green products are approximately 15% (based on the eco-

exhibition costs) greater than their conventional cousins—low VOC paints are a good case in point. This will change as the market plays its part and the demand for greener products increases. Indeed, the agrifiber particle boards (wheat board etc.) have all but gone out of business, not so much due to lack of demand, but ironically because the makers of conventional particle boards such as MDF, have switched to FSC (Forest Stewardship Council) certified wood and non-toxic binders in response to the competition. It is also worth noting that the temporary nature of the commercial exhibition industry is reliant on exhibit modularity and reuse. The customer demand for greater customization (unique branding) has in recent years diluted this one-size-fits-all approach. Commercial exhibition professionals are aggressively pursuing green materials and products because they are a visible expression of greening a company's image. For better or worse, this profit driven part of our sector will increase the range and financial viability of greener exhibition products, particularly lighting and graphics.

The strength of our profession has been as deft communicators of environmental issues rather than as practitioners of sustainability, although we are far better than most industries. From an ethical and financial perspective, recycled and renewable materials are important. However, rethinking the design process, reducing energy consumption, and repurposing materials and products will bring us closer to environmental innovation. ☀

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