



CALIFORNIA
ACADEMY OF
SCIENCES

California Academy of Sciences
Sustainability Program

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The California Academy of science's mission is "to explore, explain and protect the natural world". For 150 years the Academy has a researched life on this planet and educated the public about biodiversity. In 1992, when reconstruction plans for a new Academy facility began, staff and board members envisioned a building and an organization with a renewed focus on sustainability; a source of scientifically sound information, inspiration and empowerment.

After completing a \$488 million reconstruction and renovation project, the Academy reopened in Golden Gate Park, San Francisco on September 27th 2008. Utilizing the latest technologies the Steinhart Aquarium, the Morrison Planetarium and the Kimball Natural History Museum have been combined into one guest experience with a central theme of "life and its sustainability".

HISTORY

The California Academy of Sciences was formed in San Francisco in 1853, with a mission to promote science through exhibition, education and research. The buildings and most of the exhibits and collections at the original downtown location were destroyed by the 1906 San Francisco earthquake, whereupon the Academy established itself in Golden Gate Park in 1916. During the ensuing half a century or so, the Academy expanded its exhibits and programs. Over time the buildings and infrastructure deteriorated, and the effects of the 1989 Loma Prieta earthquake precipitated a review of the institution's future. Completed in 1992, a master plan presented a number of options for the Academy to consider.

Over the next decade the vision of the new Academy took shape. Led by the Academy's senior leadership, numerous community groups, members, staff scientists, futurists, planners, museum and aquarium professionals were asked the question, "What should the Academy of the 21st Century look like?"

One of the clear directives that emerged from this process was that the new facility, and the organization itself, must position itself as a sustainability leader to continue fulfilling its mission. The new Academy needed not only minimize its own environmental impact, but also had to make a statement about the importance and viability of building and operating sustainably.

The selection of Renzo Piano as the new building's principal architect in 1999 helped to cement this direction. Renzo's vision was of a building intimately connected to the surrounding environment and its natural weather systems. He pictured a slice of Golden Gate Park being lifted up and the new Academy building tucked underneath. He wanted expansive walls of glass and clear sightlines throughout the building to blur the boundaries between the interior and the outside park. Integrating this vision with the exhibitry needs of the Academy resulted in a design for the world's largest, LEED platinum certified public building.

The Academy closed its doors to the public in Golden Gate Park at the end of 2003 and opened its temporary transition facility in the spring of 2004. Ground breaking for the new facility occurred in September 2005, and after two years of construction, and one year of exhibit completion and fit-out, the new Academy opened to the public in Golden Gate Park.

OVERVIEW

The principal building exhibitions feature Philippine coral reefs, rainforests of the world, the Northern California coast, a southern swamp, as well as a unique exhibit entitled *The Water Planet* (which explores the challenges of living in water). There are exhibitions that showcase the Academy's long-standing and on-going research in the Galapagos Islands and Madagascar, and the diverse habitats of Africa are presented through a series of renovated dioramas. There is also a major exhibition area that focuses on global climate change and its impacts in California. A combination of interpretive methods is used throughout the facility, with an emphasis on person-to-person interactions, live animal presentations and interactive technologies.

Topped by a more than one hectare living roof, the building employs a wide range of energy saving materials and technologies. The roof is bordered by a glass canopy containing 60,000 photo voltaic cells, which produce up to 10% of the Academy's annual energy needs and prevent the release of over 180,000 kilos (400,000 pounds) of greenhouse gas emissions each year. Radiant floor heating reduces heating energy needs and heat recovery systems capture and utilize heat produced by HVAC equipment. The undulating roofline draws cool air into the building, naturally ventilating the adjacent exhibit spaces through automatically controlled skylights, and at least 90% of the regularly occupied spaces have access to natural daylight and outside views. Combined these features help the Academy use 30-35% less energy than a conventional building of its size.

Advanced features helps the Academy conserve water as well. The building reduces potable water use through a reclaimed water system, low-flow fixtures, and by piping in aquarium water directly from the Pacific Ocean, miles away. Nitrate wastes are purified with natural systems, ensuring that aquarium water can be recycled. The living roof reduces storm water run-off by more than 14,000 cubic meters (3.6 million gallons) per year, as well as providing habitat for a range of local animal and plant species.

Recycled materials also play a big part in the building's story. Over 90% of the demolition waste from the old Academy was recycled in local construction projects. In the new building, recycled steel is used for 100% of the building's structural steel. At least 50% of

the wood was sustainably harvested and certified by the Forest Stewardship Council. The insulation in the walls is made from recycled blue jean scraps, a renewable, cotton resource that is non-toxic. The building's concrete is composed of 50% industrial by-product.

Buildings in the United States are responsible for 39% of energy use, 38% of total carbon dioxide emissions, 30% of raw materials use and 12% of total potable water consumption. Building more sustainably is a critical part of a sustainable future. Construction project managers Don Young and Associates (San Francisco) estimated that the incremental construction costs associated with the green design were about 5%-10% of the total construction costs.

In recognition of the Academy's commitment to sustainable design, the project has received the 2005 North American silver Holcim award for Sustainable Construction, the EPA's regional 2006 Environmental Award for new building's sustainable design, and the Green Building Council's highest possible LEED rating, platinum.

Throughout the museum sustainability education is integrated into many of the exhibits, as well as the visitor amenities. In the aquarium, signage highlights the serious threats ocean environments face and showcases inspiring local conservation efforts underway in Indonesia. At the *Building Green* exhibit visitors can learn about the sustainable design of the building and how similar strategies can make their own homes more efficient. Restrooms messages remind visitors to conserve water and offer up inspirational quotes. The roof railing graphics explain the benefits of living roofs and why the Academy living roof is so revolutionary. At the rainforest railings visitors can learn how the Academy saves energy by utilizing as much natural sunlight as possible. Finally, in the café customers learn how the café focuses on local, seasonal and organic ingredients.

All this reflects the institution's commitment to the natural world. This environmental focus is also woven into the Academy's public floor programs, operational procedures, strategic partnerships, retail shops, marketing, website development, educational programs and scientific research. The Academy distributes sustainability information through its audio tours, handouts, intern and docent programs and neighborhood outreach.

GOALS

All academy research is based on sound scientific principles. The recent empirical data gathered through internal study and partnerships with other scientific institutions suggests that rapid, widespread human behavior change is necessary to sustain a healthy environment, conducive to life. The Academy is anticipating its reputation as a trusted source of information, along with its array of public-facing sustainability initiatives, will drive change among visitors and within other organizations. The various initiatives contribute to a multi-layered approach, designed to help the Academy reach the widest possible audience and have the largest impact. The overall goals are to reduce the Academy's environmental impact, and to provide education and inspiration about sustainability.

Another of the Academy's goals is to help foster a sense of connection between visitors and the environment. In today's society, there is a growing chasm between the modernized, urban lives of many people and the natural world. The Academy's exhibits

and programs attempt to bridge that gap by providing inspiring experiences for visitors who would not otherwise get the chance to develop an emotional attachment to the wild places of the earth. With no emotional attachment, people are unlikely to prioritize protecting the natural systems which actually support humans and all other forms of life.

The new Academy building is receiving a high level of attention from the media and visitors, because of its cutting edge, green design; it's the second most popular attraction for visitors, ahead of the planetarium and the natural history museum, according to surveys. Investing in such a high-profile design has already proven to be a sound decision from the standpoint of the Academy's attendance goals, but a less tangible benefit is to showcase what is possible in the field of green building design, and hopefully to help inspire a new generation of green building and retrofit projects., another of the organizations goals.

EVALUATION AND TRANSPARENCY

Evaluation and transparency are key to a successful sustainability program. Being part of the solution means communicating results, successes and failures, for others to learn from. The Academy is taking several steps to ensure this.

A full-time evaluator will conduct an analysis of all the Academy exhibits. This staff member will use a combination of crowd analysis and visitor surveys to determine what information visitors are taking away from their visit, how it has changed their lives, and how future improvements to the museum can be made. Website feedback, surveys, partner input and social networking penetration will round out the tools to evaluate the entire program.

Evaluating and publicizing the building's real-time performance will help inform future green building projects. The Institution's overall carbon footprint will be calculated and areas for future reductions will be identified. Becoming Sustainable is a long-term process and the Academy anticipates learning much along the way that it can share with the public.

RELEVANCE TO TRAVELER OR TRAVEL INDUSTRY

Interest in sustainability is growing rapidly worldwide. As more and more travelers wrestle with the environmental challenges facing us all, from climate change to over-fishing, they are demanding travel programs which explore these issues. Many want to reduce their impact on the environment through eco-tourism or purchasing carbon offsets. Others choose destinations which offer insight into future solutions such as the California Academy of Sciences.

Historically, the "Academy" served predominantly as a local museum where residents living relatively close to the facility were able to learn where life came from and, more importantly, how we can ensure its continued existence for future generations. Since its grand re-opening in September 2008, however, much has changed.

Out of necessity, the Academy has created a travel industry sales department in order to handle the growing number of ticket inquiries it has received from prospective visitors from all over the globe. Tour operators worldwide now have an opportunity to enter into

commissionable wholesale contracts in return for encouraging a visit to the Academy. Commission rates will vary according to the volume of tickets generated. Within 24 months of its re-opening, sales volume from the newly created travel industry sales department may represent as much as 20% of the Academy's paid attendance where it was formerly non-existent. This is unprecedented in the non-profit/cultural institution industry.

In order to provide essential information to its diverse mix of visitors, the Academy has added micro-sites in eight languages other than English to the Academy's website (Chinese, French, German, Italian, Japanese, Korean, and Spanish). It will continue to add languages as foreign attendance dictates. Once guests arrive, visitor brochures are available in seven languages other than English (Chinese, French, German, Italian, Japanese, and Korean). The facility literature is produced using environmentally friendly inks on recycled paper. Upon entering the building, brochure recycling bins are available in order to encourage incoming guests to re-use visitor brochures and minimize paper waste. Throughout the facility, all trash bins are marked "recycle", "compost", and "landfill" to ensure visitors are conscious of the impact of items they are disposing.

Additionally, on-site multi-media tours are available in eight languages. Presently, one tour focuses on the highlights of the Academy while the other is an architectural tour underscoring many of the environmentally friendly and sustainable initiatives that took place during both the construction of the building as well as our ongoing operation.

After just more than 100 days of operation, the Academy has been thrilled with the interest, support, and partnership from the travel and tourism industry. Academy staff are active participants and hold committee positions with the San Francisco Convention & Visitors Bureau, the California Travel & Tourism Commission and the California Travel Industry Association (CalTIA).