USGBC-LA Case Study:

WATER+LIFE Museums and Campus

2325 Searl Parkway, Hemet, CA 92546

LEED® Platinum Certification

Project Owners:	Metropolitan Water District, Western Center for Archaeology & Paleontology
Architects:	Lehrer + Gangi Design + Build (Michael B. Lehrer, FAIA of Lehrer Architects and Mark Gangi, AIA of Gangi Architects
LEED Consultant:	Zinner Consultants
MEP Engineer:	IBE Consulting Engineers
Structural Engineer:	Nabih Youseff & Associates
Civil Engineer:	KPFF Consulting Engineers
Landscape Architect:	Mia Lehrer + Associates
Solar Power Consultant:	Vector Delta Design Group
Lighting:	Prudential Lighting
Contractor:	Lehrer + Gangi Design + Build
Completion Date:	February 2007
Construction Cost:	$40 million (Phase I)
Size:	70,000 square feet; 17-acre campus

Case study by Lehrer+Gangi, April 2008

Project Description:

The WATER + LIFE Museums and Campus at Diamond Valley Lake celebrates the link between Southern California's water infrastructure and the evolution of life. The assorted complex includes two museums, laboratories, classrooms, two auditoriums, administrative offices, and support facilities. A crisp, modern design concept envelops the 17-acre campus, whose indoor and outdoor spaces mingle within the framework of airy floor plans and endless window walls.

The two sister museums—The Center for Water Education and Western Center for Archaeology and Paleontology—are striking mélanges of glass and steel at the eastern entrance to Diamond Valley Lake. A series of five slender, steel towers blazes across each structure's façade, providing an eloquent contrast against the azure desert skyline. The water center incorporates such educational components as a simulated dam, two aquarium spaces, and interactive exhibits. The archeological museum houses an interactive theater in the round, research lab, and archaeology and paleontology labs, as well as extensive specimen storage. Environmental features include one of the nation's largest rooftop photovoltaic installations, state-of-the-art irrigation systems using reclaimed water, and a sophisticated mechanical system of radiant heating and cooling, among others. The campus buildings were designed to achieve LEED Platinum certification.

Project Highlights:

- One of the world's largest institutional rooftop photovoltaic installations of its kind (540 kilowatts; 3,000 panels) generates energy for 68% of the museum
- Specially designed solar power display located in the Museum provides an interactive display on a large flat plasma monitor, whereby visitors to the museum are allowed to interact and request information regarding the solar power co-generation system
- The efficient envelope and sophisticated mechanical system of radiant flooring and forced air units provide significant cost savings in facilities operation
- Roofs covered in a single-ply white membrane and shaded by solar panels reduce heat island effect
- Translucent banners hanging in front of high-performance curtain walls at the east elevation mitigate heat radiation
- Interior and exterior lighting controls, outdoor light pollution controls, and interior occupancy sensors are savvy energy saving devices
- Bicycle storage for five percent of building occupants. Shower and locker facilities encourage alternative transportation and reduce environmental impact from automobile use, while buildings incorporate waterless urinals and dual-flush toilets
- Braided streams containing pervious surfaces provide storm water management by conveying rainwater to the water table
- Irrigation systems are state-of-the-art drip systems that use reclaimed water.

architect@lehrerarchitects.com

Project Economics:

- The architects used key energy-efficient devices to slash operational costs, a strategy that propels the complex's energy standards to 40% above the required minimum of California Title 24 Energy Conformance. The museum campus—built to achieve LEED Platinum certification—incorporates such effective design features as automated lighting control and solar power cogeneration.

- The lighting design includes a network of electronic sensing devices and timers that optimize day light harvesting and program zone lighting controls in all buildings. The buildings' rooftop photovoltaic installation, a 540 kilowatt solar power system of 3,000 solar panels, requires minimal maintenance and substantially lowers the toxic out pour of carbon dioxide into the atmosphere. The solar power system, whose roof-mounted panels provide shading are expected to extend the roof covering life by about 25 percent, boasts a projected net savings of at least $13 million during its lifespan.

- An advanced computerized telemetry and monitoring system is designed to monitor and display real time power output parameters from each building. Instantaneous display of power output in Kwh, system power efficiency, cumulated power output statistics, barometric pressure, outdoor temperature, humidity and many other vital operational parameters are displayed on a number of screens on the supervisory console.

- In order to maximize the available solar platform area, the PV modules were design to cover the roof tops in a flat array formation. Losses resulted from the optimum tilt angle (about 11%) were significantly compensated by a gain of more than 40% of surface area, which resulted in deployment of much larger number of PV modules and less expensive support system platforms.

- With 50% of the CEC solar power rebate received and projected escalation of electrical energy cost, the solar power co-generation system investment is expected to recover its cost in less than seven years.

Lessons Learned:

- Architect and Builder must be jointly committed to achieve the higher levels of LEED certification.

- Listen to your consultants. Our investigation began with the question: What is a hyper-functional system? And we proceeded from there. This never meant we were building a mechanical, electrical, or structural system rather than a work of architecture, but it let us synthesize these systems to proceed to the next step.

- Be true to the building. Triumph in creating value and beauty rather than getting lost in playing a points game or scamming a system. Do the right thing, and you will be rewarded beyond just LEED points.

- Don't oversell the sustainability of the project. At the start of this project, experts in this field debunked so-called sustainable, media-hungry projects. Our method was to undersell our expectations of sustainability and financial return so we could deliver the client a pleasant surprise instead of disappointment.

- Architects who are committed to LEED design must achieve the following objectives:
  - From the outset of design development, the architect or the program coordinator must prepare a project plan that defines all design measures and goals that would meet a specific LEED classification requirement
  - Ensure that design disciplines are presented with a clear mandate to meet their specific energy conformance objective
  - To be successful, the architect must, in addition to familiarity with building and structural materials, be familiar with specific technologies, such as solar power co-generation, solar thermal heating, solar power absorption chillers, etc.
  - The design team must consist of experienced members who trust one another and take pride in sharing the team's success in an equitable manner.

For more information on the project: architect@lehrerarchitects.com