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GreenPix - Zero Energy Media Wall in Beijing

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Others involved in the project: see page 564
www.greenpix.org

The 2008 Olympics have brought not only the top athletes of the world to Beijing, but some of the top architects as well, giving sports fans, architecture enthusiasts and even business investors reasons to visit the region. Joining such new projects as CCTV and the Olympic Stadium is the GreenPix Zero Energy Media Wall.

In the Xicui entertainment complex, near Herzog & De Meuron's Bird's Nest, this glass curtain wall adorns the main facade of the box-like Xicui commercial building. Using sustainable and digital media technology, the screen harvests solar energy by day and illuminates itself by night.

Architect Simone Giostra explains how the concept came about: "The original idea of combining a sustainable aspect to the digital media performance was driven by an ethical obligation I felt while designing a proposal for the World Trade Center in New York with Steven Holl in 2002. A truly organic system should depend on its own ability to gather resources and, at the same time, it should remain vulnerable to changing environmental conditions."

Since GreenPix relies on solar energy, its lighting performance is affected by the amount of solar exposure it receives each day, creating a self-sustaining, interactive and narrative system that constantly conveys information about the local light and weather conditions.

The display is 35 metres tall and 60 metres wide and is comprised of 2,292 colour (RGB) LED light points and polycrystalline photovoltaic cells laminated within the glass and placed with varying density throughout the display. Before production began on the LEDs and photovoltaic cells, more than 200 combinations of interlayer texture, thickness and cell patterns were tested on a large prototype to create the most efficient and aesthetically pleasing result. The lighting performance of the panels was optimized using multiple PVB interlayers with different degrees of translucency in the lamination of the glass. The resulting panels provide the light diffusion values required for blurring the pixels, making the dynamic image perceptible to the human eye.

A daylight diagram was created to respond to the light requirement determined by the interior programme. Using a pixelated version of a seascape by Gerhard Richter, Giostra created the varying density pattern along the facade that improves the building's performance by allowing natural light in when required and reducing heat gain, while "evoking the ocean's constantly undulating surface".

The combination of the large scale and the low resolution of the display allows for a distinct and abstract visual quality, creating an art-specific form of communication for a broad audience. It is unique in that high-



resolution screens in other entertainment complexes are typically used exclusively for commercial purposes. Though the display is integrated into the envelope of the building, the interior is not directly affected by the lighting performance, as the LED fixtures are oriented outwards.

The Xicui building includes an entertainment centre, high-end restaurants, a spa and a cinema. With such an introverted programme, the facade has very limited openings, making this type of display especially appropriate. Giostra, however, looks forward to integrating the technology into other building typologies.

GreenPix represents a number of firsts in China: the first photovoltaic system integrated into a glass curtain wall, the first media display of its kind dedicated solely (it is hoped) to digital art, and the production of the first glass solar panels.

Giostra explains: "The client decided to use GreenPix as an opportunity to develop the Building Integrated Photovoltaic (BIPV) industry in China ... as the government is taking every opportunity to upgrade the building technology sector and, in the case of GreenPix, jumpstart a production line that did not exist in China."

What is more, GreenPix was constructed entirely in China, underscoring yet another sustainable aspect of the project and emphasizing its small carbon footprint.



