

Winter Garden Children's School A Zero Energy Living Building For Beijing's Olympic Village

In its commitment to a "Green Olympics" and a Zero Net Emissions at the 2008 Olympic Games, the Beijing Olympic Committee is working with the U.S. Department of Energy and a team of designers, architects and contractors to design and develop facilities with cutting edge environmental technologies for the Olympic Village. One of the most exciting projects is the Winter Garden Children's School.

The school, which will eventually be home to some 300 children, is designed around the concept of a winter garden. The garden and the building which surrounds it are both highly energy efficient and environmentally friendly. Incorporating a wide range of leading edge technologies, the school will serve as a warm and receptive environment for Beijing's children and as a laboratory to demonstrate the viability of advanced energy efficient applications in contemporary buildings. During the Olympics themselves, the building will be used as a clinic for the athletes and administrative offices for the Olympic Village.

Winter Garden Children's School

All the classrooms and multipurpose spaces will open onto a three story glass atrium which faces south to maximize the sunlight entering the school. In the winter, the garden will provide a warm place for the children to gather and play as well as natural solar heating for the building. The atrium's winter garden planted with trees and plants will help clean the air in the school. Waste water from the sinks and water fountains will be collected and used to irrigate the trees and plants. In the summer, the atrium will be shaded and the open space ventilated to keep the garden cool. This living space will be neither heated nor cooled mechanically, but rather directly heated by the sun in winter and cooled with natural ventilation in summer.



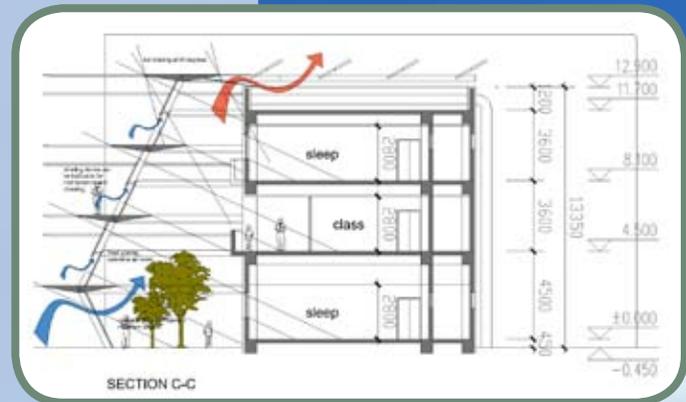
Winter

In the winter, sunlight coming through the glass will warm the air and the structure itself. The heavy concrete walls and floors will absorb the heat and release it slowly during the day and evening. Fans that circulate the heat that rises to the top of the garden and move it efficiently throughout the building will enhance heat collection. They will also serve to keep temperatures equalized in the building and prevent the upper floors from over heating through electronically controlled sensors.



Summer

In the summer, the inner garden will help to cool and ventilate the building. Glass areas will be shaded to prevent solar heating of the space. Several options for shading are under consideration. In one, roll down shades made of nylon or light weight canvas will block the heat and allow a soft light to filter through the fabric to illuminate the atrium. A second option will utilize motorized shades mounted on the inside of the glass. A third option will incorporate horizontal blinds on the outside of the glass, which can be adjusted to fully shade the glass in summer or allow full sun to enter in winter. The blinds can be designed to automatically adjust the amount of solar heat entering the garden to prevent over heating in the swing seasons between summer and winter. Control will be automatic as temperature dictates.



Technical Details

This innovative building will utilize highly insulating glass, lower power fans, R15 foundation insulation and adjustable window shades. Each classroom, quiet room and bathroom will be a separate zone with its own HVAC system. Hot water will be provided by a central solar system, while a 65kW solar photovoltaic system mounted on the roof will make the school electrically self-sustaining. Waste water in the form of grey water will provide irrigation for the garden and a flush system for the bathrooms. Materials and finishes will be non-toxic and natural wherever possible.

For further information please contact:

