

Newport Coast Elementary School, Newport Beach, California **Showcase Project for Energy Efficiency and Sustainability**

Recognizing the increasing responsibility architects have to design facilities that reduce the impact structures have on the natural landscape and resources, the project team accepted the challenge of integrating basic concepts of sustainable design to create the best environments for learning in this new school. It was the project team's primary goal not only to identify the means toward energy efficiency and sustainability, but also to express the educational benefits of incorporating energy-conserving features into the design.

This school is the first to be built within the Newport-Mesa Unified School District in twenty years. It was adopted by Design and Engineering Services Division of Southern California Edison as a showcase project for the *School of the Future*. Working with the architect from the outset of the project, SCE facilitated an integrated design approach for all building systems to optimize energy usage and improve the overall environmental performance of the school. Detailed energy modeling, natural ventilation studies, physical daylighting modeling and energy efficient lighting designs were conducted on the classroom spaces.

Focus groups were organized with the Santa Monica-based think tank, RAND Corporation, to gauge interest in energy and environmental priorities for the school. It was discovered that although energy conservation was supported as a concept, there was a certain question in the minds of the school's constituents about its impact on individual classrooms or the life of the school. In turn, the environment wasn't viewed as a significant resource that could contribute to student achievement. Teachers were interested in having greater control of their classrooms in terms of temperature, outside air, mechanical ventilation, artificial lighting, natural daylighting, furniture arrangement, and technology. The opinions gathered in these focus groups were quite similar to those opinions gathered in a much larger, national survey of teachers and principals conducted in 1998.

Sophisticated studies were performed to identify areas of the school in which energy efficiency could be achieved. Physical daylight modeling allowed the design team to find a solution that would render the need for window treatments largely unnecessary and reduce the amount of artificial lighting required during peak daylighting hours. Even and controlled distribution of natural light has been proven to increase student performance by as much as 20% compared to classrooms that rely solely on artificial lighting. Natural ventilation options were determined through the use of computational fluid dynamics models. Although air conditioning was included in the design, highly energy efficient compact units were specified for use during times of extreme heat.

Energy modeling showed that the single largest energy and cost savings occurred when a dimming system was used for classroom lighting. The modeling process concluded that a 43% annual utility savings could be

achieved over a minimum Title 24 building by including the use of indirect/direct pendant fixtures, occupancy sensors, multiple light switching, and strategic task lighting.

The integration of energy efficient technology, recycled “green” materials, and design concepts that will save the District long term energy costs was just the beginning. The project would not be complete until these features could function as teaching tools, expressing to students how an environmentally-friendly building contributes to saving the earth’s resources and reduces pollution and waste. Each energy efficiency and sustainability feature included in the design—lightshelves and clerestory windows to improve natural daylighting, solar water heating, reclaimed water systems for irrigation and water-saving faucets/fixtures; drought tolerant landscape—is readily visible and to be included in the course curriculum. Each component reinforces the concept that buildings are a valuable tool for learning.