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GREEN AWARENESS

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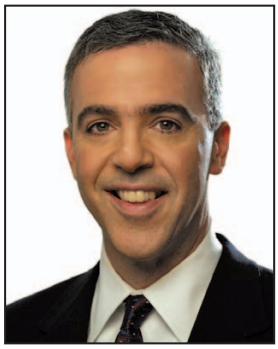
Daylight harvesting using smart glass

The sustainable design movement is accelerating and buildings are prime targets for improvements in energy efficiency. The U.S. Green Building Council reports that buildings account for 40% of the country's primary energy use and consume 72% of its electrical energy. Artificial lighting use in buildings is very high and is expected to represent 14% of total energy consumption in U.S. buildings in 2010, according to the U.S. Department of Energy (DOE). The DOE projects energy costs in U.S. buildings to exceed $400 billion in 2010.

Windows are central elements of a building's design. They contribute aesthetically and support occupant comfort by introducing natural light and preserving views. "Smart glass" gives users the ability to "tune" the amount of light, glare and heat passing through windows, skylights, doors and other fenestration products. On bright days, tint levels can be adjusted to provide more shading, reduce glare and limit heat build-up. When the maximum amount of light is desired, smart glass can be set to its clearest state. Smart glass can eliminate the need for shades, blinds and curtains because the variable tinting capability is fabricated within the glass itself. Control systems range from basic switches to automated systems using photosensors, motion detectors or timing devices. Smart glass can reduce energy consumption and improve occupant well-being.



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SPD-SmartGlass in the dark and clear states at the Research Frontiers Design Center

Daylight harvesting is a sustainable design strategy that introduces natural light into a building to reduce the energy used for artificial lighting. It typically involves photosensors that measure incoming natural light levels and adjust artificial lighting accordingly to satisfy task needs. The New Buildings Institute reports that daylight harvesting can save 35%-60% on lighting energy, and it is estimated that in the U.S., daylight harvesting can save $20-$35 billion annually on artificial lighting costs.

Daylight harvesting using smart glass involves the automatic and simultaneous adjustment of both the tint of windows and the intensity of artificial lighting so as to optimally satisfy task needs and minimize energy usage. Switching speed matters when attempting to maximize daylight harvesting benefits. SPD-SmartGlass, for example, is a fast-responding type of smart glass that offers an infinite number of light transmission states between very dark and clear. The tint of windows and skylights using this technology can be instantly and precisely controlled as lighting conditions and needs change throughout the day. Early in the morning, for example, SPD-Smart windows can be in their clearest state to harvest the maximum amount of natural light, thus lowering requirements for artificial lighting. During the midday, they can be tinted to just the right level to avoid exceeding desired light levels within the room. As a further benefit, motion-based sensors can instantly darken these windows and a room's lights when that room becomes unoccupied, thereby smartly limiting the energy used for artificial lighting while also reducing heat build-up and related cooling costs.

Daylight harvesting with smart glass is a sustainable design strategy that saves energy and support people's sense of comfort. With the growing pressure to ease the energy use of buildings, many expect it to be a cornerstone of intelligent building design for many years to come.

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