

International Trends in Design and Energy

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The sustainable building and energy-efficiency movements have made significant strides worldwide in a relatively short time. This brief highlights some of what's going on... and where.

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The day after Earth Day, I sat in San Francisco City Hall with 350 leading environmental advocates celebrating the city's environmental accomplishments. Mayor Gavin Newsome spoke about how and why he wants San Francisco to become the pace car of environmental leadership for cities around the world. His vision is compelling, and, wonderfully, his competition is getting tougher to beat.

Energy Efficiency and Conservation

Three years ago, who would have thought that the oil- and gas-rich United Arab Emirates would be encouraging energy-efficient buildings. But that is exactly what is happening. As of January 2008, all new residential and commercial construction in Dubai must comply with the USGBC's LEED rating system, which requires, among other things, that new commercial buildings be at least 14 percent more energy efficient than recommended by ASHRAE.

Nearby, India has taken an aggressive stance on energy conservation, as one of the first countries to embrace LEED. There, one cannot expect to receive construction approval for any major commercial building project without delivering a compelling energy-efficiency story. Further east in China, new national standards require that all new public construction cut the energy use by at least 50 percent; Shanghai has set the target at 65 percent.

Even in the United States, all federal facilities (new and operating) must reduce energy consumption by 30 percent by 2015. And city after city—such as San Francisco, Chicago, Portland and Los Angeles—is pushing forward initiatives requiring similar, if even better, performance in private-sector buildings.

What does this mean for design professionals? It means designing for energy efficiency from the get-go and reinvigorating the art of smart passive design—proper solar orientation, thermal massing, daylight optimization, evaporative cooling, natural ventilation, tuned glazing, insulation, and integrated interior design, to name a few strategies. It also means a continuing need for more energy-efficient lighting, appliances, computer equipment, and heating and cooling technologies.

Carbon Accountability

Tightly tied to energy efficiency is carbon accountability. While some increases in the atmospheric levels of carbon dioxide can be attributed to deforestation and changes in animal husbandry practices, the majority of the increase is tied directly to the consumption of fossil fuel resources to power our lifestyles—transporting us from place to place, running our buildings, manufacturing our toys. Since the first signatory to the Kyoto Protocol in 1998, numerous countries have embarked on carbon accountability programs, most typically focusing on heavy industry, manufacturing and utilities, but increasingly reaching out to the building sector.

Worldwide leadership trends are coming from the European Community (EC), particularly with the implementation of Directive 2002/91/EC, which in part intends to limit carbon dioxide emissions by improving the energy performance of buildings. In Britain, in addition to grading and reporting buildings' energy efficiency at the time of sale and/or lease, owners also must report the environmental impact rating, which is based on carbon dioxide emissions. (For a chart illustrating this connection, visit www.contractmagazine.com.)

Design to reduce a building's carbon footprint requires energy efficiency, but also must leverage green energy technologies. Grid-supplied or building-integrated solar, wind, geothermal, and combined heat and power technologies are just some of the growing options to reduce a carbon footprint.

Carbon accountability also is rolling through the product sector. Fast on the heels of ISO 21930, which contains specifications for the environmental declarations (EPD) of building products, governmental agencies throughout Europe are requiring manufacturers to submit EPDs for key products used in construction projects. One of the required elements of an EPD is reporting the product's carbon footprint (also referred to as its Global Warming or Climate Change Potential).

Water Water Everywhere but Not a Drop to Drink

While the energy and carbon dialogues tend to discussions, it's water that has scientists, city planners, and public works officials really worried. At any given time, close to half the population in the developing world is suffering from one or more diseases associated with inadequate provision of water and sanitation services. Equally alarming are the reports that over one-half the human population will experience water scarcity in its lifetime.

India is aggressively tackling this problem, requiring sophisticated water conservation and reclamation systems in manufacturing and new building developments. China, too, is taking stiff action. By 2010, Shanghai's annual residential water consumption cannot exceed 155 liters per person.

In the United Arab Emirates, smart water management tools are a way of life. In the United States, we are facing the bottled versus tap water challenge. While many of Mayor Newsom's fellow San Franciscoans chose to spend 10,000 times more for bottled water than the cost of high-quality drinking water available out of the tap with an almost zero carbon footprint, the city no longer stocks bottled water in its offices and is saving almost \$500,000 dollars annually as a result.

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