Plus leading companies that "get it"

Finding the Gold in Green Building

Consider for a moment that Americans spend 90% of their time indoors. The built world surrounds us. It covers the landscape and gets bigger every day: Schools, homes, and office towers are totems to our civilization. To know this is to understand the enormous implications of the shift toward environmentally sustainable construction.

In the U.S., 35% of the total energy supply and 60% of annual electricity production goes to operate buildings. Society is quickly recognizing that if buildings are energy-efficient, use environmentally sustainable materials, and reduce impact on the planet, they are indeed better buildings. A new generation of buildings—residential, commercial, and industrial—employs advanced materials technology, better energy management, and improved building processes, and therefore uses less energy, costs less to operate, and enhances comfort.

While transportation may leap to mind with the mention of energy use or environmental security, the U.S.'s 81 million buildings consume more energy than any other sector of the national economy. The design, construction, operation, and maintenance of buildings take enormous amounts of energy, water, and materials—whether for a single-family home in Phoenix or a Manhattan skyscraper. Even after a large-scale building is sited and built, the structure can generate large quantities of waste and air and water pollution by virtue of its energy use.

On a global scale, a recent United Nations Environmental Program report states that more than one fifth of present energy consumption and up to 45 million tons of carbon dioxide per year could be saved by applying more ambitious standards to new and existing buildings. By some conservative estimates, the building sector worldwide could deliver emission reductions of 1.8 billion tons of CO_2, and a more aggressive energy efficiency policy could deliver close to three times the amount scheduled to be reduced under the Kyoto Protocol.

"Given that the power sector of the energy market generates more than 40% of CO_2 emissions, there are two areas of opportunity to make an impact," says Lee Edwards, president and CEO of BP Solar International Inc. "The first is power generation: Can we improve the overall carbon footprint of electricity generation? The second is power consumption: Can we be more efficient with the energy we use on a daily basis? The significance of the second should not be underestimated."

The Green Business Case

As the effects of energy use become clearer, experts predict that trends in "bigger" will transform to "better." Green buildings constructed to the standards in place today use

32% less electricity, 26% less natural gas, and 36% less total energy than traditional buildings.

The green business case is also being helped by public policy. Homeowners can now receive tax credits for certain home improvements, including adding insulation, energy-efficient windows, and some types of heating and cooling equipment. In both the residential and commercial arenas, says Harvey Bernstein, vice president, industry analytics, alliances, and strategic initiatives, for McGraw-Hill Construction, "It is not surprising that energy efficiency has maintained the focus as a critical driver of green building. It is the largest controllable cost of a building, and the paybacks are much more easily measurable than productivity improvements."

The world of green building includes the renovation of existing buildings as well as new construction. The market for materials, consultants, and new products is huge for both, and each has its own dynamic.

Eco-friendly buildings are an increasingly large part of the trillion-dollar U.S. new-construction industry. Taken together, 2005 and 2006 were a turning point in green building, as more and more builders began to move toward greener building techniques. A 2006 McGraw-Hill survey found that in 2005 the number of

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home builders producing green, environmentally responsible homes grew by 20%. If trends continue, by 2010 up to 10% of new residential and commercial construction starts will be green. The residential market's share alone would translate to roughly $38 billion, not counting remodeling.

A major goal for the 21st century is the concept of net-zero energy—meaning that over the course of a year a building, for example, consumes no more energy than it produces. While an open rooftop may absorb heat and reflect it back into the atmosphere, the roof of a building can be thought of as an open canvas waiting for a solar installer's opus. The integration of renewable technologies—building integrated photovoltaics and solar hot water, for starters—is the first step toward a net-zero energy building.

The value of building integrated solar power lies is the concept of "peak load." Solar power technologies

BASF BASF's eco-efficiency analysis helps this global chemical leader demonstrate which products and processes are both economically and environmentally superior. BASF communicates regularly about the importance of sustainability and incorporates it into every aspect of its business. In 2007, BASF, with global headquarters in Germany, was designated Europe's most socially responsible company, according to Manager Magazine's Good Company Ranking.

Credit Suisse In 2006 this international bank incorporated an innovative "thermal ice storage-based" cooling system into its building in Manhattan. The system has lowered the building's peak energy usage by over 900 kilowatts, saving about one million dollars a year. Credit Suisse's overall goals are energy savings, improved plant resiliency, and environmental consciousness. The bank is "greening up" all its facilities with the latest in energy-saving systems.

Haworth Known around the world for its office furniture and architectural interiors, this Holland (Mich.) company has been a long-time advocate for corporate environmental responsibility. The company integrates sustainable design and materials into its products and processes, and more than 90% of the products Haworth sells in North America are Greenguard-certified for indoor air quality.

LivingHomes Combining healthy materials and efficient systems with a resource-saving, modular fabrication process, LivingHomes, based in Santa Monica, Calif., contributes to cleaner air, water, and soil by using natural and nontoxic materials and systems. The model home recently achieved "platinum" certification by the USGBC's LEED for Home program, making it the first home in the nation to be certified platinum.

Pensacola Junior College This 30,000-student institution, in Pensacola, Fla., chose to lower maintenance and energy costs through a partnership with Trane. Some of the technical design features include such improvements as a gas backup system, new chilled water systems, and control system modifications. The improvements guarantee a minimum of $650,000 in cost savings and through a unique, phased approach will have a major positive impact on the college operating budget.

Turner Construction Company This New York-headquartered company has completed 41 LEED-certified projects and has completed or is currently working on more than 82 additional projects that are registered with the USGBC. Among other initiatives, Turner has joined the U.S. Environmental Protection Agency's climate leaders program and is pledging to reduce its company-wide greenhouse gas emissions.

U.S. Navy Dam Neck Annex Base This federal facility in New Jersey recently signed an energy savings contract with Trane to create high-performance building environments. The unique project uses liquid waste from a nearby sanitary district to cool and heat the base, plus such energy conservation measures as the replacement of 18,000 lighting fixtures.

Walgreens The 5,600-store drugstore chain, based in Deerfield, Ill., closely monitors energy use at each store, installing optimized HVAC equipment and adjusting light and climate-control fixtures to maximize benefit. Walgreens also uses the latest in energy-efficiency technologies in new stores and retrofits energy-using components to reduce the energy costs at older locations.

The companies above were selected by independent consultants and the Energy Series 2007 Board of Advisors. The selection process did not involve BusinessWeek editors or staff.

BP
A Trusted Partner for Green Building

Green is the new black. Not only do trendsetters consider environmental building "hot," but many vendors are motivated to join the market by the profit potential in environmentally friendly products. For consumers ready to use green building techniques or retrofit existing structures for energy efficiency, however, the challenge lies in selecting the right partner.

"In choosing supply sources for alternative energy sources and products, it's vital to look for a track record of reliability, quality, and trust," cautions Lee Edwards, president and CEO of BP Solar International Inc. "BP has the name and brand that people recognize and respect in this new and emerging marketplace." The company, which has 30 years' experience using the sun's energy to produce solar electricity, is a division of global energy giant BP.

BP Solar is creating innovative products that can be used to incorporate solar technology into new and existing buildings. Green products such as integrated roofing tiles are designed to reduce the overall installed cost, improve aesthetics, and provide consumers with more choice in their solar projects. Products are designed and manufactured at facilities in the U.S., Spain, India, Australia, and China.

In addition, BP Solar is supporting collaborative design projects for next-generation products. By bringing together materials suppliers, enterprises in the roofing industry,

This home in Davis, CA showcases BP Solar's EnergyTile roof-integrated solar electric system, improving the appearance of traditional solar electric systems.

architects, and technologists in the solar community, the company hopes to continue expanding how consumers can use solar energy.

Supporting BP Solar's collaborative initiative is a recent research grant from the U.S. Department of Energy. The funds, which are part of the DOE's three-year Solar America Initiative, will be matched by BP and used in conjunction with 16 partner companies who have teamed with BP in this effort. Yet this funding is just a small portion of BP Solar's long-term research and development investment. By collaborating with corporate partners and leading universities around the world, the company hopes to drive innovation that will meet consumer demand for more secure, clean, and efficient energy solutions.

"Taking solar mainstream requires having designs and engineering that allow products to be incorporated effectively," Edwards says. "The business case for going green is increasingly clear. By producing innovative solar building products, we are not only meeting our obligation to shareholders but doing good for our world."

Photo: John Shubin

Babson College in Wellesley, Mass., installed SolarOne Solutions' solar-powered lighting to avoid disruptive trenching and to save on energy.

produce the most power in the middle of the day, when energy use is highest. When solar power is integrated into a building, the need for additional power plants brought on line to deal with peak power is significantly reduced.

One example of the interest in this area is the Department of Energy's Solar Decathlon, a two-week event on the National Mall in which 20 university teams build the ultimate in energy-efficient housing. The 2007 event is planned for October. "As a major sponsor of this event since its inception, we feel a great sense of pride from helping get the next generation of creativity and innovation working on practical solutions," says BP Solar's Edwards. "It's a huge dose of reality to see creative, unique, aesthetically pleasing designs being created by the next generation of architects and engineers…and how much more energy-efficient a structure can be versus what is typically out there today."

Turning Old into Green

While much of the green building conversation focuses on new buildings, the number of existing buildings dwarfs new construction. The potential for making a difference in terms of environmental impact is much greater in the world of retrofits and improvements.

The home improvement market alone is massive. Americans spent about $224 billion on home remodeling and repair in 2004. Since buildings are responsible for 40% of worldwide energy flow and material use, green remodeling is becoming an ever-bigger piece of the pie. The green building products market stands at about $8 billion, more than 10 times the 2000 total. Estimates are that by 2010 the market will be worth about $32 billion and will cover everything from flooring to windows to light bulbs and on-site energy systems. Low-E windows, compact fluorescent light bulbs (CFLs), and the coming revolution in solid-state lighting will all transform our indoor experience.

One company in particular that sees great opportunity in the move toward greener buildings is Trane, the maker of what's known as "indoor comfort systems," such as heating, ventilating, and air conditioning (HVAC) products and services. Its varied client list speaks to the breadth of the market of cleaner, greener building. "Around the world, customers tell us that they want an HVAC partner who can provide integrated systems and services that make their buildings work better for life," says Craig Kissel, president of Trane's commercial business. "We know that meeting our customers' needs requires HVAC solutions with maximum efficiency and minimal impact on the environment."

A Materials World

As green construction has gone mainstream, the world of green materials and products has followed closely behind. Whether building a new project or renovating an old one, materials are essential. The universe of things that go into green building include products made from environmentally attractive materials, such as salvaged products, or those that are made with post-consumer or post-industrial content. Other items include certified wood products, rapidly renewable products, products made from agricultural waste material, and natural or minimally processed products.

Green building professionals are also incorporating products that reduce the environmental impact of building operation, such as building components that reduce heating and cooling loads, equipment that conserves energy, and renewable energy and fuel cell equipment. Fixtures and equipment that conserve water and products with exceptional durability or low maintenance requirements are used to meet goals tied to lowering impact.

BP Solar's Edwards says his company is working on ways to make lower-impact energy solutions a mainstream choice as well: "We're working to increase solar power's cost-effectiveness by ensuring designs and engineering that will allow solar to be built in to new construction projects. The next step for all of us is to come up with more efficient, cost-effective solutions to bring distributed power to the marketplace."

It's Good to be Green

While interest and investment in the green building space grow, many are recognizing the multiple wins each new green project represents. The advantages are rolled up in a number of issues, both macro and micro, that include

slowing global warming, reducing dependence on foreign sources of energy, decreasing the impact on ecological habitats, and just plain living and working healthier.

The green building universe is expanding at an accelerating rate. "This is good business and a good time to be in this business," says BP Solar's Edwards. "We're able to apply technologies that are available today, generate sufficient growth prospects for the future, create value for our shareholders, and bring all of it to a broadening segment of the population. It's a great time to be building the future."

From university students to global corporations, the growing demand in both the residential and commercial space is transforming not only an industry, but a way of life—and a way of business life.

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