

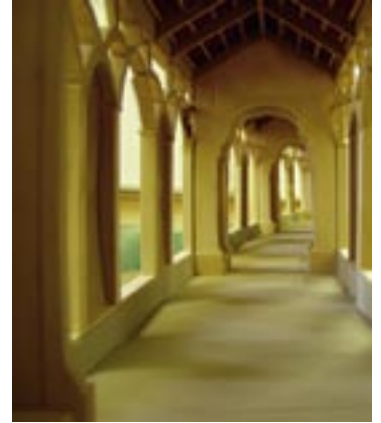
Designing

case studies
in sustainable
design

green

ASID

American Society of Interior Designers



Susan Szenasy, in the Afterword of the recently released ASID report, *The Interior Design Profession: Facts and Figures*, and again in her keynote address at **INTERIORS '04: The ASID Conference on Design**, charges all interior designers to accept responsibility to “think about himself or herself as an active participant in reshaping the old industrial marketplace into a cleaner post-industrial system.” Szenasy, editor in chief of *Metropolis* magazine, also asks designers “to become true collaborators with manufacturers” to create better, more relevant products, and offers specific prescriptives: “Did you ask your supplier if chairs [you ordered] were designed for disassembly, if they had recycled content, if the factories that made the parts were known for polluting the water and air, if the parts were made by semi-slave labor, if the chairs were shipped long distances and used up a great deal of energy to reach their destination?”

“Your questions will be welcomed by many manufacturers who are looking to please you, their valued clients. And you will understand how powerful you can be as an agent of change in a marketplace looking to fit into the 21st century.”

A strategic initiative of ASID is to promote awareness and accountability among its membership—and all contributors to the built environment—to incorporate sustainable practices, not just when asked or when required, but as a baseline design consideration for all their work. The following case studies demonstrate the practical application of these considerations in specific commercial environments. Schools, hospitals and recreational facilities have special needs and, thus, unique requirements to uphold sustainability. These challenges can be met without compromising design aesthetics, as these case studies demonstrate.

“You are a powerful agent of change in a marketplace looking to fit into the 21st century.”

— Susan Szenasy, editor in chief,
Metropolis magazine

*Photo on cover and page 15 courtesy of BeeryRio Architecture + Interiors.
Photographer: Duane Lempke, Sisson Studios.*



Case Study: School

LEED™ Ratings: A Community Goal, A Community Collaboration

By Julie Warren, editor, American Society of Interior Designers

Achieving a LEED™ Silver certification was a goal for Arlington County, Va., planners even before approaching BeeryRio Architecture + Interiors to begin designing the John M. Langston High School Continuation and Langston-Brown Community Center, according to Dave Alberts, facility planner for the Arlington County Infrastructure and Operations Agency. This goal came as a “nudge from the community through the county board,” said Alberts. The county adopted the USGBC’s LEED Green Building Rating System as a way to measure the energy and environmental performance of buildings in the county, and since 1998, county officials have measured all building projects within the county against LEED standards.

The first silver-rated LEED facility in Virginia, the Langston-Brown Center is one of only a small number of LEED-certified schools and community centers in the United States. The joint-use community center, dedicated in September 2003, serves high school students, the elderly and Arlington’s Head Start programs. Residents of the historic African-American neighborhood in which the center is located were consulted throughout its planning, design and construction.



▲ Rather than using vinyl-composition tile for the floors in the John M. Langston High School Continuation and Langston-Brown Community Center, BeeryRio designers specified stained and polished concrete, a highly durable and environmentally friendly alternative.

◀ Third-floor clearstory windows provide the upper-level instructional spaces with natural daylight.





◀ *Much of the interior of the structure was left exposed, minimizing finishing materials. Color—in the form of low-VOC paints—was used to add character.*

William T. Brown, AIA, REFP,* a partner with BeeryRio Architecture + Interiors, was the project manager and architect. Brown and his team—who have designed other institutional structures in Arlington—went through the LEED scorecard with the county planners at the outset of the project to “find out what was tolerable and what [was] the threshold of acceptable practice.” County planners and the designers determined that the major considerations for the Langston-Brown center were “affordability, maintenance, usability and cleanliness.”

A LEED-accredited professional, Brown commented that usually “the greenest concept is not to build it.” “That wouldn’t apply to this project,” said Alberts. The new Langston-Brown center sends less and cleaner water to the Chesapeake watershed than the building it replaced. In addition, the square footage of the center was kept to a minimum through the cooperation of three community departments—the Arlington County Infrastructure and Operations Agency, the Arlington County School Board and the county’s Head Start Program—entities that share the space at different times during the day.

Brown and the BeeryRio design team used a number of sustainable design approaches in the construction of the building and grounds, including indirect daylighting strategies, solar shading devices, and an energy-efficient and environmentally friendly HVAC system. The center also includes waterless urinals and low-flow faucets and showers to reduce potable water consumption, and third-floor clearstory windows provide the upper-level instructional spaces with natural daylight. In addition, only low-VOC materials, adhesives, sealants and paints were specified and used. Hess Construction Company, the general contractor on the \$7.5 million project, produced and implemented a construction waste management plan that diverted 75 percent of the construction waste from landfills (30 percent of the contents of landfills is construction waste) and developed



an indoor air quality plan to minimize contaminant exposure in the building during construction.

The designers also tried to find areas where they could leave the interior of the structure exposed, minimizing finishing materials and introducing color—in the form of low-VOC paints—for character. Durability of finishes was another important consideration, as was avoiding the use of products from the clear-cutting of forests. “We used stained concrete floors instead of using vinyl composition tile,” said Brown. The designers also selected wheat straw fiber rather than particleboard for the cabinetry. This agrifiber-based material is a rapidly renewable, formaldehyde-free product that provides exceptional strength and moisture resistance. According to Brown, the product is denser than particleboard (which emits chemical vapors), is very hard and durable, and is becoming more readily available.

Steve Stricker, the Arlington County Public Schools project manager for the Langston-Brown Center, adds that the exposed ceilings and lack of walls in the facility actually allow for easier maintenance and reconfiguration of room sizes. “The users are thrilled with the space,” he adds. “Overall, this has been a very successful project.”

*Recognized Educational Facilities Planner

With a total of five county buildings currently in the planning stages or under construction, and nearly a dozen buildings expected to be built using the LEED scorecard by 2005, Arlington County is among the top 10 communities pushing LEED compliance. In addition to the Langston-Brown facility, Arlington County currently has plans to rebuild Washington-Lee High School—an estimated \$50-million project—as a LEED-rated building. Also underway are a park operations building, a community center, and the reconstruction of Fire Station No. 5 at Pentagon City, which was the first call center to respond to the Pentagon on Sept. 11, 2001. According to Alberts, the county gives private builders incentives to build “green” and all contractors in the county are required to submit a LEED scorecard even if they don’t plan to build a sustainable building.

When asked about the costs of sustainable buildings, Alberts says, “If I can get the money back in 10 years, I’m doing

well.” An example he cites is the vegetated roof on the Walter Reed Community Center and two other projects in the county. This roofing method—consisting of two to three inches of dirt on top of a waterproof membrane—has slower rainwater runoff, creates evaporative cooling in the building and gives more UV protection. This type of roof will last 40 years as opposed to the 15 or 20 years for a typical roof.

“We defend the costs of sustainability with the lower operating costs,” says Alberts. “Twenty to thirty percent less utility costs means a lot.”

For more information about Arlington County development, visit www.arlingtonvirginiausa.com For more information about BeeryRio Architects + Interiors, visit www.beeryrio.com. For more information about Hess Construction Company, visit www.hessconstruction.com.

All John M. Langston High School Continuation and Langston-Brown Community Center photos courtesy BeeryRio Architecture + Interiors. Photographer: Duane Lempke, Sisson Studios.



Case Study: Hospital

Making a Hospital Green: Transparent Solutions to Unique Challenges

By Jennifer Miller, associate editor,
American Society of Interior Designers

Seeking LEED™ accreditation was a logical step for the Boulder Community Foothills Hospital. The hospital, which opened late in 2003, earned a LEED v2 Silver rating from the USGBC and is a natural fit within a community that is known for its forward-thinking approach to social and environmental concerns. Boulder, Colo., has been emphasizing sustainability for years. In 2001, Boulder Community Hospital (BCH) established an environmental policy to ensure that all of their facilities met certain environmental standards, instituting programs such as recycling and water efficiency. At around the same time, the City of Boulder decided that all new projects and major renovations of existing government facilities would be required to meet LEED certification standards.

This posed a special challenge in building the Foothills facility, the nation's first LEED-accredited hospital. "At first, the project was like putting a square peg into a round hole," explains Kai Abelkis, environmental coordinator for BCH. "A lot of challenges that we face when building a hospital simply weren't taken into consideration in the existing LEED plan."

Numerous outside contractors were brought in, each of whom played an integral role in building the groundbreaking hospital. The objective of LEED certification was written into every contract throughout the building process, and as the project got underway, achieving accreditation became a personal goal for all involved in the Foothills project.

"We all knew we had a challenge to do this [LEED] in the health care environment. But this is probably the best design work I've been involved with," recalls DiAnn Sherk, of

► *The front entry welcomes visitors to both the hospital and outpatient services building.*

SOdesign, the lead interior designer on the Foothills project. "It was challenging and fun, and made me look harder and think harder about what we were doing."

Durability

Perhaps the greatest test in designing the hospital's interiors was meeting the durability needs of a round-the-clock health care facility. "We explored more interesting 'green' products than we could really use," Sherk says. Kristi Ennis, AIA, LEED AP, Foothill's project architect for medical





◀ *Expansive windows in the atrium maximize use of natural light throughout the building. The atrium's western exposure, toward the mountains, helps orient visitors while in the building.*

because she felt that the company has made an enormous effort on behalf of sustainability, even though the product did not qualify for any LEED points. "There were a lot of subjective calls on our part," she says.

Much of the hospital's flooring is linoleum by Forbo and Armstrong. A rapidly renewable product, it was applied with low-VOC adhesive. The Interface carpeting selected is low VOC comprised of 42 percent recycled material and also installed using low-VOC adhesive. "Because the hospital really focused on being a 'healthy' building, we used low-emitting products throughout—for walls, carpet, vinyl, etc.," Ennis says.

Transparency

"Many of the sustainable things we did [in the hospital] are almost invisible because the same or similar-looking products appear in other health care facilities," explains Ennis, who describes the facility as almost hospitality-like.

architecture, reiterates this point, "There are a lot of great sustainable materials out there for residential projects that have no place in health care." Popular sustainable flooring materials such as cork and bamboo simply could not handle the hospital's traffic and cleaning requirements. The interiors team did intensive research to get recommendations for green commercial products. From there, it was a process of elimination.

Every interior product under consideration was brought to BCH's environmental services team for rigorous testing. "At the time we were building the hospital, there were not a lot of wallcoverings with recycled content that the client couldn't destroy," recalls Ennis. Eventually, the design team selected non-recycled wallcoverings from Maharam, which were installed using low-VOC adhesive.

"In some cases, we made our decisions based not on a particular product, but on manufacturers who have a consistent sustainable philosophy," explains Sherk. For instance, she specified Herman Miller systems furniture

▶ *The waiting area of the women's imaging department features recycled, low-emitting carpet and locally harvested sandstone.*



In fact, many of the criteria for achieving LEED certification are elements of the planning and building process, and aren't apparent in the completed project. For instance, locally made materials were used whenever possible to reduce transportation, and more than 70 percent of the construction materials used were later recycled. Additionally, many processes were utilized during construction to ensure a healthy building and good air quality, including capping all unfinished ducts during the building process, vacuuming floor tracks before installing drywall and "flushing" the building for two weeks before occupancy.

Abelkis estimates that building costs were approximately two percent higher overall to meet the LEED criteria. "But it's hard to differentiate what we would have done anyway. We built a beautiful facility and the LEED program just gave it an extra boost," he says.

Sherk and her design team—which included designers from the project's two architecture firms, Boulder Associates, Inc., and OZ Architecture—used transparency as a strategy throughout the building's interiors. Daylighting was used whenever possible, particularly in the hospital's main gallery. Recycling bins were built into the interior, rather than placed as an afterthought to encourage recycling by employees and visitors. And to discourage smoking anywhere on the hospital's campus, ash containers were purposely not placed outside the building.

Members of the planning and design teams point out that the hospital should not be viewed simply through the lens of sustainability. "The hospital is not just green," says Abelkis. "It has greater efficiency, cost savings, use of resources—good air quality is good air quality, regardless of how you describe it."

For those involved in the Foothills project, sustainability means more than just being environmentally conscious. An equally important goal is ensuring that the facility fits in with its community. To this end, designers worked with a Boulder art gallery to initiate a county-wide search for original art. All the art purchased for the hospital was created by artists living and working within Boulder County. BCH employees each created unique tiles, now displayed in the hospital's waiting room.



▲ (top) Maternity rooms feature views of Boulder's impressive scenery. Patients can operate individual lighting and temperature settings in their rooms, and in-room refrigerators give them control over dietary needs as well.

▲ (bottom) Rooms in the neo-natal intensive care unit, with adjoining guest rooms for parents, incorporate lighting options that mimic the infant's experience in the womb or daily circadian rhythms.

Changing Attitudes

In the months since it opened, the Foothills hospital has had a far-reaching impact on the world of sustainable building. Abelkis has been contacted by facilities professionals from around the country and as far away as Australia. He is pleased by the "ripple effect" of the project.





▲ BCH selected original works by local artisans for all artwork featured in the hospital's public gallery spaces.

All Boulder Community Foothills Hospital photos courtesy of Boulder Associates, Inc.
Photographer: Sergio Ballivian Photography.

“This process has changed a lot of peoples’ thoughts on LEED—contractors, designers, architects. We were able to get people on board and now they use that experience and spread it . . . People are starting to recognize that applying LEED will make better hospitals. LEED should be the platform, and we should go further from there.”

Sherk’s experience on the project proves this point. A health care designer for more than a decade, she was relatively unfamiliar with the requirements of LEED ratings. “It’s hard to look at a project in the same way now, it becomes automatic [to incorporate sustainability]. All our specs have changed, to use low-emission, low-VOC products.” She emphasizes that designers can make a significant difference just by changing their own standard specifications to greener products, as her firm and Boulder Associates have done.

Abelkis sums up the attitude of many who worked on the Foothills project and those involved in sustainable building and design across the country: “Green is a by-product of good design. They’re not mutually exclusive, nor should they be.”

For more information about Boulder Community Hospital, visit www.bch.org. For more information about Boulder Associates, Inc., visit www.boulderassociates.com. For more information about OZ Architecture, visit www.ozarch.com. To contact SOdesign, e-mail diann@sodesign.us.



Case Study: Hospitality

Rancho Arroyo Grande: A New Standard for California Wineries

By Claire E. Tamburro, ASID

The owners of Rancho Arroyo Grande originally planned to develop their newly acquired 4,000 acres, located on the central California coast near Pismo Beach and San Luis Obispo, into a community of homes.



▲ *Watercolor rendering of Rancho Arroyo Grande elevation by Jon Havrilesko of ISI.*

As Gary and Thereza Verboon spent more time on the property, once the site of a 125-year-old winery that had burned down and lain untouched for a decade, they felt the peace and beauty of the landscape should be preserved and the property restored to its original purpose. The Verboons decided to take their restoration plan a step further and re-create a winery that would attract visitors to the Central Valley area—famous for beaches, cattle ranches, mountains, canyons and abundant wildlife—and to do so by incorporating sustainable design and building practices.

Centuries ago, Franciscan friars introduced the wine-making custom to the California central coast area, which now boasts more than 100 wineries. Rancho Arroyo Grande, scheduled to open sometime in 2005, will stand apart from its regional competition by hosting community events, festivals, wine tastings, trade shows, educational tours, rodeos and, eventually, a bed and breakfast. The owners' ambitions also include producing more than 100,000 cases of wine annually.

The Verboons turned to Integrated Structures, Inc., a Berkeley (Calif.)-based architectural and engineering firm, to help them realize their vision. The firm is renowned for environmentally conscious projects that include schools, churches, wineries and residences throughout the United

States. The brainchild of R. Gary Black, Allied Member AIA, professor of architecture at the University of California at Berkeley, Integrated Structures combines age-old design and building techniques with environmentally conscious innovations, and employs Black's scholarly research of concrete lattice structures, heavy timber connections and straw-bale construction.

Black and Cullen Burda, vice president of Integrated Structures, plan to incorporate each component of the winery, outbuildings and surrounding landscape into an environmentally sound (their goal for the project is a LEED™ Platinum rating) and aesthetically pleasing compound. The design includes constructed wetlands, micro-turbines to produce electricity, straw-bale construction with a spar membrane system, roofs with hydronically insulated panels for radiant solar collection, photovoltaics (solar cells) and pine

▼ *Computer rendering of Rancho Arroyo Grande by Jon Havrilesko of ISI.*



resin—a natural byproduct of a nearby paper mill—to pave the roadways.

Although it would seem the price tag of these sustainable practices would generate costs in excess of typical construction methods, the ultimate value of the firm's design stems from its fundamental mission to design buildings made to last a century or more—three times the life span of more traditional buildings. Some Integrated Structure designs, moreover, are more cost efficient than traditional alternatives: the firm seeks to eliminate wasteful construction practices and to use untapped energy sources within the structure itself, reducing the budget and conserving resources. Furthermore, the end result of sustainable designs, such as a natural, energy-saving temperature control system, will save more money over time than any excess cost of construction.

Integrated Structures met the HVAC challenge at Rancho Arroyo Grande by combining a straw-bale construction method and a unique “night cooling” system that draws upon natural daily temperature fluctuations to maintain comfortable temperatures in the building throughout

the day and night. A centuries-old process, straw-bale construction uses as insulation bales of hay encapsulated between cement inner and outer walls. In lieu of wood or metal studs, a spar and membrane system pierces the hay bales and joins the concrete slabs to form 2-foot-thick walls. Integrated Structures originally adopted this very stable construction system to help resist seismic loads, an important consideration in California. Burda says, “This is cost competitive with standard framing even though the foundations are wider and the roof is bigger. The system is great for cold storage because of its construction cost, thermal mass and insulation. The architecture has a wonderful old world feel due to the thick walls and lends itself to residences, spas and hospitality (spaces).” Code requires an insulation R-value of 19. The straw-bale system gives an R-value of 50—far above the minimum requirement.

Because of the exceptional insulation properties of straw-bale construction, the designers were able to implement another unique heating and cooling strategy. Temperatures can exceed 100 degrees during the day in this area of California and at night can fall to the low- to mid-50s.

▼ *The patent-pending “Spar-Membrane Wall System” ready for application of shotcrete.*





▲ *Cast-in-place concrete column and arch with lacquered copper inserts give authenticity and rustic elegance to the interior.*

Conventional wineries require electricity for HVAC systems to maintain a desired temperature throughout the day and night. In contrast, the “night cooling” system by the design team allows the cool night temperatures to be trapped inside the building and insulates against the warm temperatures during the day. Black explains that sensors throughout the building detect whenever the outside air is cooler than the inside air. These sensors then automatically open motorized shutters and draw cool night air into the building through a screen. Simultaneously, fans near the ceiling blow warm air that has risen to the outside. The air is cooled throughout the night so that by morning it is approximately 52 degrees. The sensors again tell the automatic shutters to close as the sun comes up. The straw-bale construction then comes into play. The inner and outer concrete slabs are each three inches thick and infused with the cold temperatures from the night. When the sun rises the exterior wall is approximately 50 degrees.

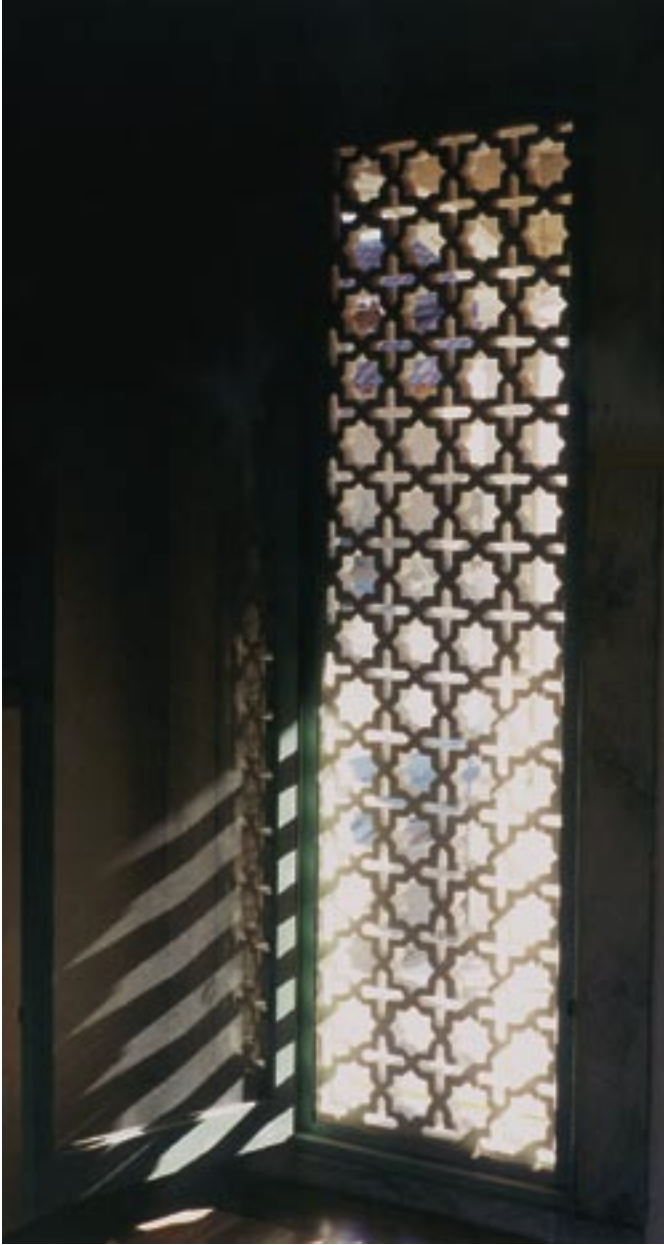
By mid-afternoon the exterior wall has been heated by the sun to approximately 80 degrees. The heat begins to travel into the interior wall but meets the straw-bale insulation. As the day progresses, this insulating layer will also heat up but is so thick that this heat will barely reach the inner slab by the end of the day. In this way the three layers prevent the heat of the sun from penetrating the interior of the building, thus insuring the cool interior temperature achieved the previous night is maintained, and the process starts again.

Integrated Structures also devised a way to integrate solar heat. The roof is a ½-inch to 2-inch concrete slab with an inside layer of ½-inch water pipes used for radiant heat. Below the pipes is a layer of polystyrene insulation and below that another slab of ½-inch to 2-inch concrete on the interior. The sun heats the water in the pipes during the day, which is then sent throughout the winery and can be used as steam to prevent bacteria growth. Gravity also is used to move water throughout the compound, instead of electricity for pumps, so energy costs are low.

Cutting construction and energy costs, the design team is able to create a more luxurious interior than the budget otherwise would have allowed. For Rancho Arroyo Grande, Black plans to institute techniques similar to those Integrated Structures developed for another winery project, which required expensive two-toned terrazzo flooring. Terrazzo is a mixture of cement with marble dust and pieces mixed in for aggregate. Once poured into place and cured, the terrazzo can be polished to bring out the colors of the marble. This type of flooring, which produces a beautiful and durable surface, is considered eco-friendly because it uses discarded material and has a long lifecycle. Some installations have lasted more than 30 years with little or no sign of wear.

▼ *Terrazzo flooring is considered eco-friendly because it uses discarded material and has a long lifecycle. It is also exceptionally durable.*





Typically, terrazzo flooring can run as much as \$95 per square foot. Integrated Structures' method costs about \$20 per square foot. The team's preparation method uses Styrofoam™ forms hot glued to the slab, instead of the brass, zinc or copper forms usually used. Once the first color of terrazzo is cured, the Styrofoam is popped out and the second color is poured. Since it is the metal forms that drive up the cost of this type of flooring (as much as \$5 per piece as opposed to \$0.50 per piece for Styrofoam) this method saves considerable expense.

Through Integrated Structures' cost-effective sustainable design and building practices, the Verboons' ambitious vision for Rancho Arroyo Grande is taking shape. Future guests will visit a tasting room that blends natural materials, such as stone and Venetian plaster, to blur the line between interior and exterior and enhance the stunning outside views that the Verboons strove to preserve and complement. Rancho Arroyo Grande stands to illuminate both the delicacy of red wine and the comfort and aesthetics of a green interior.

For more information about Rancho Arroyo Grande, go to www.ranchoarroyograndewines.com. For more information about Integrated Structures, Inc., visit www.integratedstructures.com.

◀ Part of the "night cooling system," the concrete screen provides security and ventilation when the shutters are open.

All Rancho Arroyo Grande photos courtesy Integrated Structures, Inc. Photos by ISI.



The ASID Board of Directors has identified sustainable design as one of three major areas of strategic focus for the Society. These efforts are led by a volunteer sustainable design council, which is responsible for setting strategy and direction. Activities include expanding the content of the Sustainable Design Resource Center on the ASID Web site at www.asid.org, sponsoring a liaison member to the USGBC, collaborating with other design organizations, developing and distributing information and publications on related topics, and supporting the development and delivery of sustainable design education programs at industry venues throughout the United States and abroad. For more information on these sustainable design initiatives, call ASID at (202) 546-3480 or visit www.asid.org.

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