Capital Update

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By Brown, Vence & Associates, Inc.

Sustainable Buildings

The construction and architecture industries are abuzz with the idea of "green" buildings these days. With the growing popularity of programs including California High Performance Schools (CHPS)* and the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED)*, environmentally sustainable building practices are gaining legitimacy not only in the building industry, but also among both private and public building owners.

Each construction project, whether it is a new building or a renovation project, has unique opportunities to reduce or even have positive impacts on the environment. Therefore, no single definition of environmentally sustainable, or "green", buildings applies. In general, however, green buildings have minimal or positive environmental impacts with respect to various aspects of constructing and operating a building, including the site, water use, energy use, material resource use, and indoor environmental quality.

The economic argument for green buildings is made in terms of the long-term operating costs of a structure. The following figures apply to a typical commercial building:

- Over a 30-year period, construction costs are roughly only two percent of the total cost of owning and operating a building. Even when the cost of constructing a green building is slightly higher than a standard building, green buildings save money over the long term because they are typically more durable and have lower component replacement costs and operating costs.
- Operations, maintenance, and utility costs compose about six percent of the costs. Buildings that use water, energy, and material resources efficiently, as well as implement effective commissioning and maintenance practices, lower on-going operations and repair costs.
- The cost of human resources – the salaries and benefits of employees who work in the building – compose the remaining 92 percent of the ownership costs. Healthy building environments have positive impacts on the health and well-being of employees. This is expected to translate into increased productivity, including lower sick leave and workers compensation costs.

The *process* employed in creating a green building is not vastly different from traditional design and construction practices. However, there is one important difference: the building owners, financial backers, architects, and other building specialists begin with a commitment and willingness to incorporate environmental sustainability as a key aspect of the building project. In addition, a green building project involves a higher level of collaboration among the stakeholders throughout the design and construction process than a traditional building. The selection, implementation, and success of specific sustainable measures

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*** More information about these organizations can be found on the web.**

California High Performance Schools (CHPS)
www.chps.net

U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED)
www.usgbc.org/LEED/LEED_main.asp

are the result of this common goal and the collaborative process.

The exact measures employed in a green building will vary depending on the project specifics. Measures may range from promoting alternative modes of transportation for building occupants, to installing high efficiency water fixtures, to substituting daylighting for electric lighting, to reusing buildings and/or building materials. An integrated building design process takes into account the building project's specific purpose, location, and constraints or limitations when selecting measures to optimize the building's environmental performance. For this brief introduction to sustainable buildings, we have selected a few green building measures to discuss in more detail.

Design Process: Charrettes

A building design team – which for green buildings includes building owners, financial backers, architects, and other building specialists – may kick off the design process with a charrette. A charrette is basically a fast-paced workshop (typically one or two days long), in which all participants collaborate to develop a project's design goals and directions. A well-run charrette has a high-energy, creative atmosphere that allows all the participants to contribute their goals and concerns for the project. These are incorporated into a realistic design that has the support of each member of the design team.

Charrettes follow these key principles:

- Work collaboratively
- Include stakeholders
- Include participants from different disciplines
- Gather participants in one place, in real time
- Clearly show the value and impact of each participant's input
- Maintain a sustained focus on the charrette goals
- Limit the time for the charrette
- Adopt a decision-making process that all participants agree to use

Energy Efficiency: Lighting

Electric lighting typically accounts for 20 to 30 percent of the energy use of a commercial building. Additionally, lighting systems have a large impact on the appearance and comfort of a workplace or retail establishment. Therefore, lighting design is a key component of green building design. Many green building designs optimize the use of natural daylight as an alternative to artificial lighting. This helps save energy and improves the "feel" of the space. Studies have found links between worker productivity and levels of daylight. Green buildings also make use of new lighting technologies that offer high performance and lower energy use, including fluorescent lamps with better color rendering properties, lighting fixtures that reduce glare and save energy, energy-efficient desk lamps, and dimmable electronic ballasts. Lighting manufacturers are also offering fluorescent lamps with reduced mercury content that minimize the environmental impact of fluorescent lighting.

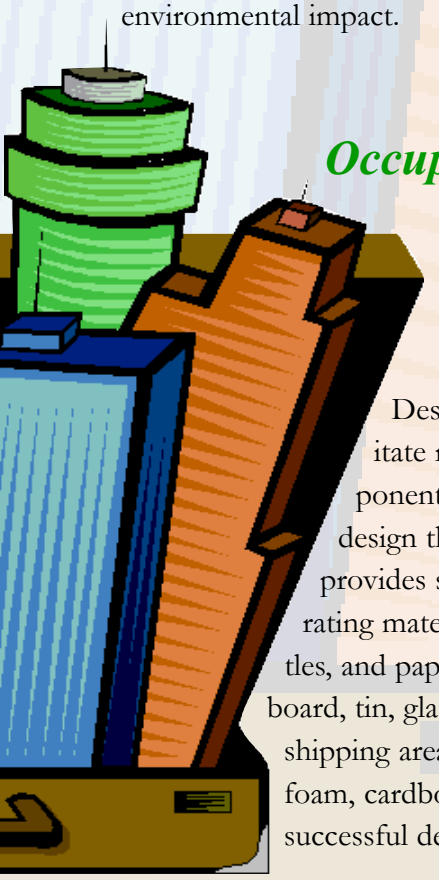
Construction Waste: Waste Reduction/Recycling

The removal of construction and demolition (C&D) debris from building projects is a key compo-

nent of green building. C&D debris is typically one of the largest components of a city's waste stream, and many jurisdictions are considering C&D diversion ordinances that require generators to optimize recycling and diversion of C&D waste.

Demolition and land-clearing waste (e.g., concrete, asphalt, dirt, green waste) is typically highly recyclable with diversion rates of over 90 percent. Construction waste (e.g., wall board, wood, plastics, carpeting, composite materials) is often more difficult to keep segregated and therefore, is more difficult to recycle. The LEED green building certification program sets aggressive diversion goals of 50 percent and 75 percent diversion (depending on the level of certification sought by the project).

Construction waste can also be reduced at the source through careful planning. Architects can design around to standard sizes of building materials, to avoid end-cuts. Builders can order what they need and reuse forms and scaffolding. Jobsite crews can keep scrap materials segregated for easier recycling. All of these measures can reduce the amount of C&D waste generated and the building's ultimate environmental impact.



Occupancy Practices: Materials Resource Efficiency

Designing a building to facilitate recycling is another component of green building. A design that facilitates recycling provides sufficient space for separating materials in offices (cans, bottles, and papers), cafeterias (cardboard, tin, glass, and food waste) and shipping areas (packaging materials, foam, cardboard and shrink wrap). A successful design also accommodates the easy movement of waste materials through the building, from the point of generation to the loading dock or service area.

Building users can also practice waste reduction by codifying certain practices within the building's infrastructure:

- Office areas: double-sided printing, electronic communication, warehouse for exchanging bone room for reusable furniture and office supplies, efficient purchasing
- Cafeterias: reusable dishware and silverware (with dish return areas located throughout the building), food donation, efficient purchasing
- Shipping and receiving: reusable shipping containers, reusing packaging materials (boxes, foam).

For more information about how BVA can assist your green building project, please contact:

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BVA Green Building Projects

BVA is producing two case studies of demonstration schools in Northern California that combine energy-efficient design with health, comfort, and other amenities needed for a quality education. Green features included improved insulation, extensive use of daylighting, natural ventilation, high efficiency HVAC, cool roofs, and light-colored exterior walls.

BVA assisted the City of San Francisco in developing a proposed ordinance amendment for public buildings that requires eligible City construction projects to pursue LEED certification at the Silver level. BVA assisted in structuring the requirements for City facilities and developed a compliance manual to aid City building designers

BVA has developed model C&D ordinances for the cities of Oceanside, Salinas, Santa Clara, Santa Rosa, and Stockton. Communities can regulate diversion of C&D through mandates on C&D generators or requirements of C&D haulers. BVA has assisted jurisdictions in successfully implementing both approaches.

Recently BVA provided a preliminary feasibility study for obtaining LEED green building certification for a public building in San Francisco. Our scope of work included making an initial recommendation regarding which LEED credits should be pursued; conducting a site visit to assess the extent of improvements required in lighting, HVAC, water, and other systems; identifying and developing cost estimates for possible upgrades; estimating the range of potential energy and water savings; and developing strategies for completing the recommended projects. BVA will also take the lead in helping the building owners fulfill the requirements for several of the recommended LEED credits.

BVA is currently providing Resource Efficiency Audits for businesses in Alameda County. The audits include evaluating solid waste levels, recommending new waste reduction and recycling program, assisting with the implementation of new programs and monitoring the programs to ensure long-term success.